XPS Unified

Universal High-Performance Motion Controller/Driver

Newport®

Programmer's Manual

V1.7.x

Table of Contents

Universal High-Performance Motion Controller/Driver XPS-D Controller

1.0 Note

This XPS Programmer's Manual describes all the functions available for the XPS family of controllers.

NOTE

Not all below described functions are available for XPS standard controller. If you are interested in a function that is described but not available for your controller, please contact Newport.

NOTE

For more details on XPS features, please refer to XPS User's Manual.

2.0 TCP/IP Communication

XPS is based on a 10/100/1000 Base-T Ethernet communication link with TCP/IP protocol and uses a web site as the Graphical User Interface (GUI) to access all the software tools and an FTP server for file transfer. This makes the XPS controller independent of the user's operating system. When networked, Unix, Linux or Windows users can access the same controller from any place in the world for remote control, code development, file transfer or diagnostics. The completely object oriented approach of the XPS firmware with powerful, multi-parameter Functions (commands) is also much more consistent and intuitive to use than old-style mnemonic commands.

To connect to the XPS controller you must open a socketThe XPS allows up to 100 open sockets with 30 sockets communicating simultaneously.

Each Function returns a complete or error code. If successful, the return is 0 (zero). In case of an error, the returned error code can be used for diagnosing the.

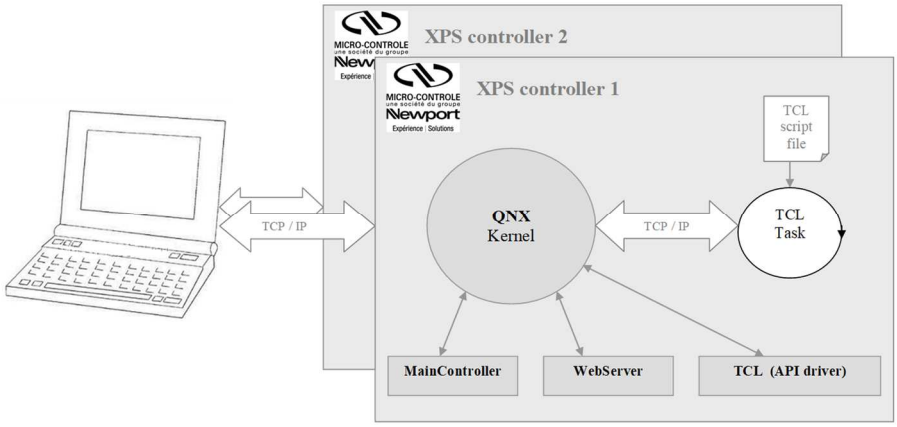
The function call is blocked until a reply is sent by the XPS, or until the timeout value is reached. Running several processes in parallel (for instance getting the position while a stage is moving), several sockets can be used in parallel. When using the XPS controller with programming languages that do not support multiple sockets, the timeout value of the function can be set to a low value (20 ms), in that case you cannot capture errors.

NOTE

When a communication ends with a time out fault, it could be caused by some hardware failure or the timeout value is lower than the time needed by the controller to execute the requested function.

For example, setting a timeout of one second and requesting a motion that requires 2 seconds will end with a timeout. In this situation the controller will continue the move and when accomplished will send the response back to the host.

It is the host responsibility to take the appropriate actions to handle properly these situations.



3.0 XPS .NET Software Drivers

3.1 How to Install .NET Drivers for XPS Controller

3.1.1 Requirements

.Net Framework is a programming infrastructure created by Microsoft for building, deploying, and running applications and services that use .NET technologies such as custom desktop applications.

The Windows PC computer requires having at least the .NET Framework installed and you need to install either 32 bit (x86) or 64 bit (x64) .NET assembly depending on the Windows version you are using.

When developing your application, refer to the programming environment documentation to make the installed .NET assembly visible.

To communicate with the XPS controller you will need to:

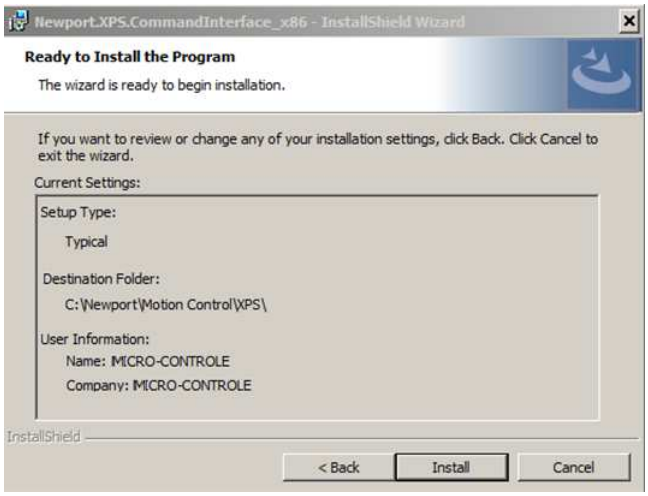
- Use the **OpenInstrument** method to connect to the controller
- Communicate with the controller using any of its API e.g. **FirmwareVersionGet**
- Once your application terminates it needs to disconnect from the controller using the **CloseInstrument** method. If it doesn't close the communication channel and runs many connections to the controller, it can run out of free channels and gets an error.

3.1.2 Installing the 32 bit (x86) Windows Platform

The .NET assembly is in the controller in "/Public/Drivers" folder, refer to the controller user's manual for more details.

Download the "Newport.XPS.CommandInterface_x86.exe" to your computer.

Once downloaded, run it.



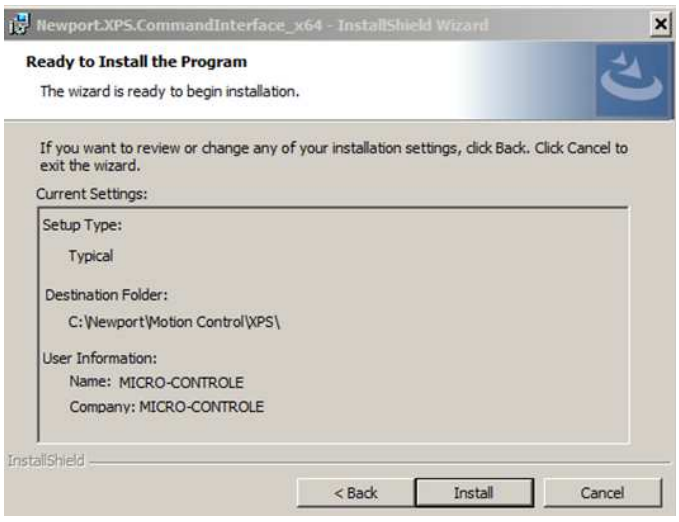
The .NET assembly "Newport.XPS.CommandInterface.dll" is installed in the GAC for x86 platforms in "C:\Windows\Microsoft.NET\assembly\GAC_32\Newport.XPS.CommandInterface\" folder and is ready for use.

3.1.3 Installing the 64 bit (x64) Windows Platform

The .NET assembly is in the controller in "/Public/Drivers" folder, refer to the controller user's manual for more details.

Download the "Newport.XPS.CommandInterface_x64.exe" to your computer.

Once downloaded, run it.



The .NET assembly "Newport.XPS.CommandInterface.dll" is installed in the GAC for x64 platforms in "*C:\Windows\Microsoft.NET\assembly\GAC_64\Newport.XPS.CommandInterface* \" folder and is ready for use.

3.2 Variables Equivalent for Programming Langages

The table below describes a simple of a prototype model for different languages:

Prototype	int **FunctionName** (double inputParam, double * outputParam)
C++	int **FunctionName**(int SocketID, double inputParam, double * outputParam)
VBasic	Long **FunctionName**(ByVal SocketID As Long, ByVal inputParam As Double, outputParam As Double)
Matlab	[Error, outputParam] **FunctionName**(int32 SocketID, double inputParam)
Python	[Error, outputParam] **FunctionName**(integer SocketID, double inputParam)
TCL	set Error [catch "**FunctionName** SocketID inputParam outputParam "]

The table below shows parameters types needed for different languages:

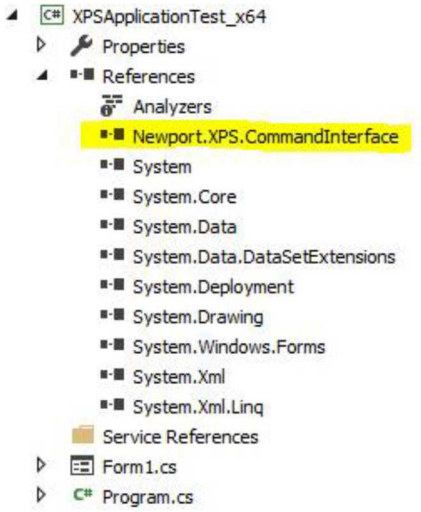
Parameter Types	**C++**	**VBasic**	**Python**
Input/Output Parameters			
bool	bool	Boolean	bool
float	float	Single	float
double	double	Double	double
short	short	Short	short
unsigned short	unsigned short	UShort	unsigned short
int	int	Integer	integer
unsigned int	unsigned int	UInteger	unsigned int
long	long	Long	long
unsigned long	unsigned long	ULong	unsigned int
long long int	long long int	Long	long long
unsigned long long	unsigned long long	ULong	unsigned long long
char * / char[]	char *	String	string
charhex32	char *	String	string

3.3 How to Use XPS .NET Assembly from Visual Studio C#?

Refer to Microsoft for more information on how to load and use a .NET assembly depending on your Visual Studio version.

3.3.1 Add Reference to Newport XPS .NET Assembly

In your project add Newport.XPS.CommandInterface.dll in References from Windows GAC:



3.3.2 C# Code Sources

C# Header

```
using CommandInterfaceXPS; // Newport.XPS.CommandInterface .NET Assembly
                              access
```

Add a Variable to Declare an "XPS" Object

```
CommandInterfaceXPS.XPS m_xpsInterface = null;
```

Create an Instance of "XPS" Object

```
m_xpsInterface = new CommandInterfaceXPS.XPS();
if (m_xpsInterface != null)
…
```

Open XPS Connection

```
if (m_xpsInterface != null)
int returnValue = m_xpsInterface.OpenInstrument(m_IPAddress, m_IPPort,
DEFAULT_TIMEOUT);
```

Call "XPS" Functions

```
if (m_xpsInterface != null)
{
   string XPSVersion = string.Empty;
   string errorString = string.Empty;
   int result = m_xpsInterface.FirmwareVersionGet(out XPSVersion, out
      errorString);
   if (result == CommandInterfaceXPS.XPS.FAILURE)
   ...
```

Close XPS Connection

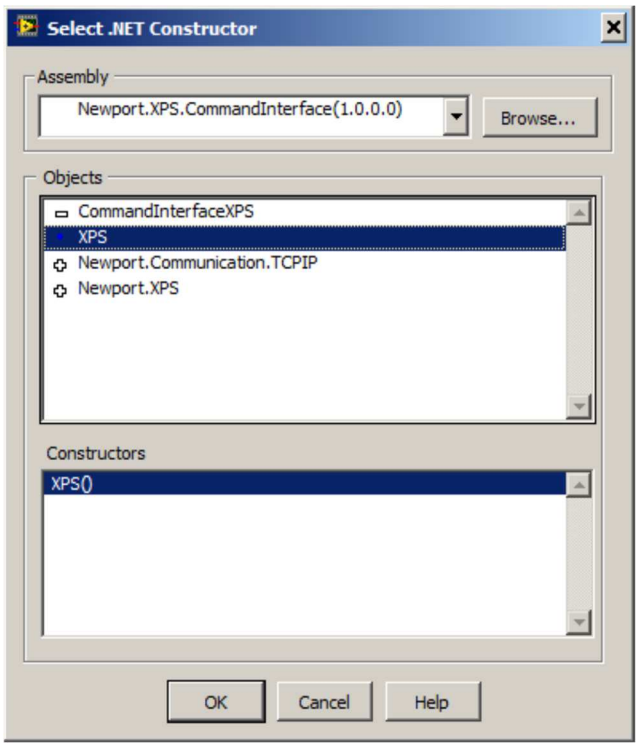
```
if (m_xpsInterface != null)
    m_xpsInterface.CloseInstrument();
```

3.4 How to Use XPS .NET Assembly from LabVIEW?

Refer to LabVIEW for more information on how to load and use a .NET assembly depending on your LabVEW version.

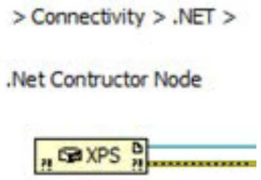
3.4.1 Add Reference to .NET Assembly

Select **CommandInterfaceXPS** and **XPS** constructor from a **.Net Constructor Node** (refer to Connectivity panel):

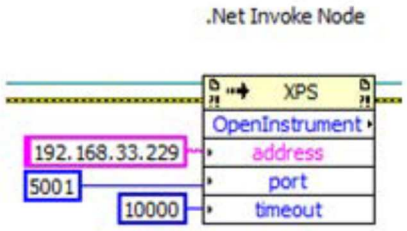


3.4.2 LabVIEW Code Sources

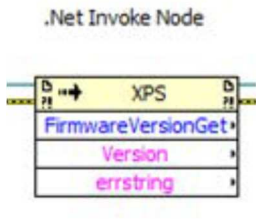
The instance of "XPS" object is created after configuration of **.Net Constructor Node**:



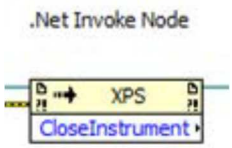
Open XPS connection (Use a **.Net Invoke Node** to select the XPS method "OpenInstrument"):



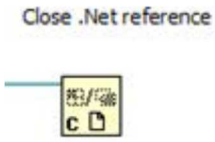
Call "XPS" functions (Use a **.Net Invoke Node** to select a XPS method):



Close XPS connection (Use a **.Net Invoke Node** to select the XPS method "CloseInstrument"):



Close .NET Reference:



3.5 How to Use XPS .NET Assembly from IronPython?

Refer to IronPython for more information on how to load and use a .NET assembly depending on your IronPython version.

3.5.1 Add Reference to .NET Assembly

Add **Newport.XPS.CommandInterface.dll** in **References** of your script:

x86:

```
import sys
sys.path.append(r'C:\Windows\Microsoft.NET\assembly\GAC_32\Newport.XPS.CommandInterface\v4.0_1.0.0.0__9a267756cf640dcf')
```

x64:

```
import sys
sys.path.append(r'C:\Windows\Microsoft.NET\assembly\GAC_64\Newport.XPS.CommandInterface\v4.0_1.0.0.0__9a267756cf640dcf')
```

3.5.2 IronPython Code Source

IronPython Header

```
# The CLR module provide functions for interacting with the underlying
# .NET runtime
import clr
# Add reference to assembly and import names from namespace (IronPython)
clr.AddReferenceToFile("Newport.XPS.CommandInterface.dll") from
CommandInterfaceXPS import *
```

Create an Instance

```
# Create XPS interface myXPS = XPS()
```

Open XPS Connection

```
def XPS_Open (address, port):
# Create XPS interface
myXPS = XPS()
# Open a socket
timeout = 1000
result = myXPS.OpenInstrument(address, port, timeout)
if result == 0:
   print 'Open ', address, ":", port, " => Successful"
else:
   print 'Open ', address, ":", port, " => failure ", result
return myXPS
```

Call XPS Functions

```
def XPS_GetControllerVersion (myXPS, flag):
result, version, errString = myXPS.FirmwareVersionGet()
if flag == 1:
   if result == 0:
   print 'XPS firmware version => ', version
   else:
   print 'FirmwareVersionGet Error => ',errString
   return result, version
def XPS_GetControllerState (myXPS, flag):
result, state, errString = myXPS.ControllerStatusGet()
if flag == 1:
   if result == 0:
   print 'XPS controller state => ', state
else:
   print 'ControllerStatusGet Error => ',errString
return result, state
```

Close XPS Connection

```
def XPS_Close(myXPS):
myXPS.CloseInstrument()
```

3.6 How to Use XPS .NET Assembly from Matlab?

Refer to Matlab for more information on how to load and use a .NET assembly depending on your Matlab version.

3.6.1 Add Reference to .NET Assembly

```
% Make the assembly visible from Matlab
asmInfo = NET.addAssembly('Newport.XPS.CommandInterface')
```

3.6.2 Matlab Code Source

Create an Instance

```
% Make the instantiation
myxps=CommandInterfaceXPS.XPS();
```

Open XPS Connection

```
% Connect to the XPS controller
code=myxps.OpenInstrument('192.168.254.254',5001,1000);
```

Call XPS Functions

```
% Use API's
[code Version]=myxps.FirmwareVersionGet [code]=myxps.GroupKill('Group1')
[code]=myxps.GroupInitialize('Group1')
[code]=myxps.GroupHomeSearch('Group1')
```

Close XPS Connection

```
% Disconnect from the XPS controller
code=myxps.CloseInstrument;
```

4.0 TCP/IP Support Functions

To ease the use of the TCP/IP communication, few functions have been develop by Newport. These functions uses the Microsoft System.Net.Sockets.

4.1 OpenInstrument

Name

OpenInstrument – Create and open a socket.

Description

This function is used to create and open a socket. Send Timeout is set to 1 second

Prototype

int **OpenInstrument** (string IP_Address, int Port, int ReceiveTimeout)

Input parameters

IP_Address	string	IP address of instrument.
Port	int	Port number.
Timeout	int	ReceiveTimeout in milliseconds.

Output parameters

None.

Return

- 0: No error.
- -1: Error of socket open.

4.2 CloseInstrument

Name

CloseInstrument – Closes the current socket.

Description

This function is used to close the current socket.

Prototype

int CloseInstrument ()

Input parameters

None.

Output parameters

None.

Return

- 0: No error.
- -1: Error of socket close.

4.3 SetTimeout

Name

SetTimeout – Configures socket timeout.

Description

This function is used to configure socket timeout for sending and reading.

Prototype

int **SetTimeout** (int SendingTimeout, int ReadingTimeout)

Input parameters

SendingTimeout	int	Sending timeout in milliseconds.
ReadingTimeout	int	Reading timeout in milliseconds.

Output parameters

None.

Return

- 0: No error.
- -1: Error of set timeout.

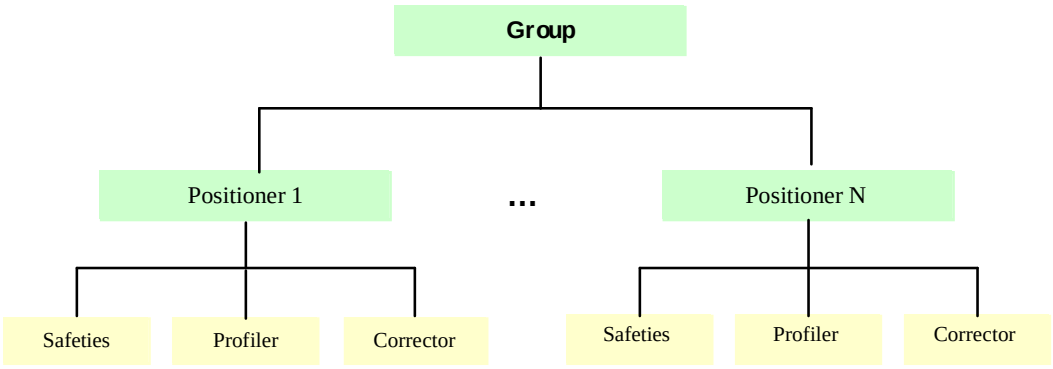
5.0 XPS Standard Firmware Architecture (Base Version)

5.1 Group Definition

The "Group" objects are used to define one or several "positioners" in the same motion group. The available motion groups are defined in the section [GROUPS] in the system.ini file and the group types are:

- **SingleAxis** (1 positioner)/"**Gantry" SingleAxis** (2 positioners)
- **SingleAxisWithClamping** (1 positioner)
- **SingleAxisTheta** (1 positioner)
- **Spindle** (1 positioner)
- **XY** (2 positioners)/"**Gantry" XY** (3 or 4 positioners)
- **XYZ** (3 positioners)
- **MultipleAxes/"Gantry" MultipleAxes** (1 to 8 positioners)
- **TZ** (3 positioners)

5.1.1 Object Structure



A motion "**Group**" is created in relation to a **group type** (SingleAxis, SingleAxisWithClamping, SingleAxisTheta, Spindle, XY, XYZ, TZ or MultipleAxes).

A group is defined by a **group name**.

NOTE

The maximum number of positioners in the same group is limited to 8.

5.2 Positioner Definition

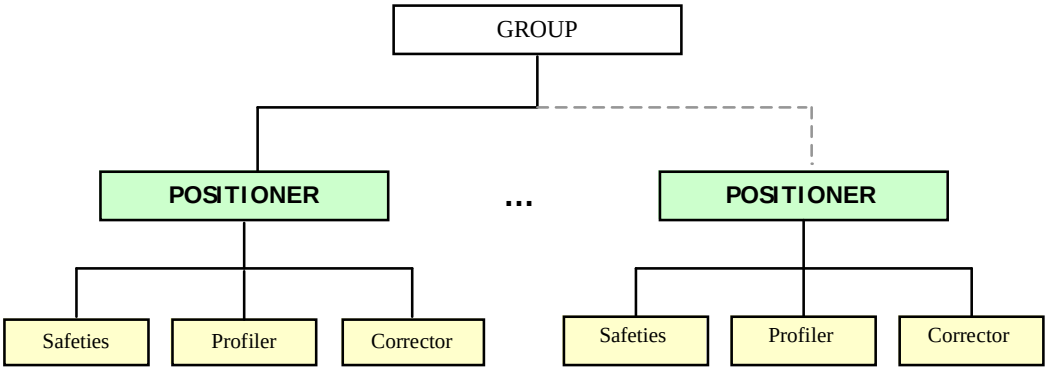
Positioner objects are used to define all motion specific configuration parameters.

The positioner includes a mapping correction: X = f (X)

The positioner includes the SGamma profile.

The maximum number of positioners is limited to ControllerAxesNumber (*4, 8, 12 or 16, depending on type of the XPS controller hardware*).

5.2.1 Object Structure



To use a **positioner**, it must belong to a motion group. Positioners are defined by their **full positioner name**. The full positioner name is composed of the group name and the positioner name seperated by a character ".".

Example:

GroupName.PositionerName or

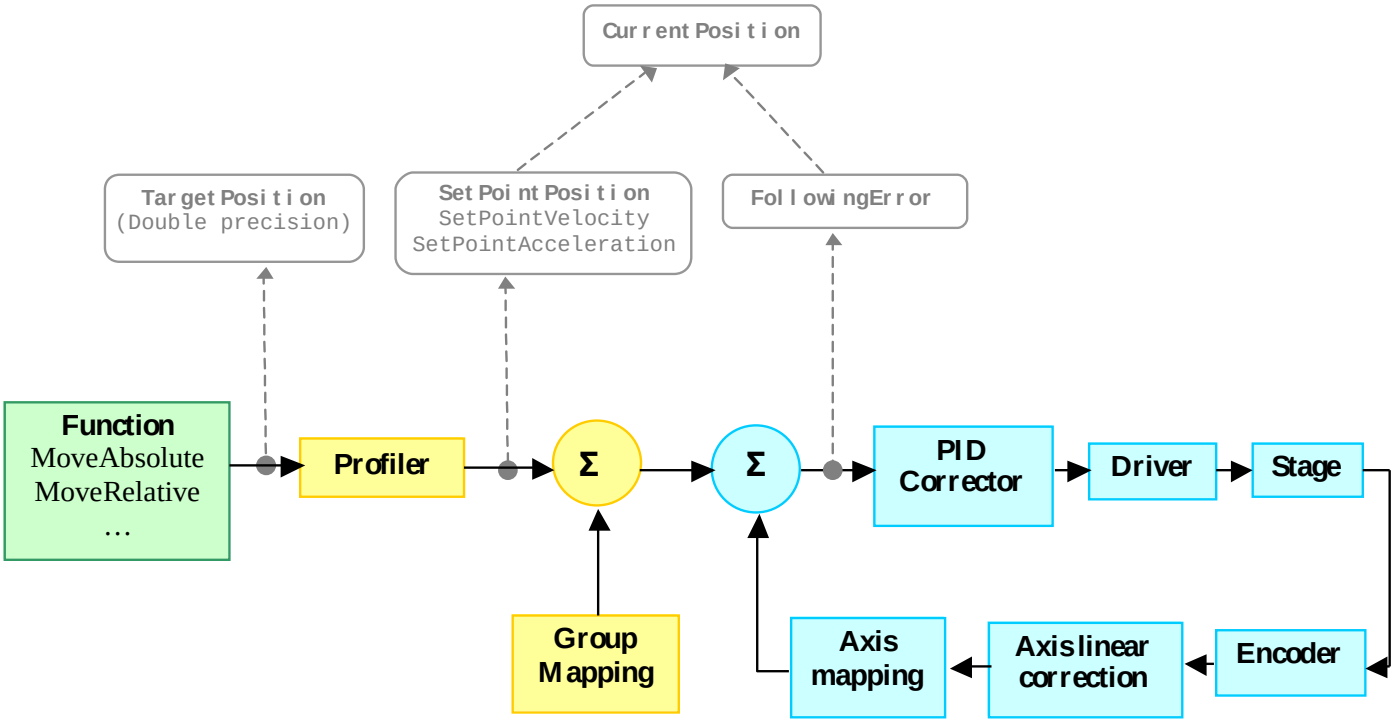
3-Axis system.X-axis

5.2.2 Definition of the Positions Available for Each Positioner

For each positioner, three different positions can be called:

1. The **SetpointPosition** is the profiler position. This is the position where the positioner should be according to the ideal theoretical motion profile.
2. The **CurrentPosition** is the encoder position of the stage after mapping corrections are applied. This is the actual position of the positioner at this moment of the query.
3. The **TargetPosition** is the final target position commanded by the user.

The difference between the SetpointPosition and the CurrentPosition is called the following error.



For example, during a motion from the position 0 (units) to 100 (units), a query in the middle of the motion could have the following result:

SetpointPosition = 50

CurrentPosition = 49.998 (FollowingError = 50 – 49.998 = 0.002 unit)

TargetPosition = 100.

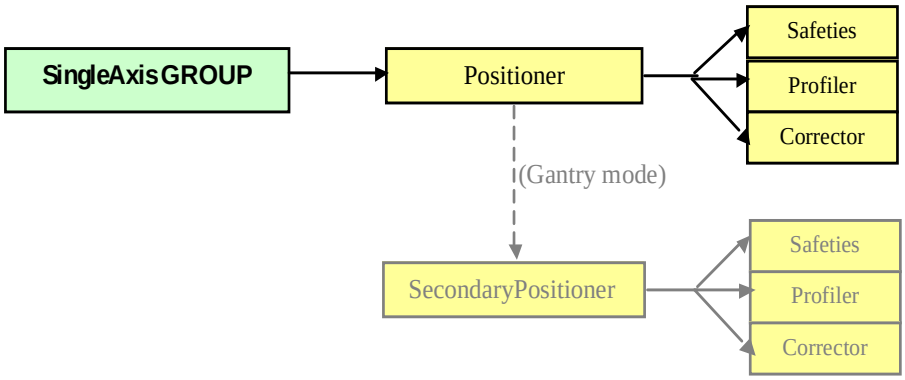
5.3 SingleAxis Group

The SingleAxis group is composed of one single positioner for the execution of motion commands.

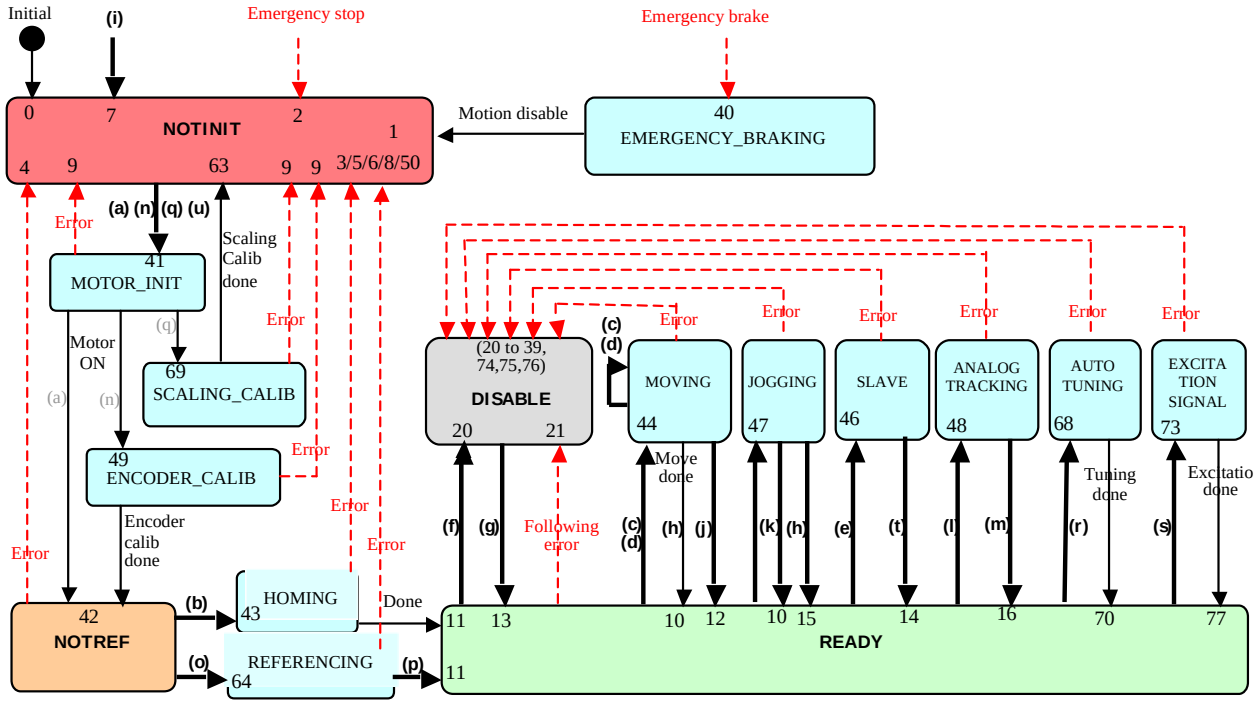
A SingleAxis group can be used in GANTRY mode (dual positioner).

The XPS controller can handle several SingleAxis objects.

There is no relation between SingleAxis objects and other objects handled by the controller.



5.3.1 State Diagram



Called functions:

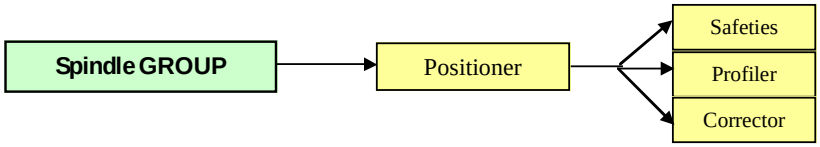
(**a**)	GroupInitialize	(**l**)	GroupAnalogTrackingModeEnable
(**b**)	GroupHomeSearch	(**m**)	GroupAnalogTrackingModeDisable
(**c**)	GroupMoveAbsolute	(**n**)	GroupInitializeWithEncoderCalibration
(**d**)	GroupMoveRelative	(**o**)	GroupReferencingStart
(**e**)	GroupSlaveModeEnable	(**p**)	GroupReferencingStop
(**f**)	GroupMotionDisable	(**q**)	PositionerAccelerationAutoScaling
(**g**)	GroupMotionEnable	(**r**)	PositionerCorrectorAutoTuning
(**h**)	GroupMoveAbort	(**s**)	PositionerExcitationSignalSet / PositionerPreCorrectorExcitationSignalSet
(**i**)	GroupKill or KillAll	(**t**)	GroupSlaveModeDisable
(**j**)	GroupJogModeEnable	(**u**)	GroupInitializeNoEncoderReset
(**k**)	GroupJogModeDisable		

5.4 Spindle Group

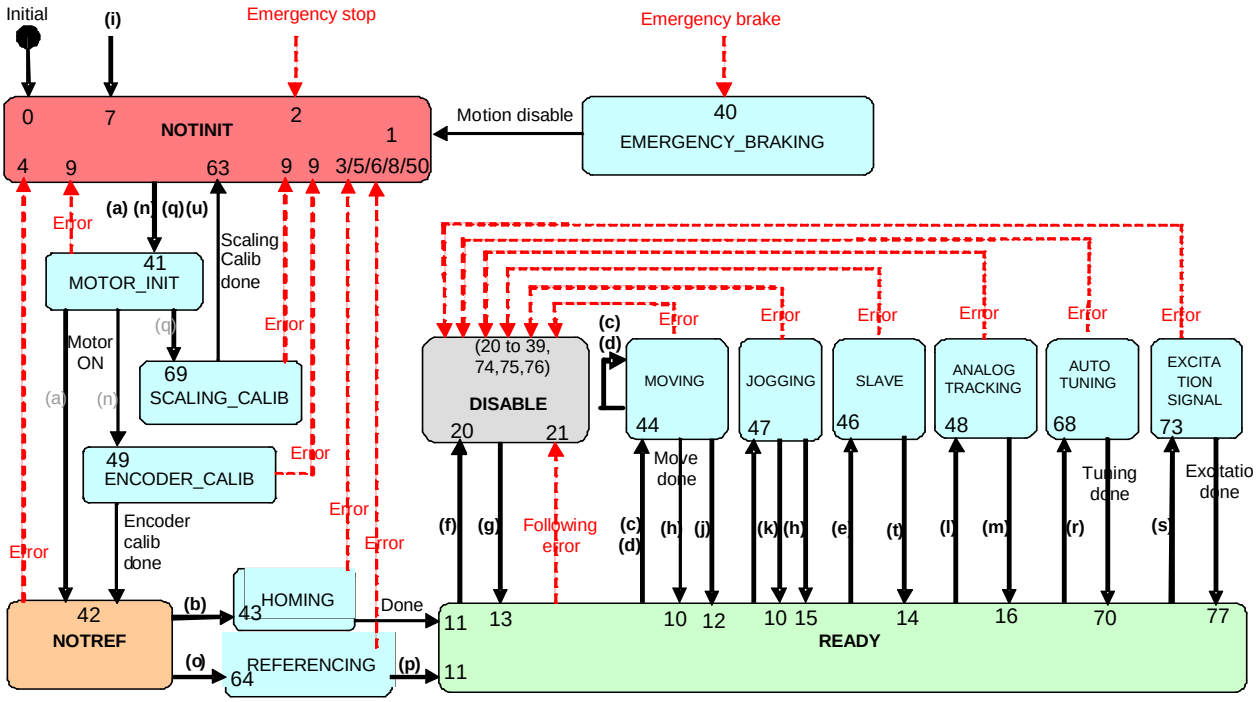
A Spindle group is very similar to the SingleAxis group. It is composed of only one positioner with one main difference, it does not handle software or hardware end of runs. Therefore, it is allowed to spin indefinitely in any direction. The SingleAxis group motion commands are still allowed (except jog, which is replaced by spin).

The controller can handle several Spindle groups.

There is no relation between Spindle groups and other objects handled by the controller.



5.4.1 State Diagram



Called functions:

(**a**) GroupInitialize
(**b**) GroupHomeSearch
(**c**) GroupMoveAbsolute
(**d**) GroupMoveRelative
(**e**) GroupSlaveModeEnable
(**f**) GroupMotionDisable
(**a**) GroupInitialize
(**b**) GroupHomeSearch
(**c**) GroupMoveAbsolute
(**d**) GroupMoveRelative
(**e**) GroupSlaveModeEnable
(**l**) GroupAnalogTrackingModeEnable
(**m**) GroupAnalogTrackingModeDisable
(**n**) GroupInitializeWithEncoderCalibration
(**o**) GroupReferencingStart
(**p**) GroupReferencingStop
(**q**) PositionerAccelerationAutoScaling
(**r**) PositionerCorrectorAutoTuning
(**s**) PositionerExcitationSignalSet / PositionerPreCorrectorExcitationSignalSet
(**t**) GroupSlaveModeDisable
(**u**) GroupInitializeNoEncoderReset

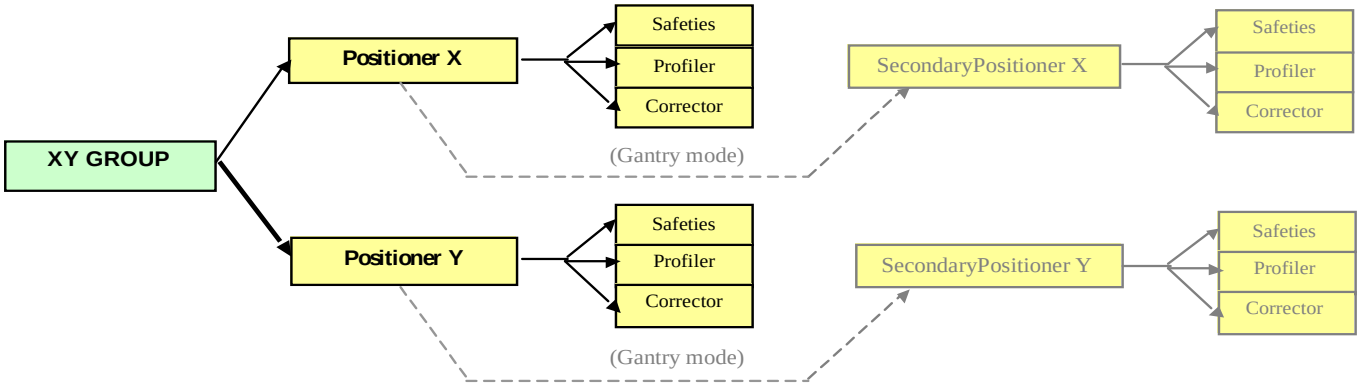
5.5 XY Group

An XY group is composed of two positioners, typically in an orthogonal XY configuration.

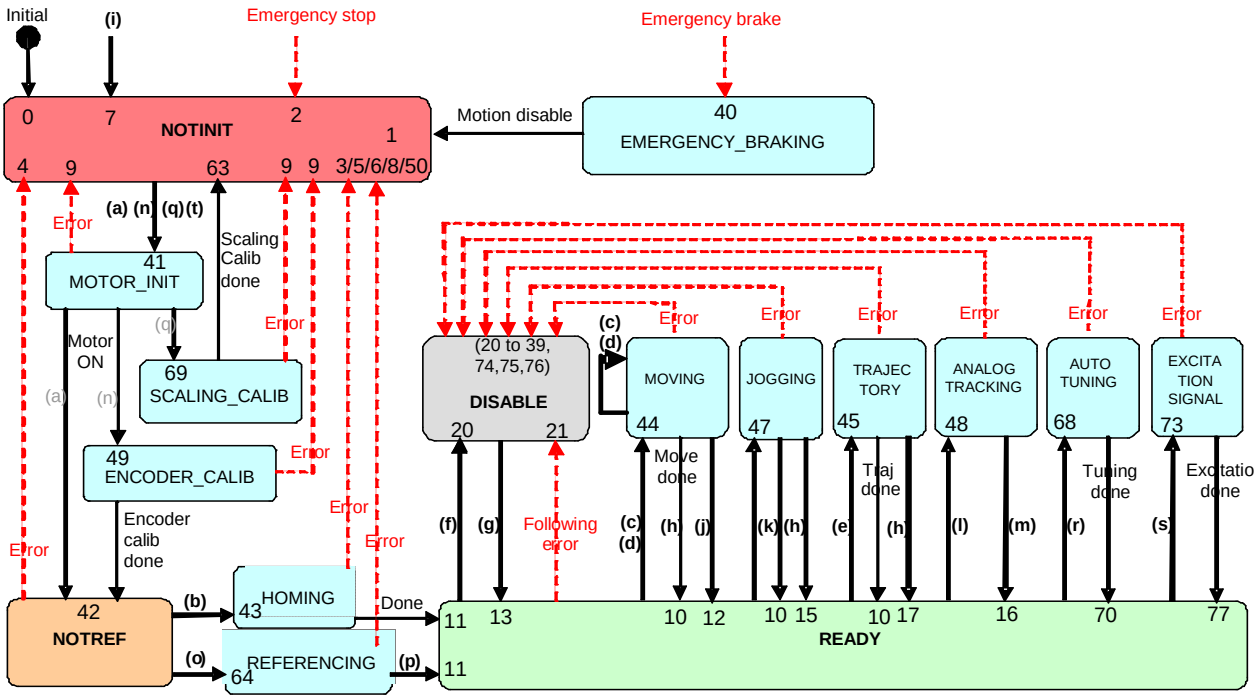
An XY group can be used in GANTRY mode (dual positioner for X or for Y).

It includes an XY mapping feature: XY = f (XY)

It includes a line-arc and a PVT (PositionVelocityTime) two-dimension trajectories.



5.5.1 State Diagram



Called functions:

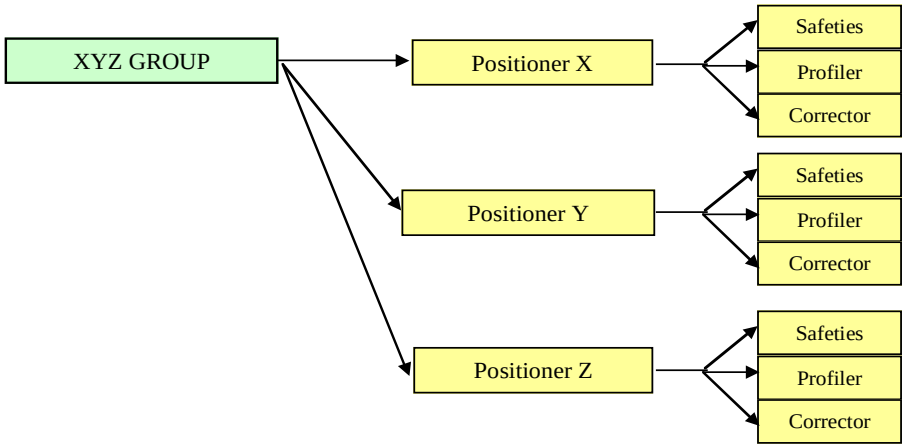
(**a**)	GroupInitialize	(**k**)	GroupJogModeDisable
(**b**)	GroupHomeSearch	(**l**)	GroupAnalogTrackingModeEnable
(**c**)	GroupMoveAbsolute/…Relative	(**m**)	GroupAnalogTrackingModeDisable
(**d**)	MoveSlice	(**n**)	GroupInitializeWithEncoderCalibration
(**e**)	XYLineArcExecution	(**o**)	GroupReferencingStart
(**f**)	GroupMotionDisable	(**p**)	GroupReferencingStop
(**g**)	GroupMotionEnable	(**q**)	PositionerAccelerationAutoScaling
(**h**)	GroupMoveAbort	(**r**)	PositionerCorrectorAutoTuning
(**i**)	GroupKill or KillAll	(**s**)	PositionerExcitationSignalSet / PositionerPreCorrectorExcitationSignalSet
(**j**)	GroupJogModeEnable	(**t**)	GroupInitializeNoEncoderReset

5.6 XYZ Group

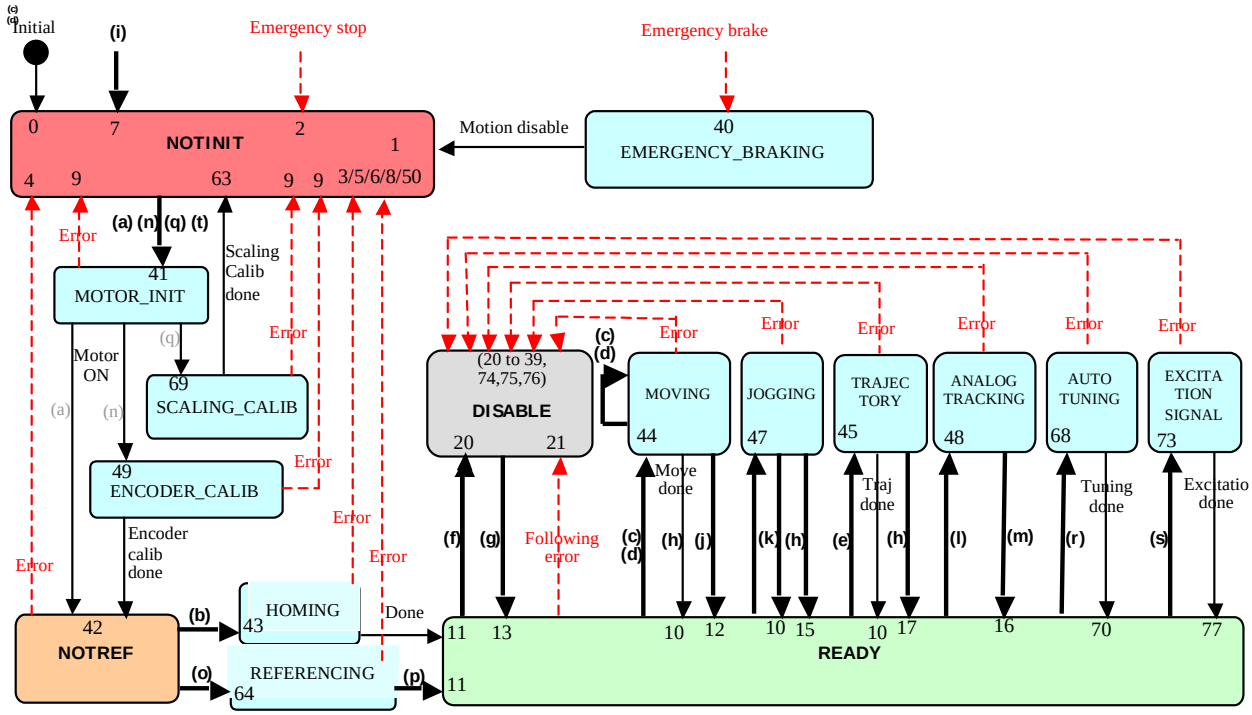
An XYZ group is a three positioner object, typically in an orthogonal XYZ configuration.

It includes an XYZ mapping feature: XYZ = f(XYZ)

It also includes 3D spline trajectories.



5.6.1 State Diagram



Called functions:

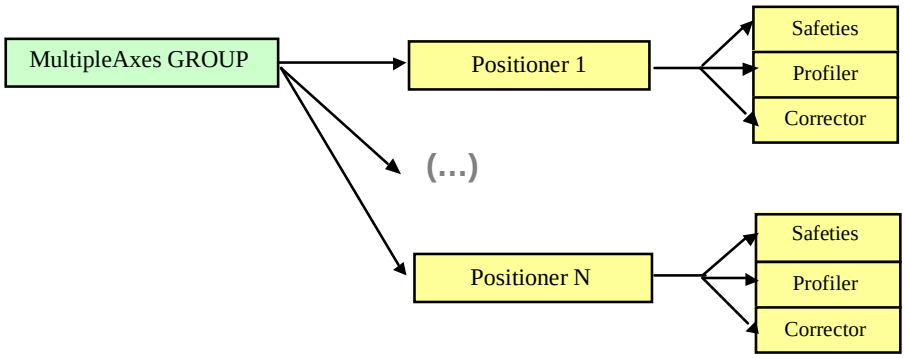
(**a**)	GroupInitialize	(**k**)	GroupJogModeDisable
(**b**)	GroupHomeSearch	(**l**)	GroupAnalogTrackingModeEnable
(**c**)	GroupMoveAbsolute	(**m**)	GroupAnalogTrackingModeDisable
(**d**)	GroupMoveRelative	(**n**)	GroupInitializeWithEncoderCalibration
(**e**)	XYZSplineExecution	(**o**)	GroupReferencingStart
(**f**)	GroupMotionDisable	(**p**)	GroupReferencingStop
(**g**)	GroupMotionEnable	(**q**)	PositionerAccelerationAutoScaling
(**h**)	GroupMoveAbort	(**r**)	PositionerCorrectorAutoTuning
(**i**)	GroupKill or KillAll	(**s**)	PositionerExcitationSignalSet
(**j**)	GroupJogModeEnable	(**t**)	GroupInitializeNoEncoderReset

5.7 MultipleAxes Group

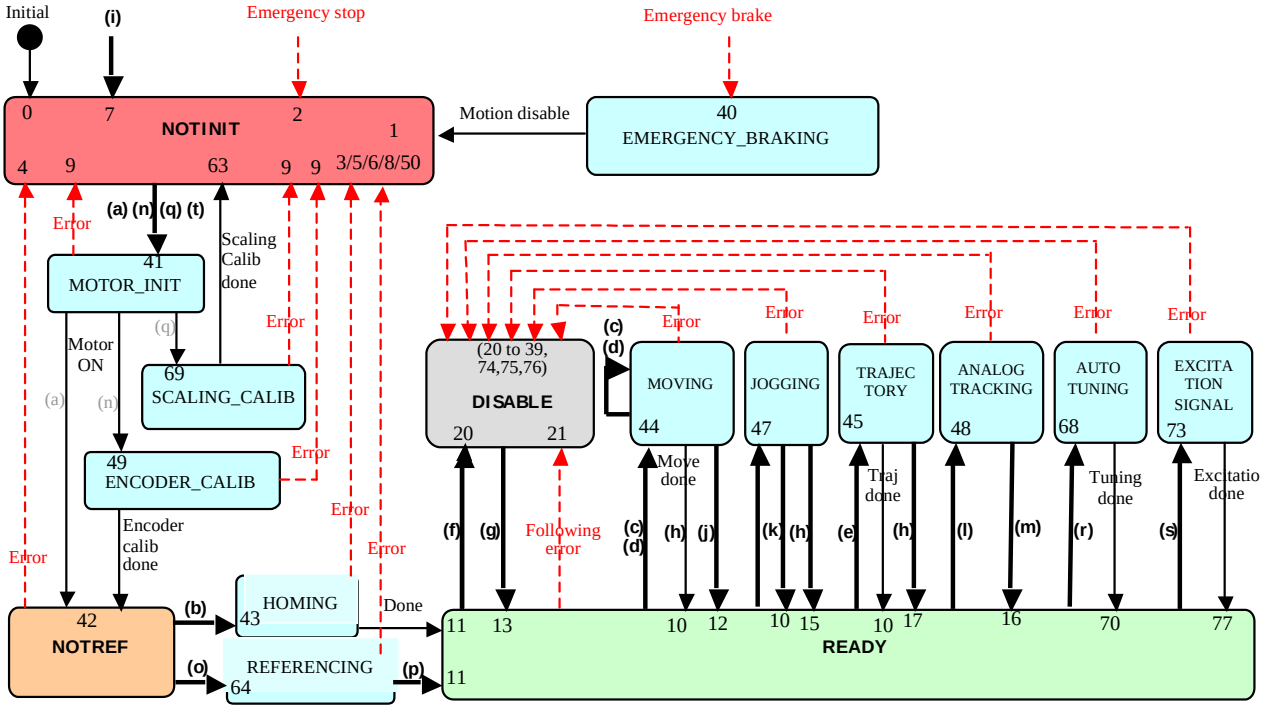
A MultipleAxes group is an n-positioner object, where n can be any number from 1 to 8.

A MultipleAxes group can be used in GANTRY mode (dual positioner for one or several positioners).

It includes the PVT (PositionVelocityTime) and PT (PositionTime) trajectories.



5.7.1 State Diagram



Called functions:

(**a**)	GroupInitialize	(**k**)	GroupJogModeDisable
(**b**)	GroupHomeSearch	(**l**)	GroupAnÒalogTrackingModeEnable
(**c**)	GroupMoveAbsolute	(**m**)	GroupAnalogTrackingModeDisable
(**d**)	GroupMoveRelative	(**n**)	GroupInitializeWithEncoderCalibration
(**e**)	MultipleAxesPVTExecution	(**o**)	GroupReferencingStart
(**f**)	GroupMotionDisable	(**p**)	GroupReferencingStop
(**g**)	GroupMotionEnable	(**q**)	PositionerAccelerationAutoScaling
(**h**)	GroupMoveAbort	(**r**)	PositionerCorrectorAutoTuning
(**i**)	GroupKill or KillAll	(**s**)	PositionerExcitationSignalSet
(**j**)	GroupJogModeEnable	(**t**)	GroupInitializeNoEncoderReset

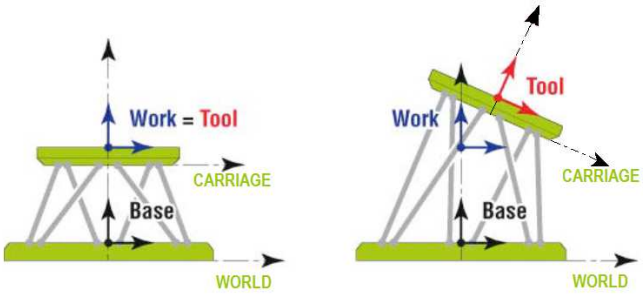
5.8 Hexapod Group (Contact Newport)

NOTE

Contact Newport to obtain an HXP-D controller that manages an Hexapod group with the following features.

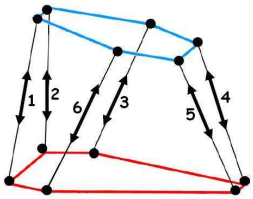
5.8.1 Definition of hexapod coordinate systems

- **Work** is defined in **WORLD**
- **Base** is defined in **WORLD**
- **Tool** is defined in **CARRIAGE**



5.8.2 Hexapod group real system (Legs)

The real system allows to move each positioner "legs" (1,2,3,4,5,6) in the real coordinate (units).

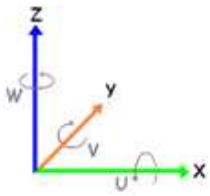


5.8.3 Hexapod coordinate system

The hexapod system allows to move all positioners in the hexapod coordinate (X,Y,Z,U,V,W) Tool in Work.

X,Y,Z (units) and U,V,W (degrees) with

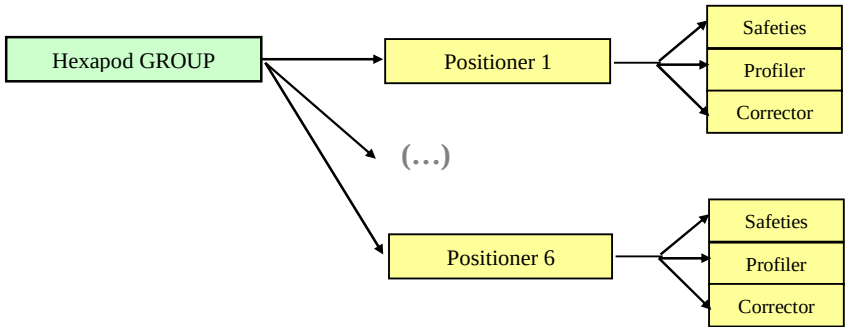
- U being the rotation around axis X
- V being the rotation around axis Y
- W being the rotation around axis Z



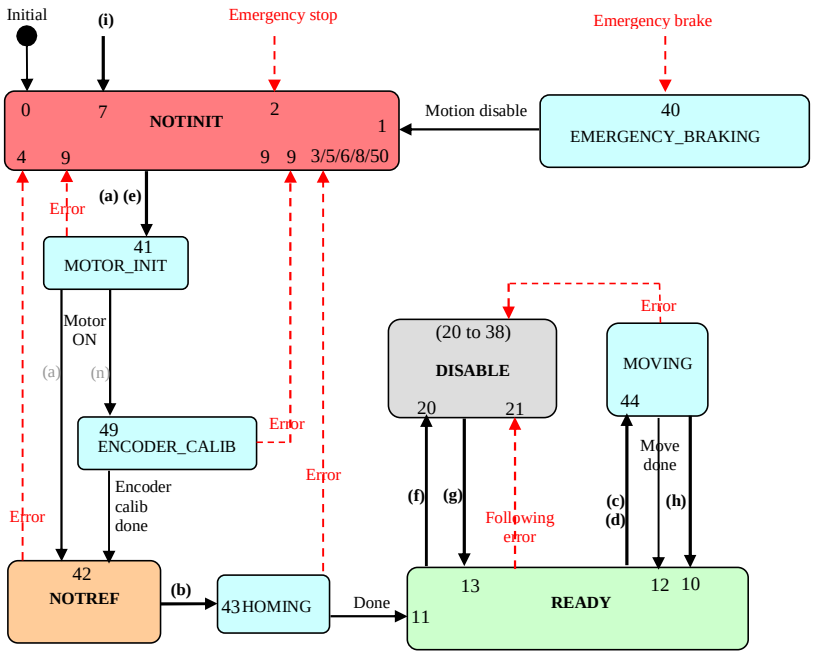
5.8.4 Hexapod group

A Hexapod is a motion device with 6 degrees of freedom.

The Hexapod Group is composed of six positioners (legs) that allows execution of motion commands.



5.8.4.1 State Diagram



Called function :

(a) GroupInitialize
(b) GroupHomeSearch
(c) GroupMoveAbsolute
GroupMoveRelative
(d) HexapodMoveAbsolute
HexapodMoveIncremental
HexapodMoveIncrementalControl
HexapodMoveIncrementalControlWithTargetVelocity
(e) GroupInitializeWithEncoderCalibration
(f) GroupMotionDisable
(g) GroupMotionEnable
(h) GroupMoveAbort
(i) GroupKill or KillAll

5.9 Analog and Digital I/O

5.9.1 GPIO Name List

5.9.1.1 XPS-Q Hardware

Digital inputs

GPIO1.DI Digital Input of the I/O board connector #1 (8 bits)
GPIO2.DI Digital Input of the I/O board connector #2 (6 bits)
GPIO3.DI Digital Input of the I/O board connector #3 (6 bits)
GPIO4.DI Digital Input of the I/O board connector #4 (16 bits)

Digital outputs

GPIO1.DO Digital Output of the I/O board connector #1 (8 bits)
GPIO3.DO Digital Output of the I/O board connector #3 (6 bits)
GPIO4.DO Digital Output of the I/O board connector #4 (16 bits)

Analog inputs

GPIO2.ADC1 Analog Input #1 of the I/O board connector #2
GPIO2.ADC2 Analog Input #2 of the I/O board connector #2
GPIO2.ADC3 Analog Input #3 of the I/O board connector #2
GPIO2.ADC4 Analog Input #4 of the I/O board connector #2

Analog outputs

GPIO2.DAC1 Analog Output #1 of the I/O board connector #2
GPIO2.DAC2 Analog Output #2 of the I/O board connector #2
GPIO2.DAC3 Analog Output #3 of the I/O board connector #2
GPIO2.DAC4 Analog Output #4 of the I/O board connector #2

5.9.1.2 XPS-RL or XPS-D Hardware

Digital inputs

	Basic GPIO board	Extended GPIO board
GPIO Board #1	GPIO1.DI (8 bits)	GPIO3.DI (8 bits) GPIO5.DI (16 bits) GPIO6.DI (16 bits)
GPIO Board #2	GPIO12.DI (8 bits)	GPIO32.DI (8 bits) GPIO52.DI (16 bits) GPIO62.DI (16 bits)
GPIO Board #3	GPIO13.DI (8 bits)	GPIO33.DI (8 bits) GPIO53.DI (16 bits) GPIO63.DI (16 bits)
GPIO Board #4	GPIO14.DI (8 bits)	GPIO34.DI (8 bits) GPIO54.DI (16 bits) GPIO64.DI (16 bits)

Digital outputs

	Basic GPIO board	Extended GPIO board
GPIO Board #1	GPIO1.DO (8 bits)	GPIO3.DO (8 bits) GPIO5.DO (16 bits) GPIO6.DO (16 bits)
GPIO Board #2	GPIO12.DO (8 bits)	GPIO32.DO (8 bits) GPIO52.DO (16 bits GPIO62.DO (16 bits)
GPIO Board #3	GPIO13.DO (8 bits)	GPIO33.DO (8 bits) GPIO53.DO (16 bits) GPIO63.DO (16 bits)
GPIO Board #4	GPIO14.DO (8 bits)	GPIO34.DO (8 bits) GPIO54.DO (16 bits) GPIO64.DO (16 bits)

Analog inputs

	Basic GPIO board	Extended GPIO board
GPIO Board #1	GPIO2.ADC	GPIO4.ADC
GPIO Board #2	GPIO22.ADC	GPIO42.ADC
GPIO Board #3	GPIO23.ADC	GPIO43.ADC
GPIO Board #4	GPIO24.ADC	GPIO44.ADC

Analog outputs

	Basic GPIO board	Extended GPIO board
GPIO Board #1	GPIO2.DAC	GPIO4.DAC
GPIO Board #2	GPIO22.DAC	GPIO42.DAC
GPIO Board #3	GPIO23.DAC	GPIO43.DAC
GPIO Board #4	GPIO24.DAC	GPIO44.DAC

6.0 XPS Extended Firmware Architecture (Contact Newport)

NOTE

Contact Newport to obtain the extended firmware version that includes the following features.

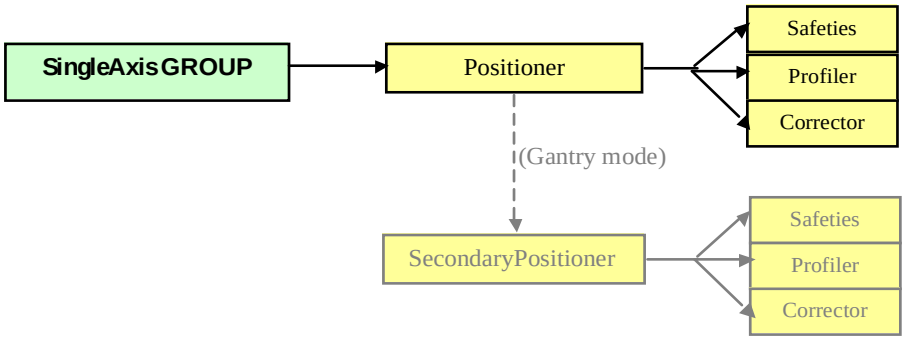
6.1 SingleAxisWithClamping Group

The SingleAxisWithClamping Group is composed of one single positioner that allows execution of motion commands.

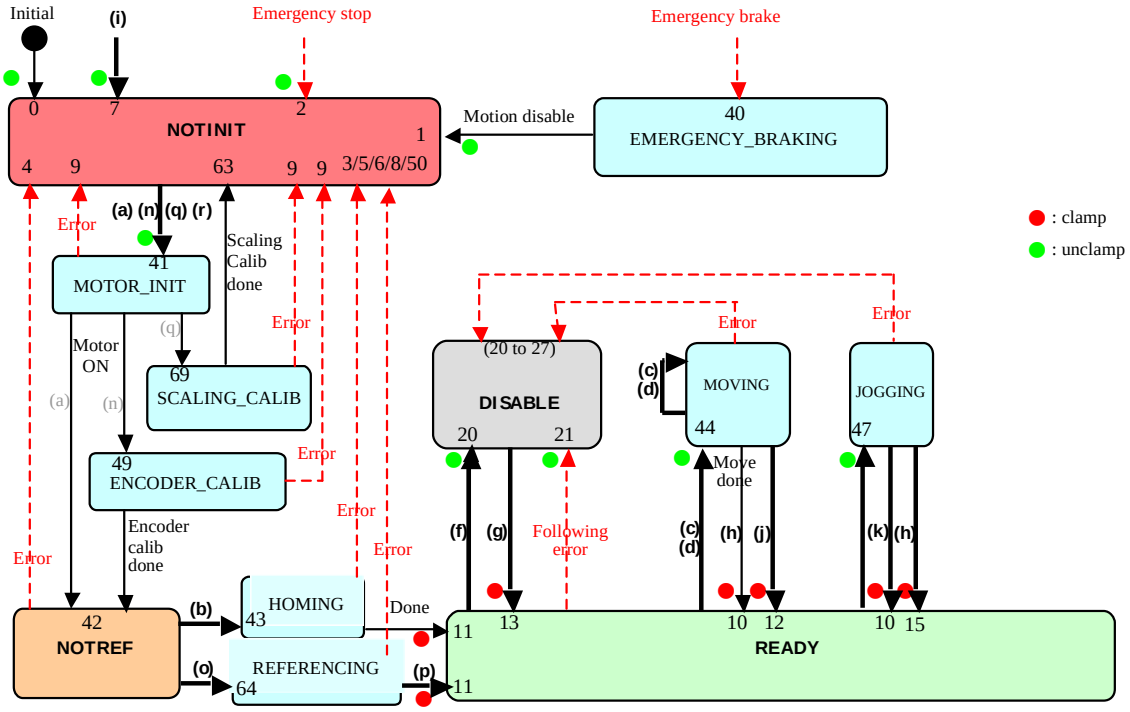
In general, it is similar to SingleAxis group, the only difference is the support of clamping: axis is clamped before moves, unclamped during moves and reclamped at stop. This enhances the stability at a position.

A SingleAxisWithClamping group CANNOT be used in GANTRY mode (*secondary positioner is impossible*).

The XPS controller can handle several SingleAxisWithClamping objects.



6.1.1 State Diagram

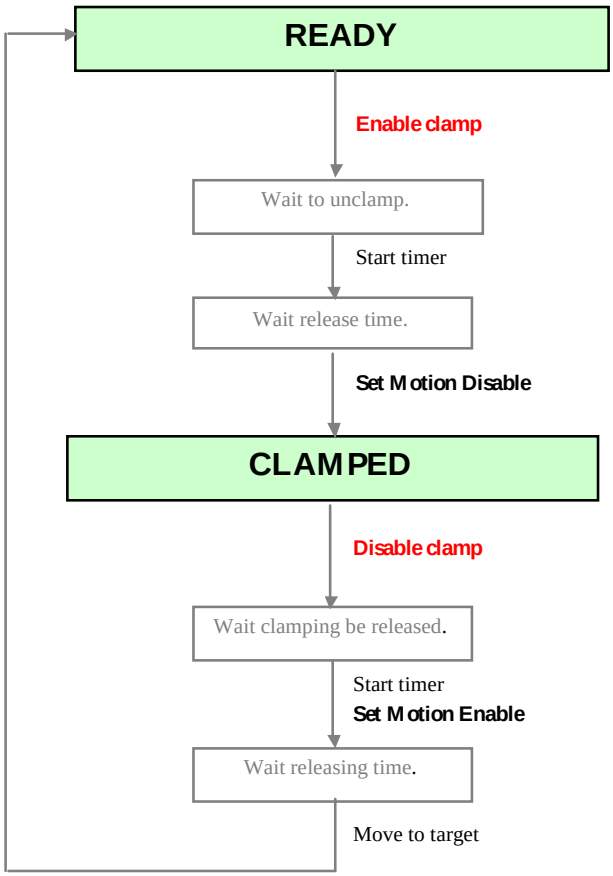


Called functions:

(**a**) GroupInitialize
(**b**) GroupHomeSearch
(**c**) GroupMoveAbsolute
(**d**) GroupMoveRelative
(**f**) GroupMotionDisable
(**g**) GroupMotionEnable
(**h**) GroupMoveAbort
(**i**) GroupKill or KillAll
(**j**) GroupJogModeEnable
(**k**) GroupJogModeDisable
(**l**) GroupAnalogTrackingModeEnable
(**m**) GroupAnalogTrackingModeDisable
(**n**) GroupInitializeWithEncoderCalibration
(**o**) GroupReferencingStart
(**p**) GroupReferencingStop
(**q**) PositionerAccelerationAutoScaling
(**r**) GroupInitializeNoEncoderReset

6.1.2 Group Clamping Sequence

6.1.2.1 Clamping State Diagram



NOTES

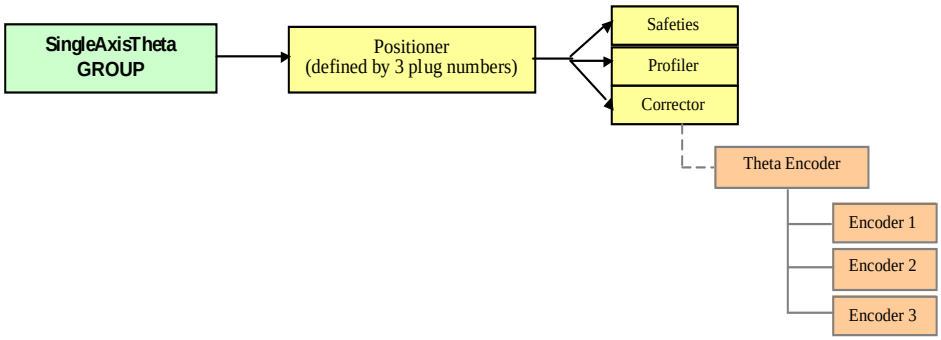
In case of recoverable errors (go to DISABLE state or go to READY state), the clamp is unclamped.

In case of fatal errors (go to NOT INIT state), the clamp stays in the current state (clamped).

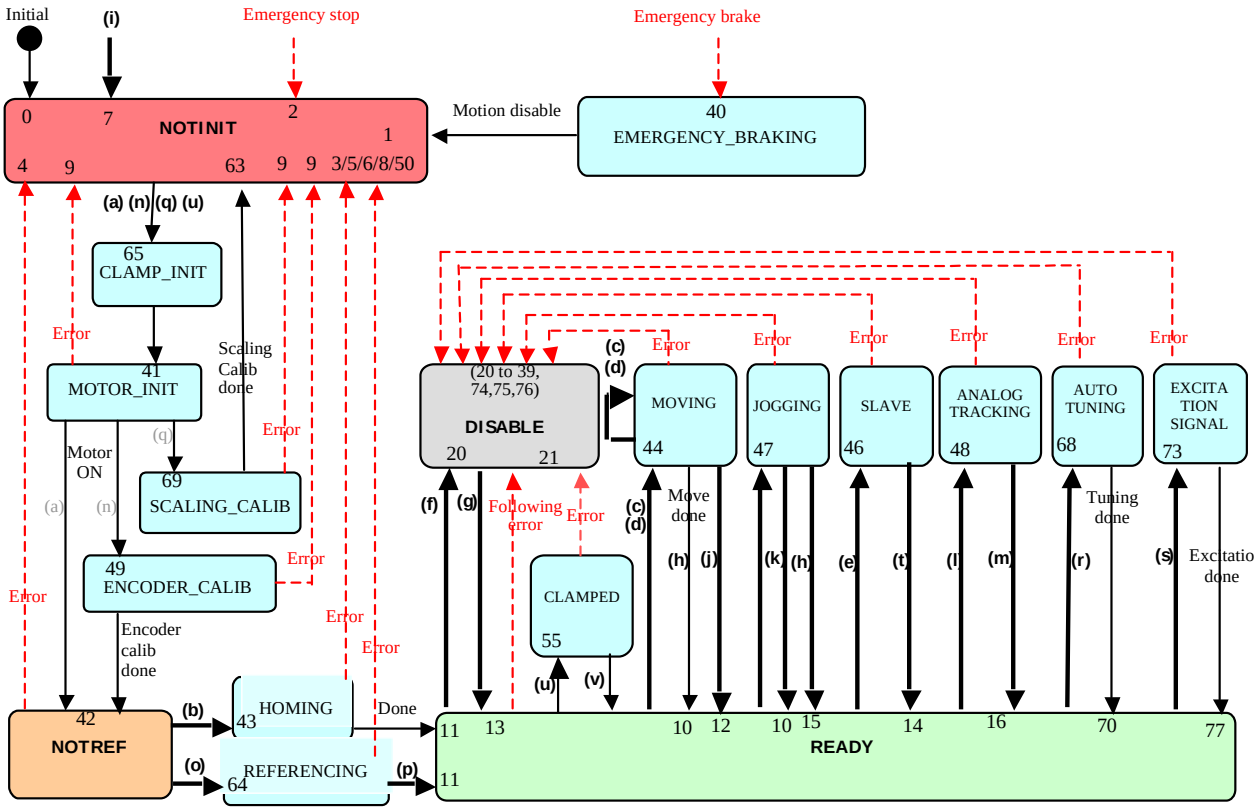
6.2 SingleAxisTheta Group

The SingleAxisTheta is composed of one single positioner object with three encoders (Theta encoder) for the execution of motion commands. It includes a “Yaw” mapping and a “Theta” correction on an XY group.

A SingleAxisTheta group CANNOT be used in GANTRY mode (*secondary positioner is impossible*).



6.2.1 State Diagram

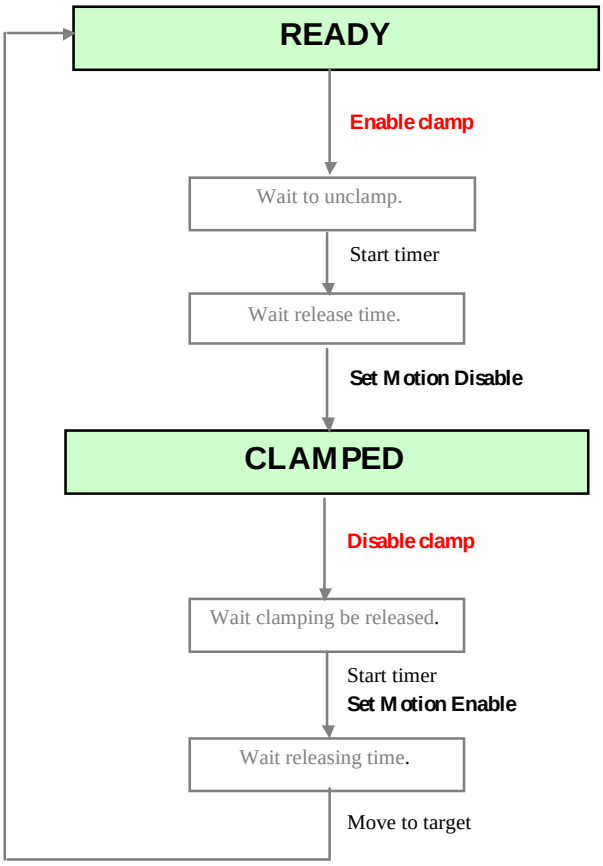


Called functions:

(**a**)	GroupInitialize	(**l**)	GroupAnalogTrackingModeEnable
(**b**)	GroupHomeSearch	(**m**)	GroupAnalogTrackingModeDisable
(**c**)	GroupMoveAbsolute	(**n**)	GroupInitializeWithEncoderCalibration
(**d**)	GroupMoveRelative	(**o**)	GroupReferencingStart
(**e**)	GroupSlaveModeEnable	(**p**)	GroupReferencingStop
(**f**)	GroupMotionDisable	(**q**)	PositionerAccelerationAutoScaling
(**g**)	GroupMotionEnable	(**r**)	PositionerCorrectorAutoTuning
(**h**)	GroupMoveAbort	(**s**)	PositionerExcitationSignalSet / PositionerPreCorrectorExcitationSignalSet
(**i**)	GroupKill or KillAll	(**t**)	GroupSlaveModeDisable
(**j**)	GroupJogModeEnable	(**u**)	GroupInitializeNoEncoderReset
(**k**)	GroupJogModeDisable		

6.2.2 Group Clamping Sequence

6.2.2.1 Clamping State Diagram



NOTES

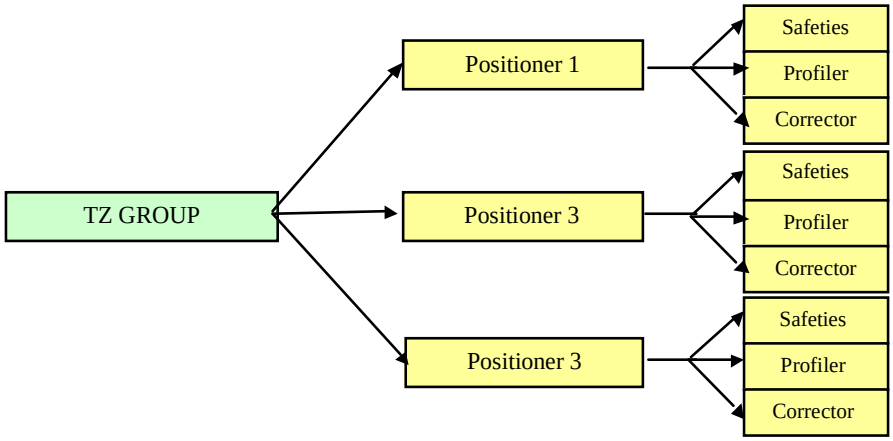
In case of recoverable errors (go to DISABLE state or go to READY state), the clamp is unclamped.

In case of fatal errors (go to NOT INIT state), the clamp stays in the current state (clamped).

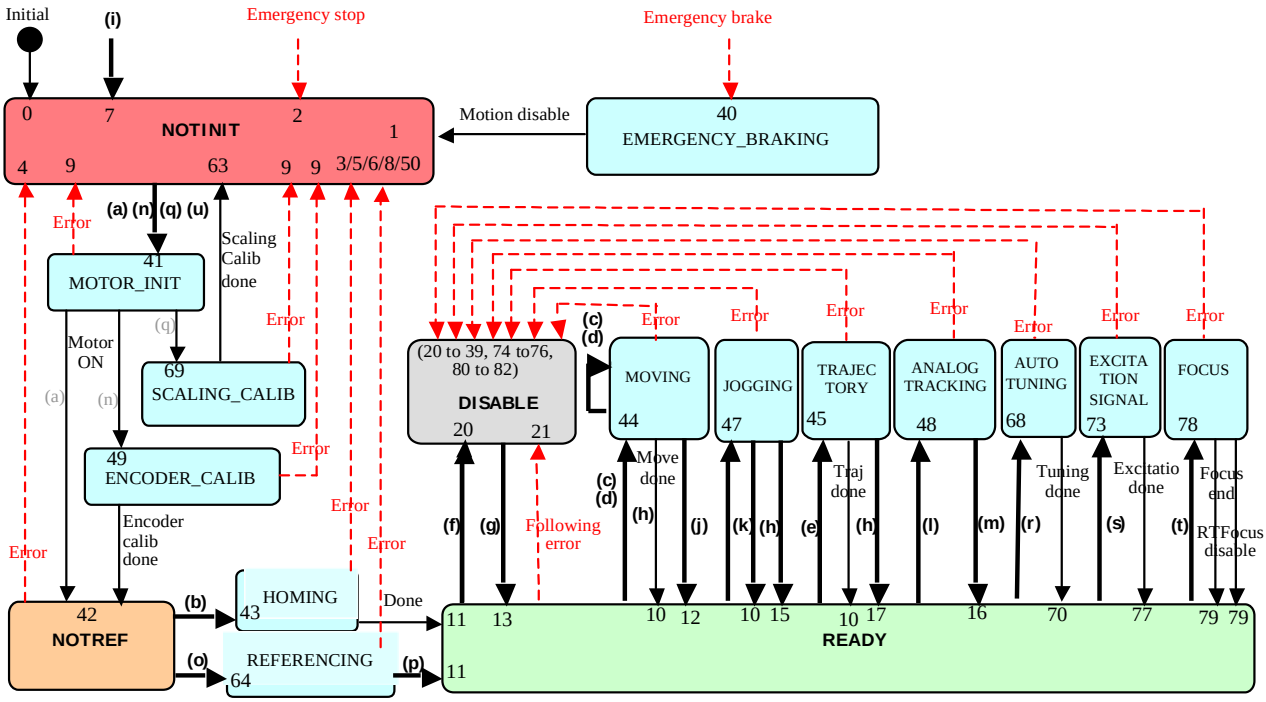
6.3 TZ Group

A TZ group is a 3-positioner object, like the XYZ group, but with the following differences:

- It supports the **PVT** trajectories.
- It does not support 3D **spline** trajectories.
- It supports **TZDecoupling**, **XYtoZZZAccelerationFeedforward** and **TZTracking** functionalities.
- It supports **Focus process** via the XPS focus interface board and focus process module (focus.out).
- It has a specific way of initialization (*MotorDriverInterface* = *AnalogAccelerationTZ*).



6.3.1 State Diagram



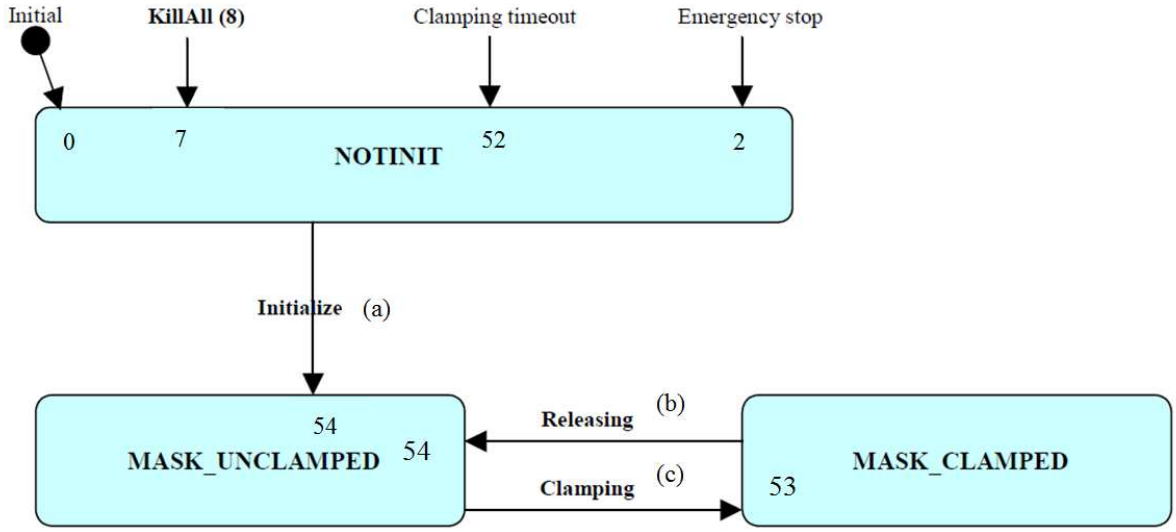
Called functions:

(**a**)	GroupInitialize	(**l**)	GroupAnalogTrackingModeEnable
(**b**)	GroupHomeSearch	(**m**)	GroupAnalogTrackingModeDisable
(**c**)	GroupMoveAbsolute	(**n**)	GroupInitializeWithEncoderCalibration
(**d**)	GroupMoveRelative	(**o**)	GroupReferencingStart
(**e**)	MultipleAxesPVTExecution	(**p**)	GroupReferencingStop
(**f**)	GroupMotionDisable	(**q**)	PositionerAccelerationAutoScaling
(**g**)	GroupMotionEnable	(**r**)	PositionerCorrectorAutoTuning
(**h**)	GroupMoveAbort	(**s**)	PositionerExcitationSignalSet
(**i**)	GroupKill or KillAll	(**t**)	TZFocusModeEnable
(j)	GroupJogModeEnable	**(u)**	GroupInitializeNoEncoderReset
(k)	GroupJogModeDisable		

6.4 Mask Group

Mask object defines a clamper drive with real time state monitoring.

6.4.1 State Diagram



Called functions:

(**a**) GroupInitialize

(**b**) MaskClampEnable

(**c**) MaskClampDisable

6.5 User External Module Programming

The user external module programming manages the written by user program blocks (*ExternalModules*) in the XPS controller, with the following conditions:

- Every user external module is written in C language (GNU with QNX Momentics IDE).
- The user ExternalModule (*.so) must be stored in the "/Admin/ UserOptionalModules /" in the XPS controller.
- Every user external module is loaded and executed at boot in adding the external module name in the **`SharedLibraryModuleNames`** line of the *[GENERAL]* section of system.ref file.

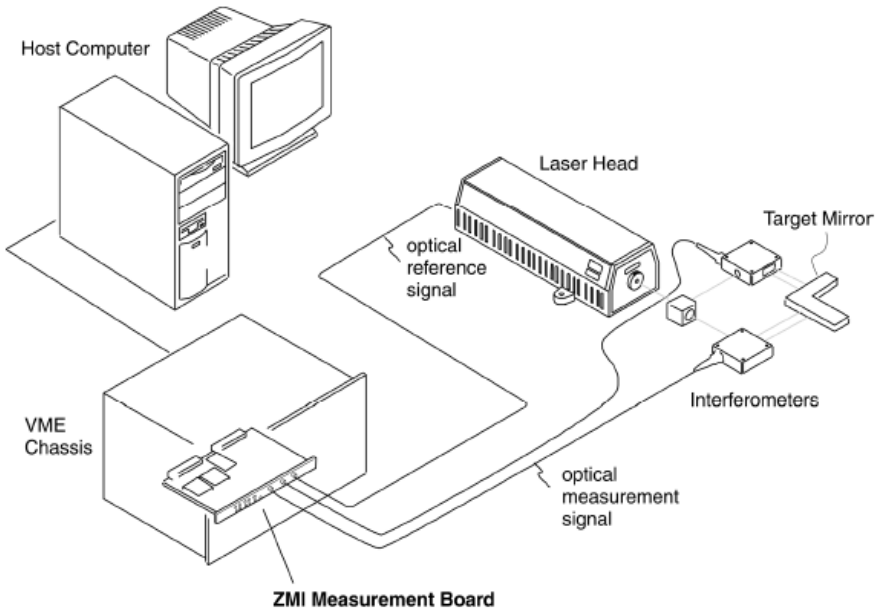
system.ref :

```
[GENERAL]
[…]
SharedLibraryModuleNames = ExternalModule1, ExternalModule2
[…]
```

6.6 ZYGO Interferometer

6.6.1 ZMI Measurement System

Refer to **ZMI 2400 series manual - OMP 0537_F**



6.6.2 ZYGO P2 Interface Registers

	P2 Registers	Read	Write
Axis #1	0	Axis status	*Read only*
	2	Position	
	4	Velocity	
	6	Time	
Axis #2	8	Axis status	*Read only*
	10	Position	
	12	Velocity	
	14	Time	
General	16	Board status	Command
Info	18	Revision	*Read only*
	20	ID	

6.6.3 Status, Error, and High Nibble P2 Interface Register

This register contains the status bits, error bits, and the 4 high order position data bits. The table below lists the bit positions of these signals in the register. See "Error Detection and Status Reporting" section for more information. The bits that correspond to fatal errors are indicated by "(F)".

Table 3-4 Status, Error, and High Nibble P2 Interface Register Bit Positions

Bit	Description	XPS group state after detection
0	1 (not used)	
1	1 (not used)	
2	1 (not used)	
3	1 (not used)	
4	1 (not used)	
5	1 (not used)	
6	1 (not used)	
7	1 (not used)	
8	1 (not used)	
9	1 (not used)	
10	1 (not used)	
11	User Bit	
12	Position Data bit 32	
13	Position Data bit 33	
14	Position Data bit 34	
15	Position Data bit 35	
16	Reference Signal Present	
17	Reference PLL Locked	
18	System OK	
19	Measurement Signal Present	
20	Position Reset Complete	
21	(F) Reference Signal Missing	Not init
22	(F) Reference PLL Error	Not init
23	(F) System Error	Not init
24	(F) Measure Signal Missing	Not init
25	(F) Measure Signal Dropout	Not init
26	(F) Measure Signal Glitch	Not init
27	(F) Velocity Error	
28	User Velocity Error	
29	(F) Acceleration Error	
30	(F) 36 bit Position Overflow	Not init
31	32 bit Position Overflow	Not init

The high nibble bits are latched at the same time as the P2 Position register, and should be read after the position is read. The error bits (21-31) have the same meaning as the corresponding errors in the VME Error Status register (bits 0-10). The P2 Error register is set and reset separately from the VME Error Status register.

The status bits (16-20) have the same meaning as the corresponding status bits in the VME Status Register (bits 0-4). The *User Bit* shows the state of the *User P2* bit in VME Control Register 1.

6.6.4 ZYGO Error Code Table

Error Code	Description
-100001	Syntax error in command or unrecognized command
-100002	Internal error occurred while parsing request
-100003	Invalid character detected in command input
-100004	Un-terminated string
-100005	Invalid hex number
-100020	Error accessing the Measuring Board
-100021	Operation not supported for ZEC-Measuring Board set
-100022	Invalid Register offset detected
-100023	Invalid axis number detected
-100024	Invalid ADC Mux value detected
-100025	ADC operation timed out
-100026	Invalid EEPROM offset detected
-100027	EEPROM operation timed out
-100028	Invalid register type specified
-100029	Value to write too large for register type
-100030	Value to write missing
-100031	Invalid operation type specified
-100032	Value to write invalid
-100033	Internal error saving Ethernet Card configuration data
-100034	Invalid IP address
-100035	Invalid Subnet mask
-100036	Invalid Gateway IP address
-100037	UDP Measurement Data transmission already in progress
-100050	Another Firmware update is already in progress
-100051	Firmware update irrecoverable file transfer error
-100052	Firmware update file data received is incomplete
-100053	Firmware update error performing a PROM operation

The error description is returned by the “ErrorStringGet” function.

All error code list is returned by the “ErrorListGet” function.

6.6.5 PEG Control Register

The bit assignments of the PEG Control register are listed below. The *PEG Enable Control* and *PEG Disable Control* fields control the overall operation of the PEG subsystem.

Bit	Description
1:0	PEG Pulse Width (00 = 25 ns, 01 = 50 ns, 10 = 75 ns, 11 = 100 ns)
2	Enable P1->P2 operation
3	Enable P2->P1 operation
4	PEG Axis Select (0 = axis 1, 1 = axis 2)
5	PEG Output Enable
6	PEG Output Polarity (0 = Low pulse, 1 = High pulse)
7	Enable Delta 2
10:8	PEG Disable Control 0 = NO_EXIT = Don't disable 1 = P1_EXIT = Disable at P1 exit 2 = P2_EXIT = Disable at P2 exit 3 = ANY_EXIT = Disable at P1 or P2 exit 4 = IMM_EXIT = Disable immediately
11	PEG P2 Delta (0 = Delta 1, 1 = Delta 2)
13:12	PEG Enable Control 0 = NO_ENT = Don't enable 1 = P1_ENT = Enable at P1 entry 2 = P2_ENT = Enable at P2 entry 3 = ANY_ENT = Enable at P1 or P2 entry
15:14	Reserved

6.6.6 ZYGO Axis Error Status List

code	Error Status description	Error mask
0	Success	
0x0001	Reference signal is missing	1
0x0002	Reference PLL Error	1
0x0004	System Error	1
0x0008	Measure Signal Missing	1
0x0010	Measure Signal Dropout	0
0x0020	Measure Signal Glitch	1
0x0040	Velocity Error	1
0x0100	Acceleration Error	0
0x0200	36 bit Position Overflow	1
0x0400	32 bit Position Overflow	1
0x0800	P2 External Sample	0
0x1000	Not used	0
0x2000	PEG Error	0
0x4000	Not used	0
0x8000	IRQ Pending	0

The axis error status register is read via Ethernet. A XPS controller error is generates when one or several bits of Error mask are ON. In this case, the group goes to NOTINIT state.

6.6.7 ZYGO Axis Status List

code	Status description
0	Success
0x0001	Reference signal present
0x0002	Reference PLL
0x0004	System OK
0x0008	Measure Signal present
0x0010	Position Reset Complete
0x0020	ADC Ready
0x0040	ADC Mux = 0
0x0100	External Sample Flag (SCLK0)
0x0200	Not used
0x0400	Not used
0x0800	Not used
0x1000	System Type ST0
0x2000	System Type ST1
0x4000	System Type ST2
0x8000	System Type ST3

The axis status register is read via **Ethernet**.

7.0 XPS Functions Description

7.1 Input Tests Common to all XPS Functions

For all commands, general input tests are the following:

General:

-20 Controller initialization failed.

-21 XPS initialization in progress.

Check the command format:

-7 Wrong format in the command string.

Check the number of parameters:

-9 Wrong number of parameters in the command.

Check input/output parameter type:

-10 Wrong parameter type in the command string.

-11 Wrong parameters type in the command string: word or word * expected.

-12 Wrong parameter type in the command string: bool or bool * expected.

-13 Wrong parameter type in the command string: char * expected.

-14 Wrong parameter type in the command string: double or double * expected.

-15 Wrong parameter type in the command string: int or int * expected.

-16 Wrong parameter (value < 0) or wrong type in the command string: unsigned int or unsigned int * expected.

-128 Wrong parameter (value < 0) or wrong type in the command string: unsigned short or unsigned short * expected.

-129 Wrong parameter (value < 0) or wrong type in the command string: unsigned long or unsigned long * expected.

-132 Wrong parameter (value < 0) or wrong type in the command string: unsigned long long or unsigned long long * expected.

7.2 XPS Functions Lists

7.2.1 Standard Functions

7.2.1.1 CleanCoreDumpFolder

Name

CleanCoreDumpFolder – Cleans the folder "/Admin/Public/CoreDump" to delete all debug core dump (*.core) files.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks if "/Admin/Public/CoreDump" exists: (-22)
- Checks error code returned by shell system command: (-100)

Description

This function cleans the "/Admin/Public/CoreDump" folder to delete all core files and to free memory.

Prototype

int **CleanCoreDumpFolder**(

int SocketID

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -22: Not allowed action.
- -100: Internal error.

7.2.1.2 CleanTmpFolder

Name

CleanTmpFolder – Cleans the folder "tmp" to delete all temporary files.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks error code returned by shell system command: (-100)

Description

This function cleans the "tmp" folder to delete all temporary files.

Prototype

int **CleanTmpFolder**(int SocketID)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -100: Internal error.

7.2.1.3 CloseAllOtherSockets

Name

CloseAllOtherSockets – Closes all sockets beside the one used.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks "Administrator" rights: (-107)

Description

This function allows an administrator to close all user sockets except the socket used to call this function.

All other user sockets are closed. So, ERR_SOCKET_CLOSED_BY_ADMIN error is sent to each running (on an user socket) process before the socket is really closed.

Prototype

int **CloseAllOtherSockets**()

Input parameters

None.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -107: This function requires Administrator rights.

NOTE

Call the "Login" function to identify the user as "Administrator".

CAUTION

If some TCL scripts are in progress (after a "TCLScriptExecute" function or a "TCLScriptExecuteAndWait" function), do not use CloseAllOtherSockets to function to kill these TCL scripts. Use the "TCLScriptKill" function to stop the TCL execution and only after can you use the "CloseAllOtherSockets" function to close sockets.

7.2.1.4 ControllerMotionKernelTimeLoadGet

Name

ControllerMotionKernelTimeLoadGet – Gets controller motion kernel time load.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".

Description

This function gets the last exact value of the controller's motion kernel time load (total , corrector, profier and servitudes calculation time).

CorrectorTimeLoad = CorrectorCalculationTime/CorrectorISRPeriod

ProfilerTimeLoad = ProfilerCalculationTime/CorrectorISRPeriod /ProfileGeneratorISRRatio

ServitudesTimeLoad = ServitudesCalculationTime/CorrectorISRPeriod /ServitudesISRRatio

TotalTimeLoad = CorrectorTimeLoad + ProfilerTimeLoad + ServitudesTimeLoad

---

NOTE

Refer to system.ref file to get CorrectorISRPeriod, ProfileGeneratorISRRatio and ServitudesISRRatio.

Prototype

int **ControllerMotionKernelTimeLoadGet**(

int SocketID,

double * CPUTotalLoadRatio,

double * CPUCorrectorLoadRatio,

double * CPUProfilerLoadRatio,

double * CPUServitudesLoadRatio

)

Input parameters

SocketID	int	Socket identifier used in each function.

Output parameters

CPUTotalLoadRatio	double *	Controller motion kernel total CPU time load.
CPUCorrectorLoadRatio	double *	Controller motion kernel corrector CPU time load.
CPUProfilerLoadRatio	double *	Controller motion kernel profiler CPU time load.
CPUServitudesLoadRatio	double *	Controller motion kernel servitudes CPU time load.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.

7.2.1.5 ControllerRTTimeGet

Name

ControllerRTTimeGet – Gets the controller corrector period and corrector calculation time.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".

Description

This function gets the last exact value of the controller's corrector period and the corrector calculation time.

NOTE

The default value of XPS controller corrector period is 0.125 ms (corresponding to an 8 kHz controller corrector frequency).

Prototype

int **ControllerRTTimeGet**(

int SocketID,

double * CurrentRTPeriod,

double * CurrentRTUsage

)

Input parameters

SocketID	int	Socket identifier used in each function.

Output parameters

CurrentRTPeriod	double *	Controller corrector period (seconds).
CurrentRTUsage	double *	Controller corrector calculation time (seconds).

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.

7.2.1.6 ControllerSlaveStatusGet [Extended]

Name

ControllerSlaveStatusGet – Gets the slave controller status code.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".

Description

This function, called from the master controller, gets the status of its slave controller(s). The slave controller status codes can take the following values:

0: All slave controllers are externally synchronized with the master controller.

1: The synchronization cable is not connected to any slave controller.

2: At least one slave controller is not externally synchronized with the master controller.

The description of slave controller(s) status codes can be obtained by "ControllerSlaveStatusStringGet" function sent from the master controller.

Prototype

int **ControllerSlaveStatusGet**(

int SocketID, int * SlaveControllerStatus

)

Input parameters

SocketID	int	Socket identifier used in each function.

Output parameters

SlaveControllerStatus	int *	Slave status of the controller.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.

7.2.1.7 ControllerSlaveStatusStringGet [Extended]

Name

ControllerSlaveStatusStringGet – Gets the slave controller's status description from a slave controller status code.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".

Description

This function returns the slave controller status description corresponding to a slave controller status code.

If the slave status code is not referenced then the function returns (-17) error.

Prototype

int **ControllerSlaveStatusStringGet**(

int SocketID,

int SlaveControllerStatus,

char * SlaveControllerStatusString

)

Input parameters

SocketID	int	Socket identifier used in each function.
SlaveControllerStatus	int	Slave controller status code.

Output parameters

SlaveControllerStatusString	char *	Slave controller status description.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.

7.2.1.8 ControllerStatusGet

Name

ControllerStatusGet – Gets the controller status code.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".

Description

Returns the controller status code. The controller status codes are listed in section 8.10: "Controller Status List".

The description of the controller status code can be obtained with the "ControllerStatusStringGet" function.

The controller status flag is automatically reset after a controller status reading using the *ControllerStatusGet()* command.

Prototype

int **ControllerStatusGet**(

int SocketID,

int SlaveControllerStatus,

char * SlaveControllerStatusString

)

Input parameters

SocketID	int	Socket identifier used in each function.
SlaveControllerStatus	int	Slave controller status code.

Output parameters

SlaveControllerStatusString	char *	Slave controller status description.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.

7.2.1.9 ControllerStatusRead

Name

ControllerStatusRead – Reads the controller status code.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".

Description

Returns the controller status code. The controller status codes are listed in section "Group Status List".

The description of the controller status code can be obtained with the "ControllerStatusStringGet" function.

Prototype

int **ControllerStatusRead**(int SocketID, int * ControllerStatus)

Input parameters

SocketID	int	Socket identifier used in each function.

Output parameters

ControllerStatus	int *	Status of the controller.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.

7.2.1.10 ControllerStatusStringGet

Name

ControllerStatusStringGet – Gets the controller's status description from a controller status code.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".

Description

This function returns the controller status description corresponding to a controller status code (see section "Group Status List").

If the status code is not referenced then the "Unknown controller status code" message will be returned.

Prototype

int **ControllerStatusStringGet**(

int SocketID,

int ControllerStatusCode,

char * ControllerStatusString

)

Input parameters

SocketID	int	Socket identifier used in each function.
ControllerStatusCode	int	Controller status code.

Output parameters

ControllerStatus	char *	Controller status description.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.

7.2.1.11 ControllerSynchronizeCorrectorISR [Extended]

Name

ControllerSynchronizeCorrectorISR – Synchronizes the corrector ISR for master-slave controllers system.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".

Description

This function sets the mode of corrector ISR synchronization between master controller and its slave controllers.

Possible synchronization mode *(ModeString*) values:

"*MasterWithEcho*": Turns a controller in the corrector ISR synchronization mode as Master. The master generates a synchronization signal (derived from its corrector ISR frequency) on a pin of the INHIBIT connector.

"*SlaveOnEcho*": Turns a controller in the corrector ISR synchronization mode as Slave. The slave receives a synchronization signal (on a pin of INHIBIT connector) coming from its master and uses it as its corrector frequency.

"*Master*": Return to local mode (each controller generates and uses its own corrector ISR frequency.

CAUTION

This function must be called on each controller (master and its slaves) in the following order: *Master first, then 1st, 2nd… slaves.*

Call this function only if every group is in the NOTINIT state.

If the controller has just rebooted, wait 300 seconds before calling this function (the necessary time to have the controller corrector ISR frequency stabilized).

Prototype

int **ControllerSynchronizeCorrectorISR**(

int SocketID,

char * ModeString

)

Input parameters

SocketID	int	Socket identifier used in each function.
ModeString	char *	Synchronization mode.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.

7.2.1.12 DataCollectionBufferReset [Extended]

Name

DataCollectionBufferReset – Reset data collection buffer.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".

Description

This function clears any data in the data collection buffer.

Prototype

int **DataCollectionBufferReset**(
int SocketID,
)

Input parameters

SocketID	string	Socket identifier used in each function.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.

7.2.1.13 DataCollectionBufferAndTimeReset [Extended]

Name

DataCollectionBufferAndTimeReset – Reset data collection buffer and time stamp.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".

Description

This function clears the data collection buffer and resets the data collection time stamp. It allows to reset data and time stamp at once with a function call only.

Prototype

int **DataCollectionBufferAndTimeReset**(

int SocketID,

)

Input parameters

SocketID	string	Socket identifier used in each function.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.

7.2.1.14 DataCollectionRequest [Extended]

Name

DataCollectionRequest – Gets data collection frame.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".

Description

This function return a frame that contains the requested first blocks (max 500) of current data collection.

The frame length can be from 0 (no block) to 500 blocks depending on the time between the successive calls of DataCollectionRequest function. If the number of available blocks is smaller than the requested blocks in the function call, the actual number of blocks will be returned without error.

Example of a frame containing 4 data blocks :

0x1234ABCD 0x1234ABCD 0x1234ABCD 0x1234ABCD 0x1234ABCD 0x1234ABCD 0x1234ABCD
0x1234ABCD 0x1234ABCD 0x1234ABCD 0x1234ABCD 0x1234ABCD 0x1234ABCD 0x1234ABCD
0x1234ABCD;0x1234ABCD 0x1234ABCD 0x1234ABCD 0x1234ABCD 0x1234ABCD 0x1234ABCD
0x1234ABCD 0x1234ABCD 0x1234ABCD 0x1234ABCD 0x1234ABCD 0x1234ABCD 0x1234ABCD
0x1234ABCD 0x1234ABCD;0x1234ABCD 0x1234ABCD 0x1234ABCD 0x1234ABCD 0x1234ABCD
0x1234ABCD 0x1234ABCD 0x1234ABCD 0x1234ABCD 0x1234ABCD 0x1234ABCD 0x1234ABCD
0x1234ABCD 0x1234ABCD 0x1234ABCD;0x1234ABCD 0x1234ABCD 0x1234ABCD 0x1234ABCD
0x1234ABCD 0x1234ABCD 0x1234ABCD 0x1234ABCD 0x1234ABCD 0x1234ABCD 0x1234ABCD
0x1234ABCD 0x1234ABCD 0x1234ABCD 0x1234ABCD

Prototype

int **DataCollectionRequest**(

int SocketID,

int NbRequestBlocks,

int *NbReturnBlocks,

char *Frame

)

Input parameters

SocketID	string	Socket identifier used in each function.
NbRequestBlocks	int	Number of data blocks to get.

Output parameters

NbReturnBlocks	int *	Number of actually returned blocks.
Frame	char *	Blocks of collected data.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.

7.2.1.15 DataCollectionTimeStampGet [Extended]

Name

DataCollectionTimeStampGet – Gets data collection time stamp.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".

Description

This function returns the time stamp in milliseconds that elapsed since the last reset.

Prototype

int **DataCollectionTimeStampGet**(

int SocketID,

double *TimeStamp

)

Input parameters

SocketID	string	Socket identifier used in each function.

Output parameters

TimeStamp	double *	Data collection current time stamp (milliseconds).

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.

7.2.1.16 DataCollectionTimeStampReset [Extended]

Name

DataCollectionTimeStampReset – Reset data collection time stamp.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".

Description

This function resets internal millisecond counter used as time stamp for data collection.

Prototype

int **DataCollectionTimeStampReset**(
int SocketID,
)

Input parameters

SocketID	string	Socket identifier used in each function.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.

7.2.1.17 DoubleGlobalArrayGet

Name

DoubleGlobalArrayGet – Gets the value of the global array of type "double".

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Verifies the index number [0:1000]: (-17)

Description

This function gets the variable value from the global array of type "double", related to a "Number" index. So, the first variable value from the global array is related to the index "0".

The returned value is returned in a double format.

NOTE

The number of data points in the global array of type "double" is limited to 1000.

Prototype

int **DoubleGlobalArrayGet**(

int SocketID,

int Number,

double * DoubleValue

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
Number	int	Index in the global array.

Output parameters

DoubleValue	double *	Variable value.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -17: Parameter out of range or incorrect.

7.2.1.18 DoubleGlobalArraySet

Name

DoubleGlobalArraySet – Sets a value for the global array of type "double".

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Verifies the index number [0:1000]: (-17)

Description

This function sets a new value in the global array located at the "Number" index and the new value is set in a double format.

NOTE

The first variable value from the global array is always located at index "0".

The number of data points in the global array is limited to 1000, so the last index is "999".

Prototype

int **DoubleGlobalArraySet**(

int SocketID,

int Number,

double DoubleValue

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
Number	int	Index in the global array.
DoubleValue	double	Variable value.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -17: Parameter out of range or incorrect.

7.2.1.19 ElapsedTimeGet

Name

ElapsedTimeGet – Gets the elapsed time since the controller was powered on.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".

Description

This function returns the time in seconds that elapsed since the controller was powered on.

Prototype

int **ElapsedTimeGet**(

int SocketID,

double * ElapsedTime

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.

Output parameters

ErrorString	double *	Elapsed time (seconds).

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.

7.2.1.20 ErrorStringGet

Name

ErrorStringGet – Gets the error description from a function error code.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".

Description

The function returns the error description corresponding to a function error code (see section 8.7: "Positioner Driver Status List").

If the error code is not referenced then the "Unknown error code" message will be returned.

Prototype

int **ErrorStringGet**(int SocketID, int ErrorCode, char * ErrorString)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
ErrorCode	int	Error code.

Output parameters

ErrorString	char *	Error description.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.

7.2.1.21 EventActionSetAndStart

Name

EventActionSetAndStart – Defines a combination of one event and one action in buffer, it launches the event and action configuration and gives an ID of the set event.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Event parameters: (-40), (-8).
- Action parameters: (-17), (-8)
- Action to execute: (-32) "Gathering" action.
- Action name: (-39)
- Last action configured in memory: (-81)

Description

Defines a combination of one event and one action, it activates the event and the action. See event specification to see which are necessary. The actions are defined in section "Events and Actions" in the XPS user's manual.

Refer to section 8.2: "Actions List".

EventActionSetAndStart() is useful to avoid conflict between Events/Actions configurations set from many processes that run in parallel.

NOTE

For the "ExecuteTCLScript" action, the "ActionParameter3" represents a list of arguments, which must be separated with a semicolon (;).

Prototype

```
int EventActionSetAndStart (
    int SocketID,
    char * ExtendedEventName,
    char * EventParameter1,
    char * EventParameter2,
    char * EventParameter3,
    char * EventParameter4
    char * ExtendedActionName,
    char * ActionParameter1,
    char * ActionParameter2,
    char * ActionParameter3,
    char * ActionParameter4
    int*    EventId)
```

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
ExtendedEventName	char *	event name (maximum size = 250) . The events are defined in section "Events and Actions" in the XPS user's manual.
EventParameter1	char *	optional event's parameter #1 (maximum size = 250).
EventParameter2	char *	optional event's parameter #2 (maximum size = 250).
EventParameter3	char *	optional event's parameter #3 (maximum size = 250).
EventParameter4	char *	optional event's parameter #4 (maximum size = 250).
ExtendedActionName	char *	action full name (maximum size = 250).
ActionParameter1	char *	optional action's parameter #1 (maximum size = 250).
ActionParameter2	char *	optional action's parameter #2 (maximum size = 250).
ActionParameter3	char *	optional action's parameter #3 (maximum size = 250).
ActionParameter4	char *	optional action's parameter #4 (maximum size = 250).

Output parameters

EventId	int*	event Id

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -17: Parameter out of range or incorrect.
- -32: Gathering not configured.
- -39: Mnemonic action doesn't exist.

7.2.1.22 EventExtendedAllGet

Name

EventExtendedAllGet – Gets all "event and action" identifiers in progress.

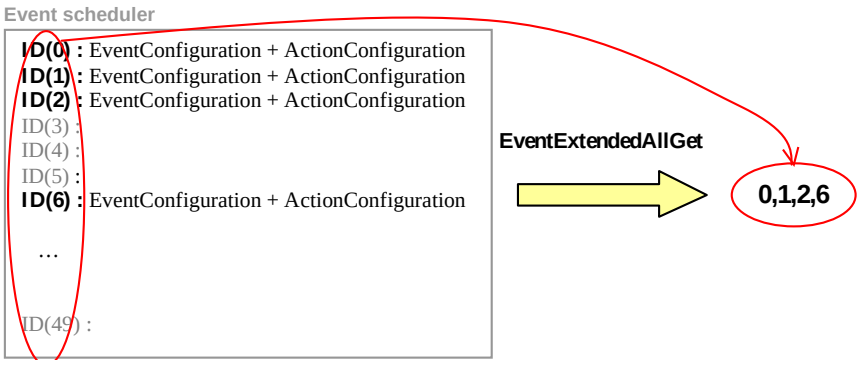
Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks Event ID: (-83).

Description

Gets the list of all "event and action" combination identifiers from the event scheduler (filled by the **ExtendedEventStart** or **ExtendedEventWait** functions).

The list separator is a comma. If no "event and action" combination is in progress (in the event scheduler) then the error (-83) is returned.



Prototype

int **EventExtendedAllGet**(

int SocketID,

int EventID,

char * EventIdentifiersList

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
EventID	int	"Event and action" identifier from "ExtendedEventStart".

Output parameters

EventIdentifiersList	char *	List of "event and action" identifiers in scheduler.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -83: Event ID not defined.

7.2.1.23 EventExtendedConfigurationActionGet

Name

EventExtendedConfigurationActionGet – Gets the action combination defined in buffer.

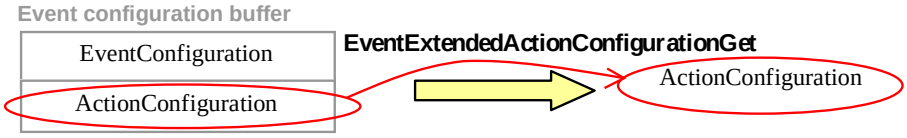
Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks last action configuration in memory: (-81)

Description

Returns the combination of action(s) defined by "EventExtendedConfigurationActionSet" function.

If no action is configured in the buffer, (-81) error is returned.



NOTE

This function doesn't return the last activated action. A combination of action(s) can be defined in the buffer but not activated.

Prototype

int **EventExtendedConfigurationActionGet**(

int SocketID,

char * ActionConfiguration

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
EventID	int	"Event and action" identifier from "ExtendedEventStart".

Output parameters

ActionConfiguration	char *	Action combination configured in buffer.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -81: Action not configured.

7.2.1.24 EventExtendedConfigurationActionSet

Name

EventExtendedConfigurationActionSet – Defines a combination of one or several actions in buffer.

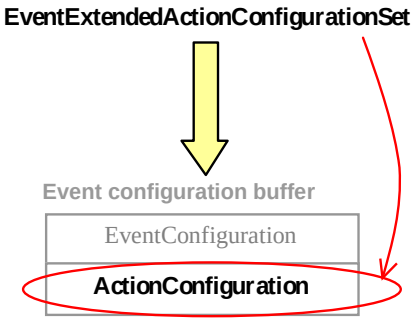
Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Action parameters: (-17), (-8)
- Action to execute: (-32) "Gathering" action.
- Action name: (-39)
- Last action configured in memory: (-81)

Description

Defines a combination of one or several actions but does not activate the actions. Use the "EventExtendedStart" function to activate these defined actions. For each action, 4 parameters can be configured … see event specification to see which are necessary. The actions are defined in section "Events and Actions" in the XPS user's manual.

The number of actions in a combination is limited to 10 actions.



Refer to section 8.2: "Actions List".

NOTE

Before activating the defined actions, you must configure the events. Only then, can you use the "EventExtendedStart" or "EventExtendedWait" function.

For the "ExecuteTCLScript" action, the "ActionParameter3" represents a list of arguments, which must be separated with a semicolon (;).

Prototype

int **EventExtendedConfigurationActionSet**(

int SocketID,

int NbElements,

char * ExtendedActionName,

char * ActionParameter1,

char * ActionParameter2,

char * ActionParameter3,

char * ActionParameter4)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
NbElements	int	Number of events in configuration.
ExtendedActionName	char *	Event full name (maximum size = 250). The events are defined in section "Events and Actions" in the XPS user's manual.
ActionConfiguration	char *	Action combination configured in buffer.
ActionParameter1	char *	optional action's parameter #1 (maximum size = 250).
ActionParameter2	char *	optional action's parameter #2 (maximum size = 250).
ActionParameter3	char *	optional action's parameter #3 (maximum size = 250).
ActionParameter4	char *	optional action's parameter #4 (maximum size = 250).

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -17: Parameter out of range or incorrect.
- -32: Gathering not configured.
- -39: Mnemonic action doesn't exist.

7.2.1.25 EventExtendedConfigurationTriggerGet

Name

EventExtendedConfigurationTriggerGet – Gets the trigger defined in the buffer.

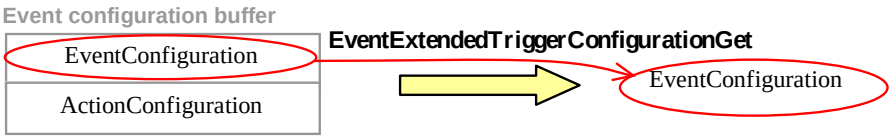
Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Last event configuration in memory: (-80)

Description

Returns the last event defined in buffer by "EventExtendedConfigurationTriggerSet" function.

If no event is defined in buffer, (-80) error is returned.



NOTE

This function doesn't return the last activated event. An event can be configured but not activated.

Prototype

int **EventExtendedConfigurationTriggerGet**(

int SocketID,

char * EventTriggerConfiguration

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.

Output parameters

EventTriggerConfiguration	char *	Event combination configured in buffer.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -80: Event not configured.

7.2.1.26 EventExtendedConfigurationTriggerSet

Name

EventExtendedConfigurationTriggerSet - Defines a combination of one or several events in buffer.

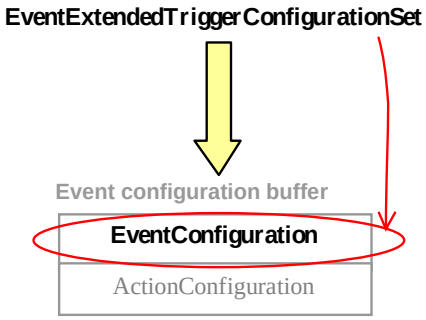
Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Event actor: (-8)
- Event name: (-40)

Description

Defines one trigger (combination of one or several events). To activate the trigger, use the "EventExtendedStart" function. For each event, 4 parameters can be configured… see event specification to see the necessary parameters. The events are defined in section "Events and Actions" in the XPS user's manual.

The number of events in a combination is limited to 10 events.



Each full event name is defined as **[actor].[category].event** (see Event list):

[actor] - Optional actor name (Group name, Positioner name, GPIO name or Nothing)

[category] - Optional category name (Event category or Nothing)

event - Event name

NOTE

Before activating this event combination, you must define one or several action(s) with the "EventExtendedConfigurationTriggerSet" function. Next, use the "EventExtendedStart" or "EventExtendedWait" function to launch these defined "event and action".

Prototype

int **EventExtendedConfigurationTriggerSet**(

int SocketID,

int NbElements,

char * ExtendedEventName,

char * EventParameter1,

char * EventParameter2 ,

char * EventParameter3,

char * EventParameter4

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
NbElements	int	Number of events in configuration.
ExtendedEventName	char *	list of event full names (maximum size = 250) – separator is ';'.
EventParameter1	char *	list of optional event's parameter #1 (maximum size = 250).
EventParameter2	char *	list of optional event's parameter #2 (maximum size = 250).
EventParameter3	char *	list of optional event's parameter #3 (maximum size = 250).
EventParameter4	char *	list of optional event's parameter #4 (maximum size = 250).

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -40: Mnemonic event doesn't exist.

7.2.1.27 EventExtendedGet

Name

EventExtendedGet – Gets the details of "event and action" combinations in scheduler defined by an identifier.

Input tests

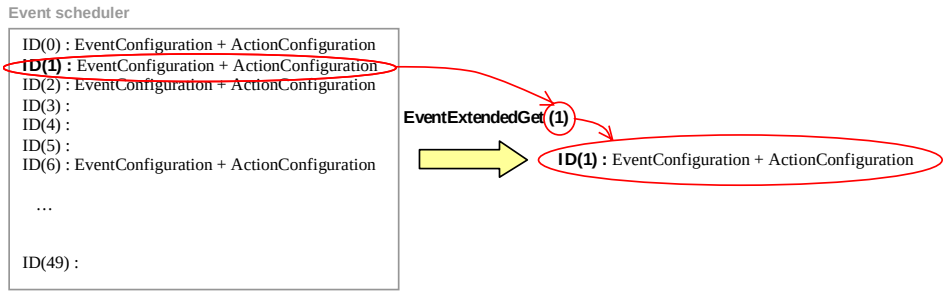
- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Event identifier [0:49]: (-83)

Description

Returns the composition of events and actions in progress defined by an identifier. This identifier is defined in the "EventExtendedStart" function.

The identifier must be defined between 0 and 49, if its value is "–1" then it's not defined.

If the configured event is already deleted, (-83) error is returned.



Prototype

int **EventExtendedGet**(

int SocketID,

int EventID,

char * EventConfiguration,

char * ActionConfiguration

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
EventID	int	"Event and action" identifier from "ExtendedEventStart".

Output parameters

EventConfiguration	char *	Event combination defined in scheduler.
ActionConfiguration	char *	Action combination defined in scheduler.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -83: Event ID not defined.

7.2.1.28 EventExtendedRemove

Name

EventExtendedRemove – Removes an "event and action" combination in the scheduler defined by an identifier.

Input tests

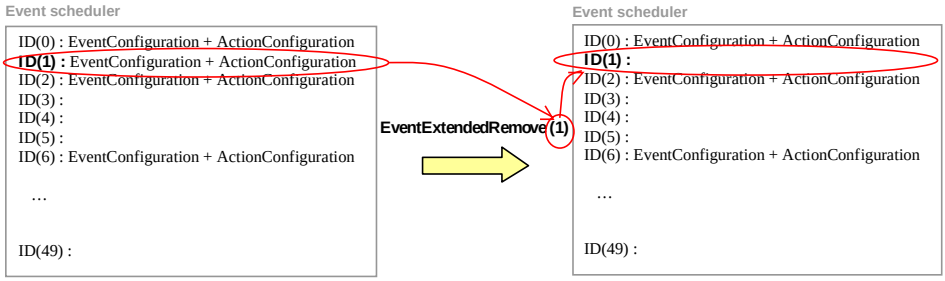
- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Actor event: (-8)
- Event identifier [0:49]: (-17), (-83)

Description

Deletes the "event(s) and action(s)" combination in the scheduler defined by an event identifier. This identifier is defined in the "EventExtendedStart" function.

The identifier must be defined between 0 and 49, or -1. If the identifier is equal to "–1", the EventExtendedRemove function removes all current "event and action" combinations.

If the configured event is already deleted, (-83) is returned.



Prototype

int **EventExtendedRemove**(

int SocketID,

int EventID

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
EventID	int	"Event and action" identifier.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -17: Parameter out of range or incorrect.
- -83: Event ID not defined.

7.2.1.29 EventExtendedStart

Name

EventExtendedStart – Activates the "event and action" defined in the buffer.

Input tests

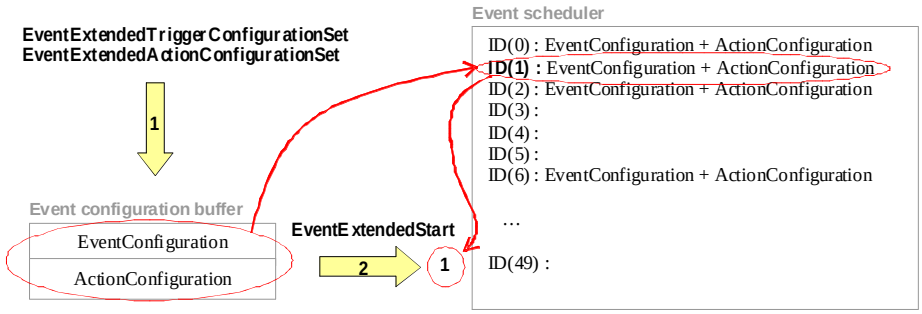
- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Event name to execute: (-8), (-40)
- Last event configuration in memory: (-80)
- Last action configuration in memory: (-81)
- Number of compositions in execution: (-82)

Description

Launches the configured event(s) and action(s) from the event configuration buffer into the event scheduler and gets an event identifier. The identifier must be defined between 0 and 49, if its value is "–1" then that means it's not defined.

If no event is configured in buffer, (-80) error is returned.

If no action is configured in buffer, (-81) error is returned.



NOTE

In the event scheduler, when a configured event has occurred it is deleted from the event scheduler.

CAUTION

If the configured event is PERMANENT then it is not deleted after it occurs, and must use the "EventExtendedRemove" function to delete it.

Prototype

int **EventExtendedStart**(

int SocketID,

int EventID

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.

Output parameters

EventID	int *	"Event and action" identifier.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -40: Mnemonic event doesn't exist.
- -80: Event not configured.
- -81: Action not configured.
- -82: Event buffer is full.

7.2.1.30 EventExtendedWait

Name

EventExtendedWait – Activates the last "event" configuration in memory and wait until it occurs.

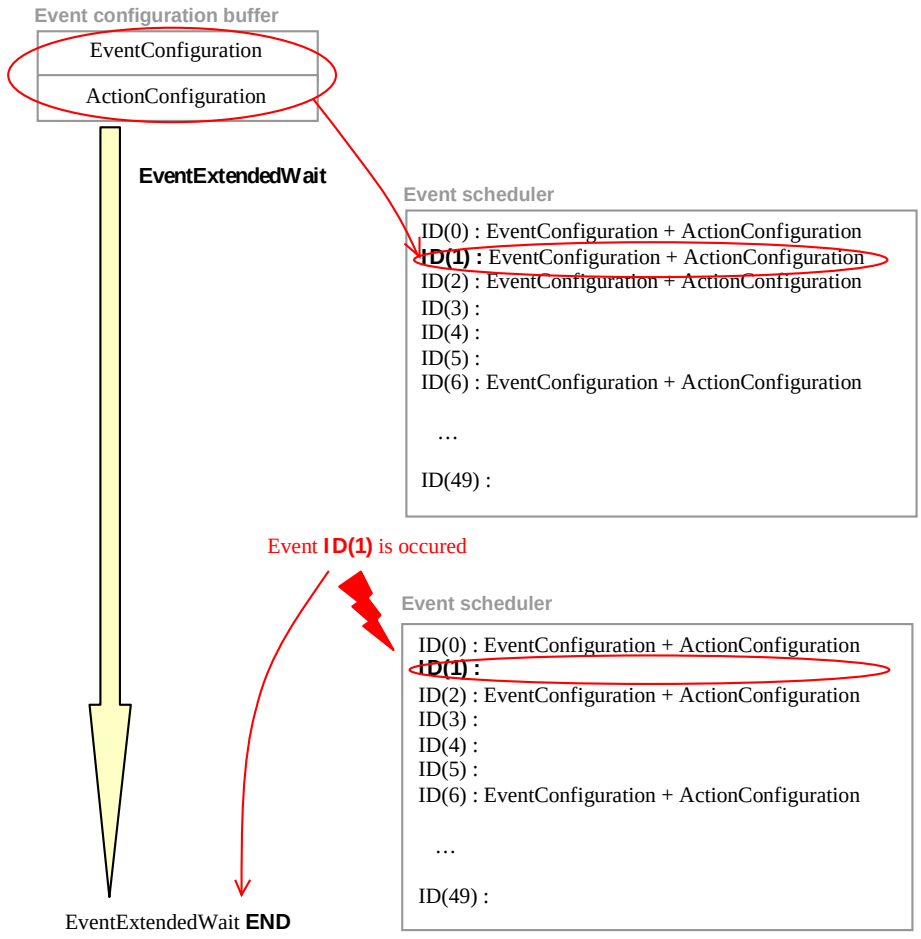
Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Event actor: (-8)
- Last event configuration in memory: (-80)
- Number of compositions in execution: (-82)

Description

Launches the last configured event(s) into the event scheduler and wait until it occurs to unlock the socket.

If no "event and action" combination is configured in the event configuration buffer, (-80) error is returned.



Prototype

int **EventExtendedWait**(

int SocketID

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -40: Mnemonic event doesn't exist.
- -80: Event not configured.
- -82: Event buffer is full.

7.2.1.31 ExternalInterlockErrorStringGet [MODULE]

Name

ExternalInterlockErrorStringGet – Gets the external interlock error description.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Optional module load in memory: (-97)

Description

This function returns an external interlock error description from an external interlock error code. This external interlock error code value is between 0 to 65535 and is represented on 16 bits as following:

Error code	Error Bit #	Error description
0	-	No error
1	0	Error #1
2	1	Error #2
4	2	Error #3
8	3	Error #4
16	4	Error #5
…	…	…
32768	15	Error #15

NOTE

Error #x is defined in relation to the referenced errors managed by the External Interlock optional module load in memory.

See section 8.11: "Positioner Error List".

Prototype

int **ExternalInterlockErrorStringGet** (

int SocketID,

int ErrorCode,

char * ErrorDescription

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
ErrorCode	int *	External interlock error code.

Output parameters

ErrorDescription	char *	External interlock error description.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -17: Parameter out of range or incorrect.
- -98: Error of loading an optional module

7.2.1.32 ExternalInterlockGroupErrorGet [MODULE]

Name

ExternalInterlockGroupErrorGet – Gets the current external group interlock error code.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Valid group type: (-8)
- Valid Group name: (-19)
- External group interlock configuration: (-205)

Description

This function returns the current external group interlock error code. It must be used after the erreur -202 to get interlock error description.

The external group interlock error code is a 16 bit word and its value is between 0 to 65535.

NOTE

See section 8.11: "Positioner Error List".

Prototype

int **ExternalInterlockGroupErrorGet** (

int SocketID,

char GroupName[250],

int *CurrentErrorCode

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.

Output parameters

CurrentErrorCode	int *	Current external group interlock error code.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -19: Group name doesn't exist or unknown command.
- -205: Not enable in your configuration

7.2.1.33 ExternalInterlockLiftPinErrorGet [MODULE]

Name

ExternalInterlockLiftPinErrorGet – Gets the current external lift pin interlock error code.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Valid SingleAxis group type: (-8)
- Valid Group name: (-19)
- External group interlock configuration: (-205)

Description

This function returns the current external lift pin interlock error code. It must be used after the erreur -202 to get interlock error description. This command is compatible with SingleAxis group only.

The external lift pin interlock error code is a 16 bit word and its value is between 0 to 65535.

NOTE

See section 8.11: "Positioner Error List".

Prototype

int **ExternalInterlockLiftPinErrorGet** (

int SocketID,

char GroupName[250],

int *CurrentErrorCode

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name (SingleAxis only).

Output parameters

CurrentErrorCode	int *	Current external lift pin interlock error code.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -19: Group name doesn't exist or unknown command.
- -205: Not enable in your configuration

7.2.1.34 ExternalModuleErrorStringGet

Name

ExternalModuleErrorStringGet– Gets the external interlock error description.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Optional module load in memory: (-97)

Description

This function returns an error description from an error code. This error code value is between 0 to 65535 and is represented on a 16 bit word:

Error code	Error Bit #	Error description
0	-	No error
1	0	Error #1
2	1	Error #2
4	2	Error #3
8	3	Error #4
16	4	Error #5
…	…	…
32768	15	Error #15

NOTE

Error #x is defined in relation to the referenced errors managed by the optional module load in memory.

If Error #x is not referenced by the optional module then the function returns "Unknown error"

Prototype

int **ExternalModuleErrorStringGet** (

int SocketID,

int ModuleNumber,

int ErrorCode,

char * ErrorDescription

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
ModuleNumber	int	External module number [1:4]
ErrorCode	int	Error code.

Output parameters

ErrorDescription	char *	Error description.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -17: Parameter out of range or incorrect.

7.2.1.35 ExternalModuleFirmwareVersionGet

Name

ExternalModuleFirmwareVersionGet – Gets the firmware version of an ExternalModule.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the module number (must >=1 and <= *NbExternalModules*): (-17)

  Here: *NbExternalModules* is the number of modules declared in the line *SharedLibraryModuleNames* of *system.ref*

Description

This function gets the firmware version of an ExternalModule.

Prototype

int **ExternalModuleFirmwareVersionGet**(

int SocketID,

int ModuleNumber,

char *Version

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
ModuleNumber	int	External module number

Output parameters

Version	char *	External module firmware version.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -17: Parameter out of range or incorrect.

7.2.1.36 ExternalModuleTemplateNumberGet

Name

ExternalModuleTemplateNumberGet – Gets the expected external module template number managed by the XPS controller.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".

Description

This function gets the expected external module template number. All user external modules must be developed from this template to be compatibles.

If one of the user external modules is not compatible then an XPS boot error will be generated.

Prototype

int **ExternalModuleTemplateNumberGet** (

int SocketID,

char *TemplateNumber

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.

Output parameters

TemplateNumber	char *	Expected external module template number. ("Nx" with x the template number)

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.

7.2.1.37 ExternalModuleScanFuncTimeDurationsGet

Name

ExternalModuleScanFuncTimeDurationsGet – Gets the current and the maximum scan executing time for an ExternalModule.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the module number (must >=1 and <= *NbExternalModules*): (-17)
- Here: *NbExternalModules* is the number of modules declared in the line *SharedLibraryModuleNames* of *system.ref*

Description

An ExternalModule has a scan function that is called periodically by Newport MotionKernel. This function gets the current and the maximum scan executing time for an ExternalModule.

Prototype

int **ExternalModuleScanFuncTimeDurationsGet**(

int SocketID,

int ModuleNumber,

double *CurrentDuration,

double *MaximumDuration

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
ModuleNumber	int	External module number

Output parameters

CurrentDuration	char *	Current scan executing duration.
MaximumDuration	char *	Maximum scan executing duration.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -17: Parameter out of range or incorrect.

7.2.1.38 ExternalModuleSocketFree

Name

ExternalModuleSocketFree – Free the socket previously reserved for an ExternalModule.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the module number (must >=1 and <= *NbExternalModules*): (-17)

  Here: *NbExternalModules* is the number of modules declared in the line *SharedLibraryModuleNames* of *system.ref*

Description

This function frees the socket previously reserved for an ExternalModule. If the function is executed successfully via this socket all the controller functions (*like FirmwareVersionGet(), ElapsedTimeGet(, ErrorStringGet(),* …) become active, while ExternalModule functions (*like ExternalModuleTZPositionCurrentGet(), ExternalModuleGPIODigitalInputGet(),* …) become inactive.

(*return error -18: Positioner Name doesn't exist or unknown command*).

Prototype

int **ExternalModuleSocketFree**(

int SocketID,

int ModuleNumber

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
ModuleNumber	int	External module number

Output parameters

None

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -17: Parameter out of range or incorrect.

7.2.1.39 ExternalModuleSocketReserve

Name

ExternalModuleSocketReserve – Reserves the current socket for an ExternalModule.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the module number (must >=1 and <= *NbExternalModules*): (-17)

  Here: *NbExternalModules* is the number of modules declared in the line *SharedLibraryModuleNames* of *system.ref*
- Checks if the current socket is already reserved for another ExternalModule: (-22)
- Checks if the ExternalModule has already been linked with another socket: (-22)

Description

- To be able to execute the own API functions of an ExternalModule via a TCP Terminal, the user must reserve a socket for this ExternalModule.
- This function reserves the current socket for an ExternalModule. If the function is executed successfully, via this socket the own ExternalModule functions (*like ExternalModuleTZPositionCurrentGet(), ExternalModuleGPIODigitalInputGet(),* …) become functioning, whereas the controller functions (*like FirmwareVersionGet(), ElapsedTimeGet() , ErrorStringGet(),* …) become inactive (*return Unknown command*).

Prototype

int **ExternalModuleSocketReserve**(

int SocketID,

int ModuleNumber

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
ModuleNumber	int	External module number

Output parameters

None

Return (In addition to the results of "Input Tests Common to all XPS Functions")

- 0: No error.
- -17: Parameter out of range or incorrect.
- -22: Not allowed action.

7.2.1.40 FileGatheringRename

Name

FileGatheringRename – Renames "Gathering.dat" file.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".

Description

This API renames the "Gathering.dat" file with another .dat file name.

Prototype

int **FileGatheringRename**(
int SocketID,
char * NewFileName
)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
NewFileName	char *	New file name used to rename "Gathering.dat".

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.

7.2.1.41 FileScriptHistoryRename

Name

FileScriptHistoryRename – Renames "history.tcl" file

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".

Description

This API renames the "history.tcl" file with another tcl file name.

Prototype

int **FileScriptHistoryRename**(
int SocketID,
char * NewFileName
)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
NewFileName	char *	New file name used to rename "history.tcl".

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.

7.2.1.42 FirmwareBuildVersionNumberGet

Name

FirmwareBuildVersionNumberGet – Gets the built firmware version

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".

Description

This function gets the controller name and the firmware version.

Example of returned version string:

"XPS Unified Firmware V1.0.0"

- Controller name is **XPS.**
- Firmware version is **V1.0.0**.

Prototype

int **FirmwareBuildVersionNumberGet**(

int SocketID,

char * Version

)

Input parameters

SocketID	int	Socket identifier gets by the TCP_ConnectToServer" function.

Output parameters

Version	char *	Controller firmware version.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.

7.2.1.43 FirmwareVersionGet

Name

FirmwareVersionGet – Gets the version of the controller.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".

Description

This function gets the controller version defined in firmware.ref.

Example of returned version string: "XPS-Q8 V2.1.0"

Prototype

int **FirmwareVersionGet**(

int SocketID,

char * Version

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.

Output parameters

Version	char *	Controller version.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.

7.2.1.44 GatheringConfigurationGet

Name

GatheringConfigurationGet – Gets the current configuration of internally triggered data gathering.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Gathering must be configured: (-32)

Description

This function returns the current configuration of internally triggered data gathering.

Use the "GatheringListGet" function to retrieve a complete list of allowed gathering types.

For a more thorough description of the internal data gathering capability, please refer to section Data Gathering/Internal Data Gathering of XPS Motion Tutorial.

Prototype

int **GatheringConfigurationGet**(int SocketID, char * TypeList)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.

Output parameters

TypeList	char *	List of configured gathering types (separator is semicolon).

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -32: Gathering not configured.

7.2.1.45 GatheringConfigurationSet

Name

GatheringConfigurationSet – Sets a data gathering action.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks input gathering mnemonic: (-29)
- Gathering must not be in progress: (-43)

Description

Defines one or several types of data gathered during the internal triggered data gathering.

Maximum of 1000000 points can be acquired.

Maximum of 25 data types can be configured in a gathering.

Refer to section 8.3: "Gathering Data Types".

The "GatheringListGet" function can be used to retrieve a complete list of gathering types.

For a more thorough description of the internal data gathering capability, please refer to section Data Gathering/Internal Data Gathering of XPS Motion Tutorial.

Prototype

int **GatheringConfigurationSet**(

int SocketID,

int NbElements,

char * TypeArray

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
NbElements	int	Number of types.
TypeArray	char *	Array of configured gathering types.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -29: Mnemonic gathering type doesn't exist.
- -32: Gathering not configured.
- -43: Gathering running.

7.2.1.46 GatheringCurrentNumberGet

Name

GatheringCurrentNumberGet – Gets the current and maximum number of gathered data points.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Gathering must be configured: (-32)

Description

This function returns the current and maximum number of data points gathered during the internal triggered data gathering.

For more thorough description of the internal data gathering capability, please refer to section Data Gathering/Internal Data Gathering of XPS Motion Tutorial.

Prototype

int **GatheringCurrentNumberGet**(

int SocketID,

int * CurrentNumber,

int * MaxSamplesNumber

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.

Output parameters

CurrentNumber	int *	Current number during acquisition.
MaxSamplesNumber	int *	Maximum number of samples.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -32: Gathering not configured.

7.2.1.47 GatheringDataAcquire

Name

GatheringDataAcquire – Manually Acquires one data set.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Gathering must be configured: (-32)
- Gathering must not be in progress: (-43)
- Checks gathering buffer size: (-111)

Description

This function manually acquiresone data set configured by "GatheringConfigurationSet" function.

Prototype

int **GatheringDataAcquire**(int SocketID)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -32: Gathering not configured.
- -43: Gathering running.
- -111: Gathering buffer is full.

7.2.1.48 GatheringDataGet

Name

GatheringDataGet – Reads one data line from the current gathering buffer.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks index number: (-17)
  - IndexPoint ≥ 0.
  - IndexPoint <currently gathered data number.
- Checks gathering state: (-32)

Description

This function reads a line of data from the current gathering buffer. The buffer line number is defined by the index of an acquired point.

The separator is ";" in the returned data line.

Gathering must be configured in order to use this function, otherwise (-32) error is returned.

Prototype

int **GatheringDataGet**(int SocketID, int IndexPoint, char * DataBufferLine)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
IndexPoint	int	Index of an acquired data from the current gathering buffer.

Output parameters

DataBufferLine	char *	String contains values from the current buffer at the selected index.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -32: Gathering not configured.

7.2.1.49 GatheringDataMultipleLinesGet

Name

GatheringDataMultipleLinesGet – Reads several data lines from the current gathering buffer in memory.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks index number: (-17)
  - IndexPoint ≥ 0 (**Note:** index #0 = line #1)
  - IndexPoint <currently gathered data number.
- Checks gathering state: (-32)

Description

This function reads one or several data lines from the current gathering buffer. The buffer line number is defined by the index of an acquired point.

The separator is ";" in the returned data line and the end of each line is carriage return "\n".

Gathering must be configured in order to use this function, otherwise (-32) error is returned.

Example of gathering buffer in memory:

index	Data1	Data2	Data3	Data4	Data5
0 →	1	10	0.1	21	100
1 →	2	20	0.2	22	102
2 →	3	30	0.3	23	103
3 →	4	40	0.4	24	104
5 →	5	50	0.5	25	105

GatheringDataMultipleLinesGet(0, 3, myString)

= >0 = the start line is #1

= >3 = the number of lines to read is 3

= >myString = buffer to get the part of buffer (32767 characters maximum)

index	Data1	Data2	Data3	Data4	Data5
0 →	1	10	0.1	21	100
1 →	2	20	0.2	22	102
2 →	3	30	0.3	23	103
3 →	4	40	0.4	24	104
5 →	5	50	0.5	25	105

"myString" result:

1;10;0.1;21;100

2;20;0.2;22;102

3;30;0.3;23;103

GatheringDataMultipleLinesGet(1, 4, myString)

= >1 = the start line is #2

= >4 = the number of lines to read is 4

= >myString = buffer to get the part of buffer (65536 characters maximum)

index	Data1	Data2	Data3	Data4	Data5
0 →	1	10	0.1	21	100
1 →	2	20	0.2	22	102
2 →	3	30	0.3	23	103
3 →	4	40	0.4	24	104
5 →	5	50	0.5	25	105

"myString" result:

2;20;0.2;22;102

3;30;0.3;23;103

4;40;0.4;24;104

5;50;0.5;25;105

Prototype

int **GatheringDataMultipleLinesGet**(

int SocketID,

int IndexPoint,

char * DataBufferLine

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
IndexPoint	int	Index of an acquired data from the current gathering buffer.
NbLines	int	Number of lines to get.

Output parameters

DataBufferLine	char *	String contains values from the current buffer at the selected index.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -17: Parameter out of range or incorrect.
- -32: Gathering not configured.

7.2.1.50 GatheringExternalConfigurationGet

Name

GatheringExternalConfigurationGet – Gets the current configuration of an externally triggered data gathering.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Gathering must be configured: (-32)

Description

This function returns the current configuration of an externally triggered data gathering.

Use the "GatheringExternalListGet" function to retrieve a complete list of external gathering types.

For a more thorough description of the external data gathering capability, please refer to section Data Gathering/External Data Gathering of XPS Motion Tutorial.

Prototype

int **GatheringExternalConfigurationGet**(int SocketID, char * TypeList)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.

Output parameters

TypeList	char *	List of configured gathering types (separator is semicolon).

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -32: Gathering not configured.

7.2.1.51 GatheringExternalConfigurationSet

Name

GatheringExternalConfigurationSet – Sets an external data gathering.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks input external gathering mnemonic: (-29)
- Gathering must not be in progress: (-43)

Description

Defines one or several types of data gathered during externally triggered data gathering.

Maximum of 1000000 points can be acquired.

Maximum of 25 data types can be configured in a gathering.

Refer to section 8.4: "External Gathering Data Types".

The "GatheringExternalListGet" function can be used to retrieve a complete list of gathering types.

For more thorough description of the external data gathering capability, please refer to section Data Gathering/External Data Gathering XPS Motion Tutorial.

Prototype

int **GatheringExternalConfigurationSet**(

int SocketID,

int NbElements,

char * TypeArray

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
NbElements	int	Number of types.
TypeArray	char *	Array of configured gathering types.

Output parameters

None.

Return (In addition to the results of "Input Tests Common to all XPS Functions")

- 0: No error.
- -29: Mnemonic gathering type doesn't exist.
- -43: Gathering running.

7.2.1.52 GatheringExternalCurrentNumberGet

Name

GatheringExternalCurrentNumberGet – Gets the current and maximum number of externally gathered data points.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- External gathering must be configured: (-32)

Description

This function returns the current and maximum number of data points gathered during an externally triggered data gathering.

For more thorough description of external data gathering capability, please refer to section Data Gathering/External Data Gathering XPS Motion Tutorial.

Prototype

int **GatheringExternalCurrentNumberGet**(

int SocketID,

int * CurrentNumber,

int * MaxSamplesNumber

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.

Output parameters

CurrentNumber	int *	Current number during acquisition.
MaxSamplesNumber	int *	Maximum number of samples.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -32: Gathering not configured.

7.2.1.53 GatheringExternalDataGet

Name

GatheringExternalDataGet – Reads one line of data from current external gathering buffer.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks index number: (-17)
  - IndexPoint ≥ 0.
  - IndexPoint <currently gathered data number.
- Checks gathering state: (-32)

Description

This function reads a line of data from current gathering gathering buffer. The buffer line number is defined by the index of an acquired point.

The separator is ";" in the returned data line.

Gathering must be configured in order to use this function, otherwise (-32) error is returned.

Prototype

int **GatheringExternalDataGet**(

int SocketID,

int IndexPoint,

char * DataBufferLine

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
IndexPoint	int	Index of an acquired data from the current gathering buffer.

Output parameters

DataBufferLine	char *	String contains values from the current buffer at the selected index.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -17: Parameter out of range or incorrect.
- -32: Gathering not configured.

7.2.1.54 GatheringExternalStopAndSave

Name

GatheringExternalStopAndSave – Stops externally triggered data gathering and saves the data into the XPS controller.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks number of data (>0): (-30)
- Checks file opening: (-60)

Description

This function stops externally triggered data gathering and saves the data into the XPS controller. Gathered data is stored in the "GatheringExternal.dat" file under "..\Public" folder of XPS controller.

For more thorough description of external data gathering capability, please refer to section Data Gathering/External Data Gathering of XPS Motion Tutorial.

Prototype

int **GatheringExternalStopAndSave**(

int SocketID

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -30: Gathering not started.
- -60: Error during file writing or file doesn't exist.

7.2.1.55 GatheringReset

Name

GatheringReset – Resets gathered data to start new gathering.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Gathering must not be in progress: (-43)

Description

This function resets to start a brand new gathering.

The number of gathered data is set to zero.

For more thorough description of internal data gathering capability, please refer to section Data Gathering/Internal Data Gathering of XPS Motion Tutorial.

Prototype

int **GatheringReset**(

int SocketID

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -43: Gathering running.

7.2.1.56 GatheringRun

Name

GatheringRun – Starts to gather data.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Gathering must be configured: (-32)
- Gathering must not be in progress: (-43)

Description

This function starts data gathering.

Data gathering needs to be configured before using this function (See GatheringConfigurationSet function)

The parameters are the number of data points to be gathered and the divisor of the frequency (servo frequency) at which the data gathering will be done.

For more thorough description of the internal data gathering capability, please refer to section Data Gathering/Internal Data Gathering of XPS Motion Tutorial.

Prototype

int **GatheringRun**(

int SocketID,

int DataNumber,

int Divisor

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
DataNumber	int	The number of data line to gather.
Divisor	int	The divisor of the servo frequency.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -32: Gathering not configured.
- -43: Gathering running.

7.2.1.57 GatheringRunAppend

Name

GatheringRunAppend – : Restarts gathering from the point it was stopped.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Gathering must be configured: (-32)
- Gathering must not be in progress: (-43)

Description

Restarts gathering from the data point it was stopped as long as gathering current data number has not reached the *DataNumber* previously specified by *GatheringRun()* function This function repeats the gathering from the data point that was previously stopped, while the gathering current data number has not reached the *DataNumber* previously specified using the *GatheringRun()* function.

The gathering must be configured, executed and stopped before using this function (see *GatheringConfigurationSet, GatheringRun, GatheringStop* functions)

For more thorough description of the internal data gathering capability, please refer to section Data Gathering/Internal Data Gathering of XPS Motion Tutorial.

Prototype

int **GatheringRunAppend**(

int SocketID

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -32: Gathering not configured.
- -43: Gathering running.

7.2.1.58 GatheringStop

Name

GatheringStop – Stops internally and externally triggered data gathering.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks number of data (>0): (-30)
- Checks file opening: (-60)

Description

This function stops internally and externally triggered data gathering. To save to a file, use GatheringStopAndSave function.

For more thorough description of data gathering capability, please refer section Data Gathering/ of XPS Motion Tutorial.

Prototype

int **GatheringStop**(

int SocketID

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -30: Gathering not started.
- -60: Error during file writing or file doesn't exist.

7.2.1.59 GatheringStopAndSave

Name

GatheringStopAndSave – Stops internally triggered data gathering and saves data into the XPS controller.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks number of data (>0): (-30)
- Checks file opening: (-60)

Description

This function stops internally triggered data gathering as well as saves the data to the XPS controller. Data is stored in GATHERING.DAT file under "..\Public" folder of the XPS controller.

For more thorough description of internal data gathering capability, please refer to section Data Gathering/Internal Data Gathering of XPS Motion Tutorial.

Prototype

int **GatheringStopAndSave**(

int SocketID

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -30: Gathering not started.
- -60: Error during file writing or file doesn't exist.

7.2.1.60 GetLibraryVersion

Name

GetLibraryVersion – Gets the version of the DLL library.

Input tests

None.

Description

This function returns the version of DLL library.

The library version represents the firmware version that was used to build the library.

Prototype

int **GetLibraryVersion**(

int SocketID

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.

Output parameters

LibVersion	char *	DLL library version.

Return

None.

7.2.1.61 GlobalArrayGet

Name

GlobalArrayGet – Gets the variable value from the global array.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Verifies the index number [0:100[: (-17)

Description

This function gets the variable value from the global array, related to "Number" index in a string format.

The first variable value from the global array is referenced to index "0".

NOTE

The number of data points in the global array is limited to 100.

NOTE

The maximum string length is fixed to 100 characters.

Prototype

int **GlobalArrayGet**(

int SocketID,

int Number,

char * StringValue

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
Number	int	Index in the global array.

Output parameters

StringValue	char *	Variable string value (100 characters max)..

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -17: Parameter out of range or incorrect.

7.2.1.62 GlobalArraySet

Name

GlobalArraySet – Sets the value of the global array.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Verifies the index number [0:100[: (-17)
- Check input string not null: (-17)
- Check input string length (100 characters max): (-3)

Description

This function sets a new value in the global array related to the "Number" index and the new value is set to a string.

NOTE

The first variable value of the global array is always referenced to the index "0".

The number of data points in the global array is limited to 100, so the last index is "99".

NOTE

The maximum string length is fixed to 100 characters.

Prototype

int **GlobalArraySet**(

int SocketID,

int Number,

char * StringValue

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
Number	int	Index in the global array.
StringValue	char *	Variable string value (100 characters max).

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -3: String too long
- -17: Parameter out of range or incorrect.

7.2.1.63 GPIOAnalogGainGet

Name

GPIOAnalogGainGet – Gets the gain for one or several analog inputs (ADC).

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks board: (-8)
- GPIO name (ADC): (-8)
- Hardware compatibility or XPS initialization in progress: (-22)

Description

Gets the gain value for one or several analog inputs. Please refer to Appendix *B.5 Analog I/O* of the XPS Motion Tutorial for further information about ADC gain.

The gain value must be 1, 2, 4 or 8.

The maximum number of INT boards that can be plugged inside the XPS controller is 2, increasing the number of analog inputs (ADC) from 4 to 8.

Prototype

```
int GPIOAnalogGainGet(
    int SocketID,
    int NbElements,
    char * GPIONameList,
    double * AnalogGainValueArray
    )
```

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.	
NbElements	int	Number of analog GPIO to	read.
GPIONameList	char *	List of analog input names – comma.	separator is

Output parameters

AnalogGainValueArray	int *	Value of analog input gain.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -22: Not allowed action.

7.2.1.64 GPIOAnalogGainSet

Name

GPIOAnalogGainSet – Sets a gain for one or several analog inputs (ADC).

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks board: (-8)
- GPIO name (ADC): (-8)
- Checks outpout value (1, 2, 4 or 8): (-17)
- Hardware compatibility or XPS initialization in progress: (-22)

Description

Sets a gain value for one or several analog inputs.

The gain value can be 1, 2, 4 or 8

If the conversion of the gain value to bits fails then (-22) error is returned.

The maximum number of INT boards, that can be plugged inside the XPS controller, is 2, increasing the number of analog inputs from 4 to 8.

Prototype

int **GPIOAnalogGainSet**(

int SocketID,

int NbElements,

char * GPIONameList,

int * AnalogGainValueArray

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.	
NbElements	int	Number of analog GPIO to	read.
GPIONameList	char *	List of analog input names – comma.	separator is
AnalogGainValueArray	int *	Value of analog input gain.	

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -22: Not allowed action.

7.2.1.65 GPIOAnalogGet

Name

GPIOAnalogGet – Reads one or several analog inputs (ADC) or outputs(DAC).

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- GPIO name (ADC or DAC): (-8)
- Hardware compatibility or XPS initialization in progress: (-22)

Description

Reads one or several analog IO and returns the value(s) in an array.

NOTE

In case of multiple GPIO boards controller, don't mix GPIO names of different boards in the same command (error -8).

Example:

▪ GPIOAnalogGet(GPIO21.DAC1,double*,GPIO21.DAC2,double*) => 0 (OK)

▪ GPIOAnalogGet(GPIO21.DAC2,double*,GPIO42.DAC2,double*) => -8 (Error)

Prototype

int **GPIOAnalogGet**(

int SocketID,

int NbElements,

char * GPIONameList,

double * AnalogValueArray

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
NbElements	int	Number of analog GPIO to read.
GPIONameList	char *	List of analog GPIO names separated with a comma.

Output parameters

AnalogValueArray	double *	Analog GPIO value array (DAC or ADC).

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -22: Not allowed action.

7.2.1.66 GPIOAnalogRangeConfigurationGet

Name

GPIOAnalogRangeConfigurationGet – Gets GPIO DAC range configuration for analog output (DAC).

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks if the GPIO type is DAC: (-8)

Description

This API returns the DAC range value.

Prototype

int **GPIOAnalogRangeConfigurationGet**(

int SocketID,

char * GPIOName,

double * DACRange

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GPIOName	char *	GPIO name.

Output parameters

DACRange	double *	DAC range value.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.

7.2.1.67 GPIOAnalogRangeConfigurationSet

Name

GPIOAnalogRangeConfigurationSet – Sets GPIO DAC range configuration for analog output(DAC).

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks if the GPIO type is DAC: (-8)

Description

This API sets the DAC range value. Set values are:

Input value = 0 = > Disabled

Input value ≥12.0 V = > DAC range = 12.288 V

Input value ϵ [10.0 , 12.0] = >DAC range = 10 V

Input value ϵ [5.0 , 10.0] = >DAC range = 5 V

Prototype

int **GPIOAnalogRangeConfigurationSet**(

int SocketID,

char * GPIOName,

double DACRange

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GPIOName	char *	GPIO name.
DACRange	double	DAC range value.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.

7.2.1.68 GPIOAnalogSet

Name

GPIOAnalogSet – Sets one or several analog outputs (DAC).

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks if the GPIO type is DAC: (-8)
- Checks input parameters number: (-17)

Description

Sets analog value array for DAC type of GPIO.

NOTE

In case of multiple GPIO boards controller, don't mix GPIO names of different boards in the same command (error -8).

Example:

- GPIOAnalogSet(GPIO21.DAC1,5.06,GPIO21.DAC2,3.01) => 0 (OK)
- GPIOAnalogSet(GPIO21.DAC2,5.08,GPIO42.DAC2,4.02) => -8 (Error)

Prototype

int **GPIOAnalogSet**(
int SocketID,
int NbElements,
char * GPIONameList,
double * AnalogValueArray
)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
NbElements	int	Number of analog GPIO to read.
GPIONameList	char *	List of analog GPIO names separated with a comma.
AnalogGainValueArray	double *	Analog GPIO value array (DAC or ADC).

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Not allowed action.
- -22: Not allowed action.

7.2.1.69 GPIODigitalGet

Name

GPIODigitalGet – Reads one digital input or output.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- GPIO name (DI or DO): (-8)
- Hardware compatibility or XPS initialization in progress: (-22)

Description

Returns the value of digital input (DI) or digital output (DO).

Prototype

```
int GPIODigitalGet(
    int SocketID,
    char * GPIOName,
    unsigned int * DigitalValue
    )
```

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GPIOName	char *	Digital GPIO name (maximum size = 250).

Output parameters

DigitalValue	unsigned short *	Digital GPIO value (DI or DO).

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -22: Not allowed action.

7.2.1.70 GPIODigitalSet

Name

GPIODigitalSet – Sets one digital output.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- GPIO name (DO): (-8)
- Hardware compatibility or XPS initialization in progress: (-22)

Description

Sets the value of the selected digital output (DO).

Prototype

```
int GPIODigitalSet(
    int SocketID,
    char * GPIOName,
    unsigned short Mask,
    unsigned short DigitalOutputValue
    )
```

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GPIOName	char *	Digital GPIO name (maximum size = 250).
Mask	unsigned short	Mask.
DigitalOutputValue	unsigned short	Digital output value.

Output parameters

None.

Return (In addition to the results of "Input Tests Common to all XPS Functions")

- 0: No error.
- -8: Wrong object type for this command.
- -22: Not allowed action.

7.2.1.71 GPIODigitalPulseWidthGet

Name

GPIODigitalPulseWidthGet – Reads current GPIO digital I/O pulse width.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks GPIO name and type (must be Digital I/O): (-8)

Description

This function reads the current GPIO digital I/O pulse width defined in microseconds.

Prototype

int **GPIODigitalPulseWidthGet**(

int SocketID,

char GPIOName,

double * PulseWidth

)

Input parameters

SocketID	int	Socket identifier gets by the TCP_ConnectToServer" function.
GPIOName	int	GPIO digital I/O name.

Output parameters

PulseWidth	double *	Current GPIO pulse width (µsec).

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.

7.2.1.72 GPIODigitalPulseWidthSet

Name

GPIODigitalPulseWidthSet – Sets GPIO digital I/O pulse width (µsec).

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks GPIO name and type (must be Digital I/O): (-8)

Description

This function configures the GPIO digital I/O pulse width defined in microseconds.

Prototype

int **GPIODigitalPulseWidthSet**(
int SocketID,
char GPIOName,
double PulseWidth
)

Input parameters

SocketID	int	Socket identifier gets by the TCP_ConnectToServer" function.
GPIOName	int	GPIO digital I/O name.
PulseWidth	double	GPIO digital I/O pulse width (µsec).

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.

7.2.1.73 GroupAccelerationCurrentGet

Name

GroupAccelerationCurrentGet – Gets the current acceleration for one or all positioners of the selected group.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks group type: (-8)
- Checks positioner name: (-18)
- Checks group name: (-19)

Description

Gets the current acceleration for one or all positioners of the selected group.

Prototype

int **GroupAccelerationCurrentGet**(

int SocketID,

char * GroupName[250],

int NbPositioners,

double * CurrentAcceleration

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group or positioner name.
NbPositioners	int	Number of positioners in the group.

Output parameters

CurrentAcceleration	double *	Current acceleration array.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner name doesn't exist or unknown command.
- -19: Group name doesn't exist or unknown command.

7.2.1.74 GroupAccelerationSetpointGet

Name

GroupAccelerationSetpointGet – Gets the setpoint acceleration for one or all positioners of the selected group.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Invalid object type (group or positioner): (-8)
- Invalid positioner name: (-18)
- Invalid group name: (-19)

Description

Returns the setpoint acceleration for one or all positioners of the selected group.

Prototype

int **GroupAccelerationSetpointGet**(

int SocketID,

char * GroupName,

int NbPositioners,

double * SetpointAcceleration

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.
NbPositioners	int	Number of positioners in the selected group.

Output parameters

SetpointAcceleration	double *	Setpoint Acceleration array.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -19: GroupName doesn't exist or unknown command.

7.2.1.75 GroupAnalogTrackingModeDisable

Name

GroupAnalogTrackingModeDisable - Exits the analog tracking mode.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Invalid group name: (-19)
- Group status must be "ANALOG TRACKING": (-22)

Description

Disables the analog tracking mode.

The group exits the "ANALOG TRACKING" state returning to "READY" state.

If the group state is not "ANALOG TRACKING", (-22) error is returned.

NOTES

The tracking mode interprets ADC value as a position command or as a velocity command.

To enable the analog tracking mode use "GroupAnalogTrackingModeEnable" function.

Prototype

int **GroupAnalogTrackingModeDisable**(

int SocketID,

char * GroupName

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.

Output parameters

None.

Return (In addition to the results of "Input Tests Common to all XPS Functions")

- 0: No error.
- -9: Wrong number of parameters in the command.
- -19: GroupName doesn't exist or unknown command.
- -22: Not allowed action.

7.2.1.76 GroupAnalogTrackingModeEnable

Name

GroupAnalogTrackingModeEnable - Enables the analog tracking mode.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Valids tracking type ("Position" or "Velocity"): (-8)
- Invalid group name: (-19)
- Group status must be "READY": (-22)
- Configured tracking: (-22)

Description

Enables the analog tracking mode. To use this function, the group must be in READY state and tracking must be configured before, otherwise an error (-22) is returned.

Once the tracking mode is enabled, the group status must be "ANALOG TRACKING" (48 is the code for Analog tracking state due to a TrackingEnable command).

"Position" analog tracking

In case of "Position" tracking type, the analog input is interpreted as a position command. The parameters must be set by "AnalogTrackingPositionParametersSet" function and can be read by "AnalogTrackingPositionParametersGet" function.

"Velocity" analog tracking

In case of "Velocity" tracking type, the analog input is interpreted as a velocity command. The parameters must be set by "AnalogTrackingVelocityParametersSet" function and can be read by "AnalogTrackingVelocityParametersGet" function.

NOTE

To disable the analog tracking mode use "GroupAnalogTrackingModeDisable" function.

Prototype

int **GroupAnalogTrackingModeEnable**(

int SocketID,

char * GroupName,

char * Type

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.
Type	char *	Tracking type ("Position" or "Velocity").

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -9: Wrong number of parameters in the command.
- -19: GroupName doesn't exist or unknown command.
- -22: Not allowed action.

7.2.1.77 GroupBrakeStateGet [Extended]

Name

GroupBrakeStateGet – Gets current brake command state.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks if GPIO board number: (-17)
- Checks if GPIO board is present: (-100)
- Checks if "Brake" mode is enabled: (-205)

Description

This function reads the current brake command signal state from Inhibit or GPIO connector. Refer to section [BRAKE] in System.ini configuration file. The feature is developed to avoid a run away after hardware error detection (XY group only).

Brake command signal:

1) BrakeCommandSignalState parameter is defined "Direct" in System.ini
   - 0 = Brake OFF.
   - 1 = Brake ON.
2) BrakeCommandSignalState parameter is defined "Inverted" in System.ini
   - 0 = Brake ON.
   - 1 = Brake OFF.

Prototype

int **GroupBrakeStateGet**(
int SocketID,
char * GroupName,
int * BrakeCommand,
)

Input parameters

SocketID	int	Socket identifier gets by the TCP_ConnectToServer" function.
GroupName	char *	Group name (XY).

Output parameters

BrakeCommand	int *	Brake command (0 or 1).

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -205: Not enable in your configuration.
- -100: Internal error (memory allocation error …).

7.2.1.78 GroupBrakeSet [Extended]

Name

GroupBrakeSet – Sets brake command.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks GPIO board number / Checks brake command value: (-17)
- Checks if GPIO board is present: (-100)
- Checks if "Brake" mode is enabled: (-205)

Description

This function sets brake command signal from Inhibit or GPIO connector.
Refer to section [BRAKE] in System.ini configuration file. The feature is developed to avoid a run away after hardware error detection (XY group only).

Brake commands:

1) BrakeCommandSignalState parameter is defined "Direct" in System.ini
   - 0 = Brake OFF.
   - 1 = Brake ON.
2) BrakeCommandSignalState parameter is defined "Inverted" in System.ini
   - 0 = Brake ON.
   - 1 = Brake OFF.

Prototype.

```
int GroupBrakeSet(
    int SocketID,
    char * GroupName,
    int BrakeCommand,
    )
```

Input parameters

SocketID	int	Socket identifier gets by the TCP_ConnectToServer" function.
GroupName	char *	Group name (XY).
BrakeCommand	int	Brake command (0 or 1).

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -205: Not enable in your configuration.
- -100: Internal error (memory allocation error …).

7.2.1.79 GroupCorrectorOutputGet

Name

GroupCorrectorOutputGet – Gets corrector output for one or all positioners of the selected group.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".

Description

Returns corrector output for one or all positioners of the selected group.

The input parameter "group name" can be a positioner name.

For a group, this function returns the corrector output for each positioner from the selected group.

For a positioner, this function returns only the corrector output associated with the selected positioner.

Prototype

int **GroupCorrectorOutputGet**(

int SocketID,

char * GroupName,

int NbPositioners,

double * CorrectorOutput

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.
NbPositioners	int	Number of positioners in the selected group (1 if positioner).

Output parameters

CorrectorOutput	double *	Corrector output array.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.

7.2.1.80 GroupCurrentFollowingErrorGet

Name

GroupCurrentFollowingErrorGet – Gets the current following error for one or all positioners of the selected group.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Invalid object type (group or positioner): (-8)
- Invalid positioner name: (-18)
- Invalid group name: (-19)

Description

Returns the current following error for one or all positioners of the selected group.

Prototype

int **GroupCurrentFollowingErrorGet**(

int SocketID,

char * GroupName,

int NbPositioners,

double * CurrentFollowingError

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.
NbPositioners	int	Number of positioners in the selected group (1 if positioner).

Output parameters

CurrentFollowingError	double *	Current following error array.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -18: Positioner Name doesn't exist or unknown command.
- -19: GroupName doesn't exist or unknown command.

7.2.1.81 GroupExternalProfilerDisable

Name

GroupExternalProfilerDisable – Stops and disables the external profile generator.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Invalid object type (group): (-8)
- Invalid group name: (-19)
- Group status must be "EXTERNAL PROFILER ENABLED": (-22)

Description

Stops and disables the external profile generator. To use this function, the group must be in "EXTERNAL PROFILER ENABLED" state and all positioners must be idle (i.e velocity equal to 0).

This function exits the "EXTERNAL PROFILER ENABLED" state and returns to "READY" state.

If the group state is not in "EXTERNAL PROFILER ENABLED" state, or the profiler velocity is not null, error (-22) is returned.

NOTE

To enable the external profile generator, use "GroupExternalProfilerEnable" function.

CAUTION

The external profile generator can be used only with TZ group.

Prototype

int **GroupExternalProfilerDisable** (

int SocketID,

char * GroupName

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.

Output parameters

None.

Return (In addition to the results of "Input Tests Common to all XPS Functions")

- 0: No error.
- -8: Wrong object type for this command.
- -19: GroupName doesn't exist or unknown command.
- -22: Not allowed action.

7.2.1.82 GroupExternalProfilerEnable

Name

GroupExternalProfilerEnable – Enables and starts the external profile generator.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Invalid object type (group): (-8), (-18)
- Invalid group name: (-19)
- Group status must be "READY": (-22)
- Backlash must not be activated: (-46)

Description

Enables and starts the external profile generator. To use this function, the group must be in "READY" state and all positioners must be idle (i.e velocity equal to 0).

This function enters "EXTERNAL PROFILER ENABLED" state.

If the group state is not "READY", (-22) error is returned.

NOTE

To disable the external profile generator, use the "GroupExternalProfilerDisable" function.

CAUTION

The external profile generator can be used only with TZ group.

Prototype

int **GroupExternalProfilerEnable** (

int SocketID,

char * GroupName

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.

Output parameters

None.

Return (In addition to the results of "Input Tests Common to all XPS Functions")

- 0: No error.
- -8: Wrong object type for this command.
- -19: GroupName doesn't exist or unknown command.
- -22: Not allowed action.

7.2.1.83 GroupGantryModeGet [Extended]

Name

GroupGantryModeGet – Gets current gantry option.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the set option mode (Option0, Option1 or Option2): (-17)
- Checks the group name is valid (must be XY group): (-19)
- Checks gantry mode getting is allowed: (-22)
- Checks if XY dual gantry mode is enabled: (-205)

Description

Gets the current gantry option. This function is allowed only with a Gantry XY group.

Three "Gantry" options are available:

- **Option0** = >Gantry standard.
- **Option1** = >Gantry force balance.
- **Option2** = >Gantry force balance with dual encoder.

Refer to XY group section from system.ini file to enable "XYDualMode" and to configure it.

Prototype

int **GroupGantryModeGet**(

int SocketID,

char * GroupName,

char * Option

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	XY group name.

Output parameters

Option	char *	Option0, Option1 or Option2.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -17: Parameter out of range or incorrect.
- -19: GroupName doesn't exist or unknown command.
- -22: Not allowed action.
- -205: Not enable in your configuration.

7.2.1.84 GroupGantryModeSet [Extended]

Name

GroupGantryModeSet – Sets gantry option.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the user option value (Option0, Option1 or Option2): (-17)
- Checks the group name (must be XY group): (-19)
- Checks if the gantry mode getting is allowed: (-22)
- Checks the current gantry option: (-201)
- Checks if XY Dual Gantry mode is enabled: (-205)

Description

Sets the gantry option. It's possible to configure the gantry option only when the XY group is in "READY" or "DISABLE" state.

Three "Gantry" options are available:

- **Option0** = >Gantry standard.
- **Option1** = >Gantry force balance.
- **Option2** = >Gantry force balance with dual encoder.

Refer to XY group section from system.ini file to enable "XYDualMode" and to configure it.

Prototype

int **GroupGantryModeSet**(

int SocketID,

char * GroupName,

char * Option

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	XY group name.
Option	char *	Option0, Option1 or Option2.

Output parameters

None.

Return (In addition to the results of "Input Tests Common to all XPS Functions")

- 0: No error.
- -17: Parameter out of range or incorrect.
- -19: GroupName doesn't exist or unknown command.
- -22: Not allowed action.
- -201: The group is already in this mode.
- -205: Not enable in your configuration.

7.2.1.85 GroupHomeSearch

Name

GroupHomeSearch - Initiates a home search.

Input tests

- Refer to section 7.1: “Input Tests Common to all XPS Functions”.
- The actor must be a valid group name: (-19)
- Group status must be "Not referenced”: (-22)

Description

This function initiates a home search for each positioner of the selected group.

The group must be initialized and in “NOT REFERENCED” state otherwise error (-22) is returned .

The home search can fail due to:

- a following error: (-25).
- a ZM detection error: (-49).
- a motion done time out, when a dynamic error of the positioner is detected during home search process (-33).
- a home search timeout, when the complete (and complex) home search procedure was not executed in the allowed time: (-28).

For all these errors, the group returns to “NOTINIT” state.

After the home search sequence, each positioner error is checked. If an error is detected, the hardware status register is reset (motor on) and the positioner error is cleared before checking it again. If a positioner error is always present, (-35) error is returned and the group becomes “NOTINIT”.

Once the home search is successful, the group is in “READY” state.

NOTES

The home search routine for each positioner is defined in *“stages.ini”* file by “HomeSearchSequenceType” parameter.

The homesearch time out is defined in *“stages.ini”* file by “HomeSearchTimeOut” parameter.

The home search sequence is defined in *“system.ini”* file by “InitializationAndHomeSearchSequence” parameter for each group with several positioners.

XY group

The home search sequence can be “Together”, “XthenY” or “YthenX” in a standard XY configuration.

If the XY group is “Gantry” (dual positioner on X or on Y axis) only “XthenY” or “YthenX” are allowed.

XYZ group

The home search sequence can be “Together” or “XthenYthenZ”.

MultipleAxes group

The home search sequence can be “Together”, “OneAfterAnother” or “OneAfterAnotherInReverseOrder”.

If the MultipleAxes group has at least one "Gantry" positioner (dual positioner on one axis or some axes) only "OneAfterAnother" or "OneAfterAnotherInReverseOrder" is allowed.

Prototype

int **GroupHomeSearch**(
int SocketID,
char * GroupName
)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -19: GroupName doesn't exist or unknown command.
- -22: Not allowed action.
- -25: Following Error.
- -28: Home search timeout.
- -33: Motion done timeout.
- -35: Position is outside of travel limits.
- -49: Inconsistent mechanical zero during home search.

7.2.1.86 GroupHomeSearchAndRelativeMove

Name

GroupHomeSearchAndRelativeMove - Initiates a home search followed by a relative move.

Input tests

- Refer to section 7.1: “Input Tests Common to all XPS Functions”.
- Invalid group name: (-19)
- Group status must be "Not referenced”: (-22)

Description

This function initiates a home search followed by a relative move at the end of the home search.

The group must be initialized and in “NOT REFERENCED” state otherwise (-22) error is returned.

If there is no error, the group status changes to “HOMING”.

The home search sequence can fail due to:

- a following error: (-25).
- a ZM detection error: (-49).
- a home search time out: (-33).

For all these errors, the group returns to “NOTINIT” state.

Once the home search is completed, a relative move is executed. After this sequence each positioner is checked for error. If an error is detected, the hardware status register is reset (motor on) and the positioner error is cleared before checking it again. If a positioner error is always present, ERR_TRAVEL_LIMITS (-35) is returned and the group state becomes “NOTINIT”.

If the home search is successful, the group will be in “READY” state.

NOTES

The home search routine for each positioner is defined in *stages.ini* file by “HomeSearchSequenceType”parameter.

The home search time out is defined in *stages.ini* file by “HomeSearchTimeOut”parameter.

The home search sequence is defined in *system.ini* file by “InitializationAndHomeSearchSequence” parameter for each group with several positioners:

XY group

The home search sequence can be “Together”, “XthenY” or “YthenX” if the XY group is standard configuration. If the XY group is Gantry (dual positioner on X or on Y axis) only the “XthenY” or “YthenX” are allowed.

XYZ group

The home search sequence can be “Together” or “XthenYthenZ”.

MultipleAxes group

The home search sequence can be “Together”, “OneAfterAnother” or “OneAfterAnotherInReverseOrder”.

If the MultipleAxes group has at least one "Gantry" positioner (dual positioner on one axis or some axes), only "OneAfterAnother" or "OneAfterAnotherInReverseOrder" are allowed.

Prototype

int **GroupHomeSearchAndRelativeMove**(

int SocketID,

char * GroupName

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.

Output parameters

None.

Return (In addition to the results of "Input Tests Common to all XPS Functions")

- 0: No error.
- -19: GroupName doesn't exist or unknown command.
- -22: Not allowed action.
- -25: Following Error.
- -28: Home search timeout.
- -33: Motion done timeout.
- -35: Position is outside of travel limits.
- -49: Inconsistent mechanical zero during home search.

7.2.1.87 GroupInitialize

Name

GroupInitialize - Initializes the motor and activates the servo loop of the selected group.

Input tests

- Refer to section 7.1: “Input Tests Common to all XPS Functions”.
- Actor must be a group: (-8), (-18)
- Invalid group name: (-19)
- Group status must be "NOTINIT”: (-22)
- Checks state of physical ends of run: (-113)

Description

The selected group must be in not initialized “NOTINIT” state, otherwise (-22) error is returned.

This function begins to check the positioner error. If an error is detected, the hardware status register is reset (motor on) and the positioner error is cleared before checking it again. If a positioner error is always present, the motor is turned off, (-5) error is returned and the group state becomes “NOTINIT”.

If there is no positioner error, then the group status becomes “MOTOR_INIT”. The master-slave error is cleared, the encoder is reset (update encoder position) and the user travel limits are checked.

If a travel limit error is detected then the motor is turned off, the error (-35) is returned and the group state becomes “NOTINIT”.

Moreover, the function checks the state of the physical ends of run. If both physical ends of run are activated, then the motor is turned off, the error (-113) is returned and the group state becomes “NOTINIT”.

If no error detected , the motor is initialized in case of “AnalogSinAcc” or “AnalogDualSinAcc”. The error (-50) is returned, if the initialization failed and the group state becomes “NOTINIT”.

If successful, the positions are reset, the servo loop is activated and the motor is on. The group is now in “NOT REFERENCED” state.

NOTES

In Master-Slave mode, after an emergency stop, the master group and the slave group are in “NOTINIT” state.

To restart a master-slave relation the slave group(s) must be reinitialized before the master group.

Prototype

int **GroupInitialize**(

int SocketID,

char * GroupName

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -5: Not allowed due to a positioner error or hardware status.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.
- -19: GroupName doesn't exist or unknown command.
- -22: Not allowed action.
- -35: Position is outside of travel limits.
- -50: Motor initialization error. Check InitializationAccelerationLevel, ScalingAcceleration, MaximumJerkTime, EncoderResolution or EncoderScalePitch.
- -113: Both ends of run activated.

7.2.1.88 GroupInitializeNoEncoderReset

Name

GroupInitializeNoEncoderReset - Initializes the motor without encoder reset and activates the servo loop of the selected group.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Actor must be a group: (-8), (-18)
- Invalid group name: (-19)
- Group status must be "NOTINIT": (-22)
- Checks state of physical ends of run: (-113)

Description

The selected group must be in "NOTINIT" state, otherwise (-22) error is returned.

This function begins to check the positioner error. If an error is detected, the hardware status register is reset (motor on) and the positioner error is cleared before checking it again. If a positioner error is always present, the motor is turned off, (-5) error is returned and the group state becomes "NOTINIT".

If there is no positioner error, then the group status becomes "MOTOR_INIT". The master-slave error is cleared, the encoder is reset (update encoder position) and the user travel limits are checked. If a travel limit error is detected then the motor is turned off, the error (-35) error is returned and the group becomes "NOTINIT".

Moreover, the function checks the state of the physical ends of run. If both physical ends of run are activated, then the motor is turned off, the error (-113) error is returned and the group state becomes "NOTINIT".

If no error detected, the motor is initialized in case of "AnalogSinAcc" or "AnalogDualSinAcc". The error (-50) is returned if the initialization has failed and the group state becomes "NOTINIT".

If successful, the positions are not reset, the servo loop is activated and the motor is on. The group is now in "NOT REFERENCED" state.

NOTES

In Master-Slave mode, after an emergency stop, the master group and the slave group are in "NOTINIT" state.

To restart a master-slave relation the slave group(s) must be reinitialized before the master group.

Prototype

int **GroupInitializeNoEncoderReset**(

int SocketID,

char * GroupName

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -5: Not allowed due to a positioner error or hardware status.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.
- -19: GroupName doesn't exist or unknown command.
- -22: Not allowed action.
- -35: Position is outside of travel limits.
- -50: Motor initialization error. Check InitializationAccelerationLevel, ScalingAcceleration, MaximumJerkTime, EncoderResolution or EncoderScalePitch.
- -113: Both ends of run activated.

7.2.1.89 GroupInitializeWithEncoderCalibration

Name

GroupInitializeWithEncoderCalibration - Initializes motor, calibrates encoder and activates servo loop.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Actor must be a group: (-8), (-18)
- Invalid group name: (-19)
- Group status must be "NOTINIT": (-22)
- Checks state of physical ends of run: (-113)

Description

If the selected group is not in "NOTINIT" state, error (-22) is returned

Initializes the motor, calibrates the encoder and activates the servo loop of each positioner of the selected group. To get the calibration results for each positioner, use the "PositionerEncoderCalibrationParametersGet" function.

This function checks the positioner error. If an error is detected, the hardware status register is reset (motor on) and the positioner error is cleared before checking it again. If a positioner error is always present, the motor is turned off, (-5) error is returned and the group state becomes "NOTINIT".

If no positioner error detected , then the group status becomes "MOTOR_INIT". The master-slave error is cleared, the encoder is reset (update encoder position) and the user travel limits are checked. If a travel limit error is detected then the motor is turned off, the error (-35) is returned and the group state becomes "NOTINIT".

Moreover, the function checks the state of the physical ends of run. If both physical ends of run are activated, then the motor is turned off, the error (-113) is returned and the group state becomes "NOTINIT".

If no error detected, the motor is initialized in case of "AnalogSinAcc" or "AnalogDualSinAcc". The error (-50) is returned if the initialization has failed and the group state becomes "NOTINIT".

After the group initialization the group status is "MOTOR_INIT", next the encoder undergoes calibration and the group status becomes "ENCODER_CALIBRATING". If a following error occurs during calibration, (-25) error is returned and the group state becomes "NOTINIT".

If successful, the motor is initialized, the encoder is calibrated and the servo loop is activated. The group is now in "NOT REFERENCED" state.

NOTE

In Master-Slave mode, after an emergency stop, the master group and the slave group are in "NOTINIT" status.

To restart a master-slave relation the slave group(s) must be reinitialized before the master group.

Prototype

int **GroupInitializeWithEncoderCalibration**(

int SocketID,

char * GroupName

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -5: Not allowed due to a positioner error or hardware status.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.
- -19: GroupName doesn't exist or unknown command.
- -22: Not allowed action.
- -25: Following Error.
- -35: Position is outside of travel limits.
- -50: Motor initialization error. Check InitializationAccelerationLevel, ScalingAcceleration, MaximumJerkTime, EncoderResolution or EncoderScalePitch.
- -113: Both ends of run activated.

7.2.1.90 GroupInterlockDisable [Extended]

Name

GroupInterlockDisable – Disables group interlock mode.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Actor must be a group: (-8), (-18)
- Invalid group name: (-19)

Description

This function removes the dependency between a group and the groups that are included in GroupInterlock mode. So, when it is executed, the group can initialize, home or move independent of all errors coming from other interlocked groups.

GroupInterlock mode: Actions that a group takes based on the activities of other groups: execute actions (like stop axis, power-off, change state…) immediately after an error (or an user command Disable/KillGroup) detected from one of its interlocked groups.

Example: The list of interlocked groups is G1, G2, G3, this means:

- G1 depends on G2 and G3 (G1 in action if an error occurs on G2 or G3)
- G2 depends on G1 and G3 (G2 in action if an error occurs on G1 or G3)
- G3 depends on G1 and G2 (G3 in action if an error occurs on G1 or G2)

The interlocked groups are listed in the [GROUPS] section of *system.ini* file:

InterlockedGroups = …; Names of groups involved in the GroupInterlock mode.

The GroupInterlock mode is enabled by default at boot of the XPS controller.

Prototype

int **GroupInterlockDisable**(

int SocketID,

char * GroupName

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.
- -19: GroupName doesn't exist or unknown command.
- -22: Not allowed action.

7.2.1.91 GroupInterlockEnable_[Extended]

Name

GroupInterlockEnable – Enables group interlock mode.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Actor must be a group: (-8), (-18)
- Invalid group name: (-19)

Description

This function enables the dependency between a group and the groups that are involved in GroupInterlock mode. So, if this function executes, the group cannot initialize, home or move without correcting the errors coming from its interlocked groups.
GroupInterlock mode: Activities that a group takes are dependant on the activities of other groups. For example , execute actions like stop axis, power-off, change state immediately after an error or Disable/KillGroup command sent by user detected from one of its interlocked groups.
Example: The list of interlocked groups is G1, G2, G3 , this means:

- G1 depends on G2 and G3 (G1 in action if an error occurs on G2 or G3)
- G2 depends on G1 and G3 (G2 in action if an error occurs on G1 or G3)
- G3 depends on G1 and G2 (G3 in action if an error occurs on G1 or G2).

The interlocked groups are listed in the [GROUPS] section of *system.ini* file:

InterlockedGroups = …; Names of groups involved in the GroupInterlock mode.

The GroupInterlock mode is enabled by default at boot of the XPS controller.

Prototype

int **GroupInterlockEnable**(
int SocketID,
char * GroupName
)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.

Output parameters

None.

Return (In addition to the results of "Input Tests Common to all XPS Functions")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.
- -19: GroupName doesn't exist or unknown command.
- -22: Not allowed action.

7.2.1.92 GroupJogCurrentGet

Name

GroupJogCurrentGet – Gets the current velocity and acceleration from the jog profiler.

CAUTION

The jog mode cannot be used with a spindle group.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Invalid object type (group or positioner): (-8)
- Invalid positioner name: (-18)
- Invalid group name: (-19)

Description

This function returns the current velocity and acceleration from the jog profiler for one positioner or for all positioners of the selected group.

It must be called when the group is in "JOGGING" mode, otherwise the returned current velocity and current acceleration values will be null.

Prototype

int **GroupJogCurrentGet**(

int SocketID,

char * GroupName,

int NbPositioners,

double * Velocity,

double * Acceleration

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.
NbPositioners	int	Number of positioners in the selected group (1 if a positioner).

Output parameters

Velocity	double *	Current velocity array.
Acceleration	double *	Current Acceleration array.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.
- -19: GroupName doesn't exist or unknown command.

7.2.1.93 GroupJogModeDisable

Name

GroupJogModeDisable – Disables the jog mode *

Input tests

- Refer to section 7.1: “Input Tests Common to all XPS Functions”.
- Invalid object type (group): (-8)
- Invalid group name: (-19)
- Group status must be “JOGGING”: (-22)

Description

Disables the Jog mode. To use this function, the group must be in “JOGGING” state and all positioners must be idle (i.e velocity equal to 0).

This function exits the “JOGGING” state and returns to “READY” state.

If the group state is not in “JOGGING” state, or the profiler velocity is not null, error (-22) is returned.

NOTE

To enable the jog mode use “GroupJogModeEnable” function.

CAUTION

The jog mode cannot be used with spindle group.

Prototype

int **GroupJogModeDisable**(

int SocketID,

char * GroupName

)

Input parameters

SocketID	int	Socket identifier gets by the “TCP_ConnectToServer” function.
GroupName	char *	Group name.

Output parameters

None.

Return (In addition to the results of “Input Tests Common to all XPS Functions”)

- 0: No error.
- -8: Wrong object type for this command.
- -8: Wrong object type for this command.
- -19: GroupName doesn't exist or unknown command.
- -22: Not allowed action.

7.2.1.94 GroupJogModeEnable

Name

GroupJogModeEnable – Enables the jog mode.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Invalid object type (group): (-8), (-18)
- Invalid group name: (-19)
- Group status must be "READY": (-22)
- Backlash must not be activated: (-46)

Description

Enables the Jog mode. To use this function, the group must be in "READY" state and all positioners must be idle (i.e velocity equal to 0).

This function enters "JOGGING" state.

If the group state is not "READY", (-22) error is returned.

NOTE

To disable the jog mode use the "GroupJogModeDisable" function.

CAUTION

The jog mode cannot be used with spindle group.

Prototype

int **GroupJogModeEnable**(
int SocketID,
char * GroupName
)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.
- -19: GroupName doesn't exist or unknown command.
- -22: Not allowed action.
- -46: Not allowed action due to backlash.

7.2.1.95 GroupJogParametersGet

Name

GroupJogParametersGet – Gets the velocity and acceleration set by "GroupJogParametersSet".

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Invalid object type (group or positioner): (-8)
- Invalid positioner name: (-18)
- Invalid group name: (-19)

Description

This function returns the velocity and acceleration in jog mode set by the user for one positioner or for all positioners of the selected group.

It must be called when the group is in "JOGGING" mode, otherwise both the velocity and the acceleration will be null.

To change the velocity and the acceleration on the fly in jog mode, use "GroupJogParametersSet" function.

CAUTION

The jog mode cannot be used with spindle group.

Prototype

int **GroupJogParametersGet**(

int SocketID,

char * GroupName,

int NbPositioners,

double * Velocity,

double * Acceleration

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.
NbPositioners	int	Number of positioners in the selected group.

Output parameters

Velocity	double *	User jog velocity array.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.
- -19: GroupName doesn't exist or unknown command.

7.2.1.96 GroupJogParametersSet

Name

GroupJogParametersSet – Changes the velocity and acceleration on the fly, in jog mode.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Invalid object type (group or positioner): (-8)
- Invalid positioner name: (-18)
- Invalid group name: (-19)
- Group status must be "JOGGING": (-22)
- Input parameters for each positioner:
  - Velocity >MaximumVelocity =>Velocity = MaximumVelocity
  - Velocity <-MaximumVelocity =>Velocity = -MaximumVelocity
  - Acceleration ≤0 (-42)
  - Acceleration >MaximumAcceleration => Acceleration = MaximumAcceleration

Description

This function changes the velocity and acceleration in joge mode on the fly, If an error occurs, each positioner stops and the velocity value is set to zero.

To use this function, the jog mode must be enabled (requires call of the "GroupJogModeEnable" function).

If the group status is not "JOGGING", error (-22) is returned.

If a slave or following error are detected during the jog setting, then (-25) or (-44) errors are returned. In this case, the motion is stopped, the jog mode is disabled and the group status becomes "DISABLE".

CAUTION

The jog mode cannot be used with spindle group.

Prototype

int **GroupJogParametersSet**(

int SocketID,

char * GroupName,

int NbPositioners,

double Velocity,

double Acceleration

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.
NbPositioners	int	Number of positioners in the selected group.
Velocity	double	User jog velocity array.
Acceleration	double	User jog Acceleration array.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.
- -19: GroupName doesn't exist or unknown command.
- -22: Not allowed action.
- -25: Following Error.
- -42: Jog value out of range.
- -44: Slave error disabling master.

7.2.1.97 GroupKill

Name

GroupKill - Kills the selected group.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Invalid object type (group): (-8), (-18)
- Invalid group name: (-19)

Description

Kills the selected group to stop its action. The group returns to "NOTINIT" state. If the group is already in this state then it stays there.

The GroupKill is a high priority command that is executed in any condition.

NOTE

If an initialization, encoder calibration, homing, referencing, motion or trajectory process is in progress, an "emergency stop" will be exectuted.

Error (-26) will be generated, for each of these functions.

Prototype

int **GroupKill**(
int SocketID,
char * GroupName
)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.
- -19: GroupName doesn't exist or unknown command.

7.2.1.98 GroupMotionDisable

Name

GroupMotionDisable – Disables a "READY" group.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Actor must be a group: (-8), (-18)
- Invalid group name: (-19)
- Group status must be "READY": (-22)

Description

Turns OFF the motors, stops the corrector servo loop and disables the position compare mode, if active. The group status becomes "DISABLE".

If the group is not in "READY" state, error (-22) is returned.

NOTE

In the "DISABLED" state the encoder is still read.

To return to "READY" state, call "GroupMotionEnable" function.

Prototype

int **GroupMotionDisable**(

int SocketID,

char * GroupName

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.

Output parameters

None.

Return (In addition to the results of "Input Tests Common to all XPS Functions")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.
- -19: GroupName doesn't exist or unknown command.
- -22: Not allowed action.

7.2.1.99 GroupMotionEnable

Name

GroupMotionEnable – Enables a group in DISABLE state to turn the motors on and to restart corrector loops.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Actor must be a group: (-8), (-18)
- Invalid group name: (-19)
- Group status must be "DISABLE": (-22)

Description

Turns ON the motors and restarts the corrector servo loops. The group state becomes "READY".

If the group is not in "DISABLE" error (-22) is returned.

Prototype

int **GroupMotionEnable**(

int SocketID,

char * GroupName

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.
- -19: GroupName doesn't exist or unknown command.
- -22: Not allowed action.

7.2.1.100 GroupMotionStatusGet

Name

GroupMotionStatusGet – Gets the motion status for one or all positioners of the selected group.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Invalid object type (group or positioner): (-8)
- Invalid positioner name: (-18)
- Invalid group name: (-19)

Description

Returns the motion status for one or all positioners of the selected group.

The motion status possible values are:

0: Not moving state (group status in NOT_INIT, NOT_REF or READY).

1: Busy state (positioner in moving, homing, referencing, spinning, analog tracking, trajectory, encoder calibrating, slave mode).

Prototype

int **GroupMotionStatusGet**(

int SocketID,

char * GroupName,

int NbPositioners,

int * Status

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.
NbPositioners	int	Number of positioners in the selected group.

Output parameters

Status	int *	Positioner status.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.
- -19: GroupName doesn't exist or unknown command.
- -22: Not allowed action.

7.2.1.101 GroupMoveAbort

Name

GroupMoveAbort – aborts the motion or the jog in progress for a group or a positioner.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Invalid object type (group or positioner): (-8)
- Invalid positioner name: (-18)
- Invalid group name: (-19)
- Group status must be "MOVING" or "JOGGING": (-22)

Description

This function aborts a motion or a jog in progress. The group state must be "MOVING" or "JOGGING", otherwise error (-22) is returned.

For a group:

If the group status is "MOVING", this function stops all motion in progress.

If the group status is "JOGGING", this function stops all "jog" motions in progress and disables the jog mode. After this "group move abort" action, the group status becomes "READY".

For a positioner:

If the group status is "MOVING", this function stops the motion of the selected positioner.

If the group status is "JOGGING", this function stops the "jog" motion of the selected positioner.

If the positioner is idle, an error (-22) is returned.

After "positioner move abort" action, if all positioners are idle, the group status changes to "READY", otherwise it stays in the same state.

NOTE

If the "move abort" action fails, error (-27) is returned.

This error is generated when GroupMoveAbort is used to abort a motion of a positioner in a group and the name of the positioner is incorrect.

This error will also be returned by "GroupMove" function.

Prototype

int **GroupMoveAbort**(

int SocketID,

char * GroupName

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.
- -19: GroupName doesn't exist or unknown command.
- -22: Not allowed action.
- -27: Move Aborted.

7.2.1.102 GroupMoveAbortFast [Extended]

Name

GroupMoveAbortFast – aborts with user-defined deceleration a motion or a jog in progress for a group or positioner.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Invalid object type (group or positioner): (-8)
- Valids UserDecelerationMultiplier value (**≥1** and **≤100**): (-17)
- Invalid positioner name: (-18)
- Invalid group name: (-19)
- Group status must be "MOVING" or "JOGGING": (-22)

Description

This function aborts a motion or a jog in progress with a deceleration value defined by user (*UserDeceleration*):

UserDeceleration = DecelerationMultiplier * MaximumAcceleration.

Here: *DecelerationMultiplier*: GroupMoveAbortFast function parameter

MaximumAcceleration: Stage parameter, defined in the stages.ini file.

The group state must be "MOVING" or "JOGGING", otherqise error (-22) is returned.

For a group:

If the group state is "MOVING", this function stops all motion.

If the group state is "JOGGING", this function stops all "jog" motion and disables the jog mode. After this "group move abort" action, the group state becomes "READY".

For a positioner:

If the group state is "MOVING", this function stops the motion of the selected positioner.

If the group state is "JOGGING", this function stops the "jog" motion of the selected positioner.

If the positioner is idle, error (-22) is returned.

After "positioner move abort" action, if all positioners are idle, the group state becomes "READY", otherwise it stays the same

---

NOTE

If the "move abort" action fails, error (-27) is returned.

Prototype

```
int GroupMoveAbortFast(
    int SocketID,
    char * GroupName
    )
```

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.
DecelerationMultiplier	int	Braking deceleration multiplier.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -18: Positioner Name doesn't exist or unknown command.
- -19: GroupName doesn't exist or unknown command.
- -22: Not allowed action.
- -27: Move Aborted.

7.2.1.103 GroupMoveAbsolute

Name

GroupMoveAbsolute - Initiates an absolute move for a positioner or a group.

Input tests

- Refer to section 7.1: “Input Tests Common to all XPS Functions”.
- Invalid object type (group or positioner): (-8)
- Verifies target position in relation with the travel limits: (-17)
  - TargetPosition ≥MinimumTargetPosition.
  - TargetPosition ≤MaximumTargetPosition.
- Invalid positioner name: (-18)
- Invalid group name: (-19)
- Group status must be "READY” or “MOVING”: (-22)

Description

This function initiates an absolute move to one or all positioners of the selected group. The group state must be “READY” or “MOVING”, otherwise error (-22) is returned. If the group is “READY” then the group state becomes “MOVING”.

An absolute motion is defined by the distance between the zero position and the target position. If the current position is the same as the target position then no move will be done.

Each “positioner” move refers to the acceleration, velocity, minimum jerkTime and maximum jerkTime as defined in the “Stages.ini” file or as redefined by the “PositionerSGammaParametersSet” function.

If a slave or following error is detected during the move then (-25) or (-44) errors are returned. In this case, the motion in progress is stopped and the group state becomes “DISABLE”.

If the “MotionDoneMode” is defined as “VelocityAndPositionWindowMotionDone” error (-33) will be returned when the time out (defined by “MotionDoneTimeout” in the stages.ini file) is reached before the motion is done. The group state will change to “DISABLE”.

In case of “GroupMoveAbort”, error (-27) is returned., The motion in progress is stopped and the group state becomes “READY”.

During a move with PositionCompare (or TimeFlasher) scan enabled, if the current following error exceeds *WarningFollowingError* value inside the PositionCompare (or TimeFlasher) scan zone, a *WarningFollowingErrorFlag* is latched. In this case the motion continues and finishes normally (the group status becomes “READY”), but the *GroupMoveAbsolute* function returns (-120) error instead of SUCCESS (0). To reset *WarningFollowingErrorFlag* for next moves, execute *PositionerPositionCompareDisable(*or *PositionerTimeFlasherDisable*) function.

If in “GroupKill” command an emergency brake or an emergency stop has occurred, error (-26) is returned. In this case, the motion in progress is stopped and the group state becomes “NOTINIT”.

NOTE

Asynchronous moves for positioners of the same group are possible through the use of different sockets to send functions.

Prototype

int **GroupMoveAbsolute**(

int SocketID,

char * GroupName,

int NbPositioners,

double * TargetPosition

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.
NbPositioners	int	Number of positioners in the selected group.
TargetPosition	double *	Target position array.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -18: Positioner Name doesn't exist or unknown command.
- -19: GroupName doesn't exist or unknown command.
- -22: Not allowed action.
- -25: Following Error.
- -26: Kill command or Emergency signal: check each positioners and each slave positioners, check that motion does not exceed software limits when combined with mapping and other features.
- -27: Move Aborted.
- -33: Motion done timeout.
- -44: Slave error disabling master.
- -120: Warning following error during move with position compare enabled.

7.2.1.104 GroupMoveEndWait

Name

GroupMoveEndWait– Wait for the end of move (XY group only).

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the group is "XY": (-8)
- Checks expected position after motion: (-211)

Description

This function allows waiting for the true end of the move (after a GroupMoveAbsolute, GroupMoveRelative or GroupMoveSlice).

It is only available for an XY group.

Prototype

int **GroupMoveEndWait**(

int SocketID,

char * GroupName,

double TimeOutMs,

double XPosition,

double YPosition

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	XY Group name.
TimeOutMs	double	Time out in milliseconds.
XPosition	double	X position to check in controller unit.
YPosition	double	Y position to check in controller unit.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -211: Not expected position after motion.

7.2.1.105 GroupMoveRelative

Name

GroupMoveRelative - Initiates a relative move for a positioner or a group.

Input tests

- Refer to section 7.1: “Input Tests Common to all XPS Functions”.
- Invalid object type (group or positioner): (-8)
- Verifies target displacment in relation with the travel limits: (-17)
  - TargetPosition ≥MinimumTargetPosition.
  - TargetPosition ≤MaximumTargetPosition.
- Invalid positioner name: (-18)
- Invalid group name: (-19)
- Group status must be "READY” or “MOVING”: (-22)

Description

This function initiates a relative move defined by the target displacement to one or all positioners of the selected group. The group state must be “READY” or “MOVING” . otherwise error (-22) is returned. If the group is in “READY” state , then it turns intto “MOVING”.

The target displacement and the current position define the new target position to reach:

NewTargetPosition = CurrentTargetPosition + TargetDisplacement

Each “positioner” move refers to the acceleration, velocity, minimum jerkTime and maximum jerkTime as defined in the “Stages.ini” file or as redefined by the “PositionerSGammaParametersSet” function.

If a slave or following error is detected during the move then errors (-25) or (-44) are returned. In this case, the motion in progress is stopped and the group status becomes “DISABLE”.

If “MotionDoneMode” is defined as “VelocityAndPositionWindowMotionDone”, error (-33) is returned when the time out (defined by “MotionDoneTimeout” in the stages.ini file) is reached before the motion is done. The group state becomes “DISABLE”.

In case “GroupMoveAbort” is executed , error (-27) is returned. The motion in progress is stopped and the group state becomes “READY”.

During move with PositionCompare (or TimeFlasher) scan enabled, if the current following error exceeds *WarningFollowingError* value inside the PositionCompare (or TimeFlasher) scan zone, a *WarningFollowingErrorFlag* is latched. In this case the motion continues and ends normally (the group status becomes “READY”), but the *GroupMoveRelative* function returns (-120) error instead of SUCCESS (0). To reset *WarningFollowingErrorFlag* for the next moves, execute *PositionerPositionCompareDisable(*or *PositionerTimeFlasherDisable*) function.

If in “GroupKill” command an emergency brake or an emergency stop has occurred, error (-26) is returned. In this case, the motion in progress is stopped and the group state becomes “NOTINIT”.

NOTE

Asynchronous moves for positioners of a same group are possible through the use of different sockets to send the functions.

Prototype

int **GroupMoveRelative**(

int SocketID,

char * GroupName,

int NbPositioners,

double * Displacement

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.
NbPositioners	int	Number of positioners in the selected group.
Displacement	double *	Relative displacement array.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -18: Positioner Name doesn't exist or unknown command.
- -19: GroupName doesn't exist or unknown command.
- -22: Not allowed action.
- -25: Following Error.
- -26: Kill command or Emergency signal: check each positioners and each slave positioners, check that motion does not exceed software limits when combined with mapping and other features.
- -27: Move Aborted.
- -33: Motion done timeout.
- -44: Slave error disabling master.
- -120: Warning following error during move with position compare enabled.

7.2.1.106 GroupMoveRelativeSimulated

Name

GroupMoveRelativeSimulated – Calculate the Sgamma motion parameters for a distance of a positioner or a group without moving the positioners.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Invalid object type (group or positioner): (-8)
- Invalid positioner name: (-18)
- Invalid group name: (-19)

Description

Calculate the Sgamma motion parameters for a distance of a positioner or a group without moving the positioners.

The target displacement and the setpoint position define the new target position to reach:

NewTargetPosition = SetpointPosition + TargetDisplacement

Each "positioner" move refers to the acceleration, velocity, minimum jerkTime and maximum jerkTime as defined in the "Stages.ini" file or as redefined by the "PositionerSGammaParametersSet" function.

The command can be executed in any state of the group.

After this command is executed, PositionerSGammaMoveResultGet() command can be used to get the motion parameters of the last move.

Prototype

int **GroupMoveRelativeSimulated**(

int SocketID,

char * GroupName,

int NbPositioners,

double * Displacement

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.
NbPositioners	int	Number of positioners in the selected group.
Displacement	double *	Relative displacement array.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.
- -19: GroupName doesn't exist or unknown command.

7.2.1.107 GroupPositionCurrentGet

Name

GroupPositionCurrentGet – Gets the current position for one or all positioners of the selected group.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Invalid positioner name: (-18)
- Invalid group name: (-19)

Description

Returns the current position for one or all positioners of the selected group.

The current position is defined as:

$$CurrentPosition = SetpointPosition - FollowingError$$

Description [HXP-D only]

In case of an **Hexapod** group, this function returns current position of the **Tool** coordinate system in the **Work** coordinate system with X, Y, Z, U, V, W values. Otherwise, returns the current position(s) for one positioner or all positioners of the selected group.

GroupName:

This function returns the CurrentPosition for all positioners of the selected group.

The current position is defined as:

$$CurrentPosition = SetpointPosition - FollowingError$$

PositionerName:

This function returns the CurrentPosition for one positioner if *PositionerName* is:

- Hexapod.1
- Hexapod.2
- Hexapod.3
- Hexapod.4
- Hexapod.5
- Hexapod.6

This function returns the X, Y, Z, U, V or W coordinate of the Hexapod platform (the position of the **Tool** coordinate system in the **Work** coordinate system) if *PositionerName* is:

- Hexapod.X
- Hexapod.Y
- Hexapod.Z
- Hexapod.U
- Hexapod.V
- Hexapod.W

Prototype

int **GroupPositionCurrentGet**(
int SocketID,
char * GroupName,
int NbPositioners,
double * CurrentPosition
)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name or Positioner name.
NbPositioners	int	Number of positioners in the selected group.

Output parameters

CurrentPosition	double *	Current position array.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.
- -19: GroupName doesn't exist or unknown command.

7.2.1.108 GroupPositionSetpointGet

Name

GroupPositionSetpointGet – Gets the setpoint position for one or all positioners of the selected group.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Invalid object type (group or positioner): (-8)
- Invalid positioner name: (-18)
- Invalid group name: (-19)

Description

Returns the setpoint position for one or all positioners of the selected group.

The "setpoint" position is calculated by the motion profiler and represents the "theoretical" position to reach.

Prototype

int **GroupPositionSetpointGet**(

int SocketID,

char * GroupName,

int NbPositioners,

double * SetpointPosition

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.
NbPositioners	int	Number of positioners in the selected group.

Output parameters

SetpointPosition	double *	Setpoint position array.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.
- -19: GroupName doesn't exist or unknown command.

7.2.1.109 GroupPositionTargetGet

Name

GroupPositionTargetGet – Gets the target position for one or all positioners of the selected group.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Invalid object type (group or positioner): (-8)
- Invalid positioner name: (-18)
- Invalid group name: (-19)

Description

Returns the target position for one or all positioners of the selected group.

The target position represents the "end" position after the move.

For instance, during a move from 0 to 10 units, the position values are:

GroupPositionTargetGet = >**10.0000**

GroupPositionCurrentGet = >**5.0005**

GroupPositionSetpointGet = >**5.0055**

Prototype

int **GroupPositionTargetGet**(

int SocketID,

char * GroupName,

int NbPositioners,

double * TargetPosition

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.
NbPositioners	int	Number of positioners in the selected group.

Output parameters

TargetPosition	double *	Target position array.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.
- -19: GroupName doesn't exist or unknown command.

7.2.1.110 GroupReferencingActionExecute

Name

GroupReferencingActionExecute – Initiates the given action, with the given sensor and parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Valids action name and sensor name: (-8)
- Input parameter coherence: (-17)
  - For a "LatchOnHighToLowTransition" or "LatchOnLowToHighTransition" or "LatchOnIndex" or "LatchOnIndexAfterSensorHighToLowTransition" or "MoveToPreviouslyLatchedPosition" action.
  - Parameter ≤MaximumVelocity.
  - Parameter ≠ 0.
  - Referencing state: (-22)
  - Latch must be done since referencing start for a "MoveToPreviouslyLatchedPosition" action.
- Invalid positioner name: (-18)
- Group status must be "NOT REFERENCED": (-22)

Description

Initiates a referencing action for a positioner. A referencing action is defined by a given action name (see "Action list" below), with a given sensor name (see "Sensor list" below) and parameters. For more detail, see XPS User's manual referencing section.

Action list	Sensor to be defined
LatchOnHighToLowTransition	Yes
LatchOnIndex	None
LatchOnIndexAfterSensorHighToLowTransition	Yes
LatchOnLowToHighTransition	Yes
MoveRelative	None
MoveToPreviouslyLatchedPosition	None
SetPosition	None
SetPositionToHomePreset	None

Sensor list

MechanicalZero

MinusEndOfRun

PlusEndOfRun

None.

If a following error occurs during the referencing and motion is in progress, an emergency brake is applied and error (-25) is returned. The group state becomes "NOTINIT".

If the home search time out is reached, error (-28) is returned. The group state becomes "NOTINIT".

After referencing is done, to exit the "REFERENCING" state and to go to "READY" state use "GroupReferencingStop" function.

CAUTION

This function must be used with a positioner.

Prototype

int **GroupReferencingActionExecute**(

int SocketID,

char * GroupName,

char * Action,

char * Sensor,

double Parameter

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.
Action	char *	Referencing action name.
Sensor	char *	Referencing sensor name.
Parameter	double	Referencing parameter (related to the referencing action).

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -17: Parameter out of range or incorrect.
- -18: Positioner Name doesn't exist or unknown command.
- -22: Not allowed action.
- -25: Following Error.
- -28: Home search timeout.

7.2.1.111 GroupReferencingStart

Name

GroupReferencingStart – Starts the referencing mode.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Invalid group name: (-19)
- Group status must be "NOT REFERENCED": (-22)

Description

Starts the referencing mode and sets the group status to "REFERENCING".

To use this function, the selected group must be in "NOT REFERENCED" state, or error (22) is returned.

To stop the referencing mode and go to "READY" state, use "GroupReferencingStop" function.

Prototype

int **GroupReferencingStart**(

int SocketID,

char * GroupName

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -19: GroupName doesn't exist or unknown command.
- -22: Not allowed action.

7.2.1.112 GroupReferencingStop

Name

GroupReferencingStop – Stops the referencing mode.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Invalid group name: (-19)
- Group status must be "REFERENCING": (-22)

Description

Stops the referencing mode and sets the group state to "READY".

To use this function, the selected group must be in "REFERENCING" state, otherwise error (-22) is returned.

The travel limits are checked before stopping referencing mode. Error (-35) is returned, if the profiler position is out of range of the software travel limits and the group stays in the "REFERENCING" state.

Prototype

int **GroupReferencingStop**(

int SocketID,

char * GroupName

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.

Output parameters

None.

Return (In addition to the results of "Input Tests Common to all XPS Functions")

- 0: No error.
- -19: GroupName doesn't exist or unknown command.
- -22: Not allowed action.
- -35: Position is outside of travel limits.

7.2.1.113 GroupSpinCurrentGet

Name

GroupSpinCurrentGet – Gets the spin mode parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the group type (must be a Spindle group): (-8)
- Checks the positioner name: (-18)

Description

This function returns the current (or actual) velocity and acceleration used by the SPIN mode.

Prototype

int **GroupSpinCurrentGet**(

int SocketID,

char * GroupName,

double * Velocity,

double * Acceleration

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Spindle group name.

Output parameters

Velocity	double *	Velocity (units/s).
Acceleration	double *	Acceleration (units/s²).

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.
- -19: GroupName doesn't exist or unknown command.

7.2.1.114 GroupSpinModeStop

Name

GroupSpinModeStop – Stops the motion of the spindle group.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the group type (must be a Spindle group): (-8)
- Checks the positioner name (must be a group name): (-18)

Description

This function stops the motion of a spindle group and sets the group state to READY.

To use this function, the group must be in SPINNING state, otherwise error (-22) is returned.

Prototype

int **GroupSpinModeStop**(

int SocketID,

char * GroupName

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Spindle group name.

Output parameters

None.

Return (In addition to the results of "Input Tests Common to all XPS Functions")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.
- -19: GroupName doesn't exist or unknown command.
- -22: Not allowed action.

7.2.1.115 GroupSpinParametersGet

Name

GroupSpinParametersGet – Gets the spin profiler parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the group type (must be a spindle group): (-8)
- Checks the function (must be a spindle function): (-18)

Description

This function returns the "Setpoint" (theoretical) velocity and acceleration used in SPIN mode.

Prototype

int **GroupSpinParametersGet**(

int SocketID,

char * GroupName,

double * Velocity,

double * Acceleration

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Spindle group name.

Output parameters

Velocity	double *	Setpoint Velocity (units/s).
Acceleration	double *	Setpoint Acceleration (units/s²).

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.
- -19: GroupName doesn't exist or unknown command.

7.2.1.116 GroupSpinParametersSet

Name

GroupSpinParametersSet – Sets the spin profiler parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the group type (must be a spindle group): (-8)
- Checks input parameter value: (-17)
  - Velocity ≤MaximumVelocity.
  - Velocity ≥- MaximumVelocity.
  - Acceleration >0.
  - Acceleration ≤MaximumAcceleration.
- Checks the function (must be a spindle function): (-18)

Description

This function starts the SPIN mode and allows on-the-fly changes to the velocity and acceleration used by this mode. If an error occurs, the positioner stops and the velocity value is set to zero.

After the tests on input values:

If Velocity >MaximumVelocity = >Velocity = MaximumVelocity

If Velocity <- MaximumVelocity = >Velocity = - MaximumVelocity

If Acceleration ≤0 = >ERROR and stop motion

If Acceleration >MaximumAcceleration = >Acceleration = MaximumAcc.

Prototype

int **GroupSpinParametersSet**(

int SocketID,

char * GroupName,

double Velocity,

double Acceleration

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Spindle group name.
Velocity	double	Setpoint Velocity (units/s).
Acceleration	double	Setpoint Acceleration (units/s²).

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -18: Positioner Name doesn't exist or unknown command.
- -19: GroupName doesn't exist or unknown command.

7.2.1.117 GroupStatusGet

Name

GroupStatusGet – Gets the group status code.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Invalid group name: (-19)

Description

Returns the group status code. The group status codes are listed in section 8.8: "Group Status List".

The description of group status code can be retrieved from "GroupStatusStringGet" function.

Prototype

int **GroupStatusGet**(

int SocketID,

char * GroupName,

int * GroupStatus

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.

Output parameters

GroupStatus	int *	Status of the group.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -19: GroupName doesn't exist or unknown command.

7.2.1.118 GroupStatusStringGet

Name

GroupStatusStringGet – Gets the group status description from a group status code.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".

Description

This function returns the group status description corresponding to a group status code (see section 8.10: "Controller Status List").

If the group status code is not referenced, "Error: (" undefined status") will be returned.

Prototype

int **GroupStatusStringGet**(

int SocketID,

int GroupStatusCode,

char * GroupStatusString

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupStatusCode	int	Group status code.

Output parameters

GroupStatusString	char *	Group status description.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.

7.2.1.119 GroupVelocityCurrentGet

Name

GroupVelocityCurrentGet – Gets the current velocity for one or all positioners of the selected group.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Invalid object type (group or positioner): (-8)
- Invalid positioner name: (-18)
- Invalid group name: (-19)

Description

Returns the current velocity for one or all positioners of the selected group.

Prototype

int **GroupVelocityCurrentGet**(

int SocketID,

char * GroupName,

int NbPositioners,

double * CurrentVelocity

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.
NbPositioners	int	Number of positioners in the selected group.

Output parameters

CurrentVelocity	double *	Current Velocity array.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.
- -19: GroupName doesn't exist or unknown command.

7.2.1.120 GroupVelocitySetpointGet

Name

GroupVelocitySetpointGet – Gets the setpoint velocity for one or all positioners of the selected group.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks group type: (-8)
- Checks positioner name: (-18)
- Checks group name: (-19)

Description

Gets the setpoint velocity for one or all positioners of the selected group.

Prototype

int **GroupVelocitySetpointGet**(

int SocketID,

char * GroupName[250],

int NbPositioners,

double * SetpointVelocity

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group or positioner name.
NbPositioners	int	Number of positioners in the group.

Output parameters

SetpointVelocity	double *	Setpoint velocity array.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner name doesn't exist or unknown command.
- -19: Group name doesn't exist or unknown command.

7.2.1.121 HardwareDateAndTimeGet

Name

HardwareDateAndTimeGet – Gets the current date and time.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".

Description

This function returns the current date and time of XPS controller with the format "WeekDay Month Day Hour:Minute:Second Year ", for example "Tue Jan 15 10:28:06 2008".

NOTE

The date and time returned by the controller are not guaranteed and should not be used as a reference.

Prototype

int **HardwareDateAndTimeGet**(

int SocketID,

char * DateAndTime

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.

Output parameters

DateAndTime	char *	Controller date and time.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.

7.2.1.122 HardwareDateAndTimeSet

Name

HardwareDateAndTimeSet – Sets the date and time.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".

Description

This function sets the date and time of the XPS controller. The date format must be "WeekDay Month Day Hour:Minute:Second Year ", for example "Tue Jan 15 10:28:06 2008".

Prototype

int **HardwareDateAndTimeSet**(

int SocketID,

char * DateAndTime

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
DateAndTime	char *	Controller date and time.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.

7.2.1.123 HardwareDriverAndStageGet

Name

HardwareDriverAndStageGet – Gets smart hardware.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks plug number: (-17)
- Checks if the group is not in NOTINIT state: (-22)

Description

This function reads the driver reference and the smart stage name (only for a smart stage) from board EEPROMs for the selected positioner plug number.

Prototype

int **HardwareDriverAndStageGet**(

int SocketID,

int PlugNumber,

char * DriverName,

char * StageName,

)

Input parameters

SocketID	int	Socket identifier gets by the TCP_ConnectToServer" function.
PlugNumber	int	Positioner plug number.

Output parameters

DriverName	char *	Driver reference.
StageName	char *	Smart stage name.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -17: Parameter out of range or incorrect.
- -22: Not allowed action.

7.2.1.124 HexapodCoordinatesGet [HXP-D]

Name

HexapodCoordinatesGet – Takes a point X, Y, Z, U, V, W as input in a specified coordinate system (Work, Tool, Base) and give its position in another coordinate system (Work, Tool, Base)

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Invalid object type because not an hexapod group: (-8)
- Invalid group name: (-19)
- Input/Output coordinate systems must be Work, Tool or Base: (-17)
- Check coordinate systems to convert: (-1116)

Description

This function transform an input hexapod position specified in one coordinate system (Work, Tool or Base) into its hexapod position in one other coordinate system (Work, Tool or Base). The input coordinate system must be different to the output coordinate system.

Prototype

int **HexapodCoordinatesGet** (

int SocketID,

char *GroupName ,

char * CoordinateSystemIn,

char * CoordinateSystemOut,

double Xin, double Yin, double Zin,

double Uin, double Vin, double Win,

double *Xout, double *Yout, double *Zout,

double *Uout, double *Vout, double *Wout)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Hexapod group name
CoordinateSystemIn	char *	Input coordinate system: Work, Tool or Base
CoordinateSystemOut	char *	Output coordinate system: Work, Tool or Base
Xin, Yin, Zin	double	Input Hexapod positions (units)
Uin, Vin, Win	double	Input Hexapod positions (degrees)

Output parameters

Xout, Yout, Zout	double *	Output Hexapod positions (units)
Uout, Vout, Wout	double *	Output Hexapod positions (degrees)

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -19: GroupName doesn't exist or unknown command.
- -1116: Wrong coordinate system

7.2.1.125 HexapodCoordinateSystemGet [HXP-D]

Name

HexapodCoordinatesSystemGet – Get the position of a coordinate system

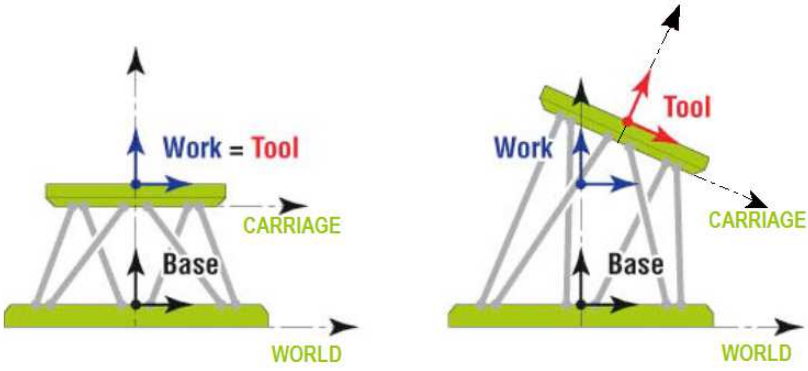
Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Invalid object type because not an hexapod group: (-8)
- Invalid group name: (-19)
- Coordinate systems must be Work, Tool or Base: (-17)
- Check coordinate systems to convert: (-1116)

Description

This function allows you to get the position of a coordinate system in its predecessor.

- **Work** is defined in **WORLD**
- **Base** is defined in **WORLD**
- **Tool** is defined in **CARRIAGE**



Prototype

int **HexapodCoordinateSystemGet** (

int SocketID,

char *GroupName ,

char *CoordinateSystem,

double *X, double *Y, double *Z,

double *U, double *V, double *W)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Hexapod group name
CoordinateSystem	char *	Coordinate system: Work, Tool or Base

Output parameters

X, Y, Z	double *	Coordinate system positions (units)
U, V, W	double *	Coordinate system positions (degrees)

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -19: GroupName doesn't exist or unknown command.
- -1116: Wrong coordinate system

7.2.1.126 HexapodCoordinateSystemSet [HXP-D]

Name

HexapodCoordinatesSystemSet – Modify on-the-fly the position of a coordinate system

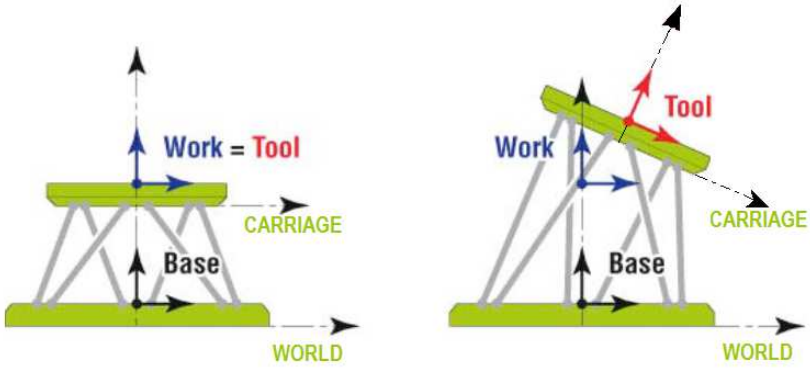
Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Invalid object type because not an hexapod group: (-8)
- Invalid group name: (-19)
- Coordinate systems must be **Work**, **Tool** or **Base**: (-17)
- Check coordinate systems to convert: (-1116)

Description

This function allows you to set the position of a coordinate system in its predecessor.

- **Work** is defined in **WORLD**
- **Base** is defined in **WORLD**
- **Tool** is defined in **CARRIAGE**



This function does not change the settings in the system.ini file. It only changes the current positions of **Tool** and **Work**. After booting the HXP controller, always the default values from the system.ini are used.
In the default configuration of the HXP, the center of the **Tool** coordinate system is at the center of the upper surface of the Hexapod **carriage**, Z is orthogonal to the carriage, and X is in the direction of the motor cables, when the Hexapod is at its reference Home position.
This means the default pivot point for all absolute moves (HexapodMoveAbsolute ()) and for all incremental rotations around **Tool** (HexapodMoveIncremental (GroupName, Tool)) is the **center of the top surface of the carriage**. To change this pivot point, one must change the position of the Tool coordinate system.

Prototype

int **HexapodCoordinateSystemSet** (

int SocketID,

char *GroupName ,

char * CoordinateSystem,

double X, double Y, double Z,

double U, double V, double W)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Hexapod group name
CoordinateSystem	char *	Coordinate system: Work, Tool or Base
X, Y, Z	double	Coordinate system positions (units)
U, V, W	double	Coordinate system positions (degrees)

Output parameters

None

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -19: GroupName doesn't exist or unknown command.
- -1116: Wrong coordinate system

7.2.1.127 HexapodMoveAbsolute [HXP-D]

Name

HexapodMoveAbsolute – Do an absolute move of the Tool coordinate system in the Work coordinate system.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Invalid object type (group or positioner): (-8)
- Verifies leg target position in relation with the positioner travel limits: (-17)
  - LegTargetPosition ≥MinimumTargetPosition.
  - LegTargetPosition ≤MaximumTargetPosition.
- Invalid group name: (-19)
- Invalid coordinate system must be **Work**: (-17)
- Group status must be "READY": (-22)

Description

This function moves the Hexapod to the target position (X Y Z U V W).

To be more precise, it moves the Tool coordinate system, and hence the carriage of the Hexapod that moves with the Tool coordinate system, to the position (X Y Z U V W) in the **Work** coordinate system.

The group state must be "READY" else the (-22) error is returned. If the group is "READY" then the group status becomes "MOVING".

Each "positioner" move refers to the acceleration, velocity, MinimumJerkTime and MaximumJerkTime as defined in the "Stages.ini" file or as redefined by the "PositionerSGammaParametersSet" function.

If a "MotionDoneMode" is defined as "VelocityAndPositionWindowMotionDone" then an (-33) error can be returned if the time out (defined by "MotionDoneTimeout" in the stages.ini file) is reached before the motion done.

If "AbortMove" or "GroupMoveAbort" is done, an (-27) error is returned. In this case, the motion in progress is stopped and the group status becomes "READY".

If a "GroupKill" command, an emergency brake or an emergency stop is occurred, an (-26) error is returned. In this case, the motion in progress is stopped and the group status becomes "NOT INITIALIZED".

NOTE

As the motion is synchronized on the Hexapod struts, the motion does not follow an ideal "straight" trajectory in the work coordinate system. For a 1 mm long trajectory, for example, this may result in a deviation of ~2 µm from the ideal trajectory in the work coordinate system.

Prototype

int **HexapodMoveAbsolute** (

int SocketID,

char *GroupName,

char * CoordinateSystem,

double X, double Y, double Z, double U, double V, double W)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Hexapod group name
CoordinateSystem	char *	Has to be **Work**
X, Y, Z	double	Hexapod target positions in **Work** (units)
U, V, W	double	Hexapod target positions in **Work** (degrees)

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -19: GroupName doesn't exist or unknown command.
- -22: Not allowed action.
- -25: Following Error.
- -26: Kill command or Emergency signal: check each positioners and each slave positioners, check that motion does not exceed software limits when combined with mapping and other features.
- -27: Move Aborted.
- -33: Motion done timeout.
- -44: Slave error disabling master.
- -120: Warning following error during move with position compare enabled.

7.2.1.128 HexapodMoveIncremental [HXP-D]

Name

HexapodMoveIncremental – Performs an incremental move along and around the axis of the Work or Tool coordinate system.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Invalid group type and group name (group or positioner): (-8) (-19)
- Verifies leg target position in relation with the positioner travel limits: (-17)
  - LegTargetPosition ≥ MinimumTargetPosition.
  - LegTargetPosition ≤ MaximumTargetPosition.
- Invalid coordinate system must be **Work** or **Tool**: (-17)
- Group status must be "READY": (-22)

Description

This function performs an incremental move along and around the axis of the **Work** or **Tool** coordinate system.

The group state must be "READY" else the (-22) error is returned. If the group is "READY" then the group status becomes "MOVING".

Each "positioner" move refers to the acceleration, velocity, MinimumJerkTime and MaximumJerkTime as defined in the "Stages.ini" file or as redefined by the "PositionerSGammaParametersSet" function.

If a "MotionDoneMode" is defined as "VelocityAndPositionWindowMotionDone" then an (-33) error can be returned if the time out (defined by "MotionDoneTimeout" in the stages.ini file) is reached before the motion done.

If "AbortMove" or "GroupMoveAbort" is done, an (-27) error is returned. In this case, the motion in progress is stopped and the group status becomes "READY".

If a "GroupKill" command, an emergency brake or an emergency stop is occurred, an (-26) error is returned. In this case, the motion in progress is stopped and the group status becomes "NOT INITIALIZED".

Although this function is very well defined and can be used to increment all 6 coordinates at the same time, it is recommended to increment either only linear coordinates (XYZ), or only one angular coordinate (U, V, or W) at a time.

Prototype

int **HexapodMoveIncremental** (

int SocketID,

char *GroupName,

char * CoordinateSystem,

double X, double Y, double Z, double U, double V, double W)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Hexapod group name
CoordinateSystem	char *	Has to be **Work** or **Tool**
X, Y, Z	double	Linear increments (units)
U, V, W	double	Angular increment (degrees)

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -18: Positioner Name doesn't exist or unknown command.
- -19: GroupName doesn't exist or unknown command.
- -22: Not allowed action.
- -25: Following Error.
- -26: Kill command or Emergency signal: check each positioners and each slave positioners, check that motion does not exceed software limits when combined with mapping and other features.
- -27: Move Aborted.
- -33: Motion done timeout.
- -44: Slave error disabling master.
- -120: Warning following error during move with position compare enabled.

7.2.1.129 HexapodMoveIncrementalControl [HXP-D]

Name

HexapodMoveIncrementalControl – Hexapod trajectory (Line, Arc or Rotation) execution.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Invalid group type and group name (group or positioner): (-8) (-19)
- Check the coordinate system (must be **Work** or **Tool**)(-1116)
- Check the trajectory type (must be "**Line**", "**Arc**" or "**Rotation**"): (-1117)

Description

This function allows executing a hexapod trajectory (Line, Arc or Rotation) with the maximum velocity.

Line: the displacement value is not limited (only by a double format)

Rotation: the displacement value is between –90° and +90° (the limitation is due to Bryant representation)

Arc: the displacement value is between –90° and +90° (the limitation is due to Bryant representation) if the arc is defined with 3 axis. And if the rotation is defined with only one axis, a value greater 90° could be used.

The **units** in case of "**Arc**" and "**Rotation**" (U,V,W) are **Degrees**.

Prototype

```
int HexapodMoveIncrementalControl (
        int SocketID,
        char GroupName [250],
        char CoordinateSystem [250],
        char HexapodTrajectoryType[250],
        double dX,
        double dY,
        double dZ)
```

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function
GroupName	char *	Group name
CoordinateSystem	char *	Coordinate System (**Work** or **Tool**)
HexapodTrajectoryType	char *	Hexapod Trajectory Type (Line, Arc or Rotation)
dX (or dU)	double	incremental displacement value (units)
dY (or dY)	double	incremental displacement value (units)
dZ (or dW)	double	incremental displacement value (units)

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -19: GroupName doesn't exist or unknown command.
- -1116: Wrong coordinate system
- -1117: Wrong trajectory type

7.2.1.130 HexapodMoveIncrementalControlLimitGet [HXP-D]

Name

HexapodMoveIncrementalControlLimitGet – Returns the maximum velocity of carriage and the percent of the trajectory executable

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Invalid group type and group name (group or positioner): (-8) (-19)
- Check the coordinate system (must be **Work** or **Tool**): (-1116)
- Check the trajectory type (must be "**Line**", "**Arc**" or "**Rotation**"): (-1117)

Description

This function allows getting the maximum velocity of **Tool** and the percent of the trajectory executable.
The **units** in case of "**Arc**" and "**Rotation**" (U,V,W) are **Degrees**.

Prototype

```
int HexapodMoveIncrementalControlLimitGet (
        int SocketID,
        char GroupName[250],
        char CoordinateSystem[250],
        char HexapodTrajectoryType[250],
        double dX,
        double dY,
        double dZ,
        double *MaximumVelocity,
        double *TrajectoryPercent)
```

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function
GroupName	char *	Group name
CoordinateSystem	char *	Coordinate System (**Work** or **Tool**)
HexapodTrajectoryType	char *	Hexapod Trajectory Type (Line, Arc or Rotation)
dX (or dU)	double	incremental displacement value (units)
dY (or dV)	double	incremental displacement value (units)
dZ (or dW)	double	incremental displacement value (units)

Output parameters

MaximumVelocity	double *	Maximum velocity of **Tool** (units/sec)
TrajectoryPercent	double *	Percent of the trajectory executable

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -19: GroupName doesn't exist or unknown command.
- -1116: Wrong coordinate system
- -1117: Wrong trajectory type

7.2.1.131 HexapodMoveIncrementalControlPulseAndGatheringSet [HXP-D]

Name

HexapodMoveIncrementalControlPulseAndGatheringSet – Configure gathering with pulses

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Check the divisor value (must be positive): (-17)

Description

This function allows configuring gathering with pulses: gathered data are X, Y, Z, U, V, W and pulses will be generated during only constant velocity.

Once gathering with pulses is configured, the customer could send ***HexapodMoveIncrementalControl*** API to activate it.

The gathered data are the Tool/Work position:
Hexapod.X, Hexapod.Y, Hexapod.Z,Hexapod.U, Hexapod.V, Hexapod.W

The pulses are generated during only SGamma Constant Velocity (Window) and at the same time the data'll be gathered at each pulse.

The interval between 2 pulses: ***Divisor * CorrectorISRPeriod (sec)***

So at the end of the displacement, the customer could send the ***GatheringStopAndSave*** API, and see the gathered data and know exactly at which position a pulse has been generated.

The trajectory pulses are generated on the following GPIO ouputs:

GPIO signals	Extended GPIO board
Window	GPIO5.DO14
Pulses	GPIO5.DO15

Prototype

int **HexapodMoveIncrementalControlPulseAndGatheringSet** (
int SocketID,
char GroupName[250],
int Divisor)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function
GroupName	char *	Group name
Divisor	int	Divisor * CorrectorISRPeriod = interval in sec between 2 pulses

Output parameters

None

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.
- -19: GroupName doesn't exist or unknown command

7.2.1.132 HexapodMoveIncrementalControlWithTargetVelocity [HXP-D]

Name

HexapodMoveIncrementalControlWithTargetVelocity – Hexapod trajectory (Line, Arc or Rotation) execution.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Check the coordinate system (must be **Work** or **Tool**): (-1116)
- Check the trajectory type (must be "Line", "Arc" or "Rotation"): (-1117)

Description

This function allows executing a hexapod trajectory (Line, Arc or Rotation) with the specified velocity.

Line: the displacement value is not limited (only by a double format)

Rotation: the displacement value is between –90° and +90° (the limitation is due to Bryant representation)

Arc: the displacement value is between –90° and +90° (the limitation is due to Bryant representation) if the arc is defined with 3 axis. And if the rotation is defined with only one axis, a value greater 90° could be used.

The **units** in case of "**Arc**" and "**Rotation**" (U,V,W) are **Degrees**.

Prototype

```
int HexapodMoveIncrementalControlWithTargetVelocity (
    int SocketID,
    char GroupName[250],
    char CoordinateSystem [250],
    char HexapodTrajectoryType[250],
    double dX,
    double dY,
    double dZ,
    double Velocity)
```

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function
GroupName	char *	Group name
CoordinateSystem	char *	Coordinate System (**Work** or **Tool**)
HexapodTrajectoryType	char *	Hexapod Trajectory Type (Line, Arc or Rotation)
dX (or dU)	double	incremental displacement value (units)
dY (or dV)	double	incremental displacement value (units)
dZ (or dW)	double	incremental displacement value (units)
Velocity	double	motion velocity (units / seconds)

Output parameters

None

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -18 : Positioner Name doesn't exist or unknown command
- -19: GroupName doesn't exist or unknown command.
- -1116: Wrong coordinate system
- -1117: Wrong trajectory type

7.2.1.133 HexapodPositionCurrentGet [HXP-D]

Name

HexapodPositionCurrentGet – When queried for a group, returns current position of the **Tool** coordinate system in the **Work** coordinate system with X, Y, Z, U, V, W values.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Check group type and group name: (-8) (-19)
- Check hexapod positioner: (-18)

Description

This function returns the current X, Y, Z, U, V, W coordinates of the Hexapod platform (the position of the **Tool** coordinate system in the **Work** coordinate system).

In case of *PositionerName*, it must be defined like following:

- Hexapod.X
- Hexapod.Y
- Hexapod.Z
- Hexapod.U
- Hexapod.V
- Hexapod.W

Prototype

int **HexapodPositionCurrentGet** (

int SocketID,

char *GroupName,

int NbPositioners,

double * HexapodCurrentPosition)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name / Positioner name
NbPositioners	int	Number of positioners in the selected group.

Output parameters

HexapodCurrentPosition	double *	Hexapod current position array

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -18 : Positioner Name doesn't exist or unknown command
- -19: GroupName doesn't exist or unknown command.

7.2.1.134 HexapodPositionSetpointGet [HXP-D]

Name

HexapodPositionSetpointGet – When queried for a group, returns setpoint position of the **Tool** coordinate system in the **Work** coordinate system with X, Y, Z, U, V, W values.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Check group type and group name: (-8) (-19)
- Check hexapod positioner: (-18)

Description

This function returns the setpoint X, Y, Z, U, V, W coordinates of the Hexapod platform (the position of the **Tool** coordinate system in the **Work** coordinate system).

In case of *PositionerName*, it must be defined like following:

- Hexapod.X
- Hexapod.Y
- Hexapod.Z
- Hexapod.U
- Hexapod.V
- Hexapod.W

Prototype

int **HexapodPositionSetpointGet** (

int SocketID,

char *GroupName,

int NbPositioners,

double * HexapodSetpointPosition)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name / Hexapod positioner name
NbPositioners	int	Number of positioners in the selected group.

Output parameters

HexapodSetpointPosition	double *	Hexapod setpoint position array

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -18 : Positioner Name doesn't exist or unknown command
- -19: GroupName doesn't exist or unknown command.

7.2.1.135 HexapodPositionTargetGet [HXP-D]

Name

HexapodPositionTargetGet – When queried for a group, returns target position of the **Tool** coordinate system in the **Work** coordinate system with X, Y, Z, U, V, W values.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Check group type and group name: (-8) (-19)
- Check hexapod positioner: (-18)

Description

This function returns the target X, Y, Z, U, V, W coordinates of the Hexapod platform (the position of the **Tool** coordinate system in the **Work** coordinate system).

In case of *PositionerName*, it must be defined like following:

- Hexapod.X
- Hexapod.Y
- Hexapod.Z
- Hexapod.U
- Hexapod.V
- Hexapod.W

Prototype

int **HexapodPositionTargetGet** (
int SocketID,
char *GroupName,
int NbPositioners,
double * HexapodTargetPosition)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name / Hexapod positioner name
NbPositioners	int	Number of positioners in the selected group.

Output parameters

HexapodTargetPosition	double *	Hexapod target position array

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -18 : Positioner Name doesn't exist or unknown command
- -19: GroupName doesn't exist or unknown command.

7.2.1.136 InstallerVersionGet

Name

InstallerVersionGet– Gets the installer pack version installed in the controller.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".

Description

This function returns the installer pack version used for the current firmware installation.

Prototype

int **InstallerVersionGet**(

int SocketID,

char * Version

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.

Output parameters

Version	char *	Installer pack version.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.

7.2.1.137 INTServitudesCommandGet [ISA]

Name

INTServitudesCommandGet – Reads INT servitudes command.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".

Description

This function returns the INT servitudes command register value.

Prototype

int **INTServitudesCommandGet**(

int SocketID,

short * INTServitudesCommand

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.

Output parameters

INTServitudesCommand	short *	INT servitudes command.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -126: Wrong parameter type in the command string: short or short * expected.

7.2.1.138 INTServitudesStatusGet [ISA]

Name

INTServitudesStatusGet– Reads INT servitudes status.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".

Description

This function returns the INT servitudes status register value.

Prototype

int **INTServitudesStatusGet**(

int SocketID,

short * INTServitudesStatus

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.

Output parameters

INTServitudesStatus	short *	INT servitudes status.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -126: Wrong parameter type in the command string: short or short * expected.

7.2.1.139 KillAll

Name

KillAll – Kills all groups.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".

Description

This function kills and resets all groups as well as all analog and digital I/O's

The following sequence of steps is performed by KillAll function.

1) An "emergency stop" is exectuted if the group state is defined as:
   HOMING
   REFERENCING
   MOVING
   JOGGING
   ANALOG_TRACKING
2) The motor is turned off, the motion done is stopped and the control loop is stopped.
3) "ERR_EMERGENCY_SIGNAL" is returned by each function in progress, and for groups that are in following states:
   MOTOR_INIT
   ENCODER_CALIBRATING
   HOMING
   REFERENCING
   MOVING
   TRAJECTORY
   ERR_EMERGENCY_SIGNAL
4) the group state is not initialized "NOTINIT" for all groups.

Prototype

int **KillAll**(
   int SocketID
)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.

7.2.1.140 Login

Name

Login – Self-identification.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the user name and the password: (-106)

Description

This function allows a user to identify himself as "SuperUser", "Administrator" or "User".

The user account must be exited, otherwise error (-106) is returned.

This function is not meant to be used from the "terminal" web page.

NOTE

To add a new user account, you must use the XPS web site with "Administrator" rights. In the main menu, select "Controller " and go to the "Users management" page.

Prototype

int **Login**(

char * Name,

char * Password

)

Input parameters

Name	char *	User name.
Password	char *	User password.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -106: Wrong user name or password.
- -123: Action not allowed, an Administrator is already logged in.

7.2.1.141 LoginS

Name

LoginS – Self-identification in secured mode.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the user name and the crypted password: (-106)

Description

This function allows a user to identify himself as "SuperUser", "Administrator" or "User".

The user account must be exited, otherwise error (-106) is returned.

This function is not meant to be used from the "terminal" web page.

NOTE

To add a new user account, you must use the XPS web site with "Administrator" rights. In the main menu, select "Controller " and go to the "Users management" page.

Prototype

int **Login**(

char * Name,

char * CryptedPassword

)

Input parameters

Name	char *	User name.
CryptedPassword	char *	Crypted User password.

Output parameters

None.

Return (In addition to the results of "Input Tests Common to all XPS Functions")

- 0: No error.
- -106: Wrong user name or crypted password.
- -123: Action not allowed, an Administrator is already logged in.

7.2.1.142 MultiplePDSAAxisByAxisExecution

Name

MultiplePDSAAxisByAxisExecution – Executes an axis by axis search algorithm.

Input tests

- Checks group type (must be a MultipleAxes group): (-8)
- Group state must be "READY": (-22)
- Checks message queue: (-71)

Description

This function executes from the current position, stages execute axis by axis a relative move in both directions, and then returns to the location of the highest power found.

During the algorithm execution, if a positioner reaches one of its travel limits, the execution stops and error (-25) is generated under positioner errors.

NOTE

In case of errors (-33), (-25) and (-44) , , the group state changes to DISABLE. To help determine the error source, check the positioner errors, the hardware status and the driver status.

Prototype

```
int MultiplePDSAAxisByAxisExecution (
    int SocketID,
    int *IsTresholdReached,
    double *SignalValue,
    char PositionerNameList [255],
    double RangeArray,
    double *PositionerPeakLocationArray,
    )
```

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerNameList	char *	List of axes, up to 6 axes names in the desired order.
Range array	double	Range value for each axis.

Output parameters

IsTresholdReached	int *	1 if the threshold is reached 0 if not.
SignalValue	double *	Value of the highest power found.
PositionerPeakLocationArray	double*	Value of the PeakLocation of each axis.

Return

- 0: No error.
- -3 String too long.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -19: Group name doesn't exist or unknown command.
- -22: Not allowed action.
- -25: Following Error.
- -33: Motion done timeout.

7.2.1.143 MultiplePDSASpiralStepExecution

Name

MultipleAxesPDSASpiralStepExecutionAPI – Executes a spiral step search algorithm.

Input tests

- Checks group type (must be a MultipleAxes group): (-8)
- Checks input value (Range must > Step): (-1057)
- Group state must be "READY": (-22)
- Checks message queue: (-71)

Description

This function used to find first-light or peak power, stages are moved in an outward "spiral" until reaching the power threshold or to the highest power position after completing the scan without reaching the power threshold "Step by step" motion allows stopping as soon as the power threshold is reached.

During the algorithm execution, if a positioner reaches one of its travel limits, the execution stops and error (-25) is generated under positioner errors.

NOTE

In case of errors (-33), (-25) and (-44) , , the group state changes to DISABLE. To help determine the error source, check the positioner errors, the hardware status and the driver status.

Prototype

```
int MultipleAxesPDSASpiralStepExecutionAPI (
    int SocketID,
    char PositionerName[255],
    char PositionerName[255],
    double Step,
    double Range,
    int *IsTresholdReached,
    double *SignalValue,
    double *FirstPositionerPeakLocation,
    double *SecondPositionerPeakLocation,
    )
```

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	First Axis.
PositionerName	char *	Second Axis.
Step	double	Spiral step size.
Range	double	Spiral total range.

Output parameters

IsTresholdReached	int *	1 if the threshold is reached 0 if not.
SignalValue	double *	Value of the highest power found.
FirstPositionerPeakLocation	double*	Value of the PeakLocation of the first axis.
SecondPositionerPeakLocation	double*	Value of the PeakLocation of the second axis.

Return

- 0: No error.
- -3 String too long.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -19: Group name doesn't exist or unknown command.
- -22: Not allowed action.
- -25: Following Error.
- -33: Motion done timeout.
- -1056: Signal below threshold.
- -1057: Range must be higher than step.

7.2.1.144 MultiplePDSASpiralContinuousExecution

Name

MultipleAxesPDSASpiralContinuousExecution – Executes a spiral continuous search algorithm.

Input tests

- Checks group type (must be a MultipleAxes group): (-8)
- Checks input value (Range must > Step): (-1057)
- Checks input value (Speed must > 0): (-17)
- Group state must be "READY": (-22)
- Checks message queue: (-71)

Description

This function used to find first-light or peak power, stages are moved in an outward "spiral" until reaching the power threshold or to the highest power position after completing the scan without reaching the power threshold "Continuous" motion completes the whole spiral in a smoother way and returns to the highest power position.

During the algorithm execution, if a positioner reaches one of its travel limits, the execution stops and error (-25) is generated under positioner errors.

NOTE

In case of errors (-33), (-25) and (-44) , , the group state changes to DISABLE. To help determine the error source, check the positioner errors, the hardware status and the driver status.

Prototype

```
int MultipleAxesPDSASpiralContinuousExecution(
    int SocketID,
    char PositionerName[255],
    char PositionerName[255],
    double Step,
    double Range,
    double Speed,
    int *IsTresholdReached,
    double *SignalValue,
    double *FirstPositionerPeakLocation,
    double *SecondPositionerPeakLocation,
    )
```

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	First Axis.
PositionerName	char *	Second Axis.
Step	double	Spiral step size.
Range	double	Spiral total range.
Speed	double	Speed on spiral

Output parameters

IsTresholdReached	int *	1 if the threshold is reached 0 if not.
SignalValue	double *	Value of the highest power found.
FirstPositionerPeakLocation	double*	Value of the PeakLocation of the first axis.
SecondPositionerPeakLocation	double*	Value of the PeakLocation of the second axis.

Return

- 0: No error.
- -3 String too long.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -19: Group name doesn't exist or unknown command.
- -22: Not allowed action.
- -25: Following Error.
- -33: Motion done timeout.
- -1056: Signal below threshold.
- -1057: Range must be higher than step.
- -46: Not allowed action due to backlash.
- -48: BaseVelocity must be null.
- -61: Error file corrupt or file doesn't exist.
- -71: Error read from or write in message queue.
- -72: Error trajectory initialization.

7.2.1.145 MultiplePDSARasterExecution

Name

MultipleAxesPDSARasterExecution – Executes a raster search algorithm.

Input tests

- Checks group type (must be a MultipleAxes group): (-8)
- Checks input value (Length must > Step): (-1059)
- Group state must be "READY": (-22)
- Checks message queue: (-71)

Description

This function used to find first-light or peak power, stages are moved in a raster scan way until reaching the power threshold or to the highest power position after completing the scan without reaching the power threshold.

During the algorithm execution, if a positioner reaches one of its travel limits, the execution stops and error (-25) is generated under positioner errors.

NOTE

In case of errors (-33), (-25) and (-44) , , the group state changes to DISABLE. To help determine the error source, check the positioner errors, the hardware status and the driver status.

Prototype

```
int MultipleAxesPDSARasterExecution  (
    int SocketID,
    char PositionerName[255],
    char PositionerName[255],
    double Length,
    double Step,
    double Width,
    int *IsTresholdReached,
    double *SignalValue,
    double *FirstPositionerPeakLocation,
    double *SecondPositionerPeakLocation,
    )
```

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	First Axis.
PositionerName	char *	Second Axis.
Length	double	2nd axis lenght.
Step	double	2nd axis step.
Width	double	1st axis width.

Output parameters

IsTresholdReached	int *	1 if the threshold is reached 0 if not.
SignalValue	double *	Value of the highest power found.
FirstPositionerPeakLocation	double*	Value of the PeakLocation of the first axis.
SecondPositionerPeakLocation	double*	Value of the PeakLocation of the second axis.

Return

- 0: No error.
- -3 String too long.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -19: Group name doesn't exist or unknown command.
- -22: Not allowed action.
- -25: Following Error.
- -33: Motion done timeout.
- -1056: Signal below threshold.
- -1059: Length must be higher than step.

7.2.1.146 MultiplePDSADichotomyExecution

Name

MultipleAxesPDSADichotomyExecution – Executes a dichotomy search algorithm.

Input tests

- Checks group type (must be a MultipleAxes group): (-8)
- Checks input value (MaxReductionFactor must > ReductionFactor): (-1058)
- Group state must be "READY": (-22)
- Checks message queue: (-71)

Description

In this function stages are moved axis by axis on a wide range using large steps to find a "summit" and return to it. Then the principle is repeated with smaller steps, until finding the peak power position.

During the algorithm execution, if a positioner reaches one of its travel limits, the execution stops and error (-25) is generated under positioner errors.

NOTE

In case of errors (-33), (-25) and (-44) , , the group state changes to DISABLE. To help determine the error source, check the positioner errors, the hardware status and the driver status.

Prototype

```
int MultipleAxesPDSADichotomyExecution (
    int SocketID,
    double ReductionFactor,
    double MaxReductionFactor
    int *IsTresholdReached,
    double *SignalValue,
    char PositionerNameList [255],
    double StepArray,
    double *PositionerPeakLocationArray,
    )
```

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
ReductionFactor	double	
MaxReductionFactor	double	
PositionerNameList	char *	List of axes, up to 6 axes names in the desired order.
Steparray	double	Initial step value for each axis.

Output parameters

IsTresholdReached	int *	1 if the threshold is reached 0 if not.
SignalValue	double *	Value of the highest power found.
FirstPositionerPeakLocation	double*	Value of the PeakLocation of the first axis.
SecondPositionerPeakLocation	double*	Value of the PeakLocation of the second axis.

Return

- 0: No error.
- -3 String too long.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -19: Group name doesn't exist or unknown command.
- -22: Not allowed action.
- -25: Following Error.
- -33: Motion done timeout.
- -1056: Signal below threshold.
- -1058: Max reduction factor must be higher than reduction factor.

7.2.1.147 MultiplePDSAEscaladeStepExecution

Name

MultipleAxesPDSAEscaladeStepExecution – Executes an escalade step search algorithm.

Input tests

- Checks group type (must be a MultipleAxes group): (-8)
- Checks input value (Range must > Step): (-1057)
- Group state must be "READY": (-22)
- Checks message queue: (-71)

Description

In this function after completing a first spiral search, a half size second spiral is executed at a different Z position, then stages moves step by step (by a quarter of Z motion) on the axis defined by the two spiral peak power until reaching a maximum or the threshold.

During the algorithm execution, if a positioner reaches one of its travel limits, the execution stops and error (-25) is generated under positioner errors.

NOTE

In case of errors (-33), (-25) and (-44) , , the group state changes to DISABLE. To help determine the error source, check the positioner errors, the hardware status and the driver status.

This algorithm works only on X, Y and Z axes

Prototype

```
int MultipleAxesPDSAEscaladeStepExecution (
    int SocketID,
    char GroupName[255],
    double XYStep,
    double XYRange,
    double Zstep
    int *IsTresholdReached,
    double *SignalValue,
    double *FirstPositionerPeakLocation,
    double *SecondPositionerPeakLocation,
    double *ZPeakLocation,
    )
```

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	GroupName.
XYStep	double	First spiral step size.
XYRange	double	First spiral total range.
ZStep	double	First Z motion.

Output parameters

IsTresholdReached	int *	1 if the threshold is reached 0 if not.
SignalValue	double *	Value of the highest power found.
FirstPositionerPeakLocation	double*	Value of the PeakLocation of the first axis.
SecondPositionerPeakLocation	double*	Value of the PeakLocation of the second axis.
ZPeakLocation	double *	Value of the Peak location of Z axis.

Return

- 0: No error.
- -3 String too long.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -19: Group name doesn't exist or unknown command.
- -22: Not allowed action.
- -25: Following Error.
- -33: Motion done timeout.
- -1056: Signal below threshold.
- -1057: Range must be higher than step.

7.2.1.148 MultiplePDSAEscaladeContinuousExecution

Name

MultipleAxesPDSAEscaladeContinuousExecution – Executes a spiral continuous search algorithm.

Input tests

- Checks group type (must be a MultipleAxes group): (-8)
- Checks input value (Range must > Step): (-1057)
- Checks input value (Speed must > 0): (-17)
- Group state must be "READY": (-22)
- Checks message queue: (-71)

Description

In this function after completing a first spiral search, a half size second spiral is executed at a different Z position, then stages moves step by step (by a quarter of Z motion) on the axis defined by the two spiral peak power until reaching a maximum or the threshold.

During the algorithm execution, if a positioner reaches one of its travel limits, the execution stops and error (-25) is generated under positioner errors.

NOTE

In case of errors (-33), (-25) and (-44) , , the group state changes to DISABLE. To help determine the error source, check the positioner errors, the hardware status and the driver status.

Prototype

```
int MultipleAxesPDSAEscaladeContinuousExecution (
    int SocketID,
    char GroupName[255],
    double XYStep,
    double XYRange,
    double Zstep
    double Speed
    int *IsTresholdReached,
    double *SignalValue,
    double *FirstPositionerPeakLocation,
    double *SecondPositionerPeakLocation,
    double *ZPeakLocation,
    )
```

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	GroupName.
XYStep	double	First spiral step size.
XYRange	double	First spiral total range.
ZStep	double	First Z motion.
Speed	double	Speed on spiral

Output parameters

IsTresholdReached	int *	1 if the threshold is reached 0 if not.
SignalValue	double *	Value of the highest power found.
FirstPositionerPeakLocation	double*	Value of the PeakLocation of the first axis.
SecondPositionerPeakLocation	double*	Value of the PeakLocation of the second axis.
ZPeakLocation	double *	Value of the Peak location of Z axis.

Return

- 0: No error.
- -3 String too long.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -19: Group name doesn't exist or unknown command.
- -22: Not allowed action.
- -25: Following Error.
- -33: Motion done timeout.
- -1056: Signal below threshold.
- -1057: Range must be higher than step.
- -46: Not allowed action due to backlash.
- -48: BaseVelocity must be null.
- -61: Error file corrupt or file doesn't exist.
- -71: Error read from or write in message queue.
- -72: Error trajectory initialization.

7.2.1.149 MultipleAxesPTExecution

Name

MultipleAxesPTExecution – Executes a PT trajectory.

Input tests

- Refer to section 7.1: “Input Tests Common to all XPS Functions”.
- Checks trajectory file name length: (-3)
- Checks group type (must be a MultipleAxes group): (-8)
- Checks input value (number of executions must >0): (-17)
- Checks group name: (-19)
- Group state must be "READY”: (-22)
- Checks backlash (must not be enabled): (-46)
- Checks BaseVelocity (stages.ini, must = 0): (-48)
- Checks trajectory file existence or file reading: (-61)
- Checks message queue: (-71)

Description

This function executes a PT (Position Time) trajectory. The trajectory file must be stored in “\Admin\Public\Trajectory” folder of the XPS controller. If the trajectory cannot be initialized (message queue or task error) , error (-72) is returned.

Before a trajectory execution, it is recommended to check whether the trajectory is within the positioner motion capabilities by using “MultipleAxesPTVerification” and “MultipleAxesPTVerificationResultGet” functions.

During the trajectory execution, if a positioner reaches one of travel limits, the trajectory execution will stop and error (-25) is generated under positioner errors.

NOTE

In case of errors (-33), (-25) and (-44) , , the group state changes to DISABLE. To help determine the error source, check the positioner errors, the hardware status and the driver status.

Prototype

```
int MultipleAxesPTExecution(
    int SocketID,
        char GroupName[250],
    char FileName[250],
    int ExecutionNumber
    )
```

Input parameters

SocketID	int	Socket identifier gets by the “TCP_ConnectToServer” function.
GroupName	char *	Group name.
FileName	char *	Trajectory file name.
ExecutionNumber	int	Number of trajectory executions.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -3: String too long.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -19: Group name doesn't exist or unknown command.
- -22: Not allowed action.
- -25: Following Error.
- -33: Motion done timeout.
- -44: Slave error disabling master.
- -46: Not allowed action due to backlash.
- -48: BaseVelocity must be null.
- -61: Error file corrupt or file doesn't exist.
- -71: Error read from or write in message queue.
- -72: Error trajectory initialization.

7.2.1.150 MultipleAxesPTLoadToMemory [Extended]

Name

MultipleAxesPTLoadToMemory – Loads some lines of PT trajectory to the controller memory.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks trajectory data (data length must >0 and ≤400): (-3) or (-17)
- Checks group type (must be a MultipleAxes group): (-8)
- Checks group name: (-19)
- Not available in this configuration (PrecisionPlatform firmware only): (-24)

Description

This function loads some lines of PT trajectory into XPS controller memory. Each trajectory element must be separated by a comma. The trajectory lines are separated between each other by "\n" (LF) character. To verify or to execute the PT trajectory loaded in memory, use "**FromMemory**" string instead of a file name.

NOTES

- **All of the PT functions, when called with the string "FromMemory" instead of a FileName, will perform the same operation as the PVT trajectory in RAM as it does from a disk.**

  Example:

  MultipleAxesPTVerification (socketId,myGroup,FromMemory)

  MultipleAxesPTExecution(socketId,myGroup,FromMemory,1).

Prototype

int **MultipleAxesPTLoadToMemory**(

int SocketID,

char GroupName[250],

char TrajectoryData[400]

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.
TrajectoryData	char *	Trajectory data lines.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -3: String too long.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -19: Group name doesn't exist or unknown command.
- -24: Not available in this configuration.

7.2.1.151 MultipleAxesPTParametersGet

Name

MultipleAxesPTParametersGet – Gets PT trajectory parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks group type (must be a MultipleAxes group): (-8)
- Checks group name: (-19)
- Checks current executing trajectory type (must be PT): (-22)

Description

This function returns the PT trajectory parameters (trajectory name and current executing element number) of the current PT trajectory.

Prototype

int **MultipleAxesPTParametersGet**(

int SocketID,

char GroupName[250],

char * FileName,

int * CurrentElementNumber

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.

Output parameters

FileName	char *	Currently executing trajectory file name.
CurrentElementNumber	int *	Currently executing element number.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -19: Group name doesn't exist or unknown command.
- -22: Not allowed action.

7.2.1.152 MultipleAxesPTPulseOutputGet

Name

MultipleAxesPTPulseOutputGet – Gets the configuration of pulse generation for PT trajectory.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks group type (must be a MultipleAxes group): (-8)
- Checks group name: (-19)

Description

This function returns the last configuration of pulse generation of a PT trajectory, that was previously set by *MultipleAxesPTPulseOutputSet().*

The pulse output configuration is defined with a start element, an end element, and a time interval in seconds.

Example:

MultipleAxesPTPulseOutputSet(MyGroup, 3, 5, 0.01)

MultipleAxesPTPulseOutputGet(MyGroup) => 0,3,5,0.01 (0 is the error return, meaning " no error ")

One pulse will be generated every 10 ms between the start of the 3rd element and the end of the 5th element.

Start element= 3

End element = 5

Time interval = 0.01 seconds.

Prototype

int **MultipleAxesPTPulseOutputGet**(

int SocketID,

char GroupName[250],

int * StartElement,

int * EndElement,

double * TimeInterval

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.

Output parameters

StartElement	int *	Start pulse element number.
EndElement	int *	End pulse element number.
TimeInterval	double *	Time interval between pulses (seconds).

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -19: Group name doesn't exist or unknown command.

7.2.1.153 MultipleAxesPTPulseOutputSet

Name

MultipleAxesPTPulseOutputSet – Sets the configuration of pulse generation for PT trajectory.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks group type (must be a MultipleAxes group): (-8)
- Checks group name: (-19)
- Checks the pulse generation must not be in progress: (-22)

Description

This function configures and activates the pulse generation of a PT trajectory. The pulse generation is defined by a start element, an end element, and a time interval in seconds. If a pulse generation is already activated on the selected PT trajectory then this function returns error -22 ("Not allowed action").

Please note,that the pulse output settings are automatically removed,when the trajectory is over. Hence, with the execution of every new trajectory, it is required to define the pulse output settings again.

This capability allows output of pulses at constant time intervals on a PT trajectory. The pulses are generated between the first and the last trajectory element. The minimum possible time interval is CorrectorISRPeriod value (*system.ref*).

The trajectory pulses are generated on the following GPIO ouputs:

GPIO signals	ISA XPS controller	PCI XPS controller (for example XPS-RL) with basic GPIO board	PCI XPS controller (for example XPS-RL) with extended GPIO board
Window	GPIO2, pin 11	GPIO1.DO6	GPIO5.DO14
Pulses	GPIO2, pin 12	GPIO1.DO7	GPIO5.DO15

To find the GPIO connector pin number from GPIOx.DOy, refer to Appendix / General I/O Description of XPS User's Manual,.

Example:

MultipleAxesPTPulseOutputSet(Group1, 3, 5, 0.01)

One pulse will be generated every 10 ms between the start of the 3rd element and the end of the 5th element.

Prototype

int **MultipleAxesPTPulseOutputSet**(

int SocketID,

char GroupName[250],

int StartElement,

int EndElement,

double TimeInterval

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.
StartElement	int	Start pulse element number.
EndElement	int	End pulse element number.
TimeInterval	double	Time interval between pulses (seconds).

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -19: Group name doesn't exist or unknown command.
- -22: Not allowed action.

7.2.1.154 MultipleAxesPTResetInMemory [Extended]

Name

MultipleAxesPTResetInMemory – Deletes the content of PT trajectory buffer in the controller memory.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks group type (must be a MultipleAxes group): (-8)
- Checks group name: (-19)
- Not available in this configuration (PrecisionPlatform firmware only): (-24)

Description

This function deletes the PT trajectory buffer, that was previously loaded with "MultipleAxesPTLoadToMemory" function, in the controller memory.

Prototype

int **MultipleAxesPTResetInMemory**(

int SocketID,

char GroupName[250]

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -3: String too long.
- -8: Wrong object type for this command.
- -19: Group name doesn't exist or unknown command.
- -24: Not available in this configuration.

7.2.1.155 MultipleAxesPTVerification

Name

MultipleAxesPTVerification – Checks the PT trajectory data file.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks trajectory file name length (must ≤250): (-3)
- Checks group type (must be a MultipleAxes group): (-8)
- Checks group name: (-19)
- Checks BaseVelocity value (must = 0): (-48)
- Checks trajectory file existence and the file format: (-61)
- Checks trajectory (number of elements must >0): (-66)
- Checks velocity (Minimum Velocity ≤Velocity ≤Maximum Velocity): (-68)
- Checks acceleration (Minimum acc. ≤acceleration ≤Maximum acc.): (-69)
- Checks end output velocity (must = 0): (-70)
- Checks delta time (DeltaTime must >0): (-75)

Description

This function verifies the execution of a PT trajectory. The results of the verification can be obtained by "MultipleAxesPTVerificationResultGet" function. The trajectory file must be stored in "\ADMIN\Public\Trajectory" folder of XPS controller. If the trajectory cannot be initialized (task error), error (-72) is returned.

This function can be executed at any time and is independent of the trajectory execution. It performs the following:

- Checks the trajectory file for data coherence.
- Calculates the trajectory limits,:1) the required travel per positioner, 2)the maximum possible trajectory velocity and 3) the maximum possible trajectory acceleration. This function helps to define the parameters for the trajectory execution.
- The required travel values (MinimumPosition and MaximumPosition) are calculated relative to the position zero and not to the current position. So before executing a PT trajectory, the user must pay attention to the current position of the positioners to make sure that the trajectory will not exceed the positioner travel limits.
- If all is OK, it returns "SUCCESS" (0). Otherwise, it returns a corresponding error.

NOTES

Because of the PT trajectory internal calculation of elements end velocity, a correct PT trajectory file must have at least two lines with zero displacements at the trajectory end. Otherwise, the "MultipleAxesPTVerification" function returns error (-70).

The "MultipleAxesPTVerification" function is independent from the "MultipleAxesPTExecution" function, but it is highly recommended to execute this function before executing the PT trajectory.

Prototype

int **MultipleAxesPTVerification**(
int SocketID,
char GroupName[250],
char FileName[250]
)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.
FileName	char *	Trajectory file name.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -3: String too long.
- -8: Wrong object type for this command.
- -19: Group name doesn't exist or unknown command.
- -61: Error file corrupt or file doesn't exist.
- -66: Trajectory doesn't content any element.
- -68: Acceleration on trajectory is too big.
- -69: Acceleration on trajectory is too big.
- -70: Final velocity on trajectory is not zero.
- -72: Error trajectory initialization.
- -75: Trajectory element has a negative or null delta T.

7.2.1.156 MultipleAxesPTVerificationResultGet

Name

MultipleAxesPTVerificationResultGet – Gets the results of the "MultipleAxesPTVerification" function.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks positioner name length (must ≤250): (-3)
- Checks positioner name: (-18)
- Checks the last MultipleAxes PTVerification (must be done): (-22)

Description

This function returns the results of the previous "MultipleAxesPTVerification" function, for every positioner. The results are the travel requirements (min and max values), the possible maximum velocity and the possible maximum acceleration.

If no verification was previously done , error (-22) is returned.

Prototype

int **MultipleAxesPTVerificationResultGet**(

int SocketID,

char PositionerName[250],

char * TrajectoryFileName,

double * MinimumPosition,

double * MaximumPosition,

double * MaximumVelocity,

double * MaximumAcceleration

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.

Output parameters

TrajectoryFileName	char *	Examined trajectory file name.
MinimumPosition	double *	Minimum position (units).
MaximumPosition	double *	Maximum position (units).
MaximumVelocity	double *	Maximum velocity (units/s).
MaximumAcceleration	double *	Maximum acceleration (units/s²).

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -3: String too long.
- -18: Positioner name doesn't exist or unknown command.
- -22: Not allowed action.

7.2.1.157 MultipleAxesPVTExecution

Name

MultipleAxesPVTExecution – Executes a PVT trajectory.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks trajectory file name length: (-3)
- Checks group type (must be a MultipleAxes group): (-8)
- Checks input value (number of executions must >0): (-17)
- Checks group name: (-19)
- Group state must be "READY": (-22)
- Checks backlash (must not be enabled): (-46)
- Checks BaseVelocity (stages.ini, must = 0): (-48)
- Checks trajectory file existence or file reading: (-61)
- Checks message queue: (-71)

Description

This function executes a PVT (Position Velocity Time) trajectory. The trajectory file must be stored in "\Admin\Public\Trajectory" folder of XPS controller. If the trajectory cannot be initialized (message queue or task error), error (-72) is returned.

Before the trajectory execution, it is recommended to check whether the trajectory is within the positioner motion capabilities by using "MultipleAxesPVTVerification" and "MultipleAxesPVTVerificationResultGet" functions.

During the trajectory execution, if a positioner reaches one of its travel limits, the trajectory execution stops and error (-25) error is generated under positioner errors.

NOTE

In case of errors (-33), (-25) and (-44) , , the group state changes to DISABLE. To help determine the error source, check the positioner errors, the hardware status and the driver status.

Prototype

int **MultipleAxesPVTExecution**(

int SocketID,

char GroupName[250],

char FileName[250],

int ExecutionNumber

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.
FileName	char *	Trajectory file name.
ExecutionNumber	int	Number of trajectory executions.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -3 String too long.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -19: Group name doesn't exist or unknown command.
- -22: Not allowed action.
- -25: Following Error.
- -33: Motion done timeout.
- -44: Slave error disabling master.
- -46: Not allowed action due to backlash.
- -48: BaseVelocity must be null.
- -61: Error file corrupt or file doesn't exist.
- -71: Error read from or write in message queue.
- -72: Error trajectory initialization.

7.2.1.158 MultipleAxesPVTLoadToMemory [Extended]

Name

MultipleAxesPVTLoadToMemory – Loads some lines of PVT trajectory to the controller memory.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks trajectory data (data length must >0 and ≤400): (-3) or (-17)
- Checks group type (must be a MultipleAxes group): (-8)
- Checks group name: (-19)
- Not available in this configuration (PrecisionPlatform firmware only): (-24)

Description

This function loads some lines of PVT trajectory into XPS controller memory. Each trajectory element must be separated by a comma. The trajectory lines are separated between each other by "\n" (LF) character. To verify or to execute the PVT trajectory loaded in memory, use "**FromMemory**" string instead of a file name.

NOTES

All of the PVT functions, when called with the string "FromMemory" instead of a FileName, will perform the same operation as the PVT trajectory in RAM as it does from a disk.

Example:

MultipleAxesPVTLoadToMemory(socketId,myGroup,"dT1,dX11,Vout11,dX12,Vout12\n…dTn,dXn1,Voutn1,dXn2,Voutn2\n")

MultipleAxesPVTVerification (socketId,myGroup,FromMemory)

MultipleAxesPVTExecution(socketId,myGroup,FromMemory,1).

Prototype

int **MultipleAxesPVTLoadToMemory**(

int SocketID,

char GroupName[250],

char TrajectoryData[400]

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.
TrajectoryData	char *	Trajectory data lines.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -3: String too long.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -19: Group name doesn't exist or unknown command.
- -24: Not available in this configuration.

7.2.1.159 MultipleAxesPVTParametersGet

Name

MultipleAxesPVTParametersGet – Gets PVT trajectory parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks group type (must be a MultipleAxes group): (-8)
- Checks group name: (-19)
- Checks current executing trajectory type (must be PVT): (-22)

Description

This function returns the PVT trajectory parameters (trajectory name and current executing element number) of the current PVT trajectory.

Prototype

int **MultipleAxesPVTParametersGet**(

int SocketID,

char GroupName[250],

char * FileName,

int * CurrentElementNumber

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.

Output parameters

FileName	char *	Currently executing trajectory file name.
CurrentElementNumber	int *	Currently executing element number.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -19: Group name doesn't exist or unknown command.
- -22: Not allowed action.

7.2.1.160 MultipleAxesPVTPulseOutputGet

Name

MultipleAxesPVTPulseOutputGet – Gets the configuration of pulse generation for PVT trajectory.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks group type (must be a MultipleAxes group): (-8)
- Checks group name: (-19)

Description

This function returns the last configuration of pulse generation for a PVT trajectory, that was previously set by *MultipleAxesPVTPulseOutputSet().*

The pulse output configuration is defined with a start element, an end element, and a time interval in seconds.

Example:

MultipleAxesPVTPulseOutputSet(MyGroup, 3, 5, 0.01)

MultipleAxesPVTPulseOutputGet(MyGroup) => 0,3,5,0.01 (0 is error return, means OK)

One pulse will be generated every 10 ms between the start of the 3rd element and the end of the 5th element.

Start element= 3

End element = 5

Time interval = 0.01 seconds.

Prototype

int **MultipleAxesPVTPulseOutputGet**(

int SocketID,

char GroupName[250],

int * StartElement,

int * EndElement,

double * TimeInterval

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.

Output parameters

StartElement	int *	Start pulse element number.
EndElement	int *	End pulse element number.
TimeInterval	double *	Time interval between pulses (seconds).

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -19: Group name doesn't exist or unknown command.

7.2.1.161 MultipleAxesPVTPulseOutputSet

Name

MultipleAxesPVTPulseOutputSet – Sets the configuration of pulse generation for PVT trajectory.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks group type (must be a MultipleAxes group): (-8)
- Checks group name: (-19)
- Checks the pulse generation must not be in progress: (-22)

Description

This function configures and activates the pulse generation of a PVT trajectory. The pulse generation is defined by a start element, an end element, and a time interval in seconds. If a pulse generation is already activated on the selected PVT trajectory , error (-22) is returned

Please note that the pulse output settings are automatically removed when the trajectory is over. Hence, with the execution of every new trajectory, it is required to define the pulse output settings again.

This capability allows output of pulses at constant time intervals on a PVT trajectory. The pulses are generated between the first and the last trajectory elements. The minimum possible time interval is CorrectorISRPeriod value (*system.ref*).

The trajectory pulses are generated on the following GPIO ouputs:

GPIO signals	ISA XPS controller	PCI XPS controller (for example XPS-RL) with basic GPIO board	PCI XPS controller (for example XPS-RL) with extended GPIO board
Window	GPIO2, pin 11	GPIO1.DO6	GPIO5.DO14
Pulses	GPIO2, pin 12	GPIO1.DO7	GPIO5.DO15

To find the GPIO connector pin number from GPIOx.DOy, refer to XPS User's Manual

Example:

MultipleAxesPVTPulseOutputSet(Group1, 3, 5, 0.01)

One pulse will be generated every 10 ms between the start of the 3rd element and the end of the 5th element.

Prototype

int **MultipleAxesPVTPulseOutputSet**(

int SocketID,

char GroupName[250],

int StartElement,

int EndElement,

double TimeInterval

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.
StartElement	int	Start pulse element number.
EndElement	int	End pulse element number.
TimeInterval	double	Time interval between pulses (seconds).

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -19: Group name doesn't exist or unknown command.
- -22: Not allowed action.

7.2.1.162 MultipleAxesPVTResetInMemory [Extended]

Name

MultipleAxesPVTResetInMemory – Deletes the content of the PVT trajectory buffer in the controller memory.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks group type (must be a MultipleAxes group): (-8)
- Checks group name: (-19)
- Not available in this configuration (PrecisionPlatform firmware only): (-24)

Description

This function deletes the PVT trajectory buffer, that was previously loaded with the "MultipleAxesPVTLoadToMemory" function, from the controller memory.

Prototype

int **MultipleAxesPVTResetInMemory**(

int SocketID,

char GroupName[250]

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -3: String too long.
- -8: Wrong object type for this command.
- -19: Group name doesn't exist or unknown command.
- -24: Not available in this configuration.

7.2.1.163 MultipleAxesPVTVerification

Name

MultipleAxesPVTVerification – Checks the PVT trajectory data file.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks trajectory file name length (must ≤250): (-3)
- Checks group type (must be a MultipleAxes group): (-8)
- Checks group name: (-19)
- Checks BaseVelocity value (must = 0): (-48)
- Checks trajectory file existence and the file format: (-61)
- Checks trajectory (number of elements must >0): (-66)
- Checks velocity (Minimum Velocity ≤Velocity ≤Maximum Velocity): (-68)
- Checks acceleration (Minimum acc. ≤acceleration ≤Maximum acc.): (-69)
- Checks end output velocity (must = 0): (-70)
- Checks delta time (DeltaTime must >0): (-75)

Description

This function verifies the execution of the PVT trajectory. The results of the verification can be obtained by "MultipleAxesPVTVerificationResultGet" function. The trajectory file must be stored in "\ADMIN\Public\Trajectory" folder of the XPS controller. If the trajectory cannot be initialized (task error) , error (-72) is returned.

This function can be executed at any time and is independent of the trajectory execution. It performs the following:

- Checks the trajectory file for data coherence.
- Calculates the trajectory limits, 1) the required travel per positioner, 2)the maximum possible trajectory velocity and 3) the maximum possible trajectory acceleration. This function helps to define the parameters for the trajectory execution.
- The required travel values (MinimumPosition and MaximumPosition) are calculated relative to the position zero and not to the current position. So before executing a PVT trajectory, the user must pay attention to the current position of the positioners to make sure that the trajectory will not exceed the positioner travel limits.
- If all is OK, it returns "SUCCESS" (0). Otherwise, it returns a corresponding error.

NOTE

The "MultipleAxesPVTVerification" function is independent from the "MultipleAxesPVTExecution" function, but it is highly recommended to execute this function before executing a PVT trajectory.

Prototype

int **MultipleAxesPVTVerification**(
int SocketID,
char GroupName[250],
char FileName[250]
)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.
FileName	char *	Trajectory file name.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -3: String too long.
- -8: Wrong object type for this command.
- -19: Group name doesn't exist or unknown command.
- -61: Error file corrupt or file doesn't exist.
- -66: Trajectory doesn't content any element.
- -68: Acceleration on trajectory is too big.
- -69: Acceleration on trajectory is too big.
- -70: Final velocity on trajectory is not zero.
- -72: Error trajectory initialization.
- -75: Trajectory element has a negative or null delta T.

7.2.1.164 MultipleAxesPVTVerificationResultGet

Name

MultipleAxesPVTVerificationResultGet – Gets the results of the "MultipleAxesPVTVerification" function.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks positioner name length (must ≤250): (-3)
- Checks positioner name: (-18)
- Checks the last MultipleAxes PVTVerification (must be done): (-22)

Description

This function returns the results of the previous "MultipleAxesPVTVerification" function, for every positioner. The results are the travel requirements (min and max values), the possible maximum velocity and the possible maximum acceleration.

If no verification was previously done , error (-22) is returned.

Prototype

int **MultipleAxesPVTVerificationResultGet**(

int SocketID,

char PositionerName[250],

char * TrajectoryFileName,

double * MinimumPosition,

double * MaximumPosition,

double * MaximumVelocity,

double * MaximumAcceleration

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.

Output parameters

TrajectoryFileName	char *	Examined trajectory file name.
MinimumPosition	double *	Minimum position (units).
MaximumPosition	double *	Maximum position (units).
MaximumVelocity	double *	Maximum velocity (units/s).
MaximumAcceleration	double *	Maximum acceleration (units/s²).

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -3: String too long.
- -18: Positioner name doesn't exist or unknown command.
- -22: Not allowed action.

7.2.1.165 MultipleAxesDisableShutter [Extended]

Name

MultipleAxesDisableShutter – disables the shutter.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks group type (must be a MultipleAxes group): (-8)
- Checks group name: (-19)
- Check shutter existence (-22)
- Checks group status must be "READY": (-22 otherwise)

Description

This function forces the group in "ready" state if its status is in "shutter enable" state.

Prototype

int **MultipleAxesDisableShutter** (

int SocketID,

char GroupName[250]

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -19: Group name doesn't exist or unknown command.
- -22: Not allowed action.

7.2.1.166 MultipleAxesScanPositions [Extended]

Name

MultipleAxesScanPositions – Set the new scan positions.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks group type (must be a MultipleAxes group): (-8)
- Checks group name: (-19)
- Check shutter group existence (-22)
- Check parameter values coherence (-17 or -68)
- Checks group status must be "READY": (-22 otherwise)

Description

This function sets the shutter new scan positions before making a shutter scan.

Prototype

int **MultipleAxesScanPositions** (
int SocketID,
char GroupName[250],
double XStartOpeningPosition,
double XStartOpeningVelocity,
double XEndOpeningPosition,
double XEndOpeningVelocity,
double XStartClosingPosition,
double XStartClosingVelocity,
double XEndClosingPosition,
double XEndClosingVelocity,
double BeamOpeningPercentage
)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.
XStartOpeningPosition	double	X start opening position.
XStartOpeningVelocity	double	X start opening velocity.
XEndOpeningPosition	double	X end opening position.
XEndOpeningVelocity	double	X end opening velocity.
XStartClosingPosition	double	X start closing position.
XStartClosingVelocity	double	X start closing velocity.
XEndClosingPosition	double	X end closing position.
XEndClosingVelocity	double	X end closing velocity.
BeamOpeningPercentage	double	Laser beam opening percentage.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter is out of range or incorrect.
- -19: Group name doesn't exist or unknown command.
- -22: Not allowed action.
- -68: Velocity on trajectory is too big.

7.2.1.167 MultipleAxesGetShutterPositions_[Extended]

Name

MultipleAxesGetShutterPositions – gets shutter positions.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks group type (must be a MultipleAxes group): (-8)
- Checks group name: (-19)

Description

This function gets positions of the shutter.

Prototype

int **MultipleAxesGetShutterPositions** (

int SocketID,
char GroupName[250],
double * BeamBlockMin,
double * BeamBlockMax,
double * ShutterPosition2,
double * ShutterPosition3,
double * ShutterPosition4,
double * ShutterPosition5

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.

Output parameters

BeamBlockMin	double *	Beam block minimum position.
BeamBlockMin	double *	Beam block maximum position.
ShutterPosition2	double *	Shutter position 2
ShutterPosition3	double *	Shutter position 3
ShutterPosition4	double *	Shutter position 4
ShutterPosition5	double *	Shutter position 5

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -19: Group name doesn't exist or unknown command.

7.2.1.168 MultipleAxesSetShutterPositions_[Extended]

Name

MultipleAxesSetShutterPositions – sets shutter positions.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks group type (must be a MultipleAxes group): (-8)
- Checks group name: (-19)
- Check parameter values coherence (-17)

Description

This function sets shutter new positions.

Prototype

```
int MultipleAxesSetShutterPositions (
    int SocketID,
    char GroupName[250],
    double BeamBlockMin,
    double BeamBlockMax,
    double ShutterPosition2,
    double ShutterPosition3,
    double ShutterPosition4,
    double ShutterPosition5
    )
```

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.
BeamBlockMin	double	Beam block minimum position.
BeamBlockMin	double	Beam block maximum position.
ShutterPosition2	double	Shutter position 2
ShutterPosition3	double	Shutter position 3
ShutterPosition4	double	Shutter position 4
ShutterPosition5	double	Shutter position 5

Output parameters

None

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -19: Group name doesn't exist or unknown command.
- -22: Not allowed action.

7.2.1.169 MultipleAxesTraceNextScan [Extended]

Name

MultipleAxesTraceNextScan – Trace the next scan.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks group type (must be a MultipleAxes group): (-8)
- Checks group name: (-19)
- Check shutter group existence (-22)

Description

This function enables trajectory trace during the next scan.

Prototype

int **MultipleAxesTraceNextScan** (

int SocketID,

char GroupName[250]

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -19: Group name doesn't exist or unknown command.
- -22: Not allowed action.

7.2.1.170 OpenConnection

Name

OpenConnection – opens a socket to connect to TCP server (local).

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks number of used sockets (Max = 100): if no free socket then the SocketID is set to -1.

Description

This function opens a socket in a TCL script located in the "Scripts" directory of the XPS controller.

The TCP/IP communication is configured as:

Local Host Address = 127.0.0.1

IP Port = 5001

This function returns a socket identifier to use for each function call. The socket identifier is defined between 0 to 99. If the TCP/IP connection fails then the "SocketID" value is –1.

Prototype

int **OpenConnection**(

int TimeOut,

int SocketID

)

Input parameters

TimeOut	int	Timeout in seconds used for each function execution.
SocketID	int	Socket identifier used in each function.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.

7.2.1.171 PositionerAccelerationAutoScaling

Name

PositionerAccelerationAutoScaling –Executes Auto-scaling process to determine the stage scaling acceleration.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Positioner must not be a "Secondary Positioner": (-8)
- Checks group type: (-8)
- Checks positioner name: (-18)
- Group status must be not initialized: (-22)
- Control loop type must be "PIDFFAcceleration": (-24)

Description

This function executes an auto-scaling process and returns the calculated scaling acceleration. The selected group must be in "NOTINIT" state, otherwise error (-22) is returned.

It only works, if the positioner control loop type is "PIDFFAcceleration" (acceleration control), otherwise error (-24) is returned

This function checks the positioner error. If an error is detected, the hardware status register is reset (motor on) and the positioner error is cleared before checking it again. If a positioner error is present, the motor is turned off, error (-5) is returned and the group status becomes "NOTINIT".

If there is no positioner error, then the master-slave error is cleared, the encoder is preset (update encoder position) and the user travel limits are checked. If a travel limit error is detected then the motor is turned off, error (-35) is returned and the group status becomes "NOTINIT".

If no error is detected , the motor initializes. If motor initialization fails, the error (-50) is returned and the group status becomes "NOTINIT".

If motor initialization is successful, the positions are preset, the motion is enabled (the motor is powered) permitting the process to auto-scale if the motion cannot be enabled, error (-22) is returned.

If the auto-scaling fails error (-105) is returned or if the motion becomes disabled, error (-26) is returned.

The auto-scaling process is executed in 5 periods. At the end of each period, the auto-scaling process estimates the auto- scaling quality by calculating the signal to noise ratio. If it is very close to zero, it means there is no oscillation, so error (-101) is returned. if the signal to noise ratio > MaximumNoiseRatio defined in system.ref (normally between 0.1 and 0.2), error (-102) is returned.

If the number of acquired data points (minimum = 9) or the number of acquired signal periods (minimum = 5) is not enough for a good estimate then error (-103) is returned.

At the end of this function, the new value of scaling acceleration is returned and the group status becomes "NOTINIT" once again.

Prototype

int **PositionerAccelerationAutoScaling**(

int SocketID,

char * PositionerName,

double * Scaling

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Name of a positioner.
FrequecyTicks	int	Number of frequency ticks.

Output parameters

Scaling	double *	Calculated scaling acceleration value.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -5: Not allowed due to a positioner error or hardware status.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -18: Positioner Name doesn't exist or unknown command.
- -22: Not allowed action.
- -24: Not available in this configuration (check hardware or configuration).
- -35: Position is outside of travel limits.
- -50: Motor initialization error. Check InitializationAccelerationLevel, ScalingAcceleration, MaximumJerkTime, EncoderResolution or EncoderScalePitch.
- -101: Relay Feedback Test failed: No oscillation.
- -102: Relay Feedback Test failed: Signal too noisy.
- -103: Relay Feedback Test failed: Signal data not enough for analyse.
- -105: Error of scaling calibration initialization.

7.2.1.172 PositionerAnalogTrackingPositionParametersGet

Name

PositionerAnalogTrackingPositionParametersGet – Gets the parameters of the current tracking position mode.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks input parameter: (-8), (-18)

Description

This function returns the current analog input name, the current offset and the current scale used by analog tracking position mode.

NOTE

"Velocity" and "Acceleration" define the maximum velocity and acceleration used in the position tracking mode.

Prototype

int **PositionerAnalogTrackingPositionParametersGet**(

int SocketID,

char * FullPositionerName,

char * GPIOName,

double * Offset,

double * Scale,

double * Velocity,

double * Acceleration

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name FrequecyTicks.

Output parameters

GPIOName	char	Analog input name (ADC).
Offset	double *	Offset in volts.
Scale	double *	Scale (Units/Volts).
Velocity	double *	Velocity (Units/s).
Acceleration	double *	Acceleration (Units/s²).

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.

7.2.1.173 PositionerAnalogTrackingPositionParametersSet

Name

PositionerAnalogTrackingPositionParametersSet – Sets the parameters of the current tracking position mode.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks Positioner and GPIO type (ADC): (-8)
- Checks velocity and acceleration: (-17)
- Checks input parameter: (-18)

Description

This function modifies the analog input name, the offset and the scale used by the analog tracking position mode. To use this function, the group state must be READYotherwise error (-22) is returned.

The "Offset" and the "Scale" parameters are used to calculate the target tracking position:

TrackingPosition = InitialPosition + (AnalogValue - **Offset**) * **Scale**

The "Velocity" and "Acceleration" parameters define the maximum velocity and acceleration used in the position tracking mode.

NOTE

The parameters for analog tracking position mode can be reset, if the "GPIOName" parameter is blank.

Prototype

int **PositionerAnalogTrackingPositionParametersSet**(

int SocketID,

char FullPositionerName,

char * GPIOName,

double Offset,

double Scale,

double Velocity,

double Acceleration

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char	Positioner name FrequecyTicks.
GPIOName	char *	Analog input name (ADC).
Offset	double	Offset in volts.
Scale	double	Scale (Units/Volts).
Velocity	double	Velocity (Units/s).
Acceleration	double	Acceleration (Units/s²).

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -18: Positioner Name doesn't exist or unknown command.
- -22: Not allowed action.

7.2.1.174 PositionerAnalogTrackingVelocityParametersGet

Name

PositionerAnalogTrackingVelocityParametersGet – Gets the parameters of the current tracking velocity mode.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks input parameter: (-8), (-18)

Description

This function returns the analog input name, the offset, the scale, the deadband threshold and the order used by analog traking velocity mode.

NOTE

"Velocity" and "Acceleration" define the maximum velocity and acceleration used in the velocity tracking mode.

Prototype

int **PositionerAnalogTrackingVelocityParametersGet**(

int SocketID,

char FullPositionerName,

char * GPIOName,

double * Offset,

double * Scale,

double * DeadBandThreshold,

int * Order,

double * Velocity,

double * Acceleration

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name FrequecyTicks.

Output parameters

GPIOName	char *	Analog input name (ADC).
Offset	double *	Offset in volts.
Scale	double *	Scale (Units/Volts).
DeadBandThreshold	double *	Dead band threshold (Volts).
Order	integer *	Order (No unit).
Velocity	double *	Velocity (Units/s).
Acceleration	double *	Acceleration (Units/s²).

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.

7.2.1.175 PositionerAnalogTrackingVelocityParametersSet

Name

PositionerAnalogTrackingVelocityParametersSet – Sets the parameters of tcurrent tracking velocity mode.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks GPIO type (ADC): (-8)
- Checks Positioner: (-8), (-18)
- Checks velocity and acceleration: (-17)

Description

This function allows modifying the GPIO name, offset, scale, deadband threshold and the order used by analog tracking velocity mode. To use this function the group state must be READY, otherwise error (-22) is returned.

The "velocity" and "acceleration" define the maximum velocity and acceleration used in the velocity tracking mode.

The target tracking velocity is defined as follows:

InputValue = GPIOAnalogInput – Offset

MaxADCAmplitude = 10/GPIOAnalogGain

if (InputValue ≥0) then

InputValue = InputValue - DeadBandThreshold

if (InputValue <0) then InputValue = 0

else

InputValue = AnalogInputValue + DeadBandThreshold

if (InputValue >0) then InputValue = 0

OutputValue = (|InputValue|/MaxADCAmplitude)^{Order}

TrackingVelocity = Sign(InputValue) * OutputValue * Scale * MaxADCAmplitude

---

NOTE

The analog tracking velocity mode can be reset if the "GPIOName" parameter is blank.

Prototype

int **PositionerAnalogTrackingVelocityParametersSet**(

int SocketID,

char * FullPositionerName,

char * GPIOName,

double Offset,

double Scale,

double DeadBandThreshold,

int Order,

double Velocity,

double Acceleration

)

Input parameters

SocketID	int	Socket identifier gets by the TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name FrequecyTicks.
GPIOName	char *	Analog input name (ADC).
Offset	double	Offset in volts.
Scale	double	Scale (Units/Volts).
	double	Dead band threshold (Volts).
Order	integer	Order (No unit).
Velocity	double	Velocity (Units/s).
Acceleration	double	Acceleration (Units/s²).

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.
- -22: Not allowed action.

7.2.1.176 PositionerBacklashDisable

Name

PositionerBacklashDisable – Disables the backlash compensation.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the positioner type (must not be a secondary positioner): (-8)

Description

This function disables the backlash compensation.

In the "stages.ini" file the parameter "Backlash" will enable or disable this feature as follows:

Backlash = 0 —>Disable backlash

Backlash >0 —>Enable backlash

NOTE

The backlash compensation is not allowed with a secondary positioner (gantry mode).

The backlash must be disabled to execute a trajectory, use a jog mode or analog tracking mode.

Prototype

int **PositionerBacklashDisable**(

int SocketID,

char * FullPositionerName

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.

7.2.1.177 PositionerBacklashEnable

Name

PositionerBacklashEnable – Enables the backlash compensation.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Group status must be "NOTINIT": (-22)
- Checks the positioner type (must not be a secondary positioner): (-8)

Description

This function enables the backlash compensation defined in the "stages.ini" file or by "PositionerBacklashSet" function. If the backlash compensation value is null then this function will have no effect, and backlash compensation will remain disabled..

The group state must be NOTINIT to enable the backlash compensation. If it is not the case error (-22) is returned.

The parameter "Backlash in the "stages.ini" file" allows the user to enable or disable the backlash compensation.

Backlash = 0 —> Disable backlash

Backlash >0 —> Enable backlash

NOTE

The backlash must be disabled to execute a trajectory use the jog mode or analog tracking mode.

CAUTION

It is not possible to use backlash compensation with positioners that have one of the following:

1)"HomeSearchSequenceType" defined as "CurrentPositionAsHome"

2)"PositionerMappingFileName" defined in the stages.ini file.

Prototype

int **PositionerBacklashEnable**(

int SocketID,

char * FullPositionerName

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -22: Not allowed action.

7.2.1.178 PositionerBacklashGet

Name

PositionerBacklashGet – Gets the backlash compensation value.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the positioner type (must not be a secondary positioner): (-8)

Description

This function returns the backlash compensation value, defined in the "stages.ini" file or by "PositionerBacklashSet" function, and the backlash status ("Enable" or "Disable").

Prototype

int **PositionerBacklashGet**(

int SocketID,

char * FullPositionerName,

double * BacklashValue,

char * Status

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.

Output parameters

BacklashValue	double *	Backlash compensation value (units).
Status	char *	Backlash status ("Enable" or "Disable").

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.

7.2.1.179 PositionerBacklashSet

Name

PositionerBacklashSet – Sets the backlash compensation value.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the positioner type (must not be a secondary positioner): (-8)
- The "BacklashValue" must be positive: (-17)

Description

This function changes the backlash compensation value.

NOTE

This function can be used only if a backlash compensation is defined in "stages.ini" file (Backlash >0) , otherwise error (-22) is returned.

Prototype

int **PositionerBacklashSet**(
int SocketID,
char * FullPositionerName,
double BacklashValue
)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.
BacklashValue	double	Backlash compensation value (units).

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -22: Not allowed action.

7.2.1.180 PositionerCompensatedFastPCOAbort

Name

PositionerCompensatedFastPCOAbort – Aborts the CIE fast compensated PCO puls generation.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the positioner name: (-18)

Description

This function aborts the CIE fast compensated PCO pulses generation. The pulses generation is stopped immediately; no more pulses will be generated even if the scanning positioner continues to move across the predefined firing positions. To stop the scanning move, use GroupMoveAbort() function.

Prototype

int **PositionerCompensatedFastPCOAbort**(

int SocketID,

char * FullPositionerName

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.

7.2.1.181 PositionerCompensatedFastPCOCurrentStatusGet

Name

PositionerCompensatedFastPCOCurrentStatusGet – Gets current status of CIEFAST compensated PCO pulses generation.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the positioner name: (-18)
- Checks if CIEFAST compensated PCO pulses generation is enabled: (-121)

Description

This function gets the current status of CIEFAST compensated PCO pulses generation.

Status possible values:

0: Pulses generation inactive (idle, no error)

1: Pulses generation activated (running)

-1: Pulses generation aborted with errors.

Prototype

int **PositionerCompensatedFastPCOCurrentStatusGet**(

int SocketID,

char * FullPositionerName,

int * Status

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.

Output parameters

Status	int *	PCO pulses generation status.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.
- -121: Function is not allowed due to configuration disabled.

7.2.1.182 PositionerCompensatedFastPCOEnable

Name

PositionerCompensatedFastPCOEnable – Activates the CIEFAST compensated PCO pulses generation.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the positioner name: (-18)
- Checks if CIEFAST compensated PCO pulses generation is enabled: (-121)

Description

This function activates the CIE Fast compensated PCO pulses generation (status becomes running (value 1)). The pulses will be generated when the scanning positioner moves across the predefined positions. When the last pulse is generated, the CIE Fast compensated PCO mode will become inactive (status becomes inactive (value 0)). To get status of the CIE Fast compensated PCO pulses generation, use PositionerCompensatedFastPCOCurrentStatusGet() function.

Note that only the scanning positioner positions are used to fire pulses: if you prepare a set of positions at a given location and then enable the pulses generation and start the move from a different location, the pulses could be generated but their accuracy will be impacted by the mapping difference between the two locations.

This function must be used after the firing pulses data preparation with the PositionerCompensatedFastPCOPrepare(), elsewhere the function fails and the error (-122) will be returned.

Prototype

int **PositionerCompensatedFastPCOEnable**(

int SocketID,

char * FullPositionerName

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.

Output parameters

None.

Return (In addition to the results of "Input Tests Common to all XPS Functions")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.
- -22: Not allowed action.
- -115: Function is not supported by current hardware.
- -121: Function is not allowed due to configuration disabled.
- -122: Data incorrect (wrong value, wrong format, wrong order or inexistent).

7.2.1.183 PositionerCompensatedFastPCOFromFile

Name

PositionerCompensatedFastPCOFromFile – Reads firing positions from a data file to controller's memory.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the positioner name: (-18)
- Checks if CIEFAST compensated PCO pulses generation is enabled: (-121)

Description

This function reads firing positions from a data file to the controller's memory.

The data file contains lines of data, formatted as follows:

$Position_i$

Example:

$Position_1$

$Position_2$

… …

$Position_N$

Data conditions:

$Position_i > Position_i-1$, $Width_i < Position_i+1 - Position_i$.

NOTE

$Position_i$ (i = 1…N) are the offset values relative to the scanning positioner start position that is defined in the PositionerCompensatedFastPCOPrepare().

Prototype

int **PositionerCompensatedFastPCOFromFile**(

int SocketID,

char * PositionerName,

char * DataFileName

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.
DataFileName	char *	Data file name.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.
- -22: Not allowed action.
- -61: Error file corrupt or file doesn't exist.
- -121: Function is not allowed due to configuration disabled.
- -122: Data incorrect (wrong value, wrong format, wrong order or inexistent).

7.2.1.184 PositionerCompensatedFastPCOLoadToMemory

Name

PositionerCompensatedFastPCOLoadToMemory– Appends firing positions to controller memory.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the positioner name: (-18)
- Checks if CIEFAST compensated PCO pulses generation is enabled: (-121)

Description

This function appends firing positions to controller memory from input parameters.

To reset the controller memory, the PositionerCompensatedFastPCOMemoryReset() function is provided.

The data line format can be a single or several offset positions as in PositionerCompensatedFastPCOSet() function:

Example:

$Position_i$

$Position_i$ $Position_i$+1 $Position_i$+2

PositionerCompensatedLoadToMemory(XY.X, 0 0.1 0.2 0.3 0.4 0.5)

Prototype

int **PositionerCompensatedFastPCOLoadToMemory**(

int SocketID,

char * PositionerName,

char * DataLine

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.
DataLine	char *	Some data lines.

Output parameters

None.

Return (In addition to the results of "Input Tests Common to all XPS Functions")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.
- -22: Not allowed action.
- -121: Function is not allowed due to configuration disabled.
- -122: Data incorrect (wrong value, wrong format, wrong order or inexistent).

7.2.1.185 PositionerCompensatedFastPCOMemoryReset

Name

PositionerCompensatedFastPCOMemoryReset – Resets CIEFast compensated PCO data memory.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the positioner name: (-18)
- Checks if CIEFAST compensated PCO pulses generation is enabled: (-121)

Description

This function resets the CIE fast compensated PCO data memory. This function is useful to remove the data that was previously entered with the PositionerCompensatedFastPCOLoadToMemory() function.

Prototype

int **PositionerCompensatedFastPCOMemoryReset**(

int SocketID,

char * PositionerName

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.
- -121: Function is not allowed due to configuration disabled.

7.2.1.186 PositionerCompensatedFastPCOPrepare

Name

PositionerCompensatedFastPCOPrepare – Prepares data for CIEFast compensated PCO pulses generation.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks direction value: (-17)
- Checks the positioner name: (-18)
- Checks if first and last PCO positions are within positions limits: (-35)
- Checks if CIEFAST compensated PCO pulses generation is enabled: (-121)

Description

This function calculates the firing for absolute positions, *in user's coordinate system* and converts them to firing absolute raw PCO positions, *in encoder's coordinate system*. It will use the supplied start positions and the offset positions set with *PositionerCompensatedFastPCOSet()* or *PositionerCompensatedFastPCOFromFile()* or *PositionerCompensatedFastPCOLoadToMemory()* function.

When mappings are enabled, the correction between user's coordinate system position and raw encoder position will be different at each location. For this reason, the prepare function must know the location (*positions of all positioners in the scanning group*) where the scan will be done.

This function must be called before the use of *PositionerCompensatedFastPCOEnable()* function.

Parameters:

- ScanDirection: Scan direction,(value: 1 (*positive*) or -1 (*negative*)).
- StartPosition1: Group 1st positioner start position
- StartPosition2: Group 2nd positioner start position
- StartPosition3: Group 3rd positioner start position
- …… etc ……

Prototype

int **PositionerCompensatedFastPCOPrepare**(

int SocketID,

char * PositionerName

int ScanDirection,

double StartPosition1,

double StartPosition2,

double StartPosition3,

…

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.
ScanDirection	int	Scan direction (1 or -1).
StartPosition1	double	Group 1st positioner start position (units).
StartPosition2	double	Group 2nd positioner start position (units).
StartPosition3	double	Group 3rd positioner start position (units).
….		

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.
- -35: Position is outside of travel limits.
- -115: Function is not supported by current hardware.
- -121: Function is not allowed due to configuration disabled.
- -122: Data incorrect (wrong value, wrong format, wrong order or inexistent).

7.2.1.187 PositionerCompensatedFastPCOPulseParametersGet

Name

PositionerCompensatedFastPCOPulseParametersGet – Gets pulse configuration to compensated PCO.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the positioner name: (-18)
- Checks pulses generation status: (-22)
- Checks if CIEFAST compensated PCO pulses generation is supported: (-115)

Description

This function returns the set values of parameters: Pulse width, Pulse polarity and Pulse toggle.

Prototype

int **PositionerCompensatedFastPCOPulseParametersGet**(

int SocketID,

char * PositionerName,

double * PulseWidth,

int * PulsePolarity,

bool * PulseToggle

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.

Output parameters

PulseWidth	double *	Width of pulse enable signal (units).
PulsePolarity	int *.	
PulseToggle	bool *.	

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.
- -22: Not allowed action.
- -115: Function is not supported by current hardware.

7.2.1.188 PositionerCompensatedFastPCOPulseParametersSet

Name

PositionerCompensatedFastPCOPulseParametersGet – Sets pulse configuration to compensated PCO.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the positioner name: (-18)
- Checks pulses generation status: (-22)
- Checks if CIEFAST compensated PCO pulses generation is supported: (-115)

Description

This function sets values of parameters: Pulse width, Pulse polarity and Pulse toggle.

Prototype

int **PositionerCompensatedFastPCOPulseParametersGet**(

int SocketID,

char * PositionerName,

double PulseWidth,

int PulsePolarity,

bool PulseToggle

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.
PulseWidth	double *	Width of pulse enable signal (units).
PulsePolarity	int *.	
PulseToggle	bool *.	

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.
- -22: Not allowed action.
- -115: Function is not supported by current hardware.

7.2.1.189 PositionerCompensatedFastPCOSet

Name

PositionerCompensatedFastPCOSet – Calculates a set of evenly spaced firing positions to the controller memory.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks Start <Stop, Step >0, and (Stop – Start) <Step: (-17)
- Checks the positioner name: (-18)
- Checks if CIEFAST compensated PCO pulses generation is enabled: (-121)
- Checks data number NData = floor(Stop - Start) / Step + 1, if NData >1000000: (-122)

Description

This function calculates a set of evenly spaced firing positions to the controller memory.

Parameters:

- Start: Relative offset where first PCO trigger is generated. Start must be less than Stop.
- Stop: Relative offset where last PCO pulses can be generated.
- Step: Distance between two consecutive pulses. Step must be positive.

This function will create a table of points that has as first point Start value and last point Stop value:

Index = 0	Start
Index = 1	Start + Step
Index = 2	Start + 2 * Step
Index = 3	Start + 3 * Step
Index = 4	Start + 4 * Step
Index = …	…
Index = N	Start + N * Step

Example:

Send PositionerCompensatedFastPCOSet(XY.X, 0, 10, 1) will generate points table below:

Index = 0	0
Index = 1	1
Index = 2	2
Index = 3	3
Index = 4	4
Index = …	…
Index = 10	10

Prototype

int **PositionerCompensatedFastPCOSet**(

int SocketID,

char * PositionerName,

double Start,

double Stop,

double Step

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.
Start	double	Start position (units).
Stop	double	Stop position (units).
Step	double	Distance between two consecutive pulses (units).

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -18: Positioner Name doesn't exist or unknown command.
- -121: Function is not allowed due to configuration disabled.
- -122: Data incorrect (wrong value, wrong format, wrong order or inexistent).

7.2.1.190 PositionerCompensatedPCOAbort [Extended - ISA]

Name

PositionerCompensatedPCOAbort – Aborts the CIE08 compensated PCO pulses generation.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the positioner type: (-8)
- Checks the positioner name: (-18)
- Checks the position encoder ("AquadB" or "AnalogInterpolated"): (-24)
- Checks the CIE board supports this function: (-115)
- Checks CIE08CompensatedPCOMode = Enabled (*system.ini*): (-121)

Description

This function aborts the CIE08 compensated PCO pulses generation. The pulses generation is stopped immediately; no more pulses will be generated even if the scanning positioner continues to move across the predefined firing positions. To stop the scanning move, use *GroupMoveAbort()* function.

NOTE

The function works only when the CIE08 compensated PCO mode configuration is enabled (*system.ini*: CIE08CompensatedPCOMode = Enabled).

This function can be used only with a position encoder ("AquadB" or "AnalogInterpolated"), elsewhere (-24) error is returned.

Prototype

int **PositionerCompensatedPCOAbort**(

int SocketID,

char * FullPositionerName

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner name doesn't exist or unknown command.
- -24: Incorrect file name, bad section name, or not available in this configuration (check hardware or configuration).
- -115: Function is not supported by current hardware
- -121: Function is not allowed due to configuration disabled.

7.2.1.191 PositionerCompensatedPCOCurrentStatusGet [Extended - ISA]

Name

PositionerCompensatedPCOCurrentStatusGet – Gets current status of CIE08 compensated PCO pulses generation.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the positioner name: (-18)
- Checks the positioner type: (-8)
- Checks the position encoder ("AquadB" or "AnalogInterpolated"): (-24)
- Checks the CIE board supports this function: (-115)
- Checks CIE08CompensatedPCOMode = Enabled (*system.ini*): (-121)

Description

This function gets the current status of CIE08 compensated PCO pulses generation.

Status possible values:

- 0: Pulses generation inactive (idle, no error)
- 1: Pulses generation activated (running)
- -1: Pulses generation aborted with errors.

Prototype

int **PositionerCompensatedPCOCurrentStatusGet**(

int SocketID,

char * FullPositionerName,

int * Status

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.

Output parameters

Status	int *	PCO pulses generation status.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner name doesn't exist or unknown command.
- -24: Incorrect file name, bad section name, or not available in this configuration (check hardware or configuration).
- -115: Function is not supported by current hardware
- -121: Function is not allowed due to configuration disabled.

7.2.1.192 PositionerCompensatedPCOEnable [Extended - ISA]

Name

PositionerCompensatedPCOEnable – Activates the CIE08 compensated PCO pulses generation.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the positioner name: (-18)
- Checks the position encoder ("AquadB" or "AnalogInterpolated"): (-24)
- Checks the CIE board supports this function: (-115)
- Checks CIE08CompensatedPCOMode = Enabled (*system.ini*): (-121)
- Checks if data have been prepared by PositionerCompensatedPCOPrepare(): (-122)
- Checks current position is out and at the good side of scanning zone (left of scanning zone if ScanDirection positive, right of scanning zone if ScanDirection negative): (-22)
- Checks CIE08 compensated PCO mode is running: (-22)

Description

This function activates the CIE08 compensated PCO pulses generation *(status becomes running (value 1))*. The pulses will be generated when the scanning positioner moves across the predefined positions. When the last pulse is generated, the CIE08 compensated PCO mode will become inactive (*status becomes inactive (value 0))*. To get status of the CIE08 compensated PCO pulses generation, use *PositionerCompensatedPCOCurrentStatusGet()* function.

Note that only the scanning positioner positions are used to fire pulses: if you prepare a set of positions at a given location and then enable the pulses generation and start the move from a different location, the pulses could be generated but their accuracy will be impacted by the mapping difference between the two locations.

This function must be used after the firing pulses data preparation with the *PositionerCompensatedPCOPrepare*(), elsewhere the function fails and the error ERR_CHECK_DATA_INCORRECT (-122) will be returned. With XPS-Q if the settings are out of range, the user might experience pulses spaced unevenly without getting any error messages.

NOTE

The PCO pulses generation depends on the ScanVelocity and the pulse settling time (*set by PositionerPositionComparePulseParametersSet()*)

Valid settings are shown in the table below:

	PCO encoder frequency (kHz)			
Pulse settling time (µs)	25	50	125	> 500
0.075			OK	OK
1		OK	OK	
4	OK	OK		
12	OK			

How to determine the PCO encoder frequency :

- For AquadB encoder :
  PCO encoder frequency = Velocity / EncoderResolution
- For analog interpolated encoder :
  PCO encoder frequency = Velocity * HardInterpolatorFactor / EncoderScalePitch

Example: XML310 stage (EncoderScalePitch=0.004 mm, HardInterpolatorFactor=200). With ScanVelocity=10mm/s => PCO encoder frequency = 10*200/0.004 = 500 kHz

---

NOTE

The function works only when the CIE08 compensated PCO mode configuration is enabled (*system.ini*: CIE08CompensatedPCOMode = Enabled).

This function can be used only with a position encoder ("AquadB" or "AnalogInterpolated"), otherwise (-24) error is returned.

Prototype

int **PositionerCompensatedPCOEnable**(

int SocketID,

char * FullPositionerName

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.

Output parameters

None.

Return (In addition to the results of "Input Tests Common to all XPS Functions")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.
- -22: Not allowed action.
- -24: Incorrect file name, bad section name, or not available in this configuration (check hardware or configuration).
- -115: Function is not supported by current hardware.
- -121: Function is not allowed due to configuration disabled.
- -122: Data incorrect (wrong value, wrong format, wrong order or inexistent).

7.2.1.193 PositionerCompensatedPCOFromFile [Extended - ISA]

Name

PositionerCompensatedPCOFromFile – Reads firing positions from a data file to controller memory.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the positioner name: (-18)
- Checks the positioner type: (-8)
- Checks the position encoder ("AquadB" or "AnalogInterpolated"): (-24)
- Checks the CIE board supports this function: (-115)
- Checks CIE08CompensatedPCOMode = Enabled (*system.ini*): (-121)
- Checks data file exists: (-61)
- Checks data from file (must be $Position_i > Position_{i-1}$, $Width_i < Position_{i+1} - Position_i$): (-122)

Description

This function reads firing positions from a data file to the controller memory.

The data file contains lines of data, formatted as follows:

$Position_i$<Space or Tabulation>$Width_i$<CRLF or LF>

Example :

$Position_1Width_1$

$Position_2Width_2$

… …

$Position_NWidth_N$

Data conditions: $Position_i > Position_{i-1}$, $Width_i < Position_{i+1} - Position_i$

NOTE

$Position_i$ (i=1..N) are the offset values relative to the scanning positioner start position that is defined in the PositionerCompensatedPCOPrepare().

The function works only when the CIE08 compensated PCO mode configuration is enabled (*system.ini*: CIE08CompensatedPCOMode = Enabled).

This function can be used only with a position encoder ("AquadB" or "AnalogInterpolated"), otherwise (-24) error is returned.

Prototype

int **PositionerCompensatedPCOFromFile**(

int SocketID,

char * PositionerName,

char * DataFileName

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.
DataFileName	char *	Data file name.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.
- -24: Incorrect file name, bad section name, or not available in this configuration (check hardware or configuration).
- -61: Error file corrupt or file doesn't exist.
- -115: Function is not supported by current hardware
- -121: Function is not allowed due to configuration disabled.
- -122: Data incorrect (wrong value, wrong format, wrong order or inexistent).

7.2.1.194 PositionerCompensatedPCOLoadToMemory [Extended - ISA]

Name

PositionerCompensatedPCOLoadToMemory– Appends firing positions to controller memory.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the positioner name: (-18)
- Checks the positioner type: (-8)
- Checks the position encoder ("AquadB" or "AnalogInterpolated"): (-24)
- Checks the CIE board supports this function: (-115)
- Checks CIE08CompensatedPCOMode = Enabled (*system.ini*): (-121)
- Checks data lines (must be $Position_i > Position_{i-1}$, $Width_i < Position_{i+1} - Position_i$): (-122)

Description

This function appends firing positions to controller's memory from *DataLines* parameter.

To reset the controller's memory, the *PositionerCompensatedPCOMemoryReset()* function is provided.

The data line format must be :

$Position_i$<Space or Tabulation>$Width_i$<CRLF, LF or ;>

Example :

$Position_1Width_1$

$Position_2Width_2$

… …

$Position_NWidth_N$

Or :

$Position_1Width_1$;$Position_2Width_2$; …;$Position_NWidth_N$

Data conditions: $Position_i > Position_{i-1}$, $Width_i < Position_{i+1} - Position_i$

Example: Send PositionerCompensatedLoadToMemory (XY.X,0 0.1;1 0.1;2 0.1;3 0.1)

NOTE

$Position_i$ (i=1..N) are the offset values relative to the scanning positioner start position that is defined in the PositionerCompensatedPCOPrepare().

The function works only when the CIE08 compensated PCO mode configuration is enabled (*system.ini*: CIE08CompensatedPCOMode = Enabled).

This function can be used only with a position encoder ("AquadB" or "AnalogInterpolated"), otherwise (-24) error is returned.

Prototype

int **PositionerCompensatedPCOLoadToMemory**(

int SocketID,

char * PositionerName,

char * DataLine

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.
DataLine	char *	Some data lines.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.
- -24: Incorrect file name, bad section name, or not available in this configuration (check hardware or configuration).
- -115: Function is not supported by current hardware
- -121: Function is not allowed due to configuration disabled.
- -122: Data incorrect (wrong value, wrong format, wrong order or inexistent).

7.2.1.195 PositionerCompensatedPCOMemoryReset [Extended - ISA]

Name

PositionerCompensatedPCOMemoryReset – Resets CIE08 compensated PCO data memory.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the positioner name: (-18)
- Checks the positioner type: (-8)
- Checks the position encoder ("AquadB" or "AnalogInterpolated"): (-24)
- Checks the CIE board supports this function: (-115)
- Checks CIE08CompensatedPCOMode = Enabled (*system.ini*): (-121)

Description

This function resets the CIE08 compensated PCO data memory. This function is useful to remove the data that was previously entered with the *PositionerCompensatedPCOLoadToMemory()* function.

NOTE

The function works only when the CIE08 compensated PCO mode configuration is enabled (*system.ini*: CIE08CompensatedPCOMode = Enabled).

This function can be used only with a position encoder ("AquadB" or "AnalogInterpolated"), otherwise (-24) error is returned.

Prototype

int **PositionerCompensatedPCOMemoryReset**(

int SocketID,

char * PositionerName

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.

Output parameters

None.

Return (In addition to the results of "Input Tests Common to all XPS Functions")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.
- -24: Incorrect file name, bad section name, or not available in this configuration (check hardware or configuration).
- -115: Function is not supported by current hardware
- -121: Function is not allowed due to configuration disabled.

7.2.1.196 PositionerCompensatedPCOPrepare [Extended - ISA]

Name

PositionerCompensatedPCOPrepare – Prepares data for CIE08 compensated PCO pulses generation.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the positioner name: (-18)
- Checks the positioner type: (-8)
- Checks the position encoder ("AquadB" or "AnalogInterpolated"): (-24)
- Checks the CIE board supports this function: (-115)
- Checks CIE08CompensatedPCOMode = Enabled (*system.ini*): ERR_NOT_ALLOWED_MODE_DISABLED (-121)
- Checks data have been set, loaded or read from file to buffer (DataNumber must > 0 and < CIE08CompensatedPCOMaximumDataNumber (*system.ini)*): ERR_CHECK_DATA_INCORRECT (-122)
- Checks scanning zone exceed stage travel limits: (-35)
- Checks input parameter values (ScanDirection value must equal to 1 *(positive direction)* or -1 *(negative direction)*): (-17)

Description

This function calculates the firing for absolute positions, *in user's coordinate system* and converts them to firing absolute raw PCO positions, *in encoder's coordinate system*.

When mappings are enabled, the correction between user's coordinate system position and raw encoder position will be different at each location. For this reason, the prepare function must know the location (*positions of all positioners in the scanning group*) where the scan will be done.

This function must be called before the use of *PositionerCompensatedPCOEnable()* function.

Parameters :

- ScanDirection: Scan direction,(value: 1 (*positive*) or -1 (*negative*)).
- StartPosition1: Group 1st positioner start position.
- StartPosition2: Group 2nd positioner start position
- StartPosition3: Group 3rd positioner start position
- …… etc ……

NOTE

The function works only when the CIE08 compensated PCO mode configuration is enabled (*system.ini*: CIE08CompensatedPCOMode = Enabled)..

This function can be used only with a position encoder ("AquadB" or "AnalogInterpolated"), otherwise (-24) error is returned.

Prototype

int **PositionerCompensatedPCOPrepare**(

int SocketID,

char * PositionerName

int ScanDirection,

double StartPosition1,

double StartPosition2,

double StartPosition3,

…

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.
ScanDirection	int	Scan direction (1 or -1).
StartPosition1	double	Group 1st positioner start position (units).
StartPosition2	double	Group 2nd positioner start position (units).
StartPosition3	double	Group 3rd positioner start position (units).

….

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect
- -18: Positioner Name doesn't exist or unknown command.
- -24: Incorrect file name, bad section name, or not available in this configuration (check hardware or configuration).
- -35: Position is outside of travel limits.
- -115: Function is not supported by current hardware.
- -121: Function is not allowed due to configuration disabled.
- -122: Data incorrect (wrong value, wrong format, wrong order or inexistent).

7.2.1.197 PositionerCompensatedPCOSet [Extended - ISA]

Name

PositionerCompensatedPCOSet – Calculates a set of evenly spaced firing positions to the controller memory.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks Start <Stop, Distance > 0, Width > 0, Width < Distance, Width < Stop-Start: (-17)
- Checks the positioner name: (-18)
- Checks the position encoder ("AquadB" or "AnalogInterpolated"): (-24)
- Checks the CIE board supports this function: (-115)
- Checks CIE08CompensatedPCOMode = Enabled (*system.ini*): (-121)
- Checks data number NData = integer((Stop-Start)/Distance) + 1, if NData >1000000: (-122)

Description

This function calculates a set of evenly spaced firing positions to the controller memory.

Parameters :

- Start: Relative distance to the start position where PCO pulses start.
- Stop: Relative distance to the start position where PCO pulses stop.
- Distance: Step of pulses (distance between two consecutive pulses)
- Width: Width of the pulse enable signal at the firing positions.

Example: Send PositionerCompensatedPCOSet (XY.X, 0, 3, 1, 0.1)

NOTE

Start and Stop are the offset values relative to the scanning positioner start position that is defined in the PositionerCompensatedPCOPrepare().

The function works only when the CIE08 compensated PCO mode configuration is enabled (*system.ini*: CIE08CompensatedPCOMode = Enabled).

This function can be used only with a position encoder ("AquadB" or "AnalogInterpolated"), otherwise (-24) error is returned.

Prototype

int **PositionerCompensatedPCOSet** (int SocketID, char PositionerName[250] , double Start, double Stop, double Distance, double Width)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function
PositionerName	char *	Positioner name
Start	double	Start position (units)
Stop	double	Stop position (units)
Distance	double	Distance between two consecutive pulses (units)
Width	double	Width of pulse enable signal (units)

Output parameter

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -18: Positioner name doesn't exist or unknown command.
- -24: Incorrect file name, bad section name, or not available in this configuration (check hardware or configuration).
- -115: Function is not supported by current hardware
- -121: Function is not allowed due to configuration disabled.
- -122: Data incorrect (wrong value, wrong format, wrong order or inexistent).

7.2.1.198 PositionerCompensationDisturbanceDisable [Extended]

Name

PositionerCompensationDisturbanceDisable – Disables disturbance compensation for selected direction (DisabledDirection = Both, Positive or Negative)

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the filter number: (-17)

Description

This function disables the compensation of disturbance for the selected direction (Both, Positive or Negative).

Prototype

int **PositionerCompensationDisturbanceDisable**(

int SocketID,

char *PositionerName,

char *DisabledDirection

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.
DisabledDirection	char*	"Both", "Positive" or "Negative"

Output parameters

None.

Return (In addition to the results of "Input Tests Common to all XPS Functions")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.

7.2.1.199 PositionerCompensationDisturbanceEnable [Extended]

Name

PositionerCompensationDisturbanceEnable– Enables disturbance compensation for selected direction (EnabledDirection = Both, Positive or Negative)

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the filter number: -17
- Checks if a disturbance compensation file is loaded: -22

Description

This function enables the compensation of disturbance for the selected direction (Both, Positive or Negative). The disturbance compensation can be enabled only if a file was loaded (refer to API PositionerCompensationDisturbanceFileLoad).

Prototype

int **PositionerCompensationDisturbanceEnable**(

int SocketID,

char *PositionerName,

char *EnabledDirection

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.
EnabledDirection	char*	"Both", "Positive" or "Negative"

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -22: Not allowed action

7.2.1.200 PositionerCompensationDisturbanceFileLoad [Extended]

Name

PositionerCompensationDisturbanceFileLoad – Loads file to compensate disturbance in requested direction (Positive or Negative).

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the filter number: (-17)
- Checks if the disturbance compenstion feature is allowed in the firmware: -205
- Checks if the disturbance compenstion is enabled in the requested direction: -22

Description

This function loads a file that contains the compensation of disturbance in one direction.

The file cannot be loaded if the disturbance compenstion in the requested direction is already enabled. In this case, it can be disabled with the PositionerCompensationDisturbanceDisable API.

Prototype

int **PositionerCompensationDisturbanceFileLoad**(

int SocketID,

char *PositionerName,

char *Direction,

char *FileName

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.
Direction	char*	"Positive" or "Negative".
FileName	char *	File name located in \Config folder.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -22: Not allowed action
- -61: Error file corrupt or file doesn't exist
- -205: Not enable in your configuration

7.2.1.201 PositionerCompensationDisturbanceStatusGet [Extended]

Name

PositionerCompensationDisturbanceStatusGet – Gets status of disturbance compensation in both directions.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the object type of this command is valid: (-8)
- Checks the filter number: (-17)

Description

This function returns the "Enabled" status of the disturbance compensation in both positive and negative directions.

Prototype

int **PositionerCompensationDisturbanceStatusGet**(

int SocketID,

char *PositionerName,

char * PositiveCompensationEnabledStatus,

char * NegativeCompensationEnabledStatus

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.

Output parameters

PositiveCompensationEnabledStatus	char *	Current "Enabled" status in the positive direction
NegativeCompensationEnabledStatus	char *	Current "Enabled" status in the negative direction

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.

7.2.1.202 PositionerCompensationDualLoopNotchFilterGet [Extended]

Name

PositionerCompensationDualLoopNotchFilterGet – *Gets* the notch filter parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the object type of this command is valid: (-8)
- Checks the notch filter number: (-17)
- Checks the positioner name: (-18)
- Checks dual corrector is enabled: (-205)

Description

This function returns the parameters defined for the selected notch filter in dual loop.

Notch filters parameters:

- NotchFrequency.
- NotchBandwidth.
- NotchGain.

Prototype

int **PositionerCompensationDualLoopNotchFilterGet**(
int SocketID,
char * PositionerName,
int NotchFrequencyNumber,
double * NotchFrequency,
double * NotchBandwith,
double * NotchGain
)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.
NotchFrequencyNumber	int	Number of the selected Notch Frequency filter.

Output parameters

NotchFrequency	double *	Frequency (Hertz) for notch filter.
NotchBandwith	double *	Band width (Hertz) for notch filter.
NotchGain	double *	Gain for notch filter.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -18: Positioner Name doesn't exist or unknown command.
- -205: Not enabled in your configuration.

7.2.1.203 PositionerCompensationDualLoopNotchFilterSet [Extended]

Name

PositionerCompensationDualLoopNotchFilterSet – Sets the notch mode filter parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the object type of this command is valid: (-8)
- Checks input parameters value: (-17)
  - NotchFrequency $\in \left[0 : \frac{0.5}{\text{CorrectorPeriod}}\right]$ with CorrectorPeriod = 0.0001 s (10 kHz) = > $[0 : 5000]$
  - NotchBandwidth with CorrectorPeriod = 0.0001 s (10 kHz) = > $[0 : 5000]$
  - NotchGain $\in [0 : 100]$
- Checks the positioner name: (-18)

Description

This function configures the parameters defined for selected notch filter in dual loop. If the "NotchFrequency" value is NULL or the "NotchGain" value is NULL then the notch filter is not activated.

Notch filters parameters:

- NotchFrequency.
- NotchBandwidth.
- NotchGain.

Prototype

int **PositionerCompensationDualLoopNotchFilterSet**(

int SocketID,

char * PositionerName,

int NotchFrequencyNumber,

double NotchFrequency,

double NotchBandwith,

double NotchGain

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.
NotchFrequencyNumber	int	Number of the selected Notch Frequency filter.
NotchFrequency	double	Frequency (Hertz) for notch filter.
NotchBandwith	double	Band width (Hertz) for notch filter.
NotchGain	double	Gain for notch filter.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -18: Positioner Name doesn't exist or unknown command.

7.2.1.204 PositionerCompensationDualLoopPhaseCorrectionFilterGet [Extended]

Name

PositionerCompensationDualLoopPhaseCorrectionFilterGet – Gets the phase correction filter parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the object type of this command is valid: (-8)
- Checks the notch filter number: (-17)
- Checks the positioner name: (-18)
- Checks dual corrector is enabled: (-205)

Description

This function returns the system compensation parameters defined for selected phase correction filter in dual loop.

Phase correction filter parameters:

- PhaseCorrectionFn.
- PhaseCorrectionFd.
- PhaseCorrectionGain.

Prototype

int **PositionerCompensationDualLoopPhaseCorrectionFilterGet**(

int SocketID,

char * PositionerName,

int PhaseCorrectionFilterNumber,

double * PhaseCorrectionFn,

double * PhaseCorrectionFd,

double * PhaseCorrectionGain

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.
PhaseCorrectionFilterNumber	int	Number of the selected selected phase correction filter.

Output parameters

PhaseCorrectionFn	double *	Numerator frequency (Hertz) for phase correction filter.
PhaseCorrectionFd	double *	Denominator frequency (Hertz) for phase correction filter.
PhaseCorrectionGain	double *	Gain for phase correction filter.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -18: Positioner Name doesn't exist or unknown command.
- -205: Not enabled in your configuration.

7.2.1.205 PositionerCompensationDualLoopPhaseCorrectionFilterSet [Extended]

Name

PositionerCompensationDualLoopPhaseCorrectionFilterSet – Sets the notch mode filter parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the object type of this command is valid: (-8)
- Checks input parameters value: (-17)
  - PhaseCorrectionFn with CorrectorPeriod = 0.0001 s (10 kHz) = > $[0 : 5000]$
  - PhaseCorrectionFd with CorrectorPeriod = 0.0001 s (10 kHz) = > $[0 : 5000]$
  - PhaseCorrectionGain ≥ 0
- Checks the positioner name: (-18)

Description

This function configures the parameters defined for the selected phase correction filter in dual loop. If the "PhaseCorrectionFn" value = 0 or the "PhaseCorrectionFd" value = 0 then the phase correction filter is not activated.

Phase correction filter parameters:

- PhaseCorrectionFn.
- PhaseCorrectionFd.
- PhaseCorrectionGain.

Prototype

int **PositionerCompensationDualLoopNotchFilterSet**(

int SocketID,

char * PositionerName,

int PhaseCorrectionFilterNumber,

double PhaseCorrectionFn,

double PhaseCorrectionFd,

double PhaseCorrectionGain

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.
PhaseCorrectionFilterNumber	int	Number of the selected selected phase correction filter.
PhaseCorrectionFn	double	Numerator frequency (Hertz) for phase correction filter.
PhaseCorrectionFd	double	Denominator frequency (Hertz) for phase correction filter.
PhaseCorrectionGain	double	Gain for phase correction filter.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -18: Positioner Name doesn't exist or unknown command.

7.2.1.206 PositionerCompensationEncoderNotchFilterGet [Extended]

Name

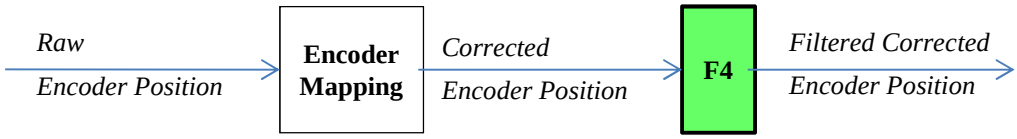
PositionerCompensationEncoderNotchFilterGet – Gets Encoder compensation notch filter parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks parameter values: (-17)
- Notch Frequency number $\in [1:5]$

Description

This function returns parameters defined for the *[Dual]EncoderFilter* frequency notch filter from the encoder compensation (F4 compensation block) configured in encoder.



Encoder Notch filters parameters:

- NotchFrequency (Hertz).
- NotchBandwidth (Hertz).
- NotchGain.

Prototype

int **PositionerCompensationEncoderNotchFilterGet**(

int SocketID,

char * PositionerName,

int NotchFrequencyNumber,

double * NotchFrequency,

double * NotchBandwith,

double * NotchGain

)

Input parameters

SocketID	int	Socket identifier gets by the TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.
NotchFrequencyNumber	int	Number of the selected Notch Frequency filter (1 to 5).

Output parameters

NotchFrequency	double *	Frequency (Hertz) for Encoder Notch filter.
NotchBandwith	double *	Band width (Hertz) for Encoder Notch filter.
NotchGain	double *	Gain for Encoder Notch filter.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -17: Parameter out of range or incorrect.

7.2.1.207 PositionerCompensationEncoderNotchFilterSet [Extended]

Name

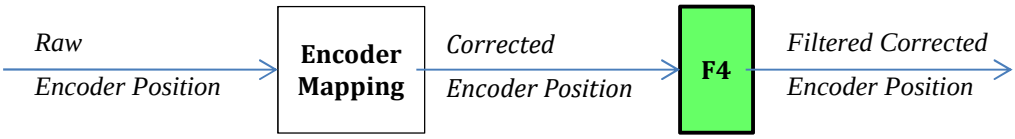
PositionerCompensationEncoderNotchFilterSet – Sets Encoder compensation notch filters parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks parameter values: (-17)
  - Notch Frequency number $\in [1:5]$
  - NotchFrequency $\in \left[0 : \frac{0.5}{\text{CorrectorPeriod}}\right]$ with CorrectorPeriod = 0.0001 s (10 kHz) => $[0:5000]$
  - NotchBandwidth $\in \left[0 : \frac{0.5}{\text{CorrectorPeriod}}\right]$ with CorrectorPeriod = 0.0001 s (10 kHz) => $[0:5000]$
  - NotchGain $\in [0:100]$

Description

This functions sets the selected *[Dual]EncoderFilter* frequency notch filter parameters from the encoder compensation (F4 compensation block) configured in encoder.



Encoder Notch filters parameters:

- NotchFrequency (Hertz).
- NotchBandwidth (Hertz).
- NotchGain.

Prototype

int **PositionerCompensationEncoderNotchFilterSet**(
int SocketID,
char * FullPositionerName,
int NotchFrequencyNumber,
double NotchFrequency,
double NotchBandwidth,
double NotchGain
)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.
NotchFrequencyNumber	int	Number of the selected Notch Frequency filter (1 to 5).
NotchFrequency	double	Frequency (Hertz) for Encoder Notch filter.
NotchBandwidth	double	Band width (Hertz) for Encoder Notch filter.
NotchGain	double	Gain for Encoder Notch filter.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -17: Parameter out of range or incorrect.

7.2.1.208 PositionerCompensationFrequencyNotchsGet [Extended]

Name

PositionerCompensationFrequencyNotchsGet – Gets pre-feedforward compensation notch filters parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks corrector type: (-8)
- CompensationFilterType = Default or XPS-Q

Description

This function returns the *CompensationSystemPreFeedForward* frequency notch filters parameters. These notch filters allow the user to reduce external perturbations such as base motion or floor vibrations. Note that the *CompensationSystemPreFeedForward* feature is available for all corrector types (acceleration, velocity, voltage or position) functioning *in closed loop configuration*.

- NotchFrequency1
- NotchsBandwidth1
- NotchsGain1
- NotchFrequency2
- NotchsBandwidth2
- NotchsGain2
- NotchFrequency3
- NotchsBandwidth3
- NotchsGain3

Prototype

int **PositionerCompensationFrequencyNotchsGet**(

int SocketID,

char * FullPositionerName,

double * NotchFrequency1,

double * NotchBandwidth1,

double * NotchGain1,

double * NotchFrequency2,

double * NotchBandwidth2,

double * NotchGain2,

double * NotchFrequency3,

double * NotchBandwidth3,

double * NotchGain3

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.

Output parameters

NotchFrequency1	double *	Notch frequency for filter #1 (Hz).
NotchBandwidth1	double *	Notch bandwidth for filter #1 (Hz).
NotchGain1	double *	Notch gain for filter #1.
NotchFrequency2	double *	Notch frequency for filter #2 (Hz).
NotchBandwidth2	double *	Notch bandwidth for filter #2 (Hz).
NotchGain2	double *	Notch gain for filter #2.
NotchFrequency3	double *	Notch frequency for filter #3 (Hz).
NotchBandwidth3	double *	Notch bandwidth for filter #3 (Hz).
NotchGain3	double *	Notch gain for filter #3.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.

7.2.1.209 PositionerCompensationFrequencyNotchsSet [Extended]

Name

PositionerCompensationFrequencyNotchsSet – Sets pre-feedforward compensation notch filters parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks correcor type: ERR_WRONG_OBJECT_TYPE (-8)
- Checks parameter values: ERR_PARAMETER_OUT_OF_RANGE (-17)
  - NotchFrequency $\in \left[0 : \frac{0.5}{\text{CorrectorISRPeriod}}\right]$
  - NotchBandwidth $\in \left[0 : \frac{0.5}{\text{CorrectorISRPeriod}}\right]$

NOTE

Refer to *system.ref* file to get CorrectorISRPeriod value.

Description

This function sets the *CompensationSystemPreFeedForward* frequency notch filters parameters. These notch filters allow the user to reduce external perturbations such as base motion or floor vibrations. Note that the *CompensationSystemPreFeedForward* feature is available for all corrector types (acceleration, velocity, voltage or position) functioning *in closed loop configuration*.

NotchFrequency1

NotchsBandwidth1

NotchsGain1

NotchFrequency2

NotchsBandwidth2

NotchsGain2

NotchFrequency3

NotchsBandwidth3

NotchsGain3

Prototype

int **PositionerCompensationFrequencyNotchsSet**(
int SocketID,
char * FullPositionerName,
double NotchFrequency1,
double NotchBandwidth1,
double NotchGain1,
double NotchFrequency2,
double NotchBandwidth2,
double NotchGain2,
double NotchFrequency3,
double NotchBandwidth3,
double NotchGain3
)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.
NotchFrequency1	double	Notch frequency for filter #1 (Hz).
NotchBandwidth1	double	Notch bandwidth for filter #1 (Hz).
NotchGain1	double	Notch gain for filter #1.
NotchFrequency2	double	Notch frequency for filter #2 (Hz).
NotchBandwidth2	double	Notch bandwidth for filter #2 (Hz).
NotchGain2	double	Notch gain for filter #2.
NotchFrequency3	double	Notch frequency for filter #3 (Hz).
NotchBandwidth3	double	Notch bandwidth for filter #3 (Hz).
NotchGain3	double	Notch gain for filter #3.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.

7.2.1.210 PositionerCompensationLowPassTwoFilterGet [Extended]

Name

PositionerCompensationLowPassTwoFilterGet – Gets the post-feedforward compensation second order low-pass filter parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks corrector type: (-8)

Description

This function returns the system compensation parameters defined for the post-feedforward compensation second order low-pass filter.

Prototype

int **PositionerCompensationLowPassTwoFilterGet**(

int SocketID,

char * FullPositionerName,

double * CutOffFrequency

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.

Output parameters

CutOffFrequency	double *	Second order filter cut-off frequency (Hertz).

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.

7.2.1.211 PositionerCompensationLowPassTwoFilterSet [Extended]

Name

PositionerCompensationLowPassTwoFilterSet – Sets the post-feedforward compensation second order low-pass filter parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks correcor type: (-8)
- Checks parameter values: (-17)
  - CutOffFrequency $\in \left[0 : \frac{0.5}{\text{CorrectorISRPeriod}}\right]$

NOTE

Refer to *system.ref* file to get CorrectorISRPeriod value.

Description

This function configures the parameters defined for the post-feedforward compensation second order low-pass filter.

NOTE

If the "CutOffFrequency" value = 0 then the second order low-pass filter is not activated.

Prototype

int **PositionerCompensationLowPassTwoFilterSet**(

int SocketID,

char * FullPositionerName,

double CutOffFrequency

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.
CutOffFrequency	double	Second order filter cut-off frequency (Hertz).

Output parameters

None.

Return (In addition to the results of "Input Tests Common to all XPS Functions")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.

7.2.1.212 PositionerCompensationNotchFilterGet [Extended]

Name

PositionerCompensationNotchFilterGet – *Gets* the notch filter parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the object type of this command is valid: (-8)
- Checks phase correction number: (-17)
- Checks the positioner name: (-18)

Description

This function returns the parameters defined for the selected notch filter.

Notch filters parameters:

- NotchFrequency.
- NotchBandwidth.
- NotchGain.

Prototype

int **PositionerCompensationNotchFilterGet**(

int SocketID,

char * PositionerName,

int NotchFrequencyNumber,

double * NotchFrequency,

double * NotchBandwith,

double * NotchGain)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.
NotchFrequencyNumber	int	Number of the selected Notch Frequency filter.

Output parameters

NotchFrequency	double *	Frequency (Hertz) for notch filter.
NotchBandwith	double *	Band width (Hertz) for notch filter.
NotchGain	double *	Gain for notch filter.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -18: Positioner Name doesn't exist or unknown command.
- -205: Not enable in your configuration.

7.2.1.213 PositionerCompensationNotchFilterSet [Extended]

Name

PositionerCompensationNotchFilterSet – Sets the notch filter parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the object type of this command is valid: (-8)
- Checks input parameters value: (-17)
  - NotchFrequency $\in \left[0 : \frac{0.5}{\text{CorrectorPeriod}}\right]$
  - NotchBandwidth $\in \left[0 : \frac{0.5}{\text{CorrectorPeriod}}\right]$
  - NotchGain $\in [0 : 100]$
- Checks the positioner name: (-18)
- Checks compensation preFeed forward mode is enabled: (-24)
- Checks the motion status (Motion status must be disable): (-134)

Description

This function configures the parameters defined for the selected notch filter. If the "NotchFrequency" value is NULL or the "NotchGain" value is NULL then the notch filter is not activated.

Notch filter parameters:

- NotchFrequency.
- NotchBandwidth.
- NotchGain.

Prototype

int **PositionerCompensationNotchFilterSet**(

int SocketID,

char * PositionerName,

int NotchFrequencyNumber,

double NotchFrequency,

double NotchBandwith,

double NotchGain

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.
NotchFrequencyNumber	int	Number of the selected phase correction filter.
NotchFrequency	double	Frequency (Hertz) for notch filter.
NotchBandwith	double	Band width (Hertz) for notch filter.
NotchGain	double	Gain for notch filter.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -18: Positioner Name doesn't exist or unknown command.
- -205: Not enabled in your configuration.
- -134: Changing the loop status is allowed in DISABLE state only.

7.2.1.214 PositionerCompensationNotchModeFiltersGet [Extended]

Name

PositionerCompensationNotchModeFiltersGet – Gets the post-feedforward compensation notch mode filter parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks corrector type: (-8)

Description

This functions returns the system compensation parameters defined for two post-feedforward compensation notch mode filters.

First notch mode filter parameters:

- NotchModeFr1.
- NotchModeFa1.
- NotchModeZr1.
- NotchModeZa1.

Second notch mode filter parameters:

- NotchModeFr2.
- NotchModeFa2.
- NotchModeZr2.
- NotchModeZa2.

Prototype

int **PositionerCompensationNotchModeFiltersGet**(

int SocketID,

char * FullPositionerName,

double * NotchModeFr1,

double * NotchModeFa1,

double * NotchModeZr1,

double * NotchModeZa1,

double * NotchModeFr2,

double * NotchModeFa2,

double * NotchModeZr2,

double * NotchModeZa2

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.

Output parameters

NotchModeFr1	double *	Resonance frequency (Hertz) for notch mode filter #1.
NotchModeFa1	double *	Anti-resonance frequency (Hertz) for notch mode filter #1.
NotchModeZr1	double *	Resonance damping factor for notch mode filter #1.
NotchModeZa1	double *	Anti-resonance damping factor for notch mode filter #1.
NotchModeFr2	double *	Resonance frequency (Hertz) for notch mode filter #2.
NotchModeFa2	double *	Anti-resonance frequency (Hertz) for notch mode filter #2.
NotchModeZr2	double *	Resonance damping factor for notch filter #2.
NotchModeZa2	double *	Anti-resonance damping factor for notch mode filter #2.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.

7.2.1.215 PositionerCompensationNotchModeFiltersSet [Extended]

Name

PositionerCompensationNotchModeFiltersSet – Sets the post-feedforward compensation notch mode filter parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks corrector type: (-8)
- Checks parameter values: (-17)
  - NotchModeFr $\in \left[0 : \frac{0.5}{\text{CorrectorISRPeriod}}\right]$
  - NotchModeFa $\in \left[0 : \frac{0.5}{\text{CorrectorISRPeriod}}\right]$

NOTE

Refer to *system.ref* file to get CorrectorISRPeriod value.

Description

This functions configures the parameters defined for two post-feedforward compensation notch mode filters.

First notch mode filter parameters:

- NotchModeFr1.
- NotchModeFa1.
- NotchModeZr1.
- NotchModeZa1.

Second notch mode filter parameters:

- NotchModeFr2.
- NotchModeFa2.
- NotchModeZr2.
- NotchModeZa2.

NOTE

If the "NotchModeFr" value = 0 or the "NotchModeFa" value = 0, then the notch mode filter is not activated.

Prototype

int **PositionerCompensationNotchModeFiltersSet**(
int SocketID,
char * FullPositionerName,
double NotchModeFr1,
double NotchModeFa1,
double NotchModeZr1,
double NotchModeZa1,
double NotchModeFr2,
double NotchModeFa2,
double NotchModeZr2,
double NotchModeZa2
)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.
NotchModeFr1	double	Resonance frequency (Hertz) for notch mode filter #1.
NotchModeFa1	double	Anti-resonance frequency (Hertz) for notch mode filter #1.
NotchModeZr1	double	Resonance damping factor for notch mode filter #1.
NotchModeZa1	double	Anti-resonance damping factor for notch mode filter #1.
NotchModeFr2	double	Resonance frequency (Hertz) for notchmode filter #2.
NotchModeFa2	double	Anti-resonance frequency (Hertz) for notch mode filter #2.
NotchModeZr2	double	Resonance damping factor for notch mode filter #2.
NotchModeZa2	double	Anti-resonance damping factor for notch mode filter #2.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.

7.2.1.216 PositionerCompensationPhaseCorrectionFilterGet [Extended]

Name

PositionerCompensationPhaseCorrectionFilterGet – Gets the phase correction filter parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the object type of this command is valid: (-8)
- Checks phase correction number: (-17)
- Checks the positioner name: (-18)

Description

This function returns the system compensation parameters defined for selected phase correction filter.

Phase correction filter parameters:

- PhaseCorrectionFn.
- PhaseCorrectionFd.
- PhaseCorrectionGain.

Prototype

int **PositionerCompensationPhaseCorrectionFilterGet**(

int SocketID,

char * PositionerName,

int PhaseCorrectionFilterNumber,

double * PhaseCorrectionFn,

double * PhaseCorrectionFd,

double * PhaseCorrectionGain

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.
PhaseCorrectionFilterNumber	int	Number of the selected Notch Frequency filter.

Output parameters

PhaseCorrectionFn	double *	Frequency (Hertz) for notch filter.
PhaseCorrectionFd	double *	Band width (Hertz) for notch filter.
PhaseCorrectionGain	double *	Gain for notch filter.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -15: Wrong parameter type in the command string: int, short, int * or short * expected.
- -17: Parameter out of range or incorrect.
- -18: Positioner Name doesn't exist or unknown command.

7.2.1.217 PositionerCompensationPhaseCorrectionFilterSet [Extended]

Name

PositionerCompensationPhaseCorrectionFilterSet – Sets the notch filter parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the object type of this command is valid: (-8)
- Checks input parameters value: (-17)
  - PhaseCorrectionFn $\in \left[0 : \frac{0.5}{\text{CorrectorPeriod}}\right]$
  - PhaseCorrectionFd $\in \left[0 : \frac{0.5}{\text{CorrectorPeriod}}\right]$
  - PhaseCorrectionGain ≥ 0
- Checks the positioner name: (-18)
- Checks the motion status (Motion status must be disable): (-134)

Description

This function configures the parameters defined for the selected phase correction filter. If the "PhaseCorrectionFn" value = 0 or the "PhaseCorrectionFd" value = 0 then the phase correction filter is not activated.

Phase correction filter parameters:

- PhaseCorrectionFn.
- PhaseCorrectionFd.
- PhaseCorrectionGain.

Prototype

int **PositionerCompensationPhaseCorrectionFilterSet**(

int SocketID,

char * PositionerName,

int PhaseCorrectionFilterNumber,

double PhaseCorrectionFn,

double PhaseCorrectionFd,

double PhaseCorrectionGain

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.
PhaseCorrectionFilterNumber		int Number of the selected Notch Frequency filter.
PhaseCorrectionFn	double	Frequency (Hertz) for notch filter.
PhaseCorrectionFd	double	Band width (Hertz) for notch filter.
PhaseCorrectionGain	double	Gain for notch filter.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -18: Positioner Name doesn't exist or unknown command.
- -205: Not enabled in your configuration.
- -134: Changing the loop status is allowed in DISABLE state only.

7.2.1.218 PositionerCompensationPhaseCorrectionFiltersGet [Extended]

Name

PositionerCompensationPhaseCorrectionFiltersGet – Gets the post-feedforward compensation phase correction filter parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks corrector type: (-8)

Description

This function returns the system compensation parameters defined for two post-feedforward compensation phase correction filters.

First phase correction filter parameters:

- PhaseCorrectionFn1.
- PhaseCorrectionFd1.
- PhaseCorrectionGain1.

Second phase correction filter parameters:

- PhaseCorrectionFn2.
- PhaseCorrectionFd2.
- PhaseCorrectionGain2.

Prototype

int **PositionerCompensationPhaseCorrectionFiltersGet**(

int SocketID,

char * FullPositionerName,

double * PhaseCorrectionFn1,

double * PhaseCorrectionFd1,

double * PhaseCorrectionGain1,

double * PhaseCorrectionFn2,

double * PhaseCorrectionFd2,

double * PhaseCorrectionGain2

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.

Output parameters

PhaseCorrectionFn1	double *	Numerator frequency (Hertz) for phase correction filter #1.
PhaseCorrectionFd1	double *	Denominator frequency (Hertz) for phase correction filter #1.
PhaseCorrectionGain1	double *	Gain for phase correction filter #1.
PhaseCorrectionFn2	double *	Numerator frequency (Hertz) for phase correction filter #2.
PhaseCorrectionFd2	double *	Denominator frequency (Hertz) for phase correction filter #2.
PhaseCorrectionGain2	double *	Gain for phase correction filter #2.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.

7.2.1.219 PositionerCompensationPhaseCorrectionFiltersSet [Extended]

Name

PositionerCompensationPhaseCorrectionFiltersSet – Sets the post-feedforward compensation phase correction filter parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks corrector type: (-8)
- Checks parameter values: (-17)
  - PhaseCorrectionFn $\in \left[0 : \frac{0.5}{\text{CorrectorPeriod}} \right]$
  - PhaseCorrectionFd $\in \left[0 : \frac{0.5}{\text{CorrectorPeriod}} \right]$

NOTE

Refer to *system.ref* file to get CorrectorISRPeriod value.

Description

This functions configures the parameters defined for two post-feedforward compensation phase correction filters.

First phase correction filter parameters:

- PhaseCorrectionFn1.
- PhaseCorrectionFd1.
- PhaseCorrectionGain1.

Second phase correction filter parameters:

- PhaseCorrectionFn2.
- PhaseCorrectionFd2.
- PhaseCorrectionGain2.

NOTE

If the "PhaseCorrectionFn" value = 0 or the "PhaseCorrectionFd" value = 0 then the phase correction filter is not activated.

Prototype

int **PositionerCompensationPhaseCorrectionFiltersSet**(
int SocketID,
char * FullPositionerName,
double PhaseCorrectionFn1,
double PhaseCorrectionFd1,
double PhaseCorrectionGain1,
double PhaseCorrectionFn2,
double PhaseCorrectionFd2,
double PhaseCorrectionGain2
)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.
PhaseCorrectionFn1	double	Numerator frequency (Hertz) for phase correction filter #1.
PhaseCorrectionFd1	double	Denominator frequency (Hertz) for phase correction filter #1.
PhaseCorrectionGain1	double	Gain for phase correction filter #1.
PhaseCorrectionFn2	double	Numerator frequency (Hertz) for phase correction filter #2.
PhaseCorrectionFd2	double	Denominator frequency (Hertz) for phase correction filter #2.
PhaseCorrectionGain2	double	Gain for phase correction filter #2.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.

7.2.1.220 PositionerCompensationPositionFilterGet [Extended]

Name

PositionerCompensationPositionFilterGet – Gets the Position filter parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the filter number: (-17)

Description

This function returns the parameters defined for the selected position filter.

Position filters parameters:

- Frequency.
- DampingFactor.

Prototype

int **PositionerCompensationPositionFilterGet**(

int SocketID,

char * PositionerName,

int PositionFilterNumber,

double * Frequency,

double * DampingFactor

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.
PositionFilterNumber	int	Number of the selected Position. Frequency filter.

Output parameters

Frequency	double *	Frequency (Hertz) for notch filter.
DampingFactor	double *	Damping factor for Position filter.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.

7.2.1.221 PositionerCompensationPositionFilterSet [Extended]

Name

PositionerCompensationPositionFilterSet– Sets the Position filter parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the filter number: (-17)

Description

This function configures the parameters defined for selected Position filter. If the "Frequency" value is NULL then the Position filter is not activated.

Position filters parameters:

- Frequency.
- DampingFactor.

Prototype

int **PositionerCompensationPositionFilterSet**(

int SocketID,

char * PositionerName,

int PositionFilterNumber,

double Frequency,

double DampingFactor

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.
PositionFilterNumber	int	Number of the selected Position. Frequency filter.
Frequency	double	Frequency (Hertz) for notch filter.
DampingFactor	double	Damping factor for Position filter.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.

7.2.1.222 PositionerCompensationPostExcitationFrequencyNotchFilterGet [Extended]

Name

PositionerCompensationPostExcitationFrequencyNotchFilterGet – Gets Notch filter parameters from F3 compensation block.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks Notch Frequency number (1 to 10): (-17)

Description

This function returns the parameters defined for the selected notch filter from the post excitation compensation (F3 compensation block) configured in the current corrector (Option0, Option1 or Option2).

Notch filters parameters:

- NotchFrequency (Hertz).
- NotchBandwidth (Hertz).
- NotchGain.

Prototype

int **PositionerCompensationPostExcitationFrequencyNotchFilterGet**(

int SocketID,

char * PositionerName,

int NotchFrequencyNumber,

double * NotchFrequency,

double * NotchBandwith,

double * NotchGain

)

Input parameters

SocketID	int	Socket identifier gets by the TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.
NotchFrequencyNumber	int	Number of the selected Notch Frequency filter (1 to 10).

Output parameters

NotchFrequency	double *	Frequency (Hertz) for notch filter.
NotchBandwith	double *	Band width (Hertz) for notch filter.
NotchGain	double *	Gain for notch filter.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -17: Parameter out of range or incorrect.

7.2.1.223 PositionerCompensationPostExcitationFrequencyNotchFilterSet [Extended]

Name

PositionerCompensationPostExcitationFrequencyNotchFilterSet – Sets Notch filter parameters from F3 compensation block.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks Notch Frequency number (1 to 10): (-17)
- Checks parameter values: (-17)
  - NotchFrequency $\in \left[0 : \frac{0.5}{\text{CorrectorPeriod}}\right]$ with CorrectorPeriod = 0.0001 s (10 kHz) = > $[0 : 5000]$
  - NotchBandwidth $\in \left[0 : \frac{0.5}{\text{CorrectorPeriod}}\right]$ with CorrectorPeriod = 0.0001 s (10 kHz) = > $[0 : 5000]$
  - NotchGain $\in [0 : 100]$

Description

This function configures the parameters defined for selected Notch filter from the post excitation compensation (F3 block) configured in the current corrector (Option0, Option1 or Option2).

If the "NotchFrequency" value is NULL or the "NotchGain" value is NULL then the notch filter is not activated.

Notch filter parameters:

- NotchFrequency (Hertz).
- NotchBandwidth (Hertz).
- NotchGain.

Prototype

int **PositionerCompensationPostExcitationFrequencyNotchFilterSet**(

int SocketID,

char * PositionerName,

int NotchFrequencyNumber,

double NotchFrequency,

double NotchBandwith,

double NotchGain

)

Input parameters

SocketID	int	Socket identifier gets by the TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.
NotchFrequencyNumber	int	Number of the selected Notch Frequency filter (1 to 10).
NotchFrequency	double	Frequency (Hertz) for notch filter.
NotchBandwith	double	Band width (Hertz) for notch filter.
NotchGain	double	Gain for notch filter.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -17: Parameter out of range or incorrect.

7.2.1.224 PositionerCompensationPostExcitationLowPassFilterGet [Extended]

Name

PositionerCompensationPostExcitationLowPassFilterGet – *Gets* the phase correction filter parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the object type of this command is valid: (-8)
- Checks the positioner name: (-18)

Description

This function returns the system compensation parameters defined for the second order low-pass filter.

Prototype

int **PositionerCompensationPostExcitationLowPassFilterGet**(

int SocketID,

char * PositionerName,

double * CutOffFrequency

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.

Output parameters

CutOffFrequency	double *	Second order filter cut-off frequency (Hertz).

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.

7.2.1.225 PositionerCompensationPostExcitationLowPassFilterSet [Extended]

Name

PositionerCompensationPostExcitationLowPassFilterSet – Sets second order low-pass filter parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the object type of this command is valid: (-8)
- Checks input parameters value: (-17)
  - CutOffFrequency with CorrectorPeriod = 0.0001 s (10 kHz) = > $[0 : 5000]$
- Checks the positioner name: (-18)
- Checks compensation post excitation mode is enabled: (-24)
- Checks the motion status (Motion status must be disable): (-134)

Description

This function configures the parameters defined for the second order low-pass filter. If the "CutOffFrequency" value = 0 then the second order low-pass filter is not activated.

Prototype

int **PositionerCompensationPostExcitationLowPassFilterSet**(

int SocketID,

char * PositionerName,

double CutOffFrequency

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.
CutOffFrequency	double	Second order filter cut-off frequency (Hertz).

Output parameters

None.

Return (In addition to the results of "Input Tests Common to all XPS Functions")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -18: Positioner Name doesn't exist or unknown command.
- -24: Not available in this configuration (check hardware or configuration).
- -134: Changing the loop status is allowed in DISABLE state only.

7.2.1.226 PositionerCompensationPostExcitationNotchModeFilterGet [Extended]

Name

PositionerCompensationPostExcitationNotchModeFilterGet – Gets the notch mode filter parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the object type of this command is valid: (-8)
- Checks phase correction number: (-17)
- Checks the positioner name: (-18)

Description

This functions returns the system compensation parameters defined for two notch mode filters.

Notch mode filter parameters:

- NotchModeFr: Resonance frequency (Hertz)
- NotchModeFa: Anti-resonance frequency (Hertz)
- NotchModeZr: Resonance damping factor.
- NotchModeZa: Anti-resonance damping factor.

Prototype

int **PositionerCompensationPostExcitationNotchModeFilterGet**(

int SocketID,

char * PositionerName,

int NotchModeNumber,

double * NotchModeFr,

double * NotchModeFa,

double * NotchModeZr,

double * NotchModeZa

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.
NotchModeNumber	int	Number of the selected notch mode filter.

Output parameters

NotchModeFr	double *	Resonance frequency (Hertz) for notch mode filter.
NotchModeFa	double *	Anti-resonance frequency (Hertz) for notch mode filter.
NotchModeZr	double *	Resonance damping factor for notch mode filter.
NotchModeZa	double *	Anti-resonance damping factor for notch mode filter.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -18: Positioner Name doesn't exist or unknown command.

7.2.1.227 PositionerCompensationPostExcitationNotchModeFilterSet [Extended]

Name

PositionerCompensationPostExcitationNotchModeFilterSet – Sets the notch mode filter parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the object type of this command is valid: (-8)
- Checks input parameters value: (-17)
  - NotchModeFr with CorrectorPeriod = 0.0001 s (10 kHz) = > $[0 : 5000]$
  - NotchModeFa with CorrectorPeriod = 0.0001 s (10 kHz) = > $[0 : 5000]$
- Checks the positioner name: (-18)
- Checks compensation post excitation mode is enabled: (-24)
- Checks the motion status (Motion status must be disable): (-134)

Description

This functions returns the system compensation parameters defined for two notch mode filters.

Notch mode filter parameters:

- NotchModeFr: Resonance frequency (Hertz)
- NotchModeFa: Anti-resonance frequency (Hertz)
- NotchModeZr: Resonance damping factor.
- NotchModeZa: Anti-resonance damping factor.

Prototype

int **PositionerCompensationPostExcitationNotchModeFilterSet**(

int SocketID,

char * PositionerName,

int NotchModeNumber,

double * NotchModeFr,

double * NotchModeFa,

double * NotchModeZr,

double * NotchModeZa

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.
NotchModeNumber	int	Number of the selected notch mode filter.
NotchModeFr	double	Resonance frequency (Hertz) for notch mode filter.
NotchModeFa	double	Anti-resonance frequency (Hertz) for notch mode filter.
NotchModeZr	double	Resonance damping factor for notch mode filter.
NotchModeZa	double	Anti-resonance damping factor for notch mode filter.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -18: Positioner Name doesn't exist or unknown command.
- -24: Not available in this configuration (check hardware or configuration).
- -134: Changing the loop status is allowed in DISABLE state only.

7.2.1.228 PositionerCompensationPostExcitationPhaseCorrectionFilterGet [Extended]

Name

PositionerCompensationPostExcitationPhaseCorrectionFilterGet – Gets the phase correction filter parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the object type of this command is valid: (-8)
- Checks the phase correction filter number: (-17)
- Checks the positioner name: (-18)

Description

This function returns the system compensation parameters defined for selected phase correction filter.

Phase correction filter parameters:

- PhaseCorrectionFn.
- PhaseCorrectionFd.
- PhaseCorrectionGain.

Prototype

int **PositionerCompensationPostExcitationPhaseCorrectionFilterGet**(

int SocketID,

char * PositionerName,

int PhaseCorrectionFilterNumber,

double * PhaseCorrectionFn,

double * PhaseCorrectionFd,

double * PhaseCorrectionGain

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.
PhaseCorrectionFilterNumber		int Number of the selected phase correction filter.

Output parameters

PhaseCorrectionFn	double *	Numerator frequency (Hertz).
PhaseCorrectionFd	double *	Denominator frequency (Hertz).
PhaseCorrectionGain	double *	Gain for phase correction filter.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -18: Positioner Name doesn't exist or unknown command.

7.2.1.229 PositionerCompensationPostExcitationPhaseCorrectionFilterSet [Extended]

Name

PositionerCompensationPostExcitationPhaseCorrectionFilterSet – Sets the phase correction filter parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the object type of this command is valid: (-8)
- Checks input parameters value: (-17)
  - PhaseCorrectionFn $\in \left[0 : \frac{0.5}{\text{CorrectorPeriod}}\right]$
  - PhaseCorrectionFd $\in \left[0 : \frac{0.5}{\text{CorrectorPeriod}}\right]$
  - PhaseCorrectionGain ≥ 0
- Checks the positioner name: (-18)
- Checks compensation post excitation mode is enabled: (-24)
- Checks the motion status (Motion status must be disable): (-134)

Description

This function configures the parameters defined for the selected phase correction filter. If the "PhaseCorrectionFn" value = 0 or the "PhaseCorrectionFd" value = 0 then the phase correction filter is not activated.

Phase correction filter parameters:

- PhaseCorrectionFn.
- PhaseCorrectionFd.
- PhaseCorrectionGain.

Prototype

int **PositionerCompensationPostExcitationPhaseCorrectionFilterSet**(

int SocketID,

char * PositionerName,

int PhaseCorrectionFilterNumber,

double * PhaseCorrectionFn,

double * PhaseCorrectionFd,

double * PhaseCorrectionGain

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.
PhaseCorrectionFilterNumber	int	Number of the selected phase correction filter.
PhaseCorrectionFn	double *	Numerator frequency (Hertz) for phase correction filter.
PhaseCorrectionFd	double *	Denominator frequency (Hertz) for phase correction filter.
PhaseCorrectionGain	double *	Gain for phase correction filter.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -18: Positioner Name doesn't exist or unknown command.
- -24: Not available in this configuration (check hardware or configuration).
- -134: Changing the loop status is allowed in DISABLE state only.

7.2.1.230 PositionerCompensationPreFeedForwardFrequencyNotchFilterGet [Extended]

Name

PositionerCompensationPreFeedForwardFrequencyNotchFilterGet – Gets the notch filter parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the object type of this command is valid: (-8)
- Checks input parameter value: (-17)
- Checks the positioner name: (-18)

Description

This function returns the parameters defined for the selected notch filter.

Notch filters parameters:

- UserNotchFrequency.
- UserNotchBandwidth.
- UserNotchGain.

Prototype

int **PositionerCompensationPreFeedForwardFrequencyNotchFilterGet**(

int SocketID,

char * PositionerName,

int NotchFrequencyNumber,

double * NotchFrequency,

double * NotchBandwith,

double * NotchGain)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.
NotchFrequencyNumber	int	Number of the selected Notch Frequency filter.

Output parameters

NotchFrequency	double *	Frequency (Hertz) for notch filter.
NotchBandwith	double *	Band width (Hertz) for notch filter.
NotchGain	double *	Gain for notch filter.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -18: Positioner Name doesn't exist or unknown command.

7.2.1.231 PositionerCompensationPreFeedForwardFrequencyNotchFilterSet [Extended]

Name

PositionerCompensationPreFeedForwardFrequencyNotchFilterSet – Sets the notch filter parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the object type of this command is valid: (-8)
- Checks input parameters value: (-17)
  - NotchFrequency with CorrectorPeriod = 0.0001 s (10 kHz) = > [0 : 5000]
  - NotchBandwidth with CorrectorPeriod = 0.0001 s (10 kHz) = > [0 : 5000]
  - NotchGain
- Checks the positioner name: (-18)
- Checks compensation preFeed forward mode is enabled: (-24)
- Checks the motion status (Motion status must be disable): (-134)

Description

This function configures the parameters defined for selected notch filter. If the "NotchFrequency" value is NULL or the "NotchGain" value is NULL then the notch filter is not activated.

Notch filters parameters:

- UserNotchFrequency.
- UserNotchBandwidth.
- UserNotchGain.

Prototype

int **PositionerCompensationPreFeedForwardFrequencyNotchFilterSet**(

int SocketID,

char * PositionerName,

int NotchFrequencyNumber,

double NotchFrequency,

double NotchBandwith,

double NotchGain

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.
NotchFrequencyNumber	int	Number of the selected Notch Frequency filter.
NotchFrequency	double	Frequency (Hertz) for notch filter.
NotchBandwith	double	Band width (Hertz) for notch filter.
NotchGain	double	Gain for notch filter.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -18: Positioner Name doesn't exist or unknown command.
- -24: Not available in this configuration (check hardware or configuration).
- -134: Changing the loop status is allowed in DISABLE state only.

7.2.1.232 PositionerCompensationPreFeedForwardPhaseCorrectionFilterGet [Extended]

Name

PositionerCompensationPreFeedForwardPhaseCorrectionFilterGet – Gets the phase correction filter parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the object type of this command is valid: (-8)
- Checks phase correction number: (-17)
- Checks the positioner name: (-18)

Description

This function returns the system compensation parameters defined for selected phase correction filter.

Phase correction filter parameters:

- PhaseCorrectionFn.
- PhaseCorrectionFd.
- PhaseCorrectionGain.

Prototype

int **PositionerCompensationPreFeedForwardPhaseCorrectionFilterGet**(

int SocketID,

char * PositionerName,

int PhaseCorrectionFilterNumber,

double * PhaseCorrectionFn,

double * PhaseCorrectionFd,

double * PhaseCorrectionGain

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.
PhaseCorrectionFilterNumber		int Number of the selected phase correction filter.

Output parameters

PhaseCorrectionFn	double *	Numerator frequency (Hertz) for phase correction filter.
PhaseCorrectionFd	double *	Denominator frequency (Hertz) for phase correction filter.
PhaseCorrectionGain	double *	Gain for phase correction filter.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -18: Positioner Name doesn't exist or unknown command.

7.2.1.233 PositionerCompensationPreFeedForwardPhaseCorrectionFilterSet [Extended]

Name

PositionerCompensationPreFeedForwardPhaseCorrectionFilterSet – Sets the phase correction filter parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the object type of this command is valid: (-8)
- Checks input parameters number: (-17)
  - PhaseCorrectionFn with CorrectorPeriod = 0.0001 s (10 kHz) = > $\left[0 : 5000\right]$
  - PhaseCorrectionFd with CorrectorPeriod = 0.0001 s (10 kHz) = > $\left[0 : 5000\right]$
  - PhaseCorrectionGain ≥ 0
- Checks the positioner name: (-18)
- Checks compensation preFeed forward mode is enabled: (-24)
- Checks the motion status (Motion status must be disable): (-134)

Description

This function configures the parameters defined for the selected phase correction filter. If the "PhaseCorrectionFn" value = 0 or the "PhaseCorrectionFd" value = 0 then the phase correction filter is not activated.

Phase correction filter parameters:

- PhaseCorrectionFn.
- PhaseCorrectionFd.
- PhaseCorrectionGain.

Prototype

int **PositionerCompensationPreFeedForwardPhaseCorrectionFilterSet**(

int SocketID,

char * PositionerName,

int PhaseCorrectionFilterNumber,

double PhaseCorrectionFn,

double PhaseCorrectionFd,

double PhaseCorrectionGain

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.
PhaseCorrectionFilterNumber	int	Number of the selected phase correction filter.
PhaseCorrectionFn	double	Numerator frequency (Hertz) for phase correction filter.
PhaseCorrectionFd	double	Denominator frequency (Hertz) for phase correction filter.
PhaseCorrectionGain	double	Gain for phase correction filter.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -18: Positioner Name doesn't exist or unknown command.
- -134: Changing the loop status is allowed in DISABLE state only.

7.2.1.234 PositionerCompensationPreFeedForwardSpatialNotchFilterGet [Extended]

Name

PositionerCompensationPreFeedForwardSpatialNotchFilterGet – Gets the spatial notch filter parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the object type of this command is valid: (-8)
- Checks spatial notch number: (-17)
- Checks the positioner name: (-18)

Description

This function returns the parameters defined for the selected spatial notch filter.

Spatial notch filters parameters:

- SpatialNotchStep.
- SpatialNotchBandwidth.
- SpatialNotchGain.

Prototype

int **PositionerCompensationPreFeedForwardSpatialNotchFilterGet**(

int SocketID,

char * PositionerName,

int SpatialNotchNumber,

double * SpatialNotchStep,

double * SpatialNotchBandwidth,

double * SpatialNotchGain)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.
SpatialNotchNumber	int	Number of the selected Spatial Notch Frequency filter.

Output parameters

SpatialNotchStep	double *	Step for spatial notch filter.
SpatialNotchBandwidth	double *	Band width (Hertz) for spatial notch filter.
SpatialNotchGain	double *	Gain for spatial notch filter.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -18: Positioner Name doesn't exist or unknown command.

7.2.1.235 PositionerCompensationPreFeedForwardSpatialNotchFilterSet [Extended]

Name

PositionerCompensationPreFeedForwardSpatialNotchFilterSet – Sets the notch filter parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the object type of this command is valid: (-8)
- Checks input parameters value: (-17)
  - If (SpatialNotchStep > 1.0e-12)
  - $\frac{\text{MaximumVelocity}}{\text{SpatialNotchStep}} \in \left[0 : \frac{0.5}{\text{CorrectorPeriod}}\right]$ *(CorrectorPeriod: see system.ref)*
  - $\text{SpatialNotchBandwidth} \in \left[0 : \frac{0.5}{\text{CorrectorPeriod}}\right]$
  - $\text{SpatialNotchGain} \in [0 : 100]$
  - Else
  - SpatialNotchStep = 0
  - SpatialNotchBandwidth = 0
  - SpatialNotchGain = 1
- Checks the positioner name: (-18)
- Checks compensation preFeed forward mode is enabled: (-24)
- Checks the motion status (Motion status must be disable): (-134)

Description

This function configures the parameters defined for selected spatial notch filter. If the "SpatialNotchStep" value is 0 then the spatial notch filter is not activated and the gain is setting to 1.

Prototype

int **PositionerCompensationPreFeedForwardSpatialNotchFilterSet**(

int SocketID,

char * PositionerName,

int SpatialNotchNumber,

double SpatialNotchStep,

double SpatialNotchBandwidth,

double SpatialNotchGain

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.
SpatialNotchStep	double	Step for spatial notch filter.
SpatialNotchBandwidth	double	Band width (Hertz) for spatial notch filter.
SpatialNotchGain	double	Gain for spatial notch filter.
SpatialNotchNumber	int	Number of the selected Spatial Notch Frequency filter.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -18: Positioner Name doesn't exist or unknown command.
- -24: Not available in this configuration (check hardware or configuration).
- -134: Changing the loop status is allowed in DISABLE state only.

7.2.1.236 PositionerCompensationSpatialPeriodicNotchsGet [Extended]

Name

PositionerCompensationSpatialPeriodicNotchsGet – Gets pre-feedforward compensation spatial periodic filters parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks corrector type: (-8)

Description

This functions returns the *CompensationSystemPreFeedForward* spatial periodic filters parameters. These filters reduce the spatial periodic perturbations coming from screw pitch or cogging.

Note that the *CompensationSystemPreFeedForward* feature is available for all corrector types (acceleration, velocity, voltage or position) functioning *in closed loop configuration*.

- SpatialNotchStep1.
- SpatialNotchsBandwidth1.
- SpatialNotchsGain1.
- SpatialNotchStep2.
- SpatialNotchsBandwidth2.
- SpatialNotchsGain2.
- SpatialNotchStep3.
- SpatialNotchsBandwidth3.
- SpatialNotchsGain3.

Prototype

int **PositionerCompensationSpatialPeriodicNotchsGet**(

int SocketID,

char * FullPositionerName,

double * SpatialNotchStep1,

double * SpatialNotchBandwidth1,

double * SpatialNotchGain1,

double * SpatialNotchStep2,

double * SpatialNotchBandwidth2,

double * SpatialNotchGain2,

double * SpatialNotchStep3,

double * SpatialNotchBandwidth3,

double * SpatialNotchGain3

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.

Output parameters

SpatialNotchStep1	double *	Spatial periodic step for filter #1 (units).
SpatialNotchBandwidth1	double *	Spatial periodic bandwidth for filter #1 (Hz).
SpatialNotchGain1	double *	Spatial periodic gain for filter #1.
SpatialNotchStep2	double *	Spatial periodic step for filter #2 (units).
SpatialNotchBandwidth2	double *	Spatial periodic bandwidth for filter #2 (Hz).
SpatialNotchGain2	double *	Spatial periodic gain for filter #2.
SpatialNotchStep3	double *	Spatial periodic step for filter #3 (units).
SpatialNotchBandwidth3	double *	Spatial periodic bandwidth for filter #3 (Hz).
SpatialNotchGain3	double *	Spatial periodic gain for filter #3.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.

7.2.1.237 PositionerCompensationSpatialPeriodicNotchsSet [Extended]

Name

PositionerCompensationSpatialPeriodicNotchsSet – Sets pre-feedforward compensation spatial periodic filters parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks correcor type: (-8)
- Checks parameter values: (-17)
  - SpatialNotchStep $\in [0 : MaximumVelocity * CorrectorISRPeriod]$
  - SpatialNotchBandwidth $\in \left[0 : \frac{0.5}{\text{CorrectorISRPeriod}}\right]$

NOTE

Refer to system.ref file to get CorrectorISRPeriod and stages.ini for MaximumVelocity values.

Description

This function sets the *CompensationSystemPreFeedForward* spatial periodic filters parameters. These filters reduce the spatial periodic perturbations coming from screw pitch or cogging.

Note that the *CompensationSystemPreFeedForward* feature is available for all corrector types (acceleration, velocity, voltage or position) functioning *in closed loop configuration*.

- SpatialNotchStep1.
- SpatialNotchsBandwidth1.
- SpatialNotchsGain1.
- SpatialNotchStep2.
- SpatialNotchsBandwidth2.
- SpatialNotchsGain2.
- SpatialNotchStep3.
- SpatialNotchsBandwidth3.
- SpatialNotchsGain3.

Prototype

int **PositionerCompensationSpatialPeriodicNotchsSet**(
int SocketID,
char * FullPositionerName,
double SpatialNotchStep1,
double SpatialNotchBandwidth1,
double SpatialNotchGain1,
double SpatialNotchStep2,
double SpatialNotchBandwidth2,
double SpatialNotchGain2,
double SpatialNotchStep3,
double SpatialNotchBandwidth3,
double SpatialNotchGain3
)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.
SpatialNotchStep1	double	Spatial periodic step for filter #1 (units).
SpatialNotchBandwidth1	double	Spatial periodic bandwidth for filter #1 (Hz).
SpatialNotchGain1	double	Spatial periodic gain for filter #1.
SpatialNotchStep2	double	Spatial periodic step for filter #2 (units).
SpatialNotchBandwidth2	double	Spatial periodic bandwidth for filter #2 (Hz).
SpatialNotchGain2	double	Spatial periodic gain for filter #2.
SpatialNotchStep3	double	Spatial periodic step for filter #3 (units).
SpatialNotchBandwidth3	double	Spatial periodic bandwidth for filter #3 (Hz).
SpatialNotchGain3	double	Spatial periodic gain for filter #3.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.

7.2.1.238 PositionerCorrectorAutoTuning

Name

PositionerCorrectorAutoTuning – Executes auto-tuning process for determining position control loop PID values.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks group type: (-8)
- Positioner must not be a "Secondary Positioner": (-8)
- Checks positioner name: (-18)
- Group status must be "READY": (-22)
- Control loop type must be "PIDFFVelocity", "PIDDualFFVoltage" or "PIDFFAcceleration": (-24)

Description

The function executes an auto-tuning process and returns the calculated PID settings (KP, KI and KD values). The selected group must be in "READY" state, else (-22) error is returned.

This function works only if the positioner control loop type is "PIDFFVelocity" (velocity control), "PIDDualFFVoltage" (voltage control) or "PIDFFAcceleration" (acceleration control), else it returns (-24) error.

If the function is called when the positioner is not in READY state, (-22) error will be returned.

The "Mode" input value indicates the control mode of the position loop (**Short Settle** or **High Robustness**).

In the **Short Settle** mode, the PID values are adjusted to have high motion performance (short settling time, less following errors).

The **High Robustness** mode is used for a relatively good performance in motion, but guarantees the robustness (stability) for all stage situations (positions, velocities, accelerations).

If auto-tuning initialization fails (-104) error is returned, or if the motion becomes disabled then (-26) error is returned.

The auto-tuning process is executed in 5 periods. At the end of each period, the auto-tuning process estimates the auto-tuning quality by calculating the noise/signal ratio. If the noise/signal ratio is very close to zero (it means no oscillation), an (-101) error is returned. Else if the noise ratio >MaximumNoiseRatio (normally between 0.1 and 0.2, exact value defined in system.ref) then (-102) error is returned.

If the number of acquired data points (minimum = 9) or the number of acquired signal periods (minimum = 5) is not enough for a good estimate then (-103) error is returned.

At end of this function, the new PID setting is returned and the group status becomes "READY" once again.

Prototype

int **PositionerCorrectorAutoTuning**(
int SocketID,
char * PositionerName,
int Mode,
double * KP,
double * KI,
double * KD
)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.
Mode	int	Loop control mode (0 = short settle, or 1 = robust).

Output parameters

KP	double *	Calculated KP value.
KI	double *	Calculated KI value.
KD	double *	Calculated KD value.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -5: Not allowed due to a positioner error or hardware status.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -18: Positioner Name doesn't exist or unknown command.
- -24: Not available in this configuration (check hardware or configuration).
- -101: Relay Feedback Test failed: No oscillation.
- -102: Relay Feedback Test failed: Signal too noisy.
- -103: Relay Feedback Test failed: Signal data not enough for analyse.
- -104: Error of tuning process initialization.

7.2.1.239 PositionerCorrectorDamperFilterGet [Extended]

Name

PositionerCorrectorDamperFilterGet – Gets Dual control loop parameters for a selected positioner.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the object type of this command is valid: (-8)
- Checks damper filter is enabled: (-205)

Description

This function allows returning the Damper Filter parameters for a PID Acceleration control loop.

NOTE

The corrector must be "PIDFFAccelerationCorrector".

Prototype

int **PositionerCorrectorDamperFilterGet**(

int SocketID,

char * PositionerName,

double * CutOffFrequency,

double * DamperFactor,

double * Gain

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.

Output parameters

CutOffFrequency	double *	Damper filter cut-off frequency (Hz).
DamperFactor	double *	Damper factor (1 by default).
Gain	double *	Filter gain (0 or negative value).

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -18: Positioner Name doesn't exist or unknown command.
- -205: Not enabled in your configuration.

7.2.1.240 PositionerCorrectorDamperFilterSet [Extended]

Name

PositionerCorrectorDamperFilterSet – Sets Dual control loop parameters for a selected positioner.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the object type of this command is valid: (-8)
- Checks input parameters value: (-17)
- CutOffFrequency ≥0 and ≤(0.5 / ISRCorrectorPeriod)
- DamperFactor >0
- Gain ≤0
- Checks the motion status (Motion status must be disable): (-134)
- Checks damper filter is enabled: (-205)

Description

This function allows configuring the Damper Filter parameters for a PID Acceleration control loop.

NOTE

The main control loop must be "PIDFFAccelerationCorrector".

This function is enabled only if the group state is DISABLE.

Prototype

int **PositionerCorrectorDamperFilterSet**(

int SocketID,

char * PositionerName,

double CutOffFrequency,

double DamperFactor,

double Gain

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.
CutOffFrequency	double	Damper filter cut-off frequency (Hz).
DamperFactor	double	Damper factor (1 by default).
Gain	double	Filter gain (0 or negative value).

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -205: Not enabled in your configuration.
- -134: Changing the loop status is allowed in DISABLE state only.

7.2.1.241 PositionerCorrectorDualGet [Extended]

Name

PositionerCorrectorDualGet – Gets Dual control loop parameters for a selected positioner.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the object type of this command is valid: (-8)
- Checks the positioner name: (-18)
- Checks dual corrector is enabled: (-205)

Description

This function allows returning the dual control loop parameter values.

NOTE

The "DualCorrectorMode" must be "Enabled" in the stages.ini file to activate the dual control loop. A secondary encoder has to be configured to be able to use the dual control loop. The main control loop must be "PIDFFAccelerationCorrector".

Prototype

int **PositionerCorrectorDualGet**(
int SocketID,
char * PositionerName,
bool * ClosedLoopStatus,
double * KP,
double * KI,
double * KD,
double * IntegrationTime,
double * DerivativeFilterCutOffFrequency,
double * KFeedForwardAcceleration,
double * KFeedForwardJerk
)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.

Output parameters

ClosedLoopStatus	bool *	Dual control loop status (true = closed and false = opened).
KP	double *	PID servo loop proportional gain.
KI	double *	PID servo loop integral gain.
KD	double *	PID servo loop derivative gain.
IntegrationTime	double *	PID integration time (seconds).
DerivativeFilterCutOffFrequency	double *	PID derivative filter cut-off frequency (Hz).
KFeedForwardAcceleration	double *	Acceleration feedforward gain (units).
KFeedForwardJerk	double *	Jerk feedforward gain (units).

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -18: Positioner Name doesn't exist or unknown command.
- -205: Not enabled in your configuration.

7.2.1.242 PositionerCorrectorDualSet [Extended]

Name

PositionerCorrectorDualSet – Sets Dual control loop parameters for a selected positioner.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the object type of this command is valid: (-8)
- Checks input parameters value: (-17)

  KP ≥0, KI ≥0, KD ≥0, KFeedForwardAcceleration ≥0, KFeedForwardJerk ≥0

  IntegrationTime ≥CorrectorPeriod (0.0001 s)
- Checks the positioner name: (-18)

Description

This function allows returning the dual control loop parameter values.

NOTE

The "DualCorrectorMode" must be "Enabled" in the stages.ini file to activate the dual control loop. A secondary encoder has to be configured to be able to use the dual control loop. The main control loop must be "PIDFFAccelerationCorrector".

Prototype

int **PositionerCorrectorDualSet**(

int SocketID,

char * PositionerName,

bool ClosedLoopStatus,

double KP,

double KI,

double KD,

double IntegrationTime,

double DerivativeFilterCutOffFrequency,

double KFeedForwardAcceleration,

double KFeedForwardJerk

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.
ClosedLoopStatus	bool	Dual control loop status (true = closed and false = opened).
KP	double	PID servo loop proportional gain.
KI	double	PID servo loop integral gain.
KD	double	PID servo loop derivative gain.
IntegrationTime	double	PID integration time (seconds).
DerivativeFilterCutOffFrequency	double	PID derivative filter cut-off frequency (Hz).
KFeedForwardAcceleration	double	Acceleration feedforward gain (units).
KFeedForwardJerk	double	Jerk feedforward gain (units).

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -18: Positioner Name doesn't exist or unknown command.

7.2.1.243 PositionerCorrectorExcitationSignalGainGet

Name

PositionerCorrectorExcitationSignalGainGet – Gets corrector excitation signal gain.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the positioner name: (-18)

Description

This function returns the corrector excitation signal gain for the selected positioner.

Prototype

int **PositionerCorrectorPIDBaseGet**(
int SocketID,
char * PositionerName,
double * ExcitationSignalGain
)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.

Output parameters

ExcitationSignalGain	double *	Excitation signal gain.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -18: Positioner Name doesn't exist or unknown command.

7.2.1.244 PositionerCorrectorExcitationSignalGainSet

Name

PositionerCorrectorExcitationSignalGainSet – Sets corrector excitation signal gain.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the parameter value: value must be between -1 and 1, else return "Parameter out of range or incorrect" (-17)
- Checks the positioner name: (-18)

Description

This function configures the corrector excitation signal gain for the selected positioner.

ExcitationSignalGain value must ≥-1 and ≤1.

NOTE

The final gain of excitation signal for primary positioner = KFeedforwardExcitationToPrimary * ExcitationSignalGain

The final gain of excitation signal for secondary positioner = KFeedforwardExcitationToSecondary * ExcitationSignalGain

To have more details about KFeedforwardExcitationToPrimary and KFeedforwardExcitationToSecondary , refer to the API PositionerExcitationKFeedforwardSet()

Prototype

Int **PositionerCorrectorExcitationSignalGainSet**(

int SocketID,

char * PositionerName,

double ExcitationSignalGain

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.
ExcitationSignalGain	double	Excitation signal gain.

Output parameters

None.

Return (In addition to the results of "Input Tests Common to all XPS Functions")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -18: Positioner Name doesn't exist or unknown command.

7.2.1.245 PositionerCorrectorNotchFiltersGet [Extended]

Name

PositionerCorrectorNotchFiltersGet – Gets the notch filter parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the positioner type: (-8)

Description

This function returns the parameters defined for two notch filters.

First notch filter parameters:

- UserNotchFrequency1.
- UserNotchBandwidth1.
- UserNotchGain1.

Second notch filter parameters:

- UserNotchFrequency2.
- UserNotchBandwidth2.
- UserNotchGain2.

NOTE

If the corrector type is "NoEncoderPositionCorrector" then (-24) error is returned.

Prototype

int **PositionerCorrectorNotchFiltersGet**(

int SocketID,

char * FullPositionerName,

double * NotchFrequency1,

double * NotchBandwith1,

double * NotchGain1,

double * NotchFrequency2,

double * NotchBandwith2,

double * NotchGain2

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.

Output parameters

NotchFrequency1	double *	Frequency (Hertz) for notch filter #1.
NotchBandwith1	double *	Band width (Hertz) for notch filter #1.
NotchGain1	double *	Gain for notch filter #1.
NotchFrequency2	double *	Frequency (Hertz) for notch filter #2.
NotchBandwith2	double *	Band width (Hertz) for notch filter #2.
NotchGain2	double *	Gain for notch filter #2.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -24: Not available in this configuration (check hardware or configuration).

7.2.1.246 PositionerCorrectorNotchFiltersSet [Extended]

Name

PositionerCorrectorNotchFiltersSet – Sets the notch filter parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the positioner type: (-8)
- Checks parameter values: (-17)
  - NotchFrequency $\in \left[0 : \frac{0.5}{\text{CorrectorISRPeriod}}\right]$
  - NotchBandwidth $\in \left[0 : \frac{0.5}{\text{CorrectorISRPeriod}}\right]$
  - NotchGain $\in [0 : 100]$

NOTE

Refer to *system.ref* file to get CorrectorISRPeriod value.

Description

This function configures the parameters defined for two notch filters. If the "NotchFrequency" value is NULL or the "NotchGain" value is NULL then the notch filter is not activated.

First notch filter parameters:

- NotchFrequency1.
- NotchBandwidth1.
- NotchGain1.

Second notch filter parameters:

- NotchFrequency2.
- NotchBandwidth2.
- NotchGain2.

NOTE

If the corrector type is "NoEncoderPositionCorrector" then (-24) error is returned.

Prototype

int **PositionerCorrectorNotchFiltersSet**(
int SocketID,
char * FullPositionerName,
double NotchFrequency1,
double NotchBandwith1,
double NotchGain1,
double NotchFrequency2,
double NotchBandwith2,
double NotchGain2
)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.
NotchFrequency1	double	Frequency (Hertz) for notch filter #1.
NotchBandwith1	double	Band width (Hertz) for notch filter #1.
NotchGain1	double	Gain for notch filter #1.
NotchFrequency2	double	Frequency (Hertz) for notch filter #2.
NotchBandwith2	double	Band width (Hertz) for notch filter #2.
NotchGain2	double	Gain for notch filter #2.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -24: Not available in this configuration (check hardware or configuration).

7.2.1.247 PositionerCorrectorPIDAccelerationFilterGet [Extended]

Name

PositionerCorrectorPIDAccelerationFilterGet – Gets PID acceleration corrector filter parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the object type of this command is valid: (-8)

Description

This function returns PID acceleration corrector filter parameters.

Prototype

int **PositionerCorrectorPIDAccelerationFilterGet**(

int SocketID,

char * PositionerName,

bool * FilterControlStatus,

double * KD,

double * DerivativeFilterCutOffFrequency

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.

Output parameters

FilterControlStatus	bool *	Current position of X axis.
KD	double *	KD gain.
DerivativeFilterCutOffFrequency	double *	Derivative Filter Cut-off Frequency (Hz).

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.

7.2.1.248 PositionerCorrectorPIDAccelerationFilterSet_[Extended]

Name

PositionerCorrectorPIDAccelerationFilterSet – Sets PID acceleration corrector filter parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the object type of this command is valid: (-8)
- Checks the motion status (Motion status must be disable): (-134)
- Checks PID Acceleration Filter is enabled: (-205)

Description

This function updates PID acceleration corrector filter parameters and enables/disables the filter.

Prototype

int **PositionerCorrectorPIDAccelerationFilterSet**(

int SocketID,

char * PositionerName,

bool * FilterControlStatus,

double * KD,

double * DerivativeFilterCutOffFrequency

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.
FilterControlStatus	bool	Current position of X axis.
KD	double	KD gain.
DerivativeFilterCutOffFrequency	double	Derivative Filter Cut-off Frequency (Hz).

Output parameters

None.

Return (In addition to the results of "Input Tests Common to all XPS Functions")

- 0: No error.
- -8: Wrong object type for this command.
- -134: Changing the loop status is allowed in DISABLE state only.
- -205: Not enabled in your configuration.

7.2.1.249 PositionerCorrectorPIDBaseGet [Extended]

Name

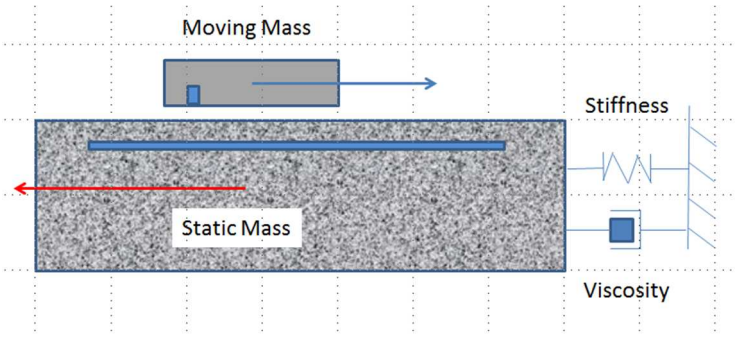
PositionerCorrectorPIDBaseGet – Gets PIDBase parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the positioner name: (-18)

Description

This function returns the PIDBase parameter values.



PIDBase parameters:

- MovingMass.
- StaticMass.
- Viscosity.
- Stiffness.

Prototype

int **PositionerCorrectorPIDBaseGet**(

int SocketID,

char * PositionerName,

double * MovingMass,

double * StaticMass,

double * Viscosity,

double * Stiffness

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.

Output parameters

MovingMass	double *	Mass of the stage moving part.
StaticMass	double *	Mass of the stage static part (the base).
Viscosity	double *	Viscosity of the base.
Stiffness	double *	Stiffness of the base.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.

7.2.1.250 PositionerCorrectorPIDBaseSet [Extended]

Name

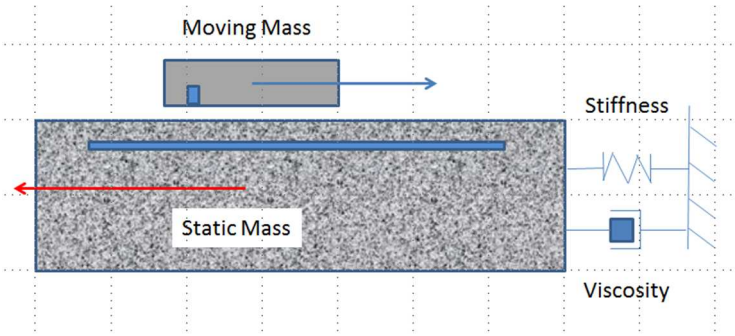
PositionerCorrectorPIDBaseSet – Sets PIDBase parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the parameter values: all values must ≥0, else return "Parameter out of range or incorrect" (-17)
- Checks the positioner name: (-18)

Description

This function configures the PIDBase parameters defined for the selected positioner.



PIDBase parameters to set:

- MovingMass.
- StaticMass.
- Viscosity.
- Stiffness.

Prototype

int **PositionerCorrectorPIDBaseSet**(

int SocketID,

char * PositionerName,

double MovingMass,

double StaticMass,

double Viscosity,

double Stiffness

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.
MovingMass	double	Mass of the stage moving part.
StaticMass	double	Mass of the stage static part (the base).
Viscosity	double	Viscosity of the base.
Stiffness	double	Stiffness of the base.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -18: Positioner Name doesn't exist or unknown command.

7.2.1.251 PositionerCorrectorPIDDualFFVoltageGet

Name

PositionerCorrectorPIDDualFFVoltageGet – Gets PIDDualFFVoltage corrector parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the positioner type and the corrector type: (-8)

Description

This function returns the corrector parameter values used by a PID dual feed-forward with a motor voltage output.

NOTE

The "CorrectorType" must be "PIDDualFFVoltage" in the stages.ini file. This servo loop type is used when the position servo loop drives the voltage applied directly to the motor.

Prototype

int **PositionerCorrectorPIDDualFFVoltageGet**(

int SocketID,

char * FullPositionerName,

bool * ClosedLoopStatus,

double * KP,

double * KI,

double * KD,

double * KS,

double * IntegrationTime,

double * DerivativeFilterCutOffFrequency,

double * GKP,

double * GKI,

double * GKD,

double * KForm,

double * FeedForwardGainVelocity,

double * FeedForwardGainAcceleration,

double * Friction

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.

Output parameters

ClosedLoopStatus	bool *	Position servo loop status (true = closed and false = opened).
KP	double *	PID servo loop proportional gain.
KI	double *	PID servo loop integral gain.
KD	double *	PID servo loop derivative gain.
KS	double *	PID integral saturation value (0 to 1).
IntegrationTime	double *	PID integration time (seconds).
DerivativeFilterCutOffFrequency	double *	PID derivative filter cut-off frequency (Hz).
GKP	double *	Variable PID proportional gain multiplier.
GKI	double *	Variable PID integral gain multiplier.
GKD	double *	Variable PID derivative gain multiplier.
KForm	double *	Variable PID form coefficient.
FeedForwardGainVelocity	double *	Velocity feedforward gain (units).
FeedForwardGainAcceleration	double *	Acceleration feedforward gain (units).
Friction	double *	Friction compensation.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.

7.2.1.252 PositionerCorrectorPIDDualFFVoltageSet

Name

PositionerCorrectorPIDDualFFVoltageSet – Sets PIDDualFFVoltage corrector parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the positioner type and the corrector type: (-8)
- Checks parameter value: (-17)
  - KP ≥0.
  - KI ≥0.
  - KD ≥0.
  - 0 ≤KS ≤1.
  - IntegrationTime ≥CorrectorISRPeriod.
  - GKP >-1.
  - GKI >-1.
  - GKD >-1.
  - KForm ≥0.
  - KFeedForwardVelocity ≥0.
  - KFeedForwardAcceleration ≥0.
  - Friction ≥0.
  - DerivativeFilterCutOffFrequency $\in \left[0 : \frac{0.5}{\text{CorrectorISRPeriod}}\right]$

NOTE

Refer to *system.ref* file to get CorrectorISRPeriod value.

Description

This function configures the "PIDDualFFVoltage" corrector parameters. The "CorrectorType" must be "PIDDualFFVoltage" in the stages.ini file, else (-8) error is returned.

NOTE

This servo loop type is used when the position servo loop drives the voltage applied directly to the motor.

Prototype

int **PositionerCorrectorPIDDualFFVoltageSet**(
int SocketID,
char * FullPositionerName,
bool ClosedLoopStatus,
double KP,
double KI,
double KD,
double KS,
double IntegrationTime,
double DerivativeFilterCutOffFrequency,
double GKP,
double GKI,
double GKD,
double KForm,
double FeedForwardGainVelocity,
double FeedForwardGainAcceleration,
double Friction
)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" unction.
FullPositionerName	char *	Positioner name.
ClosedLoopStatus	bool	Position servo loop status (true = closed and false = opened).
KP	double	PID servo loop proportional gain.
KI	double	PID servo loop integral gain.
KD	double	PID servo loop derivative gain.
KS	double	PID integral saturation value (0 to 1).
IntegrationTime	double	PID integration time (seconds).
DerivativeFilterCutOffFrequency	double	PID derivative filter cut-off frequency (Hz).
GKP	double	Variable PID proportional gain multiplier.
GKI	double	Variable PID integral gain multiplier.
GKD	double	Variable PID derivative gain multiplier.
KForm	double	Variable PID form coefficient.
FeedForwardGainVelocity	double	Velocity feedforward gain (units).
FeedForwardGainAcceleration	double	Acceleration feedforward gain (units).
Friction	double	Friction compensation.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.

7.2.1.253 PositionerCorrectorPIDFFAccelerationGet

Name

PositionerCorrectorPIDFFAccelerationGet – Gets PIDFFAcceleration corrector parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the positioner type and the corrector type: (-8)

Description

This function returns the corrector parameter values used by a PID feed-forward with an acceleration output.

NOTE

The "CorrectorType" must be "PIDFFAcceleration" in the stages.ini file. This servo loop type is used when a constant value applied to the driver results in a constant acceleration of the stage.

Prototype

int **PositionerCorrectorPIDFFAccelerationGet**(

int SocketID,

char * FullPositionerName,

bool * ClosedLoopStatus,

double * KP,

double * KI,

double * KD,

double * KS,

double * IntegrationTime,

double * DerivativeFilterCutOffFrequency,

double * GKP,

double * GKI,

double * GKD,

double * KForm,

double * FeedForwardGainAcceleration,

double * FeedForwardGainJerk

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.

Output parameters

ClosedLoopStatus	bool *	Position servo loop status (true = closed and false = opened).
KP	double *	PID servo loop proportional gain.
KI	double *	PID servo loop integral gain.
KD	double *	PID servo loop derivative gain.
KS	double *	PID integral saturation value (0 to 1).
IntegrationTime	double *	PID integration time (seconds).
DerivativeFilterCutOffFrequency	double *	PID derivative filter cut-off frequency (Hz).
GKP	double *	Variable PID proportional gain multiplier.
GKI	double *	Variable PID integral gain multiplier.
GKD	double *	Variable PID derivative gain multiplier.
KForm	double *	Variable PID form coefficient.
FeedForwardGainAcceleration	double *	Acceleration feedforward gain (units).
FeedForwardGainJerk	double *	Jerk feedforward gain (units).

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.

7.2.1.254 PositionerCorrectorPIDFFAccelerationSet

Name

PositionerCorrectorPIDFFAccelerationSet – Sets PIDFFAcceleration corrector parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the positioner type and the corrector type: (-8)
- Checks parameter value: (-17)
  - KP ≥0.
  - KI ≥0.
  - KD ≥0.
  - 0 ≤KS ≤1.
  - IntegrationTime ≥CorrectorISRPeriod.
  - GKP >-1.
  - GKI >-1.
  - GKD >-1.
  - KForm ≥0.
  - KFeedForwardAcceleration ≥0.
  - KFeedForwardJerk ≥0.
  - DerivativeFilterCutOffFrequency $\in \left[0 : \frac{0.5}{\text{CorrectorISRPeriod}}\right]$

NOTE

Refer to *system.ref* file to get CorrectorISRPeriod value.

Description

This function configures the "PIDFFAcceleration" corrector parameters.

NOTE

The "CorrectorType" parameter must be defined as "PIDFFAcceleration" in the "stages.ini" file else (-8) error is returned. This servo loop type is used when a constant value applied to the driver results in a constant acceleration of the stage.

Prototype

int **PositionerCorrectorPIDFFAccelerationSet**(
int SocketID,
char * FullPositionerName,
bool ClosedLoopStatus,
double KP,
double KI,
double KD,
double KS,
double IntegrationTime,
double DerivativeFilterCutOffFrequency,
double GKP,
double GKI,
double GKD,
double KForm,
double FeedForwardGainAcceleration,
double FeedForwardGainJerk
)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.
ClosedLoopStatus	bool	Position servo loop status (true = closed and false = opened).
KP	double	PID servo loop proportional gain.
KI	double	PID servo loop integral gain.
KD	double	PID servo loop derivative gain.
KS	double	PID integral saturation value (0 to 1).
IntegrationTime	double	PID integration time (seconds).
DerivativeFilterCutOffFrequency	double	PID derivative filter cut-off frequency (Hz).
GKP	double	Variable PID proportional gain multiplier.
GKI	double	Variable PID integral gain multiplier.
GKD	double	Variable PID derivative gain multiplier.
KForm	double	Variable PID form coefficient.
FeedForwardGainAcceleration	double	Acceleration feedforward gain (units).
FeedForwardGainJerk	double	Jerk feedforward gain (units).

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.

7.2.1.255 PositionerCorrectorPIDFFVelocityGet

Name

PositionerCorrectorPIDFFVelocityGet – Gets PIDFFVelocity corrector parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the positioner type and the corrector type: (-8)

Description

This function returns the corrector parameter values used by a PID with a velocity output:

ClosedLoopStatus, KP, KI, KD, KS, IntegrationTime, DerivativeFilterCutOffFrequency, GKP, GKI, GKD, Kform and FeedForwardGainVelocity.

NOTE

The "CorrectorType" must be "PIDFFVelocity" in the stages.ini file. This servo loop type is used when a constant value applied to the driver results in a constant velocity of the stage.

Prototype

```
int PositionerCorrectorPIDFFVelocityGet(
    int SocketID,
    char * FullPositionerName,
    bool * ClosedLoopStatus,
    double * KP,
    double * KI,
    double * KD,
    double * KS,
    double * IntegrationTime,
    double * DerivativeFilterCutOffFrequency,
    double * GKP,
    double * GKI,
    double * GKD,
    double * KForm,
    double * FeedForwardGainVelocity
    )
```

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer"function.
FullPositionerName	char *	Positioner name.

Output parameters

ClosedLoopStatus	bool *	Position servo loop status (true = closed and false = opened).
KP	double *	PID servo loop proportional gain.
KI	double *	PID servo loop integral gain.
KD	double *	PID servo loop derivative gain.
KS	double *	PID integral saturation value (0 to 1).
IntegrationTime	double *	PID integration time (seconds).
DerivativeFilterCutOffFrequency	double *	PID derivative filter cut-off frequency (Hz).
GKP	double *	Variable PID proportional gain multiplier.
GKI	double *	Variable PID integral gain multiplier.
GKD	double *	Variable PID derivative gain multiplier.
KForm	double *	Variable PID form coefficient.
FeedForwardGainVelocity	double *	Velocity feedforward gain (units).

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.

7.2.1.256 PositionerCorrectorPIDFFVelocitySet

Name

PositionerCorrectorPIDFFVelocitySet – Sets PIDFFVelocity corrector parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the positioner type and the corrector type: (-8)
- Checks parameter value: (-17)
  - KP ≥0.
  - KI ≥0.
  - KD ≥0.
  - 0 ≤KS ≤1.
  - IntegrationTime ≥CorrectorISRPeriod.
  - GKP >-1.
  - GKI >-1.
  - GKD >-1.
  - KForm ≥0.
  - KFeedForwardVelocity ≥0.
  - DerivativeFilterCutOffFrequency $\in \left[0 : \frac{0.5}{\text{CorrectorISRPeriod}}\right]$

NOTE

Refer to *system.ref* file to get CorrectorISRPeriod value.

Description

This function configures the "PIDFFVelocity" corrector parameters.

NOTE

The "CorrectorType" parameter must be defined as "PIDFFVelocity" in the stages.ini file else (-8) error is returned. This servo loop type is used when a constant value applied to the driver results in a constant velocity of the stage.

Prototype

int **PositionerCorrectorPIDFFVelocitySet**(
int SocketID,
char * FullPositionerName,
bool ClosedLoopStatus,
double KP,
double KI,
double KD,
double KS,
double IntegrationTime,
double DerivativeFilterCutOffFrequency,
double GKP,
double GKI,
double GKD,
double KForm,
double FeedForwardGainVelocity
)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.
ClosedLoopStatus	bool	Position servo loop status (true = closed and false = opened).
KP	double	PID servo loop proportional gain.
KI	double	PID servo loop integral gain.
KD	double	PID servo loop derivative gain.
KS	double	PID integral saturation value (0 to 1).
IntegrationTime	double	PID integration time (seconds).
DerivativeFilterCutOffFrequency	double	PID derivative filter cut-off frequency (Hz).
GKP	double	Variable PID proportional gain multiplier.
GKI	double	Variable PID integral gain multiplier.
GKD	double	Variable PID derivative gain multiplier.
KForm	double	Variable PID form coefficient.
FeedForwardGainVelocity	double	Velocity feedforward gain (units).

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.

7.2.1.257 PositionerCorrectorPIPositionGet

Name

PositionerCorrectorPIPositionGet – Gets PIPosition corrector parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the positioner type and the corrector type: (-8)

Description

This function returns the corrector parameter values used by a PI with a position output: ClosedLoopStatus, KP, KI and IntegrationTime.

NOTE

The "CorrectorType" must be "PIPosition" in the stages.ini file. This servo loop type is used when the position servo loop outputs a position value directly.

Prototype

int **PositionerCorrectorPIPositionGet**(
int SocketID,
char * FullPositionerName,
bool * ClosedLoopStatus,
double * KP,
double * KI,
double * IntegrationTime
)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.

Output parameters

ClosedLoopStatus	bool *	Position servo loop status (true = closed and false = opened).
KP	double *	PI servo loop proportional gain.
KI	double *	PI servo loop integral gain.
IntegrationTime	double *	PI integration time (seconds).

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.

7.2.1.258 PositionerCorrectorPIPositionSet

Name

PositionerCorrectorPIPositionSet – Sets PIPosition corrector parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the positioner type and the corrector type: (-8)
- Checks parameter value: (-17)
- KP ≥0.
- KI ≥0.
- IntegrationTime ≥CorrectorISRPeriod.

NOTE

Refer to *system.ref* file to get CorrectorISRPeriod value.

Description

This function configures the "PIPosition" corrector parameters.

NOTE

The "CorrectorType" parameter must be defined as "PIPosition" in the stages.ini file else ERR_WRONG_OBJECT_TYPE (-8) is returned. This servo loop type is used when the position servo loop outputs a position value directly.

Prototype

```
int PositionerCorrectorPIPositionSet(
    int SocketID,
    char * FullPositionerName,
    bool ClosedLoopStatus,
    double KP,
    double KI,
    double IntegrationTime
    )
```

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.
ClosedLoopStatus	bool	Position servo loop status (true = closed and false = opened).
KP	double	PI servo loop proportional gain.
KI	double	PI servo loop integral gain.
IntegrationTime	double	PI integration time (seconds).

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.

7.2.1.259 PositionerCorrectorPlantFeedForwardDelayGet [Extended]

Name

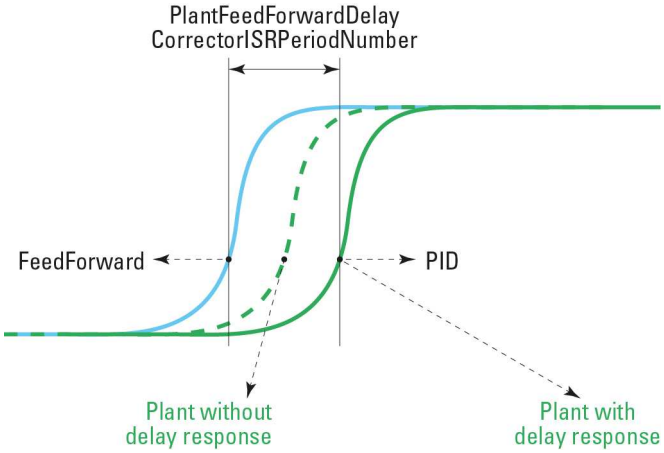
PositionerCorrectorPlantFeedForwardDelayGet – Gets the corrector ISR period number configured to define the plant delay.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the filter number: (-17)

Description

This function returns the corrector ISR period number configured to define the plant delay. Its value is predifined in the stages.ini file with the parameter named "PlantFeedForwardDelayCorrectorISRPeriodNumber".



Prototype

int **PositionerCorrectorPlantFeedForwardDelayGet**(

int SocketID,

char * PositionerName,

int * CorrectorISRPeriodNumber

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.

Output parameters

CorrectorISRPeriodNumber	int *	Number of ISR periods to delay plant

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.

7.2.1.260 PositionerCorrectorPlantFeedForwardDelaySet [Extended]

Name

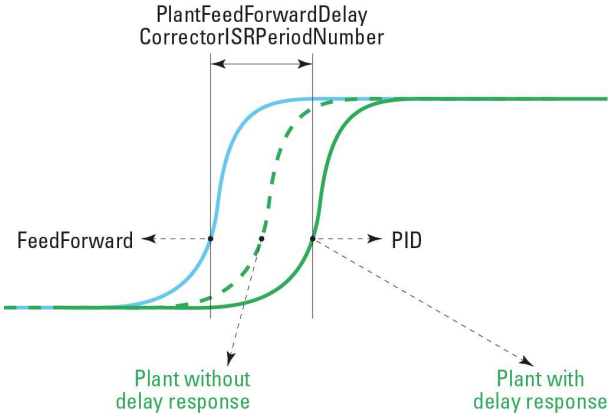
PositionerCorrectorPlantFeedForwardDelaySet – Sets the corrector ISR period number that defines the plant delay.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the filter number: (-17)

Description

This function reconfigures the corrector ISR period number to define the plant delay. Its value is predifined in stages.ini with the parameter "PlantFeedForwardDelayCorrectorISRPeriodNumber".



Prototype

int **PositionerCorrectorPlantFeedForwardDelaySet**(

int SocketID,

char * PositionerName,

int CorrectorISRPeriodNumber)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.
CorrectorISRPeriodNumber	int	Number of ISR periods to delay plant (max = 100).

Output parameters

None.

Return (In addition to the results of "Input Tests Common to all XPS Functions")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.

7.2.1.261 PositionerCorrectorPostFFGet [Extended]

Name

PositionerCorrectorPostFFGet – Gets Post Feed Forward parameters of a PIDFFAccelection corrector.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks positioner name: (-18)

Description

This function returns the parameters of the current post feed forward from PIDFFAccelection corrector.

Prototype

int **PositionerCorrectorPostFFGet**(

int SocketID,

char * PositionerName,

double * PostKFeedForwardAcceleration,

double * PostKFeedForwardJerk,

double * PostKFeedForwardSlope

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.

Output parameters

PostKFeedForwardAcceleration	double *	Post KFeedForward acceleration
PostKFeedForwardJerk	double *	Post KFeedForward jerk
PostKFeedForwardSlope	double *	Post KFeedForward slop

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -18: Positioner name doesn't exist or incorrect.

7.2.1.262 PositionerCorrectorPostFFSet [Extended]

Name

PositionerCorrectorPostFFSet – Sets Post Feed Forward parameters of a PIDFFAccelection corrector.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks positioner name: (-18)
- Not allowed due to configuration disabled: (-121)

Description

This function sets the parameters of the Post Feed Forward from PIDFFAccelection corrector.

Prototype

int **PositionerCorrectorPostFFSet**(

int SocketID,

char * PositionerName,

double PostKFeedForwardAcceleration,

double PostKFeedForwardJerk,

double PostKFeedForwardSlope

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.
PostKFeedForwardAcceleration	double	Post KFeedForward acceleration
PostKFeedForwardJerk	double	Post KFeedForward jerk
PostKFeedForwardSlope	double	Post KFeedForward slop

Output parameters

None.

Return (In addition to the results of "Input Tests Common to all XPS Functions")

- 0: No error.
- -18: Positioner name doesn't exist or incorrect.
- -121: Function is not allowed due to configuration disabled.

7.2.1.263 PositionerCorrectorTypeGet

Name

PositionerCorrectorTypeGet – Gets the corrector type.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the positioner type: (-8)

Description

This function returns the corrector type used by the selected positioner.

The corrector type can be one of this list:

- PositionerCorrectorPIDFFAcceleration.
- PositionerCorrectorPIDFFVelocity.
- PositionerCorrectorPIDDualFFVoltage.
- PositionerCorrectorPIPosition.
- NoCorrector.

NOTE

The corrector type is defined in the stages.ini file with the "CorrectorType" parameter.

Prototype

int **PositionerCorrectorTypeGet**(

int SocketID,

char * FullPositionerName,

char * CorrectorType

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.

Output parameters

CorrectorType	char *	Corrector type.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.

7.2.1.264 PositionerCurrentVelocityAccelerationFiltersGet

Name

PositionerCurrentVelocityAccelerationFiltersGet – Gets the velocity and acceleration filter cut-off frequencies.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the positioner type: (-8)

Description

This function returns the current velocity cut-off frequency and the current acceleration cut-off frequency used by gathering for the selected positioner.

Gathering uses these parameters to filter the current velocity and the current acceleration. These parameters are defined in the stages.ini file.

Prototype

int **PositionerCurrentVelocityAccelerationFiltersGet**(

int SocketID,

char * FullPositionerName,

double * VelocityCutOffFrequency,

double * AccelerationCutOffFrequency

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.

Output parameters

VelocityCutOffFrequency	double *	Velocity filter cut-off frequency (Hz).
AccelerationCutOffFrequency	double *	Acceleration filter cut-off frequency (Hz).

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.

7.2.1.265 PositionerCurrentVelocityAccelerationFiltersSet

Name

PositionerCurrentVelocityAccelerationFiltersSet – Sets the velocity and acceleration filter cut-off frequencies.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the positioner type: (-8)
- Checks parameter value: (-17)
  - VelocityCutOffFrequency $\in \left[0 : \frac{0.5}{\text{CorrectorISRPeriod}}\right]$
  - AccelerationCutOffFrequency $\in \left[0 : \frac{0.5}{\text{CorrectorISRPeriod}}\right]$

NOTE

Refer to *system.ref* file to get CorrectorISRPeriod value.

Description

This function sets a new velocity cut-off frequency and a new acceleration cut-off frequency for the selected positioner.

Gathering uses these parameters to filter the current velocity and the current acceleration. These parameters are defined in the stages.ini file.

Prototype

int **PositionerCurrentVelocityAccelerationFiltersSet**(

int SocketID,

char * FullPositionerName,

double VelocityCutOffFrequency,

double AccelerationCutOffFrequency

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.
VelocityCutOffFrequency	double	Velocity filter cut-off frequency (Hz).
AccelerationCutOffFrequency	double	Acceleration filter cut-off frequency (Hz).

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.

7.2.1.266 PositionerDriverFiltersGet

Name

PositionerDriverFiltersGet – Gets the piezo driver notch and low-pass filters parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the positioner type: (-8)
- Checks driver type (XPS-DRVP1), if not PIEZO: (-24)
- If piezo driver, check if driver is not initialized: (-118)

Description

This function returns current values of the piezo driver filters parameters (KI, notch frequency, notch bandwidth, notch gain, low-pass frequency).

Prototype

int **PositionerDriverFiltersGet**(

int SocketID,

char * FullPositionerName,

double * KI,

double * NotchFrequency,

double * NotchBandwidth,

double * NotchGain,

double * LowpassFrequency

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.

Output parameters

KI	double *	Driver KI.
NotchFrequency	double *	Driver notch frequency (Hz).
NotchBandwidth	double *	Driver notch bandwidth (Hz).
NotchGain	double *	Driver notch gain.
LowpassFrequency	double *	Driver low-pass frequency (Hz).

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -24: Not available in this configuration (check hardware or configuration).
- -118: Not allowed action driver not initialized.

7.2.1.267 PositionerDriverFiltersSet

Name

PositionerDriverFiltersSet – Sets the piezo driver filters parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the positioner type: (-8)
- Checks parameter value: (-17)
  - KI ≥0.
  - NotchFrequency $\in \left[0 : \frac{0.5}{\text{CorrectorISRPeriod}}\right]$
  - NotchBandwith $\in \left[0 : \frac{0.5}{\text{CorrectorISRPeriod}}\right]$
  - NotchGain $\in [0 : 100]$
  - LowpassFrequency $\in \left[0 : \frac{0.5}{\text{CorrectorISRPeriod}}\right]$
- Checks driver type, if not PIEZO: (-24)
- If the group state is NOTREF or READY: (-117)
- If the driver is not initialized: (-118)

Description

This function sets parameters of the driver (KI integral, notch and low-pass filters) for a piezo driver positioner.

Prototype

int **PositionerDriverFiltersSet**(
int SocketID,
char * FullPositionerName,
double KI,
double NotchFrequency,
double NotchBandwidth,
double NotchGain,
double LowpassFrequency
)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.
KI	double	Driver KI.
NotchFrequency	double	Driver notch frequency (Hz).
NotchBandwidth	double	Driver notch bandwidth (Hz).
NotchGain	double	Driver notch gain.
LowpassFrequency	double	Driver low-pass frequency (Hz).

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -24: Not available in this configuration (check hardware or configuration).
- -50: Motor initialization error. Check InitializationAccelerationLevel, ScalingAcceleration, MaximumJerkTime, EncoderResolution or EncoderScalePitch.
- -117: Function is only allowed in DISABLED state.
- -118: Not allowed action driver not initialized.

7.2.1.268 PositionerDriverPositionOffsetsGet

Name

PositionerDriverPositionOffsetsGet – Gets the current value of piezo driver stage and gage position offsets.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the positioner type: (-8)
- Checks driver type, if not PIEZO: (-24)
- If the group state is NOTREF or READY: (-117)
- If the driver is not initialized: (-118)

Description

This function returns current value of the piezo driver position offset parameters (stage position offset, gage position offset).

Prototype

int **PositionerDriverPositionOffsetsGet**(

int SocketID,

char * FullPositionerName,

double * StagePositionOffset,

double * GagePositionOffset

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.

Output parameters

StagePositionOffset	double *	Driver stage position offset (units).
GagePositionOffset	double *	Driver gage position offset (units).

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -22: Not allowed action.
- -24: Not available in this configuration (check hardware or configuration).
- -117: Function is only allowed in DISABLED state.
- -118: Not allowed action driver not initialized.

7.2.1.269 PositionerDriverStatusGet

Name

PositionerDriverStatusGet – Gets the positioner driver status code.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the positioner (must be not a secondary positioner): (-18), (-24)

Description

This function returns the positioner driver status from the driver board.

Use the "PositionerDriverStatusStringGet" function to get the driver status description.

NOTE

See section 8.7: "Positioner Driver Status List".

Prototype

int **PositionerDriverStatusGet**(

int SocketID,

char * FullPositionerName,

unsigned long * PositionerDriverStatus

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.

Output parameters

PositionerDriverStatus	unsigned long *	Driver status code.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner name doesn't exist or unknown command.
- -24: Not available in this configuration (check hardware or configuration).

7.2.1.270 PositionerDriverStatusStringGet

Name

PositionerDriverStatusStringGet – Gets the positioner driver status description.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".

Description

This function returns a driver status description from a positioner driver status code.

NOTE

See section 8.7: "Positioner Driver Status List".

Prototype

int **PositionerDriverStatusStringGet**(

int SocketID,

int DriverStatusCode,

char * DriverStatusString

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
DriverStatusCode	unsigned long	Driver status code.

Output parameters

DriverStatusString	char *	Driver status description.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.

7.2.1.271 PositionerEncoderAmplitudeValuesGet

Name

PositionerEncoderAmplitudeValuesGet – Gets the encoder amplitude values.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the positioner: (-8)
- Checks the encoder type (must be "AnalogInterpolated"): (-8)

Description

This function returns the maximum and current amplitudes values (in volts) of the analog encoder input.

NOTE

The encoder type must be "AnalogInterpolated" in the stages.ini file ("EncoderType" parameter).

Prototype

int **PositionerEncoderAmplitudeValuesGet**(

int SocketID,

char * FullPositionerName,

double * MaxSinusAmplitude,

double * CurrentSinusAmplitude,

double * MaxCosinusAmplitude,

double * CurrentCosinusAmplitude

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.

Output parameters

MaxSinusAmplitude	double *	Encoder sinus signal maximum amplitude value (Volts).
CurrentSinusAmplitude	double *	Encoder sinus signal current amplitude value (Volts).
MaxCosinusAmplitude	double *	Encoder cosinus signal maximum amplitude value (Volts).
CurrentCosinusAmplitude	double *	Encoder cosinus signal current amplitude value (Volts).

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.

7.2.1.272 PositionerEncoderCalibrationParametersGet

Name

PositionerEncoderCalibrationParametersGet – Gets the encoder calibration parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the positioner (must be not a secondary positioner): (-8)
- Checks the encoder type (must be "AnalogInterpolated"): (-8)

Description

After a calibration of the analog encoder input (by the function "GroupInitializeWithEncoderCalibration"), this function returns the optimum parameters for the analog encoder interface. To take these parameters into account (recommended to achieve best performance), these values must be entered manually in the corresponding section of the stages.ini file. The parameters to set in the stages.ini file are:

- EncoderSinusOffset = ; Volts
- EncoderCosinusOffset = ; Volts
- EncoderDifferentialGain =
- EncoderPhaseCompensation = ; Deg

NOTE

The encoder type must be "AnalogInterpolated" in the stages.ini file ("EncoderType" parameter).

Prototype

int **PositionerEncoderCalibrationParametersGet**(

int SocketID,

char * FullPositionerName,

double * SinusOffset,

double * CosinusOffset,

double * DifferentialGain,

double * PhaseCompensation

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.

Output parameters

SinusOffset	double *	Encoder sinus signal offset (Volts).
CosinusOffset	double *	Encoder cosinus signal offset (Volts).
DifferentialGain	double *	Encoder differential gain.
PhaseCompensation	double *	Encoder phase compensation (Deg).

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.

7.2.1.273 PositionersEncoderIndexDifferenceGet

Name

PositionersEncoderIndexDifferenceGet – Gets the distance between the two index encoders (gantry).

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the group type (must be a SingleAxis or an XY): (-8)
- Checks the positioner type (must not be a secondary positioner): (-8)
- Checks the positioner name: (-18)
- Checks the positioner type (must be "gantry"): (-24)
- Checks the positioner was at least once homed: (-109)

Description

This function returns the distance between the two encoders indexes of a "primary positioner – secondary positioner" couple. To use this function, the positioner must be configured in "gantry" mode else (-24) error is returned.

For further information about gantry mode, refer to the "SYSTEM – Manual Configuration – Gantries (Secondary Positioners)" section in the XPS User's Manual.

Prototype

int **PositionersEncoderIndexDifferenceGet**(

int SocketID,

char * FullPositionerName

double * Distance

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.

Output parameters

Distance	double *	Distance between the two index encoders (units).

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.
- -109: Group need to be homed at least once to use this function (distance mesured during home search).

7.2.1.274 PositionerErrorGet

Name

PositionerErrorGet – Gets the positioner error code and clears it.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Invalid positioner name: (-18)
- Valids secondary positioner: (-18)

Description

This function gets the positioner error code and clears it.

The positioner error codes are listed in section 8.5: "Positioner Error List". The description of the positioner error code can be obtained with the "GroupPositionerErrorStringGet" function.

NOTE

The "PositionerErrorRead" function reads the positioner error without clearing it.

Prototype

int **PositionerErrorGet**(

int SocketID,

char * FullPositionerName,

int * PositionerError

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.

Output parameters

PositionerError	int *	Positioner error code.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -18: Positioner Name doesn't exist or unknown command.
- -24: Not available in this configuration (check hardware or configuration).

7.2.1.275 PositionerErrorRead

Name

PositionerErrorRead – Gets the positioner error code without clearing it.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Invalid positioner name: (-18)
- Valids secondary positioner: (-18)

Description

This function gets the positioner error code without clearing it.

The positioner error codes are listed in section 8.5: "Positioner Error List". The description of the positioner error code can be obtained with the "GroupPositionerErrorStringGet" function.

NOTE

The "PositionerErrorGet" function clears the positioner error.

Prototype

int **PositionerErrorRead**(

int SocketID,

char * FullPositionerName,

int * PositionerError

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.

Output parameters

PositionerError	int *	Positioner error code.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -18: Positioner Name doesn't exist or unknown command.
- -24: Not available in this configuration (check hardware or configuration).

7.2.1.276 PositionerErrorStringGet

Name

PositionerErrorStringGet – Gets the positioner error description.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".

Description

This function returns a positioner error description from a positioner error code.

NOTE

See section 8.5: "Positioner Error List".

Prototype

int **PositionerErrorStringGet**(
int SocketID,
char * FullPositionerName,
int PositionerErrorCode,
char * PositionerErrorString
)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.
PositionerErrorCode	int	Positioner error code.

Output parameters

PositionerErrorString	int *	Positioner error description.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.

7.2.1.277 PositionerExcitationSignalGet

Name

PositionerExcitationSignalGet – Gets the currently used parameters of the excitation signal feature.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Valids object type: (-8)
- Invalid positioner name: (-18)

Description

This function gets the last configured excitation signal parameters.

Prototype

int **PositionerExcitationSignalGet**(

int SocketID,

char * FullPositionerName,

int * SignalType,

double * Frequency,

double * Amplitude,

double * Time

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.

Output parameters

SignalType	int *	Type of signal.
Frequency	double *	Frequency (Hz).
Amplitude	double *	Amplitude (acceleration, velocity or voltage unit).
Time	double *	During time (seconds).

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.

7.2.1.278 PositionerExcitationSignalSet

Name

PositionerExcitationSignalSet – Sets and activate the signal of excitation.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Valids object type: (-8)
- Is secondary positioner or has a secondary positioner: (-8)
- Checks frequency (must ≥0.1 and ≤0.5/CorrectorISRPeriod): (-17)
- Checks excitation time (*must ≥4 * CorrectorISRPeriod*): (-17)
- Checks signal amplitude [-Acceleration (Velocity or Voltage) limit to Acceleration (Velocity or Voltage) limit]: (-17)
- Checks type of signal (0, 1, 2 or 3): (-17)
- Invalid positioner name: (-18)
- Checks group status (*must be READY*): (-22)
- Valids control loop type: (-24)

Description

The excitation signal functionality generates a typical signal (a sine, a blank noise or an echelon signal) that the controller sends to motors to excite the system. In measuring the output signal of the excited system, we can determine some system characteristics, like the system transfer function.

The excitation signal functionality is only available with the stages controlled in acceleration (acceleration control, ex: brushless / linear motors), velocity (velocity control) or in voltage (voltage control). It does not exist with the stages controlled in position (ex: stepper motors).

The excitation-signal function **PositionerExcitationSignalSet** can be executed only when the positioner is in "READY" state. When the excitation-signal process is in progress, the positioner is in the "ExcitationSignal" state. At the end of the process, the positioner returns to "READY" state (see group state diagram).

The **PositionerExcitationSignalSet** function sends an excitation signal to the motor for a brief time. This function is allowed for "PIDFFAcceleration", "PIDFFVelocity" or "PIDDualFFVoltage" control loops. The parameters to configure are *signal type* (0:sine, 1:echelon,2:random-amplitude,3:random-pulse-width binary-amplitude, integer), *frequency* (Hz, double), *amplitude* (acceleration, velocity or voltage unit, double) and *during time* (seconds, double).

The function effective parameters for each mode are: (here: Limit means AccelerationLimit, VelocityLimit or VoltageLimit)

- Sine signal mode: Frequency (≥0.1 and ≤0.5/CorrectorISRPeriod), Amplitude (>0 and ≤Limit), Time (≥4 * CorrectorISRPeriod)
- Echelon signal mode: Amplitude (>0 and ≤Limit, or <0 and ≥-Limit), Time(≥4 * CorrectorISRPeriod)
  + During *Time*: Signal = *Amplitude*
  + End of *Time*: Signal = 0
- Random-amplitude signal mode: Amplitude (>0 and ≤Limit), Time(>0), Frequency (≥0.1 and ≤0.5/CorrectorISRPeriod)

Signal is generated with a random value at with a period defined by the controller base time (*CorrectorISRPeriod , default value 0.125 ms*), then is filtered with a second order low-pass filter at the cut-off *Frequency* value.

- Random-pulse-width binary-amplitude signal mode:

  Amplitude (>0 and ≤Limit), *Time* (*≥4 * CorrectorISRPeriod*), *Frequency* (*≥0.1 and ≤0.5/CorrectorISRPeriod*).

  Signal is a sequence of pulses (*Signal = Amplitude or = 0*) with pulse randomly varied width (multiple of Tbase).

  Frequency is the controlled system band-width (*cut-off frequency*), necessary for the PRBS (*Pseudo Random Binary Sequence*) function configuration.

The function non-effective parameters can accept any value, the value 0 is recommended for simplicity.

NOTE

If during the excitation signal generation the stage position exceeds the user minimum or maximum target positions, the motor excitation command is stopped and an error is returned.

Prototype

int **PositionerExcitationSignalSet**(

int SocketID,

char * FullPositionerName,

int SignalType,

double Frequency,

double Amplitude,

double Time

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.
SignalType	int	Type of signal.
Frequency	double	Frequency (Hz).
Amplitude	double	Amplitude (acceleration, velocity or voltage unit).
Time	double	During time (seconds).

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -18: Positioner Name doesn't exist or unknown command.
- -22: Not allowed action.
- -24: Not available in this configuration (check hardware or configuration).
- -112: Error of excitation signal generation initialization.

7.2.1.279 PositionerExcitationSignalCorrectorOutSet

Name

PositionerExcitationSignalCorrectorOutSet – Sets and activates the signal of excitation that is inserted at corrector output.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Valids object type: (-8)
- Is secondary positioner or has a secondary positioner: (-8)
- Checks frequency (*must ≥0.1 and ≤0.5/CorrectorISRPeriod*): (-17)
- Checks excitation time (*must ≥4 * CorrectorISRPeriod*): (-17)
- Checks signal amplitude [-*Acceleration (Velocity or Voltage) limit to Acceleration (Velocity or Voltage) limit*]: (-17)
- Checks type of signal (0, 1, 2 or 3): (-17)
- Invalid positioner name: (-18)
- Checks group status (*must be READY*): (-22)
- Valids control loop type: (-24)

Description

The excitation signal functionality generates a typical signal (a sine, a blank noise or an echelon signal) that the controller sends to motors to excite the system. In measuring the output signal of the excited system, we can determine some system characteristics, like the system transfer function.

The excitation signal functionality is only available with the stages controlled in acceleration (acceleration control, ex: brushless / linear motors), velocity (velocity control) or in voltage (voltage control). It does not exist with the stages controlled in position (ex: stepper motors).

The excitation-signal function **PositionerExcitationSignalCorrectorOutSet** can be executed only when the positioner is in "READY" state. When the excitation-signal process is in progress, the positioner is in the "ExcitationSignal" state. At the end of the process, the positioner returns to "READY" state (see group state diagram).

The **PositionerExcitationSignalCorrectorOutSet** function sends an excitation signal to the motor for a brief time. This function is allowed for "PIDFFAcceleration", "PIDFFVelocity" or "PIDDualFFVoltage" control loops. The parameters to configure are *signal type* (0:sine, 1:echelon,2:random-amplitude,3:random-pulse-width binary-amplitude, integer), *frequency* (Hz, double), *amplitude* (acceleration, velocity or voltage unit, double) and *during time* (seconds, double).

The function effective parameters for each mode are: (here: Limit means AccelerationLimit, VelocityLimit or VoltageLimit)

- Sine signal mode: Frequency (≥0.1 and ≤0.5/*CorrectorISRPeriod*), Amplitude (>0 and ≤Limit), Time (≥4 * *CorrectorISRPeriod*)
- Echelon signal mode: Amplitude (>0 and ≤Limit, or <0 and ≥-Limit), Time(≥4 * *CorrectorISRPeriod*)
  + During *Time*: Signal = *Amplitude*
  + End of *Time*: Signal = 0
- Random-amplitude signal mode: Amplitude (>0 and ≤Limit), Time(>0), Frequency (≥0.1 and ≤0.5/*CorrectorISRPeriod*)

Signal is generated with a random value at with a period defined by the controller base time (*CorrectorISRPeriod , default value 0.125 ms*), then is filtered with a second order low-pass filter at the cut-off *Frequency* value.

- Random-pulse-width binary-amplitude signal mode:

  Amplitude (>0 and ≤Limit), *Time* (*≥4 * CorrectorISRPeriod*), *Frequency* (*≥0.1 and ≤0.5/CorrectorISRPeriod*).

  Signal is a sequence of pulses (*Signal = Amplitude or = 0*) with pulse randomly varied width (multiple of Tbase).

  Frequency is the controlled system band-width (*cut-off frequency*), necessary for the PRBS (*Pseudo Random Binary Sequence*) function configuration.

The function non-effective parameters can accept any value, the value 0 is recommended for simplicity.

NOTE

If during the excitation signal generation the stage position exceeds the user minimum or maximum target positions, the motor excitation command is stopped and an error is returned.

NOTE

This function does exactly the same that the function *PositionerExcitationSignalSet()* does, with only one difference between them. The difference is that, with the function *PositionerExcitationSignalCorrectorOutSet()*, the generated excitation signal is inserted at the corrector output, that can be useful in some cases, like the measurement of robustness transfer function.

Prototype

int **PositionerExcitationSignalCorrectorOutSet**(

int SocketID,

char * FullPositionerName,

int SignalType,

double Frequency,

double Amplitude,

double Time

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.
SignalType	int	Type of signal.
Frequency	double	Frequency (Hz).
Amplitude	double	Amplitude (acceleration, velocity or voltage unit).
Time	double	During time (seconds).

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -18: Positioner Name doesn't exist or unknown command.
- -22: Not allowed action.
- -24: Not available in this configuration (check hardware or configuration).
- -112: Error of excitation signal generation initialization.

7.2.1.280 PositionerFeedforwardAccDisable [Extended]

Name

PositionerFeedforwardAccDisable – Disables XY External Feed Forward Acceleration signal.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Positioner must not be a "Secondary Positioner" and the group must be a XY group: (-8)
- Invalid positioner name: (-18)
- Not allowed due to configuration disabled: (-121)

Description

Disable XY External Feed Forward Acceleration signal.

This function is reserved for an XY group.

Prototype

int **PositionerFeedforwardAccDisable**(

int SocketID,

char * PositionerName

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.
- -121: Not enable in your configuration.

7.2.1.281 PositionerFeedforwardAccEnable [Extended]

Name

PositionerFeedforwardAccEnable – Enables XY External Feed forward Acceleration signal.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Positioner must not be a "Secondary Positioner" and the group must be a XY group: (-8)
- Invalid positioner name: (-18)
- Not allowed due to configuration disabled: (-121)
- Checks the group is ready: (-135)

Description

Enable XY External Feed Forward Acceleration signal.

This function is reserved for an XY group.

Prototype

int **PositionerFeedforwardAccEnable**(

int SocketID,

char * PositionerName

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.
- -121: Not enable in your configuration.
- -135: Function is not allowed because group is not initialized or not referenced.

7.2.1.282 PositionerFeedforwardAccGet [Extended]

Name

PositionerFeedforwardAccGet – Gets parameters of XY external feed forward acceleration signal.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Positioner must not be a "Secondary Positioner" and the group must be a XY group: (-8)
- Invalid positioner name: (-18)
- Not allowed due to configuration disabled: (-121)

Description

Gets parameters of the current XY external feed forward acceleration signal.

Prototype

int **PositionerFeedforwardAccGet**(

int SocketID,

char * PositionerName,

char * OutputName1,

double * Scale1,

double * Offset1,

char * OutputName2,

double * Scale2,

double * Offset2

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.

Output parameters

OutputName1	char *	GPIO Analog Output name #1
Scale1	double *	Signal 1 scale
Offset1	double *	Signal 1 offset
OutputName2	char *	GPIO Analog Output name #2
Scale2	double *	Signal 2 scale
Offset2	double *	Signal 2 offset

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.
- -121: Not enable in your configuration.

7.2.1.283 PositionerFeedforwardAccSet [Extended]

Name

PositionerFeedforwardAccSet – Sets parameters of XY external feed forward acceleration signal.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Positioner must not be a "Secondary Positioner" and the group must be a XY group: (-8)
- Invalid positioner name: (-18)
- Not allowed due to configuration disabled: (-121)

Description

Sets parameters of the current XY external feed forward acceleration signal.

Prototype

int **PositionerFeedforwardAccSet**(

int SocketID,

char * PositionerName,

char * OutputName1,

double Scale1,

double Offset1,

char OutputName2,

double Scale2,

double Offset2

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.
OutputName1	char *	GPIO Analog Output name #1
Scale1	double	Signal 1 scale
Offset1	double	Signal 1 offset
OutputName2	char *	GPIO Analog Output name #2
Scale2	double	Signal 2 scale
Offset2	double	Signal 2 offset

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.
- -121: Not enable in your configuration.

7.2.1.284 PositionerFeedforwardAccStatusGet [Extended]

Name

PositionerFeedforwardAccStatusGet – Gets XY external feed forward acceleration status.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Positioner must not be a "Secondary Positioner" and the group must be a XY group: (-8)
- Invalid positioner name: (-18)
- Not allowed due to configuration disabled: (-121)

Description

Get status of the current XY external feed forward acceleration:

- "Enabled" means XY external feed forward acceleration is in progress.

- "Disabled" means XY external feed forward acceleration is stopped.

Prototype

int **PositionerFeedforwardAccStatusGet**(

int SocketID,

char * PositionerName,

char * Status

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.

Output parameters

OutputName1	char *	GPIO Analog Output name #1
Status	char *	Current XY external feed forward status: "Enabled" or "Disabled"

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.
- -121: Not enable in your configuration.

7.2.1.285 PositionerFeedforwardPositionDisable [Extended]

Name

PositionerFeedforwardPositionDisable – Disables XY External Feed forward Position signal.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Positioner must not be a "Secondary Positioner" and the group must be a XY group: (-8)
- Checks the positioner name: (-18)
- Not allowed due to configuration disabled: (-121)

Description

Disables XY External Feed forward Position signal.

This function is reserved for an XY group.

Prototype

int **PositionerFeedforwardPositionDisable**(

int SocketID,

char * PositionerName

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.
- -121: Not enable in your configuration.

7.2.1.286 PositionerFeedforwardPositionEnable [Extended]

Name

PositionerFeedforwardPositionEnable – Enables XY External Feed Forward Position signal.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Positioner must not be a "Secondary Positioner" and the group must be a XY group: (-8)
- Checks the positioner name: (-18)
- Not allowed due to configuration disabled: (-121)
- Checks the group status is "READY": (-135)

Description

Enables XY External Feed Forward Position signal.

This function is reserved for an XY group.

Prototype

int **PositionerFeedforwardPositionEnable**(

int SocketID,

char * PositionerName

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.
- -121: Not enable in your configuration.
- -135: Function is not allowed because group is not initialized or not referenced.

7.2.1.287 PositionerFeedforwardPositionGet [Extended]

Name

PositionerFeedforwardPositionGet – Gets parameters of XY External Feed forward Position signal.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Positioner must not be a "Secondary Positioner" and the group must be a XY group: (-8)
- Checks the positioner name: (-18)
- Not allowed due to configuration disabled: (-121)

Description

Gets parameters of XY External Feed forward Position signal.

This function is reserved for an XY group.

Prototype

int **PositionerFeedforwardPositionGet**(

int SocketID,

char * PositionerName,

char * OutputName,

double * Scale,

double * Offset

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.

Output parameters

OutputName	char *	GPIO Analog Output name
Scale	double *	Signal scale
Offset	double *	Signal offset

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.
- -121: Not enable in your configuration.

7.2.1.288 PositionerFeedforwardPositionSet [Extended]

Name

PositionerFeedforwardPositionSet – Sets parameters of XY External Feed forward Position signal.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Positioner must not be a "Secondary Positioner" and the group must be a XY group: (-8)
- Checks the positioner name: (-18)
- Not allowed due to configuration disabled: (-121)

Description

Sets parameters of XY External Feed forward Position signal.

This function is reserved for an XY group.

Prototype

int **PositionerFeedforwardPositionSet**(

int SocketID,

char * PositionerName,

char * OutputName,

double Scale,

double Offset

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.
OutputName	char *	GPIO analog output name
Scale	double	Signal scale
Offset	double	Signal offset

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.
- -121: Not enable in your configuration.

7.2.1.289 PositionerFeedforwardPositionStatusGet [Extended]

Name

PositionerFeedforwardPositionStatusGet – Gets XY external feed forward position status.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Positioner must not be a "Secondary Positioner" and the group must be a XY group: (-8)
- Invalid positioner name: (-18)
- Not allowed due to configuration disabled: (-121)

Description

Get status of the current XY external feed forward position:

- "Enabled" means XY external feed forward position is in progress.

- "Disabled" means XY external feed forward position is stopped.

Prototype

int **PositionerFeedforwardPositionStatusGet**(

int SocketID,

char * PositionerName,

char * Status

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.

Output parameters

OutputName1	char *	GPIO Analog Output name #1
Status	char *	Current XY external feed forward status: "Enabled" or "Disabled"

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.
- -121: Not enable in your configuration.

7.2.1.290 PositionerGantryEndReferencingPositionGet

Name

PositionerGantryEndReferencingPositionGet – Gets the secondary axis position at the end of group home search.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks positioner type (must be a primary positioner): (-8)
- Checks group type: (-8)
  - SingleAxis.
  - SingleAxisTheta.
  - SingleAxisWithClamping.
  - XY.
  - MultipleAxes.
- Checks positioner name: (-18)
- Checks if positioner has a SecondaryPositioner (must be gantry): (-24)
- Checks if homing is done: (-109)

Description

This function gets the saved corrected Setpoint position of the secondary positioner at the end of group home search.

Prototype

int **PositionerGantryEndReferencingPositionGet**(

int SocketID,

char PositionerName,

double * Position

)

Input parameters

SocketID	int	Socket identifier gets by the TCP_ConnectToServer" function.
PositionerName	int	Positioner name.

Output parameters

Position	double *	SecondaryPositioner Setpoint Position at the end of home (units).

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.
- -24: Not available in this configuration (check hardware or configuration).
- -109: Group need to be homed at least once to use this function (distance measured during home search).

7.2.1.291 PositionerHardInterpolatorFactorGet

Name

PositionerHardInterpolatorFactorGet – Gets the interpolation factor for position compare mode.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the positioner (must be not a secondary positioner): (-8)
- Checks the encoder type (must be "AnalogInterpolated"): (-8)

Description

This function returns the interpolation factor of the hardware interpolator used in the "Position Compare" mode. The interpolation factor value is defined as:

InterpolationFactor = round (EncoderScalePitch/HardInterpolatorResolution)

NOTE

The encoder type must be "AnalogInterpolated" in the stages.ini file ("EncoderType" parameter).

Prototype

int **PositionerHardInterpolatorFactorGet**(

int SocketID,

char * FullPositionerName,

int * InterpolationFactor

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.
Output parameters.		
InterpolationFactor	int *	interpolation factor.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.

7.2.1.292 PositionerHardInterpolatorFactorSet

Name

PositionerHardInterpolatorFactorSet – Sets the interpolation factor for position compare mode.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the positioner type (must be not a secondary positioner): (-8)
- Checks the encoder type (must be "AnalogInterpolated"): (-8)
- Checks input parameter value: (-17)
- Checks the positioner name: (-18)
- Checks the group state (must be NOTINIT): (-22)

Description

This function sets the interpolation factor of the hardware interpolator used in the "PositionCompare" mode. The IP200 is updated and the position compare resolution is set as follows:

PositionCompareResolution = EncoderScalePitch/InterpolationFactor

The "InterpolationFactor" value must be define with one of these values:

20	25	40	50	80	100	160	200

If the input interpolator factor value is different from these values then (-17) error is returned.

NOTE

The group must be NOTINIT to use this function else (-22) error is returned.

The encoder type must be "AnalogInterpolated" in the stages.ini file ("EncoderType" parameter) else the error is returned.

This function applies to XPS-Q hardware. It is kept for XPS-D and XPS-RL backward compatibility but has no effect.

Prototype

int **PositionerHardInterpolatorFactorSet**(

int SocketID,

char * FullPositionerName,

int InterpolationFactor

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.
InterpolationFactor	int	interpolation factor.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -18: Positioner Name doesn't exist or unknown command.
- -22: Not allowed action.

7.2.1.293 PositionerHardInterpolatorPositionGet [Extended]

Name

PositionerHardInterpolatorPositionGet – Gets interpolated position from the encoder hard interpolator.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the positioner (must not be a secondary positioner): (-8)
- Checks the encoder type (must be "AnalogInterpolated"): (-8)

Description

This function returns the position interpolated by the encoder hard interpolator.

NOTE

The encoder type must be "*AnalogInterpolated*" or "*AnalogInterpolatedTheta*" in the stages.ini file ("EncoderType" parameter).

Prototype

int **PositionerHardInterpolatorPositionGet**(

int SocketID,

char * FullPositionerName,

double * Position

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.

Output parameters

Position	double *	Interpolated position.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.

7.2.1.294 PositionerHardwareStatusGet

Name

PositionerHardwareStatusGet – Gets the positioner hardware status code.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the positioner (must be not a secondary positioner): (-8), (-18), (-24)

Description

This function returns the hardware status of the selected positioner. The positioner hardware status is composed of the "corrector" hardware status and the "servitudes" hardware status:

The "Corrector" returns the motor interface and the position encoder hardware status.

The "Servitudes" returns the general inhibit and the end of runs hardware status.

NOTE

See section 8.6: "Positioner Hardware Status List".

Prototype

int **PositionerHardwareStatusGet**(

int SocketID,

char * FullPositionerName,

int * PositionerHardwareStatus

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.

Output parameters

PositionerHardwareStatus	int *	Hardware status code.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.

7.2.1.295 PositionerHardwareStatusStringGet

Name

PositionerHardwareStatusStringGet – Gets the positioner error description.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".

Description

This function returns the hardware status description from a positioner hardware status code.

NOTE

See section 8.6: "Positioner Hardware Status List".

Prototype

int **PositionerHardwareStatusStringGet**(

int SocketID,

char * FullPositionerName,

int PositionerHardwareStatusCode,

char * PositionerHardwareStatusString

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.
PositionerHardwareStatusCode	int	Positioner hardware status code.

Output parameters

PositionerHardwareStatusString	int *	Positioner hardware status description.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.

7.2.1.296 PositionerJogMaximumVelocityAndAccelerationGet

Name

PositionerJogMaximumVelocityAndAccelerationGet – Gets the jog maximum velocity and jog maximum acceleration from profiler generator.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the positioner name: (-18)

Description

This function returns the jog maximum velocity and jog maximum acceleration of the profile generators. These parameters represent the limits for the profiler and are defined in the stages.ini file:

JogMaximumVelocity = ; unit/second

JogMaximumAcceleration = ; unit/second^2

Prototype

int **PositionerJogMaximumVelocityAndAccelerationGet**(

int SocketID,

char * FullPositionerName,

double * JogMaximumVelocity,

double * JogMaximumAcceleration

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.

Output parameters

JogMaximumVelocity	double *	Jog maximum velocity (units/s).
JogMaximumAcceleration	double *	Jog maximum acceleration (units/s²).

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.

7.2.1.297 PositionerMagneticTrackPositionAtHomeGet

Name

PositionerMagneticTrackPositionAtHomeGet – Gets magnetic track position at home in units.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the object type of this command is valid: (-8)

Description

This function returns the system compensation parameters defined for the second order low-pass filter.

Prototype

int **PositionerMagneticTrackPositionAtHomeGet**(

int SocketID,

char * PositionerName,

double * MagneticTrackPosition

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.

Output parameters

MagneticTrackPosition	double *	magnetic track position at home (units).

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.

7.2.1.298 PositionerMaximumVelocityAndAccelerationGet

Name

PositionerMaximumVelocityAndAccelerationGet – Gets the maximum velocity and acceleration from the profiler generators.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the positioner (must not be a secondary positioner): (-8)

Description

This function returns the maximum velocity and acceleration of the profile generators. These parameters represent the limits for the profiler and are defined in the stages.ini file:

MaximumVelocity =; unit/second

MaximumAcceleration = ; unit/second^2

Prototype

int **PositionerMaximumVelocityAndAccelerationGet**(

int SocketID,

char * FullPositionerName,

double * MaximumVelocity,

double * MaximumAcceleration

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.

Output parameters

MaximumVelocity	double *	Maximum velocity (units/seconds).
MaximumAcceleration	double *	Maximum acceleration (units/seconds²).

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.

7.2.1.299 PositionerMotionDoneGet

Name

PositionerMotionDoneGet – Gets the motion done parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the positioner (must not be a secondary positioner): (-8)
- Checks the motion done mode (must be "VelocityAndPositionWindow"): (-8)

Description

This function returns the motion done parameters only for the "VelocityAndPositionWindow" MotionDone mode. If the MotionDone mode is defined as "Theoretical" then (-8) error is returned.

The "MotionDoneMode" parameter from the stages.ini file defines the motion done mode. The motion done can be defined as "Theoretical" (the motion done mode is not used) or "VelocityAndPositionWindow". For a more thorough description of the motion done mode, please refer to the XPS Motion Tutorial section Motion/Motion Done.

Prototype

int **PositionerMotionDoneGet**(

int SocketID,

char * FullPositionerName,

double * PositionWindow,

double * VelocityWindow,

double * MeanPeriod

double * Timeout

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.

Output parameters

PositionWindow	double *	Position window (units).
VelocityWindow	double *	Velocity window (units/seconds).
CheckingTime	double *	Checking time (seconds).
MeanPeriod	double *	Mean period (seconds).
Timeout	double *	Motion done time out (seconds).

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.

7.2.1.300 PositionerMotionDoneSet

Name

PositionerMotionDoneSet – Sets the motion done parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the positioner type: (-8)
- Checks parameter value: (-17)

Description

This function updates the motion done parameters only for the "VelocityAndPositionWindow" MotionDone mode. The "MotionDoneMode" parameter from the stages.ini file must be defined as "VelocityAndPositionWindow" else (-8) error is returned.

For a more thorough description of the Motion Done mode, please refer to the XPS Motion Tutorial section Motion/Motion Done.

Prototype

int **PositionerMotionDoneSet**(

int SocketID,

char * FullPositionerName,

double PositionWindow,

double VelocityWindow,

double MeanPeriod

double Timeout

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.
PositionWindow	double	Position window (units).
VelocityWindow	double	Velocity window (units/seconds).
CheckingTime	double	Checking time (seconds).
MeanPeriod	double	Mean period (seconds).
Timeout	double	Motion done time out (seconds).

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.

7.2.1.301 PositionerMotorDualSinForceBalanceGet

Name

PositionerMotorDualSinForceBalanceGet – Gets force balance parameters of an *AnalogDualSinAcceleration* or *AnalogDualSinAccelerationLMI* motor driver interface.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks if the motor driver interface type is *AnalogDualSinAcceleration* or *AnalogDualSinAccelerationLMI* (error -205 otherwise).

Description

This function returns the force balance parameters of an *AnalogDualSinAcceleration* or *AnalogDualSinAccelerationLMI* motor driver interface.

Prototype

int **PositionerMotorDualSinForceBalanceGet**(

int SocketID,

char * FullPositionerName,

double * FirstMotorForceBalance,

double * SecondMotorForceBalance

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Full positioner name (*for example XY.X*).

Output parameters

FirstMotorForceBalance	double *	First force balance ratio.
SecondMotorForceBalance	double *	Second force balance ratio.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -205: Not enable in your configuration.

7.2.1.302 PositionerMotorDualSinForceBalanceSet

Name

PositionerMotorDualSinForceBalanceSet – Sets force balance parameters of an *AnalogDualSinAcceleration* or *AnalogDualSinAccelerationLMI* motor driver interface.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks if the motor driver interface type is *AnalogDualSinAcceleration* or *AnalogDualSinAccelerationLMI* (error -205 otherwise).

Description

This function sets the force balance parameters of an *AnalogDualSinAcceleration* or *AnalogDualSinAccelerationLMI* motor driver interface.

Prototype

int **PositionerMotorDualSinForceBalanceSet**(

int SocketID,

char * FullPositionerName,

double FirstMotorForceBalance,

double SecondMotorForceBalance

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Full positioner name (*for example XY.X*).
FirstMotorForceBalance	double	First force balance ratio (*value between 0 and 1*).
SecondMotorForceBalance	double	Second force balance ratio (*between 0 and 1*).

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -205: Not enable in your configuration.

7.2.1.303 PositionerPositionCompareAquadBAlwaysEnable

Name

PositionerPositionCompareAquadBAlwaysEnable – Enables the AquadB signal in the always mode.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the positioner type: (-8)
- Checks the position encoder ("AquadB" or "AnalogInterpolated"): (-24)
- Checks if the CIE board supports this function: (-115)

Description

This function enables the generation of AquadB output signals on the PCO connector (the 2&3 or 4&5 pins) of the XPS controller cards. The "always" mode means that the AquadB signal is generated all the time (not position windowed).

NOTE

This function can be used only with a position encoder. If there is no position encoder then (-24) error is returned.

Prototype

int **PositionerPositionCompareAquadBAlwaysEnable**(

int SocketID,

char * FullPositionerName

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.

Output parameters

None.

Return (In addition to the results of "Input Tests Common to all XPS Functions")

- 0: No error.
- -8: Wrong object type for this command.
- -24: Not available in this configuration (check hardware or configuration).
- -115: Function is not supported by current hardware.

7.2.1.304 PositionerPositionCompareAquadBPrescalerGet

Name

PositionerPositionCompareAquadBPrescalerGet – Gets PCO AquadB interpolation factor.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks encoder type (must be "AnalogInterpolated" encoder): (-8)
- Checks parameter value: (-17)
- Checks positioner name: (-18)

Description

This function gets the current Position Compare AquadB interpolation factor.

The predefined PCO interpolation values are the following:

- 4.
- 16.
- 256.
- 4096.
- 65536.

Prototype

int **PositionerPositionCompareAquadBPrescalerGet**(

int SocketID,

char PositionerName,

double * PCOInterpolationFactor

)

Input parameters

SocketID	int	Socket identifier gets by the TCP_ConnectToServer" function.
PositionerName	int	Positioner name.

Output parameters

PCOInterpolationFactor	double *	Current PCO interpolation factor.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -18: Positioner name doesn't exist or unknown command.

7.2.1.305 PositionerPositionCompareAquadBPrescalerSet

Name

PositionerPositionCompareAquadBPrescalerSet – Sets PCO AquadB interpolation factor.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks encoder type (must be "AnalogInterpolated" encoder): (-8)
- Checks PCO interpolation factor value: (-17)
- Checks positioner name: (-18)

Description

This function configures Position Compare AquadB interpolation factor.

The predefined PCO interpolation values are the following:

- 4
- 16
- 256
- 4096
- 65536

Prototype

int **PositionerPositionCompareAquadBPrescalerSet**(

int SocketID,

char PositionerName,

double PCOInterpolationFactor

)

Input parameters

SocketID	int	Socket identifier gets by the TCP_ConnectToServer" function.
PositionerName	int	Positioner name.
PCOInterpolationFactor	double	Predefined PCO interpolation factor value.

Output parameters

None.

Return (In addition to the results of "Input Tests Common to all XPS Functions")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -18: Positioner name doesn't exist or unknown command.
- -22: Not allowed action.

7.2.1.306 PositionerPositionCompareAquadBWindowedGet

Name

PositionerPositionCompareAquadBWindowedGet – Gets the windowed AquadB mode parameters and state..

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the positioner type: (-8)
- Checks the position encoder ("AquadB" or "AnalogInterpolated"): (-24)
- Checks the position compare parameters (must be configured): (-23)
- Checks the configured mode type (must be WindowedAquadB): (-24)
- Checks if the CIE board supports this function: (-115)

Description

This function returns the configured parameters of the position windowed AquadB output signal and gives its state (enabled or disabled).

NOTE

This function can be used only with a position encoder ("AquadB" or "AnalogInterpolated"). If there is no position encoder then (-24) error is returned.

Prototype

int **PositionerPositionCompareAquadBWindowedGet** (int SocketID, char FullPositionerName[250] , double* MinimumPosition, double* MaximumPosition, bool * EnableState)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.

Output parameters

MinimumPosition	double *	Minimum position (units).
MaximumPosition	double *	Maximum position (units).
EnableState	bool *	Windowed AquadB state (true=enabled or false=disabled)

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -23: ERR_POSITION_COMPARE_NOT_SET.
- -24: Not available in this configuration (check hardware or configuration).
- -115: Function is not supported by current hardware.

7.2.1.307 PositionerPositionCompareAquadBWindowedSet

Name

PositionerPositionCompareAquadBWindowedSet – Sets the windowed AquadB signal parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the positioner type: (-8)
- Checks input parameter values: (-17)
  - MinimumPosition <MaximumPosition.
  - MinimumPosition ≥MinimumTargetPosition.
  - MaximumPosition ≤MaximumTargetPosition.
- Checks position compare state (must be disabled): (-22)
- Checks the position encoder ("AquadB" or "AnalogInterpolated"): (-24)
- Checks if the CIE board supports this function: (-115)

Description

This function sets the parameters for the position windowed AquadB output signal on the PCO connector (the 2&3 or 4&5 pins) of the XPS controller cards.

These parameters are in effect only when the position compare mode is enabled by the *PositionerPositionCompareEnable()* function.

NOTE

This function can be used only with a position encoder ("AquadB" or "AnalogInterpolated"). If there is no position encoder then (-24) error is returned.

Prototype

int **PositionerPositionCompareAquadBWindowedSet**(

int SocketID,

char * FullPositionerName

double MinimumPosition,

double MaximumPosition

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.
MinimumPosition	double	Minimum position (units).
MaximumPosition	double	Maximum position (units).

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -22: Not allowed action.
- -24: Not available in this configuration (check hardware or configuration).
- -115: Function is not supported by current hardware.

7.2.1.308 PositionerPositionCompareDisable

Name

PositionerPositionCompareDisable – Disables the position compare mode.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the positioner (must not be a secondary positioner): (-8)
- Checks the encoder ("AquadB" or "AnalogInterpolated"): (-8)

Description

This function disables the position compare mode.

For a more thorough description of the position compare output, please refer to the XPS Motion Tutorial section Triggers/Position Compare Output.

Prototype

int **PositionerPositionCompareDisable**(

int SocketID,

char * FullPositionerName

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.

Output parameters

None.

Return (In addition to the results of "Input Tests Common to all XPS Functions")

- 0: No error.
- -8: Wrong object type for this command.

7.2.1.309 PositionerPositionCompareEnable

Name

PositionerPositionCompareEnable – Enables the position compare mode.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the positioner (must not be a secondary positioner): (-8)
- Checks the encoder ("AquadB" or "AnalogInterpolated"): (-8)
- Checks the positioner name: (-18)
- Checks the group state (must be READY): (-22)
- Checks the position compare parameters (must be configured): (-22)

Description

This function enables the position compare mode. The group must be in READY state to use this function else (-22) error is returned.

If the position compare parameters are not configured (by the "PositionerPositionCompareSet" function) then (-22) error is returned.

For a more thorough description of the position compare output, please refer to the XPS Motion Tutorial section Triggers/Position Compare Output.

Prototype

int **PositionerPositionCompareEnable**(

int SocketID,

char * FullPositionerName

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.

Output parameters

None.

Return (In addition to the results of "Input Tests Common to all XPS Functions")

- 0: No error.
- -8: Wrong object type for this command.
- -22: Not allowed action.

7.2.1.310 PositionerPositionCompareGet

Name

PositionerPositionCompareGet – Gets the position compare parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the positioner (must not be a secondary positioner): (-8)
- Checks the position compare parameters (must be configured): (-23)
- Checks the configured mode type (must be PositionCompare): (-24)

Description

This function returns the real value (without correction) of parameters of the position compare output trigger and returns current state (enabled or disabled).

For a more thorough description of the position compare output, please refer to the XPS Motion Tutorial section Triggers/Position Compare Output.

Prototype

int **PositionerPositionCompareGet**(

int SocketID,

char * FullPositionerName,

double * MinimumPosition,

double * MaximumPosition,

double * PositionStep,

bool * EnableState

)

Input parameters

SocketID	int	Socket identifier gets b the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.

Output parameters

MinimumPosition	double *	Minimum position (units).
MaximumPosition	double *	Maximum position (units).
PositionStep	double *	Position step (units).
EnableState	bool *	Position compare state (true = enabled or false = disabled).

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -23: Position compare not set.
- -24: Not available in this configuration (check hardware or configuration).

7.2.1.311 PositionerPositionComparePulseParametersGet

Name

PositionerPositionComparePulseParametersGet – Gets the position compare PCO pulse parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the positioner (must not be a secondary positioner): (-8)

Description

This function returns the configured parameters of the position compare PCO pulse parameters.

For a more thorough description of the position compare output, please refer to the XPS Motion Tutorial section Triggers/Position Compare Output.

Prototype

int **PositionerPositionComparePulseParametersGet**(

int SocketID,

char * FullPositionerName,

double * PCOPulseWidth,

double * EncoderSettlingTime

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.

Output parameters

PCOPulseWidth	double *	Width of PCO pulses (µs).
EncoderSettlingTime	double *	Encoder signal settling time (µs).

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.

7.2.1.312 PositionerPositionComparePulseParametersSet

Name

PositionerPositionComparePulseParametersSet – Sets the position compare PCO pulse parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the positioner type (must not be a secondary positioner): (-8)
- Checks input parameter values: (-17)
  - PCOPulseWidth value must equal to 0.2 (default), 1, 2.5 or 10 (µs)
  - EncoderSettlingTime value must equal to 0.075 (default), 1, 4 or 12 (µs)
- Checks position compare state (must be disabled): (-22)
- Checks the position encoder ("AquadB" or "AnalogInterpolated"): (-24)
- Checks if the CIE board supports this function: (-115)

Description

This function sets two additional parameters for the position compare output trigger of the PCO connector on the XPS controller cards. The first additional parameter is the pulse width. The second parameter is the encoder settling time value, which is the time the encoder inputs have to stabilize after a change of state is detected.

These parameters are used only when using the position compare mode. For a more thorough description of the position compare output, please refer to the XPS Motion Tutorial section Triggers/Position Compare Output.

NOTE

When changing the PCO Pulse settle time you must limit the maximum velocity of the stage accordingly, otherwise you will loose the PCO position and generate the wrong number of pulses at wrong positions.

For example, if you set the EncoderSettlingTime to 4 µs, the maximum PCO encoder frequency need to be limited to less than 0.25 / $4e^{-6}$ = 62.5 kHz.

So, if EncoderScalePitch = 0.004 mm and HardInterpolatorFactor = 200 then the stage maximum velocity must ≤$62.5e^{3}$ * 0.004 / 200 = 1.25 mm/s, otherwise the PCO will not work properly.

How to determine PCO encoder frequency:

1. For AquadB encoder:
   PCO encoder frequency = Velocity / EncoderResolution
2. For analog interpolated encoder:
   *PCO encoder frequency = Velocity * HardInterpolatorFactor / EncoderScalePitch*

Example: *XML310 stage (EncoderScalePitch = 0.004 mm, HardInterpolatorFactor = 200). If Velocity = 10mm/s = >PCO encoder frequency = 10 * 200/0.004 = 500 kHz*

NOTE

This function can be used only with a position encoder. If no position encoder then (-24) error is returned.

This function is called automatically at controller reboot and at GroupInitialize() execution to set the position compare pulse parameters to default values (PCOPulseWidth to 0.2 µs, EncoderSettlingTime to 0.075 µs).

Prototype

int **PositionerPositionComparePulseParametersSet**(

int SocketID,

char * FullPositionerName,

double PCOPulseWidth,

double EncoderSettlingTime

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.
PCOPulseWidth	double	Width of PCO pulses (µs).
EncoderSettlingTime	double	Encoder signal settling time (µs).

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -22: Not allowed action.
- -24: Not available in this configuration (check hardware or configuration).
- -115: Function is not supported by current hardware.

7.2.1.313 PositionerPositionCompareScanAccelerationLimitGet [Extended]

Name

PositionerPositionCompareScanAccelerationLimitGet – Gets the position compare scan acceleration limit.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the corrector type (must be *PIDFFAcceleration* corrector): (-24)

Description

This function returns the position compare scan acceleration limit.

During scan of position compare, the motor output will be limited to this value instead of the *AccelerationLimit*.

The position compare scan acceleration limit takes effect only with *PIDFFAcceleration* corrector type.

This function can be used only with a *PIDFFAcceleration* corrector else (-24) error is returned.

For a more thorough description of the position compare output, please refer to the XPS Motion Tutorial section Triggers/Position Compare Output.

Prototype

int **PositionerPositionCompareScanAccelerationLimitGet**(

int SocketID,

char * FullPositionerName,

double * ScanAccelerationLimit

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.

Output parameters

ScanAccelerationLimit	double *	Limit of position compare scan acceleration (units/s2).

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -22: Not allowed action.
- -24: Not available in this configuration (check hardware or configuration).
- -115: Function is not supported by current hardware.

7.2.1.314 PositionerPositionCompareScanAccelerationLimitSet [Extended]

Name

PositionerPositionCompareScanAccelerationLimitSet – Sets the position compare acceleration limit.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks input parameter values: (-17)
  - PositionCompareScanAccelerationLimit value must >0 and ≤MaximumAcceleration (value in stages.ini)
- Checks the corrector type (must be *PIDFFAcceleration* corrector): (-24)

Description

This function sets the position compare scan acceleration limit.

During position compare, the motor output will be limited to this value instead of *AccelerationLimit*.

The position compare scan acceleration limit takes effect only with *PIDFFAcceleration* corrector type.

This function can be used only with a *PIDFFAcceleration* corrector otherwise the (-24) error is returned.

For a more thorough description of the position compare output, please refer to the XPS Motion Tutorial section Triggers/Position Compare Output.

Prototype

int **PositionerPositionCompareScanAccelerationLimitSet**(

int SocketID,

char * FullPositionerName,

double * ScanAccelerationLimit

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.
ScanAccelerationLimit	double	Limit of position compare scan acceleration (units/s2).

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -17: Parameter out of range or incorrect.
- -24: Not available in this configuration (check hardware or configuration).

7.2.1.315 PositionerPositionCompareSet

Name

PositionerPositionCompareSet – Sets the position compare parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the positioner type: (-8)
- Checks input parameter values: (-17)
  - MinimumPosition <MaximumPosition.
  - MinimumPosition ≥MinimumTargetPosition.
  - MaximumPosition ≤MaximumTargetPosition.
  - 0 ≤PositionStep ≤(MaximumPosition – MinimumPosition)
- Checks position compare state (must be disabled): (-22)
- Checks the position encoder ("AquadB" or "AnalogInterpolated"): (-24)

Description

This function sets the parameters for the position compare output trigger of the PCO connector on the XPS controller cards.

These parameters are used only when the position compare mode is enabled. For a more thorough description of the position compare output, please refer to the XPS Motion Tutorial section Triggers/Position Compare Output.

NOTE

This function can be used only with a position encoder. If no position encoder then (-24) error is returned.

In the PositionCompare mode (activated with PositionerPositionCompareEnable() function), during the move (relative or absolute) and inside the zone set by PositionerPositionCompareSet(), if the current following error exceeds the Warning Following Error value, the PositionCompareWarningFollowingErrorFlag is activated and the move returns an error (-120: Warning following error during move with position compare enabled). To reset the PositionCompareWarningFollowingErrorFlag, send the PositionerPositionCompareDisable() function. The WarningFollowingError is set to FatalFollowingError (defined in stages.ini file) by default, but it can be modified by PositionerWarningErrorSet().

In the PositionCompare mode (activated with PositionerPositionCompareEnable() function), during the move (relative or absolute) and inside the zone set by PositionerPositionCompareSet(), the CorrectorOutput is limited to MaximumAcceleration (*defined in stages.ini*).

Prototype

int **PositionerPositionCompareSet**(
int SocketID,
char * FullPositionerName,
double MinimumPosition,
double MaximumPosition,
double PositionStep,
bool EnableState
)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.
MinimumPosition	double	Minimum position (units).
MaximumPosition	double	Maximum position (units).
PositionStep	double	Position step (units).
EnableState	bool	Position compare state (true = enabled or false = disabled).

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -22: Not allowed action.
- -24: Not available in this configuration (check hardware or configuration).

7.2.1.316 PositionerPreCorrectorExcitationSignalGet [Extended]

Name

PositionerPreCorrectorExcitationSignalGet – Gets the currently used parameters of the pre-corrector excitation signal feature.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Valids object type: (-8)
- Invalid positioner name: (-18)

Description

This function gets the last configured pre-corrector excitation signal parameters.

Prototype

int **PositionerPreCorrectorExcitationSignalGet**(

int SocketID,

char * FullPositionerName

double * Frequency,

double * Amplitude,

double * Time

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.

Output parameters

Frequency	double *	Frequency (Hz).
Amplitude	double *	Amplitude (position units).
Time	double *	During time (seconds).

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.

7.2.1.317 PositionerPreCorrectorExcitationSignalSet [Extended]

Name

PositionerPreCorrectorExcitationSignalSet – Configures and activate the signal of pre-corrector excitation.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Valids object type: (-8)
- Is secondary positioner or has a secondary positioner: (-8)
- Checks frequency (must ≥0.1 and ≤0.5/CorrectorISRPeriod): (-17)
- Checks amplitude (*must >0*): (-17)
- Checks excitation time (*must ≥4 * CorrectorISRPeriod*): (-17)
- Invalid positioner name: (-18)
- Checks group status (*must be READY*): (-22)
- Valids control loop type: (-24)
- Checks position (CurrSetpointPos ≤UserMaximumTargetPosition and CurrSetpointPos-2Amplitude ≥UserMinimumTargetPosition): (-35)
- Checks maximum velocity (*Amplitude * ω <MaximumVelocity*): (-68)
- Checks maximum acceleration (*Amplitude * ω^2 <MaximumAcceleration*): (-69)

Description

The pre-corrector excitation signal functionality generates sine-wave signals (*ExcitationPosition, ExcitationVelocity, ExcitationAcceleration, ExcitationJerk*) inserted in the position control loop (*in closed or open loop configuration*) to excite the system. In measuring the output signal (*eg. encoder position, velocity or acceleration*) of the excited system, we can determine some system characteristics, like the system transfer function.

The exact forms of generated pre-corrector excitation signals are as follows:

$\omega = 2\pi F$ (F: excitation frequency)

$ExcitationPosition = A * \cos(\omega t) - A$ (A: excitation amplitude, t: current time)

$ExcitationVelocity = (-A\omega) * \sin(\omega t)$

$ExcitationAcceleration = (-A\omega^2) * \cos(\omega t)$

$ExcitationJerk = (A\omega^3) * \sin(\omega t)$

The pre-corrector excitation signal functionality is only available with the stages controlled in acceleration (acceleration control, ex: brushless / linear motors), velocity (velocity control) or in voltage (voltage control). It does not exist with stages controlled in position (ex: stepper motors).

The excitation signal function **PositionerPreCorrectorExcitationSignalSet** can be executed only when the positioner is in "READY" state. When the excitation-signal process is in progression, the positioner is in the "ExcitationSignal" state. At the end of the process, the positioner returns to the "READY" state (see group state diagram).

The **PositionerPreCorrectorExcitationSignalSet** function sends a sine form excitation signal to entry of position control loop during a time. This function is allowed for "PIDFFAcceleration", "PIDFFVelocity" or "PIDDualFFVoltage" control loops. The parameters to configure include: *frequency* (Hz, double), *amplitude* (position unit, double) and *during time* (seconds, double).

The function effective parameters are: *Frequency* (≥0.1 and ≤*0.5/CorrectorISRPeriod*), *Amplitude* (>0), *Time* (≥*4 * CorrectorISRPeriod*).

NOTE

If during the excitation signal generation the stage position exceeds the user minimum or maximum target positions, the motor excitation command is stopped and an error is returned.

Prototype

int **PositionerPreCorrectorExcitationSignalSet**(

int SocketID,

char * FullPositionerName

double Frequency,

double Amplitude,

double Time

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.
Frequency	double	Frequency (Hz).
Amplitude	double	Amplitude (position units).
Time	double	During time (seconds).

Output parameters

None.

Return (In addition to the results of "Input Tests Common to all XPS Functions")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -18: Positioner Name doesn't exist or unknown command.
- -22: Not allowed action.
- -24: Not available in this configuration (check hardware or configuration).
- -35: Position is outside of travel limits.
- -68: Velocity on trajectory is too big.
- -69: Acceleration on trajectory is too big.
- -112: Error of excitation signal generation initialization.

7.2.1.318 PositionerRawEncoderPositionGet

Name

PositionerRawEncoderPositionGet – Gets the raw encoder position for a positioner.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Valids object type: (-8)
- Invalid positioner name: (-18)

Description

This function returns the raw encoder position from a corrected position for a positioner.

Prototype

int **PositionerRawEncoderPositionGet**(

int SocketID,

char * FullPositionerName

double UserEncoderPosition,

double * RawEncoderPosition

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.
UserEncoderPosition	double	User corrected encoder position.

Output parameters

RawEncoderPosition	double *	Raw encoder position.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.

7.2.1.319 PositionerSGammaExactVelocityAjustedDisplacementGet

Name

PositionerSGammaExactVelocityAjustedDisplacementGet – Gets the adjusted displacement to get exact velocity.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the profiler type (must be "SGamma"): (-8)
- Checks the positioner type (must not be a secondary positioner): (-8)

Description

This function returns the closest optimum displacement to obtain the most precise velocity during the displacement.

Prototype

int **PositionerSGammaExactVelocityAjustedDisplacementGet**(

int SocketID,

char * FullPositionerName

double DesiredDisplacement,

double * AdjustedDisplacement

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.
DesiredDisplacement	double	Desired displacement (units).

Output parameters

AdjustedDisplacement	double *	Ajusted displacement (units).

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.

7.2.1.320 PositionerSGammaMoveResultGet

Name

PositionerSGammaMoveResultGet – Gets the motion information of the last Sgamma move.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the positioner type (must not be a secondary positioner): (-8)

Description

This function gets the motion results from the SGamma last move.

Prototype

int **PositionerSGammaMoveResultGet** (

int SocketID,

char * FullPositionerName

double * TimeToAccelerate,

double * RealAcceleration,

double * DistanceToAccelerate,

double * TimeAtConstantSpeed,

double * RealVelocity,

double * DistanceAtConstantSpeed,

double * TotalTimeToMove,

double * DistanceToDecelerate,

double * ExecutedDisplacement,

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.

Output parameters

TimeToAccelerate	double *	Time to reach real acceleration (seconds).
RealAcceleration	double *	Maximum acceleration during last move (units/seconds^2).
DistanceToAccelerate	double *	Distance to reach real acceleration (units).
TimeAtConstantSpeed	double *	Time at real velocity (seconds).
RealVelocity	double *	Maximum velocity during last move (units/seconds).
DistanceAtConstantSpeed	double *	Distance at real velocity (seconds).
TotalTimeToMove	double *	Total time to execute last move (seconds).
DistanceToDecelerate	double *	Distance to decelerate (units).
ExecutedDisplacement	double *	Real displacement during last move (units).

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.

7.2.1.321 PositionerSGammaParametersGet

Name

PositionerSGammaParametersGet – Gets the current motion values from the SGamma profiler.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the profiler type (must be "SGamma"): (-8)
- Checks the positioner type (must not be a secondary positioner): (-8)

Description

This function gets the current SGamma profiler values that are used in displacements.

Prototype

int **PositionerSGammaParametersGet**(

int SocketID,

char * FullPositionerName

double * Velocity,

double * Acceleration,

double * MinimumJerkTime,

double * MaximumJerkTime

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.

Output parameters

Velocity	double *	motion velocity (units/seconds).
Acceleration	double *	motion acceleration (units/seconds²).
MinimumJerkTime	double *	Minimum jerk time (seconds).
MaximumJerkTime	double *	Maximum jerk time (seconds).

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.

7.2.1.322 PositionerSGammaParametersSet

Name

PositionerSGammaParametersSet – Sets new motion values for the SGamma profiler.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the profiler type (must be "SGamma"): (-8)
- Checks the positioner type (must not be a secondary positioner): (-8)
- Checks input parameter values: (-17)
  - 0 <**NewVelocity** ≤MaximumVelocity.
  - 0 <**NewAcceleration** ≤MaximumAcceleration.
  - 2 * ISRProfileGeneratorPeriod ≤NewMinimumJerkTime and ≤NewMaximumJerkTime.

Description

This function defines the new SGamma profiler values that will be used in future displacements.

Prototype

int **PositionerSGammaParametersSet**(

int SocketID,

char * FullPositionerName

double Velocity,

double Acceleration,

double MinimumJerkTime,

double MaximumJerkTime

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.
Velocity	double	motion velocity (units/seconds).
Acceleration	double	motion acceleration (units/seconds²).
MinimumJerkTime	double	Minimum jerk time (seconds).
MaximumJerkTime	double	Maximum jerk time (seconds).

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.

7.2.1.323 PositionerSGammaPreviousMotionTimesGet

Name

PositionerSGammaPreviousMotionTimesGet – Gets the motion and the settling time.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the profiler type (must be "SGamma"): (-8)
- Checks the positioner type (must not be a secondary positioner): (-8)

Description

This function returns the motion (setting) and settling times from the previous motion.

The motion time represents the defined time to complete the previous displacement.

The settling time represents the effective settling time for a motion done.

Description

This function gets the current SGamma profiler values that are used in displacements.

Prototype

int **PositionerSGammaPreviousMotionTimesGet**(

int SocketID,

char * FullPositionerName

double * SettingTime,

double * SettlingTime

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.

Output parameters

SettingTime	double *	Setting time (seconds).
SettlingTime	double *	Settling time (seconds).

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.

7.2.1.324 PositionerSGammaVelocityAndAccelerationSet

Name

PositionerSGammaVelocityAndAccelerationSet – Sets the SGamma profiler velocity and acceleration.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks input parameter values: (-17)
  - 0 <**NewVelocity** ≤MaximumVelocity
  - 0 <**NewAcceleration** ≤MaximumAcceleration

Description

This function sets the SGamma profiler velocity and acceleration that will be used for the future displacements.

Prototype

int **PositionerSGammaVelocityAndAccelerationSet**(

int SocketID,

double Velocity,

double Accelation

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
Velocity	double	motion velocity (units / seconds).
Acceleration	double	motion accelation (units / seconds^2).

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -17: Parameter out of range or incorrect.

7.2.1.325 PositionerStageParameterGet

Name

PositionerStageParameterGet – Gets a stage parameter value from the stages.ini file.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the positioner name and the parameter name: (-24)

Description

This function returns stage parameter values from the stages.ini file of a selected positioner.

The positioner name is the stage name. And the parameter name is read in the section under this stage name.

Prototype

int **PositionerStageParameterGet**(

int SocketID,

char * FullPositionerName

char * ParameterName,

char * ParameterValue

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.
ParameterName	char *	Parameter name.

Output parameters

ParameterValue	char *	Parameter value.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -13: Wrong parameter type in the command string: char * expected.
- -24: Not available in this configuration (check hardware or configuration).

7.2.1.326 PositionerStageParameterSet

Name

PositionerStageParameterSet – Saves a stage parameter value into the stages.ini file.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the positioner name and the parameter name: (-24)
- Checks the user rights (must be identified as administrator): (-107)

Description

This function saves a stage parameter value in the "stages.ini" file.

The positioner name sets the stage name and the parameter name is searched in the section of this stage name. Once the parameter is found, the parameter value is modified to the new value.

If file reading fails then (-61) error is returned

If file writing fails then (-60) error is returned

NOTE

To use this function, the user must login with administrator rights ("Login" function).

Prototype

int **PositionerStageParameterSet**(

int SocketID,

char * FullPositionerName

char * ParameterName,

char * ParameterValue

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.
ParameterName	char *	Parameter name.

Output parameters

ParameterValue	char *	Parameter value.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -24: Not available in this configuration (check hardware or configuration).
- -60: Error during file writing or file doesn't exist.
- -61: Error file corrupt or file doesn't exist.
- -107: This function requires to be logged in with Administrator rights.

7.2.1.327 PositionerTimeFlasherDisable

Name

PositionerTimeFlasherDisable – Disables the time flasher mode.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the positioner type (must not be a secondary positioner): (-8)

Description

This function disables the time flasher mode. The time flasher mode is a trigger output per axis that can be either configured to output distance spaced pulses or time spaced pulses. The output pulses are accessible from the PCO connector at the back of the XPS controller.

For a more thorough description of the position compare output, please refer to the XPS User's manual, section named Triggers/Position Compare Output.

Prototype

int **PositionerTimeFlasherDisable**(

int SocketID,

char * FullPositionerName

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.

7.2.1.328 PositionerTimeFlasherEnable

Name

PositionerTimeFlasherEnable – Enables the time flasher mode.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the positioner type (must not be a secondary positioner): (-8)
- Checks the time flasher parameters (must be configured): (-22)

Description

This function enables the time flasher mode. The time flasher mode is a trigger output per axis that can be either configured to output distance spaced pulses or time spaced pulses. The output pulses are accessible from the PCO connector at the back of the XPS controller.

To use this function, the group must be in READY state else (-22) error is returned.

For a more thorough description of the position compare output, please refer to the XPS User's manual, section named Triggers/Position Compare Output.

Prototype

int **PositionerTimeFlasherEnable**(

int SocketID,

char * FullPositionerName

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.

7.2.1.329 PositionerTimeFlasherGet

Name

PositionerTimeFlasherGet – Gets the time flasher parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the positioner type (must not be a secondary positioner): (-8)
- Checks the time flasher parameters (must be configured): (-23)
- Checks the configured mode type (must be TimeFlasher): (-24)

Description

This function returns the parameters of the time flasher trigger. The time flasher mode is defined by:

a position window defined by a minimum position and a maximum position

a time period to set the time spaced pulses.

For a more thorough description of the position compare output, please refer to the XPS Motion Tutorial section Triggers/Position Compare Output.

Prototype

int **PositionerTimeFlasherGet**(

int SocketID,

char * FullPositionerName,

double * MinimumPosition,

double * MaximumPosition,

double * TimePeriod,

bool * EnableState

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.

Output parameters

MinimumPosition	double *	Minimum position (units).
MaximumPosition	double *	Maximum position (units).
TimePeriod	double *	Time period (seconds).
EnableState	bool *	Enable time flasher state (true = enabled and false = disabled).

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -23: Position compare not set.
- -24: Not available in this configuration (check hardware or configuration).

7.2.1.330 PositionerTimeFlasherSet

Name

PositionerTimeFlasherSet – Sets the time flasher parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the positioner type (must not be a secondary positioner): (-8)
- Checks input parameter values: (-17)
  - MinimumPosition <MaximumPosition.
  - MinimumPosition ≥MinimumTravelLimit.
  - MaximumPosition ≤MaximumTravelLimit.
  - 0.0000004 ≤TimePeriod ≤50.0 (Max 2.5 MHz and Min 0.02 Hz)
- Checks the time flasher state (must be disabled): (-22)
- Checks the position encoder (must be used): (-24)
- Checks if the CIE board supports this function: (-115)

Description

This function configures the time flasher parameters. The time flasher output trigger uses the PCO connector on the XPS controller cards. The time flasher mode is defined by:

- a position window defined by a minimum position and a maximum position.
- a time period to set the time spaced pulses.

NOTES

This function is not available without a position encoder.

These parameters are used only when the time flasher mode is enabled. To enable the time flasher mode, use the "PositionerPositionCompareEnable" function.

For a more thorough description of the position compare output, please refer to the XPS Motion Tutorial section Triggers/Position Compare Output.

Prototype

int **PositionerTimeFlasherSet**(

int SocketID,

char * FullPositionerName,

double MinimumPosition,

double MaximumPosition,

double TimePeriod,

bool EnableState

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.
MinimumPosition	double	Minimum position (units).
MaximumPosition	double	Maximum position (units).
TimePeriod	double	Time period (seconds).
EnableState	bool	Enable time flasher state (true = enabled and false = disabled).

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -22: Not allowed action.
- -24: Not available in this configuration (check hardware or configuration).
- -115: Function is not supported by current hardware.

7.2.1.331 PositionerUserTravelLimitsGet

Name

PositionerUserTravelLimitsGet – Gets the user travel limits.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the positioner type (must not be a secondary positioner): (-8)
- If piezo driver, check if driver is not initialized: (-118)

Description

This function returns the user-defined travel limits for the selected positioner.

Prototype

int **PositionerUserTravelLimitsGet**(
int SocketID,
char * FullPositionerName,
double * UserMinimumTarget,
double * UserMaximumTarget
)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.

Output parameters

UserMinimumTarget	double *	User minimum travel limit (units).
UserMaximumTarget	double *	User maximum travel limit (units).

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -118: Not allowed action driver not initialized.

7.2.1.332 PositionerUserTravelLimitsSet

Name

PositionerUserTravelLimitsSet – Sets the user travel limits.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the positioner type (must not be a secondary positioner): (-8)
- Checks input parameter values: (-17)
  - UserMinimumTargetPosition <UserMaximumTargetPosition.
  - MinimumTargetPosition ≤UserMinimumTargetPosition ≤MaximumTargetPosition.
  - MinimumTargetPosition ≤UserMaximumTargetPosition ≤MaximumTargetPosition.
  - UserMinimumTargetPosition ≤ProfilerPosition.
  - UserMaximumTargetPosition ≥ProfilerPosition.
- If piezo driver, check if driver is not initialized: (-118)

Description

This function sets the new user travel limits of the selected positioner.

Prototype

int **PositionerUserTravelLimitsSet**(

int SocketID,

char * FullPositionerName,

double UserMinimumTarget,

double UserMaximumTarget

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.
UserMinimumTarget	double	User minimum travel limit (units).
UserMaximumTarget	double	User maximum travel limit (units).

Output parameters

None.

Return (In addition to the results of "Input Tests Common to all XPS Functions")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Wrong parameter type in the command string: double or double * expected.
- -118: Not allowed action driver not initialized.

7.2.1.333 PositionerWarningFollowingErrorGet_[Extended]

Name

PositionerWarningFollowingErrorGet – Gets the warning following error for a positioner.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Valids object type: (-8)
- Invalid positioner name: (-18)

Description

This function gets the current value of the warning following error for a positioner.

Prototype

int **PositionerWarningFollowingErrorGet**(

int SocketID,

char * FullPositionerName,

double * WarningFollowingError

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.

Output parameters

WarningFollowingError	double *	Warning following error (units).

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.

7.2.1.334 PositionerWarningFollowingErrorSet [Extended]

Name

PositionerWarningFollowingErrorSet – Sets value of the warning following error for a positioner.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Valids object type: (-8)
- Checks input parameter values: (-17)
  - 0 < WarningFollowingError ≤ FatalFollowingError.
- Invalid positioner name: (-18)

Description

This function sets a new value of the warning following error for a positioner.

Prototype

int **PositionerWarningFollowingErrorSet**(

int SocketID,

char * FullPositionerName,

double WarningFollowingError

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
FullPositionerName	char *	Positioner name.
WarningFollowingError	double	Warning following error (units).

Output parameters

None.

Return (In addition to the results of "Input Tests Common to all XPS Functions")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -18: Positioner name doesn't exist or unknown command.

7.2.1.335 Reboot

Name

Reboot – Reboots the controller.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".

Description

This function reboots the controller.

NOTE

This function is not a cold reboot (power off/on), it is a warm (soft) reboot.

If an FTP client is connected, this function is not allowed and (-22) error is returned.

Prototype

int **Reboot**(

int SocketID

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -22: Not allowed action.

7.2.1.336 RestartApplication

Name

RestartApplication – Restarts the controller's application and avoids hardware reboot.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".

Description

This function allows restarting controller applications without hardware reboot.

Prototype

int **RestartApplication**(

int SocketID

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -22: Not allowed action.

7.2.1.337 SingleAxisSlaveModeDisable

Name

SingleAxisSlaveModeDisable – Disables the slave-master mode.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the group type (must be a SingleAxis group): (-8)
- Checks the positioner name: (-18)
- Checks the group name: (-19)
- Group state must be "SLAVE": (-22)

Description

This function disables the master-slave mode. If a motion is in progress then it is aborted.

To use this function, the group state must be SLAVE (46). If it's not the case then (-22) is returned.

Prototype

int **SingleAxisSlaveModeDisable**(

int SocketID,

char * GroupName

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	SingleAxis group name.

Output parameters

None.

Return (In addition to the results of "Input Tests Common to all XPS Functions")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.
- -19: GroupName doesn't exist or unknown command.
- -22: Not allowed action.

7.2.1.338 SingleAxisSlaveModeEnable

Name

SingleAxisSlaveModeEnable – Enables the slave-master mode.

Input tests

- Refer to section 7.1: “Input Tests Common to all XPS Functions”.
- Checks the group type (must be a SingleAxis group): (-8)
- Checks the positioner name: (-18)
- Checks the group name: (-19)
- Group state must be "READY”: (-22)
- Checks the slave parameters (must be configured): (-41)

Description

This function enables the master-slave mode only if the slave group is in "READY" state. In this mode the slave must be defined as a SingleAxis group and the master can be a positioner from any group.

To use this function, the SingleAxis group must be in the READY state. If it’s not the case then (-22) error is returned.

To use this function, the master positioner and the slave ratio must be configured using the “SingleAxisSlaveParametersSet” function. If it’s not the case then (-41) error is returned.

Prototype

int **SingleAxisSlaveModeEnable**(

int SocketID,

char * GroupName

)

Input parameters

SocketID	int	Socket identifier gets by the “TCP_ConnectToServer” function.
GroupName	char *	SingleAxis group name.

Output parameters

None.

Return (In addition to the results of “Input Tests Common to all XPS Functions”)

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.
- -19: GroupName doesn't exist or unknown command.
- -22: Not allowed action.
- -41: Slave-master mode not configured.

7.2.1.339 SingleAxisSlaveParametersGet

Name

SingleAxisSlaveParametersGet – Gets the slave parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the group type (must be a SingleAxis group): (-8)
- Checks the positioner name: (-18)
- Checks the slave parameters (must be configured): (-22)

Description

This function returns the slave parameters: the master positioner name and the master-slave ratio.

Prototype

int **SingleAxisSlaveParametersGet**(

int SocketID,

char * GroupName,

int NbPositioners,

char * MasterPositionerName ,

double * Ratio

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	SingleAxis group name.

Output parameters

MasterPositionerName	char *	Master positioner name from	any group.
Ratio	double *	Gear ratio between the master	and the slave.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.
- -19: GroupName doesn't exist or unknown command.
- -22: Not allowed action.

7.2.1.340 SingleAxisSlaveParametersSet

Name

SingleAxisSlaveParametersSet – Sets the slave parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the master group type: (-8)
- Checks the ratio value (Ratio >0): (-17)
- Checks the master positioner name: (-18)
- Checks the slave parameters (must be configured): (-22)
- Checks the base velocity value (must be null): (-48)

Description

This function configures the slave parameters only for a SingleAxis group.

The slave is a copy of the master and a ratio can be applied: Slave = Ratio * Master.

The slave-master mode is activated only after the call of "SingleAxisSlaveModeEnable" function.

The master can be a positioner from any group, except from a spindle group. If the master group is a spindle then (-22) error is returned. The master positioner must be different from the slave positioner else (-8) error is returned.

NOTE

After an emergency stop, the master group and the slave group are in "NOTINIT" status. To restart a master-slave relation, the slave group(s) must be reinitialized before the master group.

Prototype

int **SingleAxisSlaveParametersSet**(

int SocketID,

char * GroupName,

int NbPositioners,

char * MasterPositionerName ,

double Ratio

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	SingleAxis group name.
MasterPositionerName	char *	Master positioner name from any group.
Ratio	double	Gear ratio between the master and the slave.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -18: Positioner Name doesn't exist or unknown command.
- -19: GroupName doesn't exist or unknown command.
- -22: Not allowed action.
- -48: BaseVelocity must be null.

7.2.1.341 SingleAxisThetaClampDisable_[Extended]

Name

SingleAxisThetaClampDisable – unclamps a SingleAxisTheta group.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Invalid object type (group): (-8)
- Invalid positioner name: (-18)
- Invalid group name: (-19)

Description

This function unclamps the selected SingleAxisTheta group

The group must be in the CLAMPED state. If unclamping is successful, the group is unclamped and the group state becomes "READY".

Prototype

int **SingleAxisThetaClampDisable**(

int SocketID,

char * GroupName

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	SingleAxis group name.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.
- -19: GroupName doesn't exist or unknown command.

7.2.1.342 SingleAxisThetaClampEnable [Extended]

Name

SingleAxisThetaClampEnable – clamps a SingleAxisTheta group.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Invalid object type (group): (-8)
- Invalid positioner name: (-18)
- Invalid group name: (-19)

Description

This function clamps the selected SingleAxisTheta group.

The group must be in the READY state. If clamping is successful, the group is clamped and the group state becomes "CLAMPED".

Prototype

int **SingleAxisThetaClampEnable**(

int SocketID,

char * GroupName

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	SingleAxis group name.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.
- -19: GroupName doesn't exist or unknown command.

7.2.1.343 SingleAxisThetaFeedforwardJerkParametersGet [Extended]

Name

SingleAxisThetaFeedforwardJerkParametersGet – Gets currently used "XY to Theta Feedforward Jerk" feature parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the group name: (-19)

Description

The "XY to Theta Feedforward Jerk" feature allows to compensate the vibration effect on the Theta stage when the XY stage speeds up or speeds down.

This function gets the currently used correction gains of "XY to Theta Feedforward Jerk" feature.

This API is reserved to SingleAxisTheta group only.

Prototype

int **SingleAxisThetaFeedforwardJerkParametersGet**(

int SocketID,

char GroupName[250],

double * KFeedforwardJerkX,

double * KFeedforwardJerkY

)

Input parameters

SocketID	int	Socket identifier gets by the _ConnectToServer" function.
GroupName	char *	Group name.

Output parameters

KFeedforwardJerkX	double *	X axis feedforward Jerk gain.
KFeedforwardJerkY	double *	Y axis feedforward Jerk gain.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -7: Wrong format in the command string.
- -8: Wrong object type for this command.
- -9: Wrong number of parameters in the command.
- -14: Wrong parameter type in the command string: double or double * expected.
- -19: GroupName doesn't exist or unknown command.

7.2.1.344 SingleAxisThetaFeedforwardJerkParametersSet [Extended]

Name

SingleAxisThetaFeedforwardJerkParametersSet – Sets "XY to Theta Feedforward Jerk" feature parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the group name: (-19)

Description

The "XY to Theta Feedforward Jerk" feature allows to compensate the vibration effect on the Theta stage when the XY stage speeds up or speeds down.

This function configures the correction gains of "XY to Theta Feedforward Jerk" feature for the SingleAxisTheta group.

This API is reserved to SingleAxisTheta group only.

Prototype

int **SingleAxisThetaFeedforwardJerkParametersSet**(

int SocketID,

char GroupName[250],

double KFeedforwardJerkX,

double KFeedforwardJerkY

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	SingleAxisTheta Group name.
KFeedforwardJerkX	double	X axis feedforward Jerk gain.
KFeedforwardJerkY	double	Y axis feedforward Jerk gain.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -7: Wrong format in the command string.
- -8: Wrong object type for this command.
- -9: Wrong number of parameters in the command.
- -14: Wrong parameter type in the command string: double or double * expected.
- -19: GroupName doesn't exist or unknown command.

7.2.1.345 SingleAxisThetaFeedforwardParametersGet [Extended]

Name

SingleAxisThetaFeedforwardParametersGet – Gets currently used "XY to Theta Feedforward" feature parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the group name: (-19)

Description

The "XY to Theta Feedforward" feature allows to compensate the vibration effect on the Theta stage when the XY stage speeds up or speeds down.

This function gets the currently used correction gains of "XY to Theta Feedforward" feature.

This API is reserved to SingleAxisTheta group only.

Prototype

Int **SingleAxisThetaFeedforwardParametersGet**(

int SocketID,

char PositionerName[250],

double * KFeedforwardX,

double * KFeedforwardY

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.

Output parameters

KFeedforwardX	double *	X axis feedforward gain.
KFeedforwardY	double *	Y axis feedforward gain.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -19: GroupName doesn't exist or unknown command.

7.2.1.346 SingleAxisThetaFeedforwardParametersSet [Extended]

Name

SingleAxisThetaFeedforwardParametersSet – Sets "XY to Theta Feedforward" feature parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the group name: (-19)

Description

The "XY to Theta Feedforward" feature allows to compensate the vibration effect on the Theta stage when the XY stage speeds up or slows down.

This function configures the correction gains of "XY to Theta Feedforward" feature for the SingleAxisTheta group.

This API is reserved to SingleAxisTheta group only.

Prototype

Int **SingleAxisThetaFeedforwardParametersSet**(

int SocketID,

char * PositionerName,

double KFeedforwardX,

double KFeedforwardY

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.
KFeedforwardX	double	X axis feedforward gain.
KFeedforwardY	double	Y axis feedforward gain.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -19: GroupName doesn't exist or unknown command.

7.2.1.347 SingleAxisThetaSlaveModeDisable [Extended]

Name

SingleAxisThetaSlaveModeDisable – Disables the slave-master mode.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the group type (must be a SingleAxisTheta group): (-8)
- Checks the positioner name: (-18)
- Checks the group name: (-19)
- Group state must be "SLAVE": (-22)

Description

This function disables the master-slave mode. If a motion is in progress then it is aborted.

To use this function, the group state must be SLAVE (46). If it is not the case then the (-22) error is returned.

Prototype

int **SingleAxisThetaSlaveModeDisable**(

int SocketID,

char * GroupName

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	SingleAxisTheta group name.

Output parameters

None.

Return (In addition to the results of "Input Tests Common to all XPS Functions")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.
- -19: GroupName doesn't exist or unknown command.
- -22: Not allowed action.

7.2.1.348 SingleAxisThetaSlaveModeEnable_[Extended]

Name

SingleAxisThetaSlaveModeEnable – Enables the slave-master mode.

Input tests

- Refer to section 7.1: “Input Tests Common to all XPS Functions”.
- Checks the group type (must be a SingleAxisTheta group): (-8)
- Checks the positioner name: (-18)
- Checks the group name: (-19)
- Group state must be "READY”: (-22)
- Checks the slave parameters (must be configured): (-41)

Description

This function enables the master-slave mode only if the slave group is in "READY" state. In this mode the slave must be defined as a SingleAxisTheta group and the master can be a positioner from any group.

To use this function, the SingleAxisTheta group must be in the READY state. If it’s not the case then (-22) error is returned.

To use this function, the master positioner and the slave ratio must be configured using the “SingleAxisThetaSlaveParametersSet” function. If it’s not the case then (-41) error is returned.

Prototype

int **SingleAxisThetaSlaveModeEnable**(

int SocketID,

char * GroupName

)

Input parameters

SocketID	int	Socket identifier gets by the “TCP_ConnectToServer” function.
GroupName	char *	SingleAxisTheta group name.

Output parameters

None.

Return (In addition to the results of “Input Tests Common to all XPS Functions”)

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.
- -19: GroupName doesn't exist or unknown command.
- -22: Not allowed action.
- -41: Slave-master mode not configured.

7.2.1.349 SingleAxisThetaSlaveParametersGet [Extended]

Name

SingleAxisThetaSlaveParametersGet – Gets the slave parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the group type (must be a SingleAxisTheta group): (-8)
- Checks the positioner name: (-18)
- Checks the slave parameters (must be configured): (-22)

Description

This function returns the slave parameters: the master positioner name and the master-slave ratio.

Prototype

int **SingleAxisThetaSlaveParametersGet**(

int SocketID,

char * GroupName,

int NbPositioners,

char * MasterPositionerName ,

double * Ratio

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	SingleAxisTheta group name.

Output parameters

MasterPositionerName	char *	Master positioner name from	any group.
Ratio	double *	Gear ratio between the master	and the slave.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.
- -19: GroupName doesn't exist or unknown command.
- -22: Not allowed action.

7.2.1.350 SingleAxisThetaSlaveParametersSet_[Extended]

Name

SingleAxisThetaSlaveParametersSet – Sets the slave parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the master group type: (-8)
- Checks the ratio value (Ratio >0): (-17)
- Checks the master positioner name: (-18)
- Checks the slave parameters (must be configured): (-22)
- Checks the base velocity value (must be null): (-48)

Description

This function configures the slave parameters only for a SingleAxisTheta group.

The slave is a copy of the master and a ratio can be applied: Slave = Ratio * Master.

The slave-master mode is activated only after the call of "SingleAxisThetaSlaveModeEnable" function.

The master can be a positioner from any group, except from a spindle group. If the master group is a spindle then (-22) error is returned. The master positioner must be different from the slave positioner else (-8) error is returned.

NOTE

After an emergency stop, the master group and the slave group are in "NOTINIT" status. To restart a master-slave relation, the slave group(s) must be reinitialized before the master group.

Prototype

int **SingleAxisThetaSlaveParametersSet**(

int SocketID,

char * GroupName,

int NbPositioners,

char * MasterPositionerName ,

double Ratio

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	SingleAxisTheta group name.
MasterPositionerName	char *	Master positioner name from any group.
Ratio	double	Gear ratio between the master and the slave.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -18: Positioner Name doesn't exist or unknown command.
- -19: GroupName doesn't exist or unknown command.
- -22: Not allowed action.
- -48: BaseVelocity must be null.

7.2.1.351 SpindleSlaveModeDisable

Name

SpindleSlaveModeDisable – Disables the slave-master mode.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the group type (must be a Spindle group): (-8)
- Checks the positioner name: (-18)
- Checks the group name: (-19)
- Group state must be "SLAVE": (-22)

Description

This function disables the master-slave mode for a spindle group. If a motion is in progress then it is aborted.

To use this function, the group state must be SLAVE (46). If it's not the case then (-22) error is returned.

Prototype

int **SpindleSlaveModeDisable**(

int SocketID,

char * GroupName

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Spindle group name.

Output parameters

None.

Return (In addition to the results of "Input Tests Common to all XPS Functions")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.
- -19: GroupName doesn't exist or unknown command.
- -22: Not allowed action.

7.2.1.352 SpindleSlaveModeEnable

Name

SpindleSlaveModeEnable – Enables the slave-master mode.

Input tests

- Refer to section 7.1: “Input Tests Common to all XPS Functions”.
- Checks the group type (must be a Spindle group): (-8)
- Checks the positioner name: (-18)
- Checks the group name: (-19)
- Group state must be "READY”: (-22)
- Checks the slave parameters (must be configured): (-41)

Description

This function enables the master-slave mode only if the slave group is in ready mode. In this mode the slave must be defined as a Spindle group and the master can be a positioner from any group.

To use this function, the Spindle group must be in the READY state. If it’s not the case then (-22) error is returned.

To use this function, the master positioner and the slave ratio must be configured with the “SpindleSlaveParametersSet” function. If it’s not the case then (-41) error is returned.

Prototype

int **SpindleSlaveModeEnable**(

int SocketID,

char * GroupName

)

Input parameters

SocketID	int	Socket identifier gets by the “TCP_ConnectToServer” function.
GroupName	char *	Spindle group name.

Output parameters

None.

Return (In addition to the results of “Input Tests Common to all XPS Functions”)

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.
- -19: GroupName doesn't exist or unknown command.
- -22: Not allowed action.
- -41: Slave-master mode not configured.

7.2.1.353 SpindleSlaveParametersGet

Name

SpindleSlaveParametersGet – Gets the spindle slave parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the group type (must be a Spindle group): (-8)
- Checks the positioner name: (-18)
- Checks the slave parameters (must be configured): (-22)

Description

This function returns the slave parameters: the master positioner name and the master-slave ratio.

Prototype

int **SpindleSlaveParametersGet**(

int SocketID,

char * GroupName,

int NbPositioners,

char * MasterPositionerName ,

double * Ratio

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Spindle group name.

Output parameters

MasterPositionerName	char *	Master positioner name from	any group.
Ratio	double *	Gear ratio between the master	and the slave.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.
- -19: GroupName doesn't exist or unknown command.
- -22: Not allowed action.

7.2.1.354 SpindleSlaveParametersSet

Name

SpindleSlaveParametersSet – Sets the spindle slave parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the master group type: (-8)
- Checks the ratio value (Ratio >0): (-17)
- Checks the master positioner name: (-18)
- Checks the slave parameters (must be configured): (-22)
- Checks the base velocity value (must be null): (-48)

Description

This function configures the slave parameters only for a Spindle group.

The slave is a master copy and a ratio can be applied: Slave = Ratio * Master.

The slave-master mode is activated only after calling of "SingleAxisSlaveModeEnable" function.

The master can be a positioner from a spindle group only. If the master group is another group type then (-22) error is returned. The master positioner must be different from the slave positioner else (-8) error is returned.

NOTE

After an emergency stop, the master group and the slave group are in "NOTINIT" state. To restart a master-slave relation, the slave group(s) must be reinitialized before the master group.

Prototype

int **SpindleSlaveParametersSet**(

int SocketID,

char * GroupName,

int NbPositioners,

char * MasterPositionerName ,

double * Ratio

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Spindle group name.
MasterPositionerName	char *	Master positioner name from any group.
Ratio	double	Gear ratio between the master and the slave.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -18: Positioner Name doesn't exist or unknown command.
- -19: GroupName doesn't exist or unknown command.
- -22: Not allowed action.
- -48: BaseVelocity must be null.

7.2.1.355 TCLScriptExecute

Name

TCLScriptExecute – Executes a TCL script.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks TCL file name: (-36)
- Checks TCL interpretor (task loading): (-37)
- Checks task name: (-47)

Description

This function executes a TCL script. The TCL script file must be saved in the folder "..\Public\Scripts" of the XPS controller.

- *TaskName* is a user designation for the TCL script being executed. If two TCL scripts are executed at the same time with the same task name, The (-47) error is returned because having the same TaskName is not allowed.
- *InputArguments* represents the input arguments of the TCL script to be executed. The number of these input arguments is not limited but the string length is limited to 250 characters. The argument separator is a comma.

Prototype

```
int TCLScriptExecute(
    int SocketID,
    char * TCLFileName,
    char * TaskName,
    char * InputArguments
    )
```

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
TCLFileName	char *	File name contains the TCL script.
TaskName	char *	Task name.
InputArguments	char *	Input argument string (separator is a comma).

Output parameters

None.

Return (In addition to the results of "Input Tests Common to all XPS Functions")

- 0: No error.
- -36: Unknown TCL file.
- -37: TCL interpretor does not run.
- -47: Wrong TCL task name: each TCL task name must be different.

7.2.1.356 TCLScriptExecuteAndWait

Name

TCLScriptExecuteAndWait – Executes a TCL script and waits until the end of execution.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks TCL file name: (-36)
- Checks TCL interpretor (task loading): (-37)
- Checks task name: (-47)

Description

This function executes a TCL program. The "TCLScriptExecuteAndWait" function is different than the "TCLScriptExecute" function because it blocks the socket until the script teminates. The TCL script file must be saved in the folder "..\Public\Scripts" of the XPS controller. The file extension is ".tcl".

- *TaskName* is a user designation for the TCL script in execution. If two TCL scripts are executed at the same time with the same task name, The (-47) error is returned because having the same TaskName is not allowed.
- *InputArguments* represents the input arguments of the TCL script to be executed. The number of these input arguments is not limited but the string length is limited to 250 characters. The argument separator is a comma.
- *OutputArguments* represents the output arguments of the TCL script to be executed. The number of these output arguments is not limited but the string length is limited to 250 characters. The argument separator is a comma.

Prototype

int **TCLScriptExecuteAndWait**(

int SocketID,

char * TCLFileName,

char * TaskName,

char * InputArguments,

char * OutputArguments

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
TCLFileName	char *	File name contains the TCL script.
TaskName	char *	Task name.
InputArguments	char *	Input argument string (separator is a comma).

Output parameters

OutputArguments	char *	Output argument string (separator is a comma).

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -36: Unknown TCL file.
- -37: TCL interpretor doesn't run.
- -47: Wrong TCL task name: each TCL task name must be different.

7.2.1.357 TCLScriptExecuteWithPriority

Name

TCLScriptExecuteWithPriority – Executes a TCL script with TCL task given priority.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Priority mnemonic incorrect: (-17)
- Checks TCL file name: (-36)
- Checks TCL interpretor (task loading): (-37)
- Checks task name: (-47)

Description

This function executes a TCL script with a TCL task and a user-defined priority level. The TCL script file must be saved in the folder "..\Public\Scripts" of the XPS controller.

- *TaskName* is a user designation for the TCL script in execution. If two TCL scripts are executed at the same time with the same task name, The (-47) error is returned because having the same TaskName is not allowed.
- *InputArguments* represents the input arguments to the TCL script to be executed. The number of these input arguments is not limited but the string length is limited to 250 characters. The argument separator is a comma.
- *PriorityLevel* has three possible values: "HIGH", "MEDIUM" and "LOW", with the order being HIGH >MEDIUM >LOW.

Prototype

int **TCLScriptExecuteWithPriority**(

int SocketID,

char * TCLFileName,

char * TaskName,

char * Priority,

char * InputArguments

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
TCLFileName	char *	File name contains the TCL script.
TaskName	char *	Task name.
Priority	char *	TCL task priority (HIGH, MEDIUM or LOW).
InputArguments	char *	Input argument string (separator is a comma).

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -17: Parameter out of range or incorrect.
- -36: Unknown TCL file.
- -37: TCL interpretor doesn't run.
- -47: Wrong TCL task name: each TCL task name must be different.

7.2.1.358 TCLScriptKill

Name

TCLScriptKill – Kills a TCL script.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks semaphore to use the TCL interpretor: (-37)
- Checks TCL interpretor (task loading) and task name: (-38)

Description

This function kills a running TCL script selected using its task name. The task name is a user designation for the TCL script in execution.

NOTE

For the boot script, the task name is "BootScript".

Prototype

```
int TCLScriptKill(
    int SocketID,
    char * TaskName
    )
```

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
TaskName	char *	Task name.

Output parameters

None.

Return (In addition to the results of "Input Tests Common to all XPS Functions")

- 0: No error.
- -37: TCL interpretor doesn't run.
- -38: TCL script can not be killed: Wrong task name or task does not run.
- -47: Wrong TCL task name: each TCL task name must be different.

7.2.1.359 TCLScriptKillAll

Name

TCLScriptKillAll – Kills all running TCL scripts.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks TCL interpretor (task loading) and task name: (-38)

Description

This function kills all running TCL scripts.

Prototype

int **TCLScriptKillAll**(

int SocketID

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -38: TCL script can not be killed: Wrong task name or task does not run.

7.2.1.360 TCLScriptRunningListGet

Name

TCLScriptRunningListGet– Gets the list of all TCL processes in progress.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".

Description

This function returns the task name's list of all TCL scripts in progression.

Prototype

int **TCLScriptRunningListGet**(

int SocketID,

char * TCLScriptsList

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.

Output parameters

TCLScriptsList	char *	List of TCL scripts in progression.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.

7.2.1.361 TCP_CloseSocket

Name

TCP_CloseSocket – Closes a socket.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks socket identifier (Max = 100).
- Socket must be used.

Description

Closed the opened TCP/IP communication defined by the given socket identifier. If the socket is undefined or is not used, then nothing happens.

Prototype

void **TCP_CloseSocket**(

int SocketID

)

Input parameters

SocketID	int	Socket identifier used in each function.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

None.

7.2.1.362 TCP_ConnectToServer

Name

TCP_ConnectToServer – Sets TCP/IP communication and opens a socket.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks number of used sockets (Max = 100): if no free socket then the SocketID is set to -1.

Description

Configures the TCP/IP communication and opens a socket to connect TCP server.

This function returns a socket identifier to use for each function call. The socket identifier is defined between 0 to 99. If the TCP/IP connection failed then the "SocketID" value is –1.

NOTE

OpenConnection function is used when users are in local mode, it only needs the timeout and socket number to open the connection with the XPS controller. TCP_ConnectToServer function needs more information like the port number and the IP address. This function is called with the DLL.

Prototype

int **TCP_ConnectToServer**(

char * IP_Address,

int IP_Port,

double TimeOut

)

Input parameters

IP_Address	char *	TCP IP address: 195.168.33.xxx or another.
IP_Port	int	TCP IP port: 5001 for XPS controller.
TimeOut	double	Timeout in seconds used for each.

function execution.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

SocketID	int	Socket identifier used in each function.

7.2.1.363 TCP_GetError

Name

TCP_GetError – Gets the last error about socket.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks socket identifier (Max = 100).
- Socket must be used.

Description

Gets the last error from the socket defined by the given socket identifier. If the socket is undefined or is not used, the error description is blank.

Prototype

```
int TCP_GetError(
    int SocketID,
    char * ErrorString
    )
```

Input parameters

SocketID	int	Socket identifier used in each function.

Output parameters

ErrorString	char *	Last error description.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

None.

7.2.1.364 TCP_SetTimeout

Name

TCP_SetTimeout – Sets the timeout for TCP/IP communication.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks number of used sockets (Maximum number = 100).
- Socket must be used.
- Timeout value must be positive.

Description

Sets a new timeout value in seconds for the opened TCP/IP communication defined by a socket identifier.

If the timeout is less than 0.001, the timeout value defaults to 0.001.

If the socket is undefined or is not used then nothing happens.

Prototype

int **TCP_SetTimeout**(

int SocketID,

double Timout

)

Input parameters

SocketID	int	Socket identifier used in each function.
Timeout	double	Timeout in seconds used for each function execution.

Output parameters

None.

Return (In addition to the results of "Input Tests Common to all XPS Functions")

None.

7.2.1.365 TimerGet

Name

TimerGet – Gets the number of frequency ticks for the selected timer.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".

Description

This function returns the number of frequency ticks configured for the selected timer.

The "TimerName" can be defined as:

- Timer1
- Timer2
- Timer3
- Timer4
- Timer5

The "FrequencyTicks" defines the frequency of the timer:

One frequency tick represents a corrector period = >0.125 ms = >8 khz

N frequency ticks represents N corrector periods = >N * 0.125 ms = > $\frac{8}{N}$ kHz

NOTE

"FrequencyTicks" = 0 means that the timer is disabled.

Prototype

```
int TimerGet(
    int SocketID,
    char * TimerName,
    int * FrequencyTicks
    )
```

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
TimerName	char *	Name of timer.

Output parameters

FrequecyTicks	int *	Number of frequency ticks.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.

7.2.1.366 TimerSet

Name

TimerSet – Sets the number of frequency ticks for the selected timer.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".

Description

This function sets the number of frequency ticks for the selected timer to activate it.

The "TimerName" can be defined as:

- Timer1
- Timer2
- Timer3
- Timer4
- Timer5

The "FrequencyTicks" allows to defined the frequency of the timer:

One frequency tick represents a corrector period = >0.125 ms = >8 khz

N frequency ticks represents N corrector periods = >N * 0.125 ms = > $\frac{8}{N}$ kHz

NOTE

"FrequencyTicks" = 0 means that the timer is disabled.

Prototype

int **TimerSet**(
int SocketID,
char * TimerName,
int FrequencyTicks
)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
TimerName	char *	Name of timer.
FrequecyTicks	int	Number of frequency ticks.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.

7.2.1.367 TZEncoderCouplingMatrixGet [Extended]

Name

TZEncoderCouplingMatrixGet – Gets TZ encoder coupling matrix parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the group name: (-19)

Description

This function gets the parameters of encoder coupling matrix for the TZ group.

TZ encoder coupling matrix:

[Param1	Param2	Param3]
[Param4	Param5	Param6]
[Param7	Param8	Param9]

This API is reserved to TZ group only.

Prototype

```
int TZEncoderCouplingMatrixGet(
    int SocketID,
    char GroupName[250],
    double * Param1,
    double * Param2,
    double * Param3,
    double * Param4,
    double * Param5,
    double * Param6,
    double * Param7,
    double * Param8,
    double * Param9
    )
```

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.

Output parameters

Param1	double *	Encoder coupling matrix coefficient.
Param2	double *	Encoder coupling matrix coefficient.
Param3	double *	Encoder coupling matrix coefficient.
Param4	double *	Encoder coupling matrix coefficient.
Param5	double *	Encoder coupling matrix coefficient.
Param6	double *	Encoder coupling matrix coefficient.
Param7	double *	Encoder coupling matrix coefficient.
Param8	double *	Encoder coupling matrix coefficient.
Param9	double *	Encoder coupling matrix coefficient.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -19: GroupName doesn't exist or unknown command.

7.2.1.368 TZEncoderCouplingMatrixSet [Extended]

Name

TZEncoderCouplingMatrixSet – Sets TZ encoder coupling matrix parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the group name: (-19)

Description

This function configures the parameters of encoder coupling matrix for the TZ group.

The values are set in the decoupling matrix in the following order:

[Param1 Param2 Param3]
[Param4 Param5 Param6]
[Param7 Param8 Param9]

This API is reserved to TZ group only.

Prototype

```
int TZEncoderCouplingMatrixSet(
    int SocketID,
    char GroupName[250],
    double Param1,
    double Param2,
    double Param3,
    double Param4,
    double Param5,
    double Param6,
    double Param7,
    double Param8,
    double Param9
    )
```

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.
Param1	double	Encoder coupling matrix coefficient.
Param2	double	Encoder coupling matrix coefficient.
Param3	double	Encoder coupling matrix coefficient.
Param4	double	Encoder coupling matrix coefficient.
Param5	double	Encoder coupling matrix coefficient.
Param6	double	Encoder coupling matrix coefficient.
Param7	double	Encoder coupling matrix coefficient.
Param8	double	Encoder coupling matrix coefficient.
Param9	double	Encoder coupling matrix coefficient.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -19: GroupName doesn't exist or unknown command.

7.2.1.369 TZEncoderCouplingModeGet [Extended]

Name

TZEncoderCouplingModeGet – Gets TZ encoder coupling mode.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the group name: (-19)

Description

This function gets the current state of encoder coupling mode (1=Enabled, 0=Disabled).

This API is reserved to TZ group only.

Prototype

int **TZEncoderCouplingModeGet**(

int SocketID,

char GroupName[250],

int * Mode

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.

Output parameters

Mode	int *	Encoder coupling mode.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -19: GroupName doesn't exist or unknown command.

7.2.1.370 TZEncoderCouplingModeSet [Extended]

Name

TZEncoderCouplingModeSet – Sets TZ encoder coupling mode.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the group name: (-19)

Description

This function configures the mode of encoder coupling.

The values for Mode to set are : 1 (Enabled) or 0 (Disabled).

This API is reserved to TZ group only.

Prototype

int **TZEncoderCouplingModeSet**(

int SocketID,

char GroupName[250],

int Mode

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.
Mode	int	Encoder coupling mode.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -19: GroupName doesn't exist or unknown command.

7.2.1.371 TZFocusModeDisable [Extended]

Name

TZFocusModeDisable – Disables the TZ group from out of the FOCUS state.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the group type (must be a TZ group): (-8)
- Checks the positioner name: (-18)
- Checks the group name: (-19)
- Group state must be "READY": (-22)

Description

This function disables the FOCUS mode of a TZ group. If it executes the group quits FOCUS state and goes into READY state.

To use this function, The group must be in a FOCUS state. If not then (-22) error is returned.

Prototype

int **TZFocusModeDisable**(

int SocketID,

char * GroupName

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	TZ group name.

Output parameters

None.

Return (In addition to the results of "Input Tests Common to all XPS Functions")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.
- -19: GroupName doesn't exist or unknown command.
- -22: Not allowed action.

7.2.1.372 TZFocusModeEnable [Extended]

Name

TZFocusModeEnable – Enables the TZ group to go in FOCUS state.

Input tests

- Refer to section 7.1: “Input Tests Common to all XPS Functions”.
- Checks the group type (must be a TZ group): (-8)
- Checks the positioner name: (-18)
- Checks the group name: (-19)
- Group state must be "READY”: (-22)

Description

This function enables the focus mode for the TZ group.

To use this function, The TZ group must be in READY state. If it’s not then (-22) error is returned.

Prototype

int **TZFocusModeEnable**(

int SocketID,

char * GroupName

)

Input parameters

SocketID	int	Socket identifier gets by the “TCP_ConnectToServer” function.
GroupName	char *	TZ group name.

Output parameters

None.

Return (In addition to the results of “**Input Tests Common to all XPS Functions**”)

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.
- -19: GroupName doesn't exist or unknown command.
- -22: Not allowed action.

7.2.1.373 TZMappingModeGet [Extended]

Name

TZMappingModeGet – Gets TZ mapping mode.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the group type (must be a TZ group): (-8)
- Checks the group name: (-19)

Description

This function gets the current state of TZ mapping mode (1=Enabled, 0=Disabled).

This API is reserved to TZ group only.

Prototype

int **TZMappingModeGet**(

int SocketID,

char * GroupName,

int * Mode

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	TZ group name.

Output parameters

Mode	int *	TZ mapping mode state.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -19: GroupName doesn't exist or unknown command.

7.2.1.374 TZMappingModeSet [Extended]

Name

TZMappingModeSet – Sets TZ mapping mode.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the group type (must be a TZ group): (-8)
- Checks the group name: (-19)
- Checks if TZMapping feature is enabled in *system.ini*: (-121)
- Group state must be "NOTINIT": (-140)

Description

This function configures the mode of TZ mapping.

The values for Mode to set : 1 (Enabled) or 0 (Disabled).

This API is reserved to TZ group only.

Prototype

int **TZMappingModeSet**(

int SocketID,

char * GroupName,

int Mode

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	TZ group name.
Mode	int	TZ mapping mode.

Output parameters

None.

Return (In addition to the results of "Input Tests Common to all XPS Functions")

- 0: No error.
- -8: Wrong object type for this command.
- -19: GroupName doesn't exist or unknown command.
- -121: Function is not allowed due to configuration disabled.
- -140: Function is only allowed in NOTINIT state.

7.2.1.375 TZMotorDecouplingMatrixGet [Extended]

Name

TZMotorDecouplingMatrixGet – Gets TZ motor decoupling matrix parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the group name: (-19)

Description

This function gets the parameters of motor decoupling matrix for the TZ group.

TZ motor decoupling matrix:

[Param1 Param2 Param3]
[Param4 Param5 Param6]
[Param7 Param8 Param9]

This API is reserved to TZ group only.

Prototype

```
int TZMotorDecouplingMatrixGet(
    int SocketID,
    char GroupName[250],
    double * Param1,
    double * Param2,
    double * Param3,
    double * Param4,
    double * Param5,
    double * Param6,
    double * Param7,
    double * Param8,
    double * Param9
    )
```

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.

Output parameters

Param1	double *	Motor decoupling matrix coefficient.
Param2	double *	Motor decoupling matrix coefficient.
Param3	double *	Motor decoupling matrix coefficient.
Param4	double *	Motor decoupling matrix coefficient.
Param5	double *	Motor decoupling matrix coefficient.
Param6	double *	Motor decoupling matrix coefficient.
Param7	double *	Motor decoupling matrix coefficient.
Param8	double *	Motor decoupling matrix coefficient.
Param9	double *	Motor decoupling matrix coefficient.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -19: GroupName doesn't exist or unknown command.

7.2.1.376 TZMotorDecouplingMatrixSet [Extended]

Name

TZMotorDecouplingMatrixSet – Sets TZ motor decoupling matrix parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the group name: (-19)

Description

This function configures the parameters of motor decoupling matrix for the TZ group.

The values are set in the decoupling matrix in the following order:

[Param1 Param2 Param3]
[Param4 Param5 Param6]
[Param7 Param8 Param9]

This API is reserved to TZ group only.

Prototype

```
int TZMotorDecouplingMatrixSet(
    int SocketID,
    char GroupName[250],
    double Param1,
    double Param2,
    double Param3,
    double Param4,
    double Param5,
    double Param6,
    double Param7,
    double Param8,
    double Param9
    )
```

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.
Param1	double	Motor decoupling matrix coefficient.
Param2	double	Motor decoupling matrix coefficient.
Param3	double	Motor decoupling matrix coefficient.
Param4	double	Motor decoupling matrix coefficient.
Param5	double	Motor decoupling matrix coefficient.
Param6	double	Motor decoupling matrix coefficient.
Param7	double	Motor decoupling matrix coefficient.
Param8	double	Motor decoupling matrix coefficient.
Param9	double	Motor decoupling matrix coefficient.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -19: GroupName doesn't exist or unknown command.

7.2.1.377 TZMotorDecouplingModeGet [Extended]

Name

TZMotorDecouplingModeGet – Gets TZ motor decoupling mode.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the group name: (-19)

Description

This function gets the current state of motor decoupling mode (1=Enabled, 0=Disabled).

This API is reserved to TZ group only.

Prototype

int **TZMotorDecouplingModeGet**(

int SocketID,

char GroupName[250],

int * Mode

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.

Output parameters

Mode	int *	Motor decoupling mode.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -19: GroupName doesn't exist or unknown command.

7.2.1.378 TZMotorDecouplingModeSet [Extended]

Name

TZMotorDecouplingModeSet – Sets TZ motor decoupling mode.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the group name: (-19)

Description

This function configures the mode of motor decoupling.

The values for Mode to set are : 1 (Enabled) or 0 (Disabled).

This API is reserved to TZ group only.

Prototype

int **TZMotorDecouplingModeSet**(

int SocketID,

char GroupName[250],

int Mode

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.
Mode	int	Motor decoupling mode.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -19: GroupName doesn't exist or unknown command.

7.2.1.379 TZPTExecution [Extended]

Name

TZPTExecution – Executes a PT trajectory.

Input tests

- Refer to section 7.1: “Input Tests Common to all XPS Functions”.
- Checks trajectory file name length: (-3)
- Checks group type (must be a TZ group): (-8)
- Checks input value (number of executions must >0): (-17)
- Checks group name: (-19)
- Group state must be "READY”: (-22)
- Not available in this configuration (PrecisionPlatform firmware only): (-24)
- Checks backlash (must not be enabled): (-46)
- Checks BaseVelocity (stages.ini, must = 0): (-48)
- Checks trajectory file existence or file reading: (-61)
- Checks message queue: (-71)

Description

This function executes a PT (Position Time) trajectory. The trajectory file must be stored in the folder “\Admin\Public\Trajectory” of the XPS controller. If the trajectory cannot be initialized (message queue or task error) then (-72) is returned.

Before a trajectory execution, it is recommended to check whether the trajectory is within the positioner motion capabilities by using “TZPTVerification” and “TZPTVerificationResultGet” functions.

During the trajectory execution, if a positioner reaches one of travel limits, the trajectory execution will stop and the (-25) error is generated in the positioner errors.

NOTE

In case of an (-33) error, an (-25) error or (-44) error, the group state becomes DISABLE. To help determine the error source, check the positioner errors, the hardware status and the driver status.

This function can be used only with the XPS-Q Precision Platform controller.

Prototype

int **TZPTExecution**(

int SocketID,

char GroupName[250],

char FileName[250],

int ExecutionNumber

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.
FileName	char *	Trajectory file name.
ExecutionNumber	int	Number of trajectory executions.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -3: String too long.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -19: Group name doesn't exist or unknown command.
- -22: Not allowed action.
- -24: Not available in this configuration.
- -25: Following Error.
- -33: Motion done timeout.
- -44: Slave error disabling master.
- -46: Not allowed action due to backlash.
- -48: BaseVelocity must be null.
- -61: Error file corrupt or file doesn't exist.
- -71: Error read from or write in message queue.
- -72: Error trajectory initialization.

7.2.1.380 TZPTLoadToMemory [Extended]

Name

TZPTLoadToMemory – Loads some lines of PT trajectory to the controller memory.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks trajectory data (data length must >0 and ≤400): (-3) or (-17)
- Checks group type (must be a TZ group): (-8)
- Checks group name: (-19)
- Not available in this configuration (PrecisionPlatform firmware only): (-24)

Description

This function loads some lines of PT trajectory into XPS controller memory. Each trajectory element must be separated by a comma. The trajectory lines are separated between them by a "\n" (LF) character. To verify or to execute the PT trajectory loaded in memory, use the string "**FromMemory**" instead of a file name.

NOTE

All of the PT functions, when called with the string "FromMemory" instead of a FileName, will perform the same operation as the PT trajectory in RAM as it does from a disk.

Example:

TZPTLoadToMemory(socketId,myGroup,"dT1,dX11,dX12,dX13\n…dTn,dXn1,dXn2,dXn3\n")

TZPTVerification (socketId,myGroup,FromMemory)

TZPTExecution(socketId,myGroup,FromMemory,1).

Prototype

int **TZPTLoadToMemory**(
int SocketID,
char GroupName[250],
char TrajectoryData[400]
)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.
TrajectoryData	char *	Trajectory data lines.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -3: String too long.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -19: Group name doesn't exist or unknown command.
- -24: Not available in this configuration.

7.2.1.381 TZPTParametersGet [Extended]

Name

TZPTParametersGet – Gets PT trajectory parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks group type (must be a TZ group): (-8)
- Checks group name: (-19)
- Checks current executing trajectory type (must be PT): (-22)
- Not available in this configuration (PrecisionPlatform firmware only): (-24)

Description

This function returns the PT trajectory parameters (trajectory name and current executing element number) of the current PT trajectory.

Prototype

int **TZPTParametersGet**(

int SocketID,

char GroupName[250],

char * FileName,

int * CurrentElementNumber

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.

Output parameters

FileName	char *	Currently executing trajectory file name.
CurrentElementNumber	int *	Currently executing element number.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -19: Group name doesn't exist or unknown command.
- -22: Not allowed action.
- -24: Not available in this configuration.

7.2.1.382 TZPTPulseOutputGet [Extended]

Name

TZPTPulseOutputGet – Gets the configuration of pulse generation of a PT trajectory.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks group type (must be a TZ group): (-8)
- Checks group name: (-19)
- Not available in this configuration (PrecisionPlatform firmware only): (-24)

Description

This function returns the last configuration of pulse generation of a PT trajectory, that was previously set by *TZPTPulseOutputSet().*

The pulse output configuration is defined with a start element, an end element, and a time interval in seconds.

Example:

TZPTPulseOutputSet(MyGroup, 3, 5, 0.01)

TZPTPulseOutputGet(MyGroup) => 0,3,5,0.01 (0 is error return, means OK)

One pulse will be generated every 10 ms between the start of the 3rd element and the end of the 5th element.

Start element= 3

End element = 5

Time interval = 0.01 seconds.

Prototype

```
int TZPTPulseOutputGet(
    int SocketID,
    char GroupName[250],
    int * StartElement,
    int * EndElement,
    double * TimeInterval
    )
```

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.

Output parameters

StartElement	int *	Start pulse element number.
EndElement	int *	End pulse element number.
TimeInterval	double *	Time interval between pulses (seconds).

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -19: Group name doesn't exist or unknown command.
- -24: Not available in this configuration.

7.2.1.383 TZPTPulseOutputSet [Extended]

Name

TZPTPulseOutputSet – Sets the configuration of pulse generation of a PT trajectory.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks group type (must be a TZ group): (-8)
- Checks group name: (-19)
- Checks the pulse generation must not be in progress: (-22)
- Not available in this configuration (PrecisionPlatform firmware only): (-24)

Description

This function configures and activates the pulse generation of a PT trajectory. The pulse generation is defined by a start element, an end element, and a time interval in seconds. If a pulse generation is already activated on the selected PT trajectory then this function returns -22 ("Not allowed action") error.

Please note that the pulse output settings are automatically removed when the trajectory is over. Hence, with the execution of every new trajectory, it is required to define the pulse output settings again.

This capability allows output of pulses at constant time intervals on a PT trajectory. The pulses are generated between the first and the last trajectory element. The minimum possible time interval is CorrectorISRPeriod value (*system.ref*).

The trajectory pulses are generated on the following GPIO ouputs:

GPIO signals	ISA XPS controller	PCI XPS controller (for example XPS-RL) with basic GPIO board	PCI XPS controller (for example XPS-RL) with extended GPIO board
Window	GPIO2, pin 11	GPIO1.DO6	GPIO5.DO14
Pulses	GPIO2, pin 12	GPIO1.DO7	GPIO5.DO15

Example:

TZPTPulseOutputSet(Group1, 3, 5, 0.01)

One pulse will be generated every 10 ms between the start of the 3rd element and the end of the 5th element.

Prototype

int **TZPTPulseOutputSet**(

int SocketID,

char GroupName[250],

int StartElement,

int EndElement,

double TimeInterval

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.
StartElement	int	Start pulse element number.
EndElement	int	End pulse element number.
TimeInterval	double	Time interval between pulses (seconds).

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -19: Group name doesn't exist or unknown command.
- -22: Not allowed action.
- -24: Not available in this configuration.

7.2.1.384 TZPTResetInMemory [Extended]

Name

TZPTResetInMemory – Deletes the content of the PT trajectory buffer in the controller memory.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks group type (must be a TZ group): (-8)
- Checks group name: (-19)
- Not available in this configuration (PrecisionPlatform firmware only): (-24)

Description

This function deletes the PT trajectory buffer in the controller memory, that was previously loaded with the "TZPTLoadToMemory" function.

Prototype

int **TZPTResetInMemory**(

int SocketID,

char GroupName[250]

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -3: String too long.
- -8: Wrong object type for this command.
- -19: Group name doesn't exist or unknown command.
- -24: Not available in this configuration.

7.2.1.385 TZPTVerification [Extended]

Name

TZPTVerification – Checks a PT trajectory data file.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks trajectory file name length (must ≤250): (-3)
- Checks group type (must be a TZ group): (-8)
- Checks group name: (-19)
- Not available in this configuration (PrecisionPlatform firmware only): (-24)
- Checks BaseVelocity value (must = 0): (-48)
- Checks trajectory file existence and the file format: (-61)
- Checks trajectory (number of elements must >0): (-66)
- Checks velocity (Minimum Velocity ≤Velocity ≤Maximum Velocity): (-68)
- Checks acceleration (Minimum acc. ≤acceleration ≤Maximum acc.): (-69)
- Checks end output velocity (must = 0): (-70)
- Checks delta time (DeltaTime must >0): (-75)

Description

This function verifies the execution of a PT trajectory. The results of the verification can be got with the "TZPTVerificationResultGet" function. The trajectory file must be stored in the folder "\ADMIN\Public\Trajectory" of the XPS controller. If the trajectory cannot be initialized (task error) then the (-72) error is returned.

This function can be executed at any time and is independent of the trajectory execution. It performs the following:

- Checks the trajectory file for data coherence.
- Calculates the trajectory limits, which are: the required travel per positioner, the maximum possible trajectory velocity and the maximum possible trajectory acceleration. This function helps define the parameters for the trajectory execution.
- The required travel values (MinimumPosition and MaximumPosition) are calculated relative to the position zero, not to the current position. So before executing a PT trajectory, the user must pay attention to the current position of the positioners to make sure that the trajectory will not exceed the positioner travel limits.
- If all is OK, it returns "SUCCESS" (0). Otherwise, it returns a corresponding error.

NOTE

Because of the PT trajectory algorythm for elements end velocity calculation, a correct PT trajectory file must have at least two lines with zero displacements at the trajectory end. Otherwise, the "TZPTVerification" function returns the (-70) error.

The "TZPTVerification" function is independent from the "TZPTExecution" function, but it is highly recommended to execute this function before executing a PT trajectory.

Prototype

int **TZPTVerification**(

int SocketID,
char GroupName[250],
char FileName[250]
)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.
FileName	char *	Trajectory file name.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -3: String too long.
- -8: Wrong object type for this command.
- -19: Group name doesn't exist or unknown command.
- -24: Not available in this configuration.
- -61: Error file corrupt or file doesn't exist.
- -66: Trajectory doesn't content any element.
- -68: Acceleration on trajectory is too big.
- -69: Acceleration on trajectory is too big.
- -70: Final velocity on trajectory is not zero.
- -72: Error trajectory initialization.
- -75: Trajectory element has a negative or null delta T.

7.2.1.386 TZPTVerificationResultGet_[Extended]

Name

TZPTVerificationResultGet – Gets the results of the "TZPTVerification" function.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks positioner name length (must ≤250): (-3)
- Checks positioner name: (-18)
- Checks the last TZ PTVerification (must be done): (-22)
- Not available in this configuration (PrecisionPlatform firmware only): (-24)

Description

This function returns the results of the previous "TZPTVerification" function, positioner by positioner. The results are the travel requirements (min and max values), the possible maximum velocity and the possible maximum acceleration.

If no verification was previously done then the (-22) error is returned.

Prototype

```
int TZPTVerificationResultGet(
    int SocketID,
    char PositionerName[250],
    char * TrajectoryFileName,
    double * MinimumPosition,
    double * MaximumPosition,
    double * MaximumVelocity,
    double * MaximumAcceleration
    )
```

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.

Output parameters

TrajectoryFileName	char *	Examined trajectory file name.
MinimumPosition	double *	Minimum position (units).
MaximumPosition	double *	Maximum position (units).
MaximumVelocity	double *	Maximum velocity (units/s).
MaximumAcceleration	double *	Maximum acceleration (units/s²).

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -3: String too long.
- -18: Positioner name doesn't exist or unknown command.
- -22: Not allowed action.
- -24: Not available in this configuration.

7.2.1.387 TZPVTExecution [Extended]

Name

TZPVTExecution – Executes a PVT trajectory.

Input tests

- Refer to section 7.1: “Input Tests Common to all XPS Functions”.
- Checks trajectory file name length: (-3)
- Checks group type (must be a TZ group): (-8)
- Checks input value (number of executions must >0): (-17)
- Checks group name: (-19)
- Group state must be "READY”: (-22)
- Not available in this configuration (PrecisionPlatform firmware only): (-24)
- Checks backlash (must not be enabled): (-46)
- Checks BaseVelocity (stages.ini, must = 0): (-48)
- Checks trajectory file existence or file reading: (-61)
- Checks message queue: (-71)

Description

This function executes a PVT (Position Velocity Time) trajectory. The trajectory file must be stored in the folder “\Admin\Public\Trajectory” of the XPS controller. If the trajectory cannot be initialized (message queue or task error) then (-72) is returned.

Before a trajectory execution, it is recommended to check whether the trajectory is within the positioner motion capabilities by using “TZPVTVerification” and “TZPVTVerificationResultGet” functions.

During the trajectory execution, if a positioner reaches one of travel limits, the trajectory execution will stop and the (-25) error is generated in the positioner errors.

NOTES

In case of (-33) error, (-25) error or (-44) error, the group state becomes DISABLE. To help determine the error source, check the positioner errors, the hardware status and the driver status.

Prototype

```
int TZPVTExecution(
    int SocketID,
    char GroupName[250],
    char FileName[250],
    int ExecutionNumber
    )
```

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.
FileName	char *	Trajectory file name.
ExecutionNumber	int	Number of trajectory executions.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -3: String too long.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -19: Group name doesn't exist or unknown command.
- -22: Not allowed action.
- -24: Not available in this configuration.
- -25: Following Error.
- -33: Motion done timeout.
- -44: Slave error disabling master.
- -46: Not allowed action due to backlash.
- -48: BaseVelocity must be null.
- -61: Error file corrupt or file doesn't exist.
- -71: Error read from or write in message queue.
- -72: Error trajectory initialization.

7.2.1.388 TZPVTLoadToMemory [Extended]

Name

TZPVTLoadToMemory – Load some lines of PVT trajectory to the controller memory.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks trajectory data (data length must >0 and ≤400): (-3) or (-17)
- Checks group type (must be a TZ group): (-8)
- Checks group name: (-19)
- Not available in this configuration (PrecisionPlatform firmware only): (-24)

Description

This function loads some lines of PVT trajectory into XPS controller memory. Each trajectory element must be separated by a comma. The trajectory lines are separated between them by a "\n" (LF) character. To verify or to execute the PVT trajectory loaded in memory, use the string "**FromMemory**" instead of a file name.

NOTES

All of the PVT functions, when called with the string "FromMemory" instead of a FileName, will perform the same operation as the PVT trajectory in RAM as it does from a disk.

Example:

TZPVTLoadToMemory(socketId,myGroup,"dT1,dX11,Vout11,dX12,Vout12, dX13,Vout13\n…dTn,dXn1,Voutn1,dXn2,Voutn2, dXn3,Voutn3\n")

TZPVTVerification (socketId,myGroup,FromMemory)

TZPVTExecution(socketId,myGroup,FromMemory,1).

Prototype

int **TZPVTLoadToMemory**(
int SocketID,
char GroupName[250],
char FileName[250],
char TrajectoryData[400]
)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.
TrajectoryData	char *	Trajectory data lines.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -3: String too long.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -19: Group name doesn't exist or unknown command.
- -24: Not available in this configuration.

7.2.1.389 TZPVTParametersGet [Extended]

Name

TZPVTParametersGet – Gets PVT trajectory parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks group type (must be a TZ group): (-8)
- Checks group name: (-19)
- Checks current executing trajectory type (must be PVT): (-22)
- Not available in this configuration (PrecisionPlatform firmware only): (-24)

Description

This function returns the PVT trajectory parameters (trajectory name and current executing element number) of the current PVT trajectory.

Prototype

int **TZPVTParametersGet**(

int SocketID,

char GroupName[250],

char * FileName,

int * CurrentElementNumber

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.

Output parameters

FileName	char *	Currently executing trajectory file name.
CurrentElementNumber	int *	Currently executing element number.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -19: Group name doesn't exist or unknown command.
- -22: Not allowed action.
- -24: Not available in this configuration.

7.2.1.390 TZPVTPulseOutputGet_[Extended]

Name

TZPVTPulseOutputGet – Gets the configuration of pulse generation of a PVT trajectory.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks group type (must be a TZ group): (-8)
- Checks group name: (-19)
- Not available in this configuration (PrecisionPlatform firmware only): (-24)

Description

This function returns the last configuration of pulse generation of a PVT trajectory, that was previously set by *TZPVTPulseOutputSet().*

The pulse output configuration is defined with a start element, an end element, and a time interval in seconds.

Example:

TZPVTPulseOutputSet(MyGroup, 3, 5, 0.01)

TZPVTPulseOutputGet(MyGroup) => 0,3,5,0.01 (0 is error return, means OK)

One pulse will be generated every 10 ms between the start of the 3rd element and the end of the 5th element.

Start element= 3

End element = 5

Time interval = 0.01 seconds.

Prototype

int **TZPVTPulseOutputGet**(

int SocketID,

char GroupName[250],

int * StartElement,

int * EndElement,

double * TimeInterval

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.

Output parameters

StartElement	int *	Start pulse element number.
EndElement	int *	End pulse element number.
TimeInterval	double *	Time interval between pulses (seconds).

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -19: Group name doesn't exist or unknown command.
- -24: Not available in this configuration.

7.2.1.391 TZPVTPulseOutputSet [Extended]

Name

TZPVTPulseOutputSet – Sets the configuration of pulse generation of a PVT trajectory.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks group type (must be a TZ group): (-8)
- Checks group name: (-19)
- Checks the pulse generation must not be in progress: (-22)
- Not available in this configuration (PrecisionPlatform firmware only): (-24)

Description

This function configures and activates the pulse generation of a PVT trajectory. The pulse generation is defined by a start element, an end element, and a time interval in seconds. If a pulse generation is already activated on the selected PVT trajectory then this function returns -22 ("Not allowed action") error.

Please note that the pulse output settings are automatically removed when the trajectory is over. Hence, with the execution of every new trajectory, it is required to define the pulse output settings again.

This capability allows output of pulses at constant time intervals on a PVT trajectory. The pulses are generated between the first and the last trajectory element. The minimum possible time interval is CorrectorISRPeriod value (*system.ref*).

The trajectory pulses are generated on the following GPIO ouputs:

GPIO signals	ISA XPS controller	PCI XPS controller (for example XPS-RL) with basic GPIO board	PCI XPS controller (for example XPS-RL) with extended GPIO board
Window	GPIO2, pin 11	GPIO1.DO6	GPIO5.DO14
Pulses	GPIO2, pin 12	GPIO1.DO7	GPIO5.DO15

To find the GPIO connector pin number from GPIOx.DOy, refer to XPS User's Manual, Appendix / General I/O Description.

Example:

TZPVTPulseOutputSet(Group1, 3, 5, 0.01)

One pulse will be generated every 10 ms between the start of the 3rd element and the end of the 5th element.

Prototype

int **TZPVTPulseOutputSet**(

int SocketID,

char GroupName[250],

int StartElement,

int EndElement,

double TimeInterval

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.
StartElement	int	Start pulse element number.
EndElement	int	End pulse element number.
TimeInterval	double	Time interval between pulses (seconds).

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -19: Group name doesn't exist or unknown command.
- -22: Not allowed action.
- -24: Not available in this configuration.

7.2.1.392 TZPVTResetInMemory [Extended]

Name

TZPVTResetInMemory – Deletes the content of the PVT trajectory buffer in the controller memory.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks group type (must be a TZ group): (-8)
- Checks group name: (-19)
- Not available in this configuration (PrecisionPlatform firmware only): (-24)

Description

This function deletes the PVT trajectory buffer in the controller memory, that was previously loaded with the "TZPVTLoadToMemory" function.

Prototype

int **TZPVTLoadToMemory**(
int SocketID,
char GroupName[250],
char FileName[250],
char TrajectoryData[400]
)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.
FileName	char *	Trajectory file name.
TrajectoryData	char *	Trajectory data lines.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -3: String too long.
- -8: Wrong object type for this command.
- -19: Group name doesn't exist or unknown command.
- -24: Not available in this configuration.

7.2.1.393 TZPVTVerification [Extended]

Name

TZPVTVerification – Checks a PVT trajectory data file.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks trajectory file name length (must ≤250): (-3)
- Checks group type (must be a TZ group): (-8)
- Checks group name: (-19)
- Not available in this configuration (PrecisionPlatform firmware only): (-24)
- Checks BaseVelocity value (must = 0): (-48)
- Checks trajectory file existence and the file format: (-61)
- Checks trajectory (number of elements must >0): (-66)
- Checks velocity (MinimumVelocity ≤ Velocity ≤ MaximumVelocity): (-68)
- Checks acceleration (MinimumAcc. ≤ acceleration ≤ MaximumAcc.): (-69)
- Checks end output velocity (must = 0): (-70)
- Checks delta time (DeltaTime must >0): (-75)

Description

This function verifies the execution of a PVT trajectory. The results of the verification can be got with the "TZPVTVerificationResultGet" function. The trajectory file must be stored in the folder "\ADMIN\Public\Trajectory" of the XPS controller. If the trajectory cannot be initialized (task error) then the (-72) error is returned.

This function can be executed at any time and is independent of the trajectory execution. It performs the following:

- Checks the trajectory file for data coherence.
- Calculates the trajectory limits, which are: the required travel per positioner, the maximum possible trajectory velocity and the maximum possible trajectory acceleration. This function helps define the parameters for the trajectory execution.
- The required travel values (MinimumPosition and MaximumPosition) are calculated relative to the position zero, not to the current position. So before executing a PVT trajectory, the user must pay attention to the current position of the positioners to make sure that the trajectory will not exceed the positioner travel limits.
- If all is OK, it returns "SUCCESS" (0). Otherwise, it returns a corresponding error.

NOTES

The "TZPVTVerification" function is independent from the "TZPVTExecution" function, but it is highly recommended to execute this function before executing a PVT trajectory.

This function can be used only with the XPS-Q Precision Platform controller.

Prototype

int **TZPVTVerification**(
int SocketID,
char GroupName[250],
char FileName[250]
)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.
FileName	char *	Trajectory file name.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -3: String too long.
- -8: Wrong object type for this command.
- -19: Group name doesn't exist or unknown command.
- -24: Not available in this configuration.
- -61: Error file corrupt or file doesn't exist.
- -66: Trajectory doesn't content any element.
- -68: Acceleration on trajectory is too big.
- -69: Acceleration on trajectory is too big.
- -70: Final velocity on trajectory is not zero.
- -72: Error trajectory initialization.
- -75: Trajectory element has a negative or null delta T.

7.2.1.394 TZPVTVerificationResultGet_[Extended]

Name

TZPVTVerificationResultGet – Gets the results of the "TZPVTVerification" function.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks positioner name length (must ≤250): (-3)
- Checks positioner name: (-18)
- Checks the last TZ PVTVerification (must be done): (-22)
- Not available in this configuration (PrecisionPlatform firmware only): (-24)

Description

This function returns the results of the previous "TZPVTVerification" function, positioner by positioner. The results are the travel requirements (min and max values), the possible maximum velocity and the possible maximum acceleration.

If no verification was previously done then the (-22) error is returned.

Prototype

int **TZPVTVerificationResultGet**(

char PositionerName[250],

char * TrajectoryFileName,

double * MinimumPosition,

double * MaximumPosition,

double * MaximumVelocity,

double * MaximumAcceleration

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.

Output parameters

TrajectoryFileName	char *	Examined trajectory file name.
MinimumPosition	double *	Minimum position (units).
MaximumPosition	double *	Maximum position (units).
MaximumVelocity	double *	Maximum velocity (units/s).
MaximumAcceleration	double *	Maximum acceleration (units/s²).

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -3: String too long.
- -18: Positioner name doesn't exist or unknown command.
- -22: Not allowed action.
- -24: Not available in this configuration.

7.2.1.395 TZTrackingCutOffFrequencyGet [Extended]

Name

TZTrackingCutOffFrequencyGet – Gets tracking cut-off frequency of TZ group.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the group type (must be a TZ group): (-8)
- Checks the group (must not be a positioner): (-19)

Description

This function gets the tracking cut-off frequency of each positioner of TZ group.

Prototype

int **TZTrackingCutOffFrequencyGet**(

int SocketID,

char * GroupName,

double * CutOffFrequency1,

double * CutOffFrequency2,

double * CutOffFrequency3

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function
GroupName	char *	TZ group name

Output parameters

CutOffFrequency1	double *	Positioner 1 cut-off frequency (Hz)
CutOffFrequency2	double *	Positioner 2 cut-off frequency (Hz)
CutOffFrequency3	double *	Positioner 3 cut-off frequency (Hz)

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -19: Group name doesn't exist or unknown command.

7.2.1.396 TZTrackingCutOffFrequencySet [Extended]

Name

TZTrackingCutOffFrequencySet – Sets tracking cut-off frequency of TZ group.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the group type (must be a TZ group): (-8)
- Value is out of range: (-17)
- Checks the group (must not be a positioner): (-19)

Description

This function sets the tracking cut-off frequency for each positioner of TZ group.

Prototype

int **TZTrackingCutOffFrequencySet**(
int SocketID,
char * GroupName,
double CutOffFrequency1,
double CutOffFrequency2,
double CutOffFrequency3
)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function
GroupName	char *	TZ group name
CutOffFrequency1	double	Positioner 1 cut-off frequency (Hz)
CutOffFrequency2	double	Positioner 2 cut-off frequency (Hz)
CutOffFrequency3	double	Positioner 3 cut-off frequency (Hz)

Output parameters

None.

Return (In addition to the results of "Input Tests Common to all XPS Functions")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -19: Group name doesn't exist or unknown command.

7.2.1.397 TZTrackingUserMaximumZZZTargetDifferenceGet_[Extended]

Name

TZTrackingUserMaximumZZZTargetDifferenceGet – Gets tracking maximum ZZZ target difference of TZ group.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the group type (must be a TZ group): (-8)
- Checks the group (must not be a positioner): (-19)

Description

This function gets the tracking maximum ZZZ target difference of TZ group.

Prototype

int **TZTrackingUserMaximumZZZTargetDifferenceGet**(

int SocketID,

char * GroupName,

double * UserMaximumZZZTargetDifference

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	TZ group name.

Output parameters

UserMaximumZZZTargetDifference	double *	User maximum ZZZ target difference (units).

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -19: Group name doesn't exist or unknown command.

7.2.1.398 TZTrackingUserMaximumZZZTargetDifferenceSet [Extended]

Name

TZTrackingUserMaximumZZZTargetDifferenceSet – Sets tracking maximum ZZZ target difference for a TZ group.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the group type (must be a TZ group): (-8)
- Value is out of range: (-17)
- Checks the group (must not be a positioner): (-19)

Description

This function sets the tracking maximum ZZZ target difference for a TZ group.

Prototype

int **TZTrackingUserMaximumZZZTargetDifferenceSet**(

int SocketID,

char * GroupName,

double * UserMaximumZZZTargetDifference

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	TZ group name.
UserMaximumZZZTargetDifference	double	User maximum ZZZ target difference (units).

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -19: GroupName doesn't exist or unknown command.

7.2.1.399 XYCrossTalkCompensationMotorDecouplingGet [Extended]

Name

XYCrossTalkCompensationMotorDecouplingGet – Gets motor decoupling parameters of XY cross talk compensation.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks if the cross talk compensation switch is disabled *(firmware.ref)*: (-121).

Description

This function returns the motor decoupling parameters of XY cross talk compensation.

Prototype

int **XYCrossTalkCompensationMotorDecouplingGet**(
int SocketID,
char *GroupName,
int *CrossTalkCompensationMode,
double *YToX1FFAccRatio,
double *YToX2FFAccRatio,
double *X1ToYFFAccRatio,
double *X2ToYFFAccRatio
)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.

Output parameters

CrossTalkCompensationMode	int *	XY cross talk compensation mode (Enabled or Disabled)
YToX1FFAccRatio	double *	Current Y to X1 feed forward acceleration ratio
YToX2FFAccRatio	double *	Current Y to X2 feed forward acceleration ratio
X1ToYFFAccRatio	double *	Current X1 to Y feed forward acceleration ratio
X2ToYFFAccRatio	double *	Current X2 to Y feed forward acceleration ratio

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -121: Function is not allowed due to configuration disabled

7.2.1.400 XYCrossTalkCompensationMotorDecouplingSet [Extended]

Name

XYCrossTalkCompensationMotorDecouplingSet – Sets motor decoupling parameters of XY cross talk compensation.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks if the cross talk compensation switch is disabled *(firmware.ref)*: (-121).
- Checks if the group is not in NOTINIT nor in DISABLE state: (-215).

Description

This function sets the motor decoupling parameters of XY cross talk compensation.

Prototype

int **XYCrossTalkCompensationMotorDecouplingSet**(

int SocketID,

char *GroupName,

int CrossTalkCompensationMode,

double YToX1FFAccRatio,

double YToX2FFAccRatio,

double X1ToYFFAccRatio,

double X2ToYFFAccRatio

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.
CrossTalkCompensationMode	int	XY cross talk compensation mode (Enabled or Disabled)
YToX1FFAccRatio	double	Current Y to X1 feed forward acceleration ratio
YToX2FFAccRatio	double	Current Y to X2 feed forward acceleration ratio
X1ToYFFAccRatio	double	Current X1 to Y feed forward acceleration ratio
X2ToYFFAccRatio	double	Current X2 to Y feed forward acceleration ratio

Output parameters

None.

Return (In addition to the results of "Input Tests Common to all XPS Functions")

- 0: No error.
- -121: Function is not allowed due to configuration disabled
- -215: Not allowed action because group is not in NOTINIT nor in DISABLE state.

7.2.1.401 XYGroupPositionCorrectedProfilerGet

Name

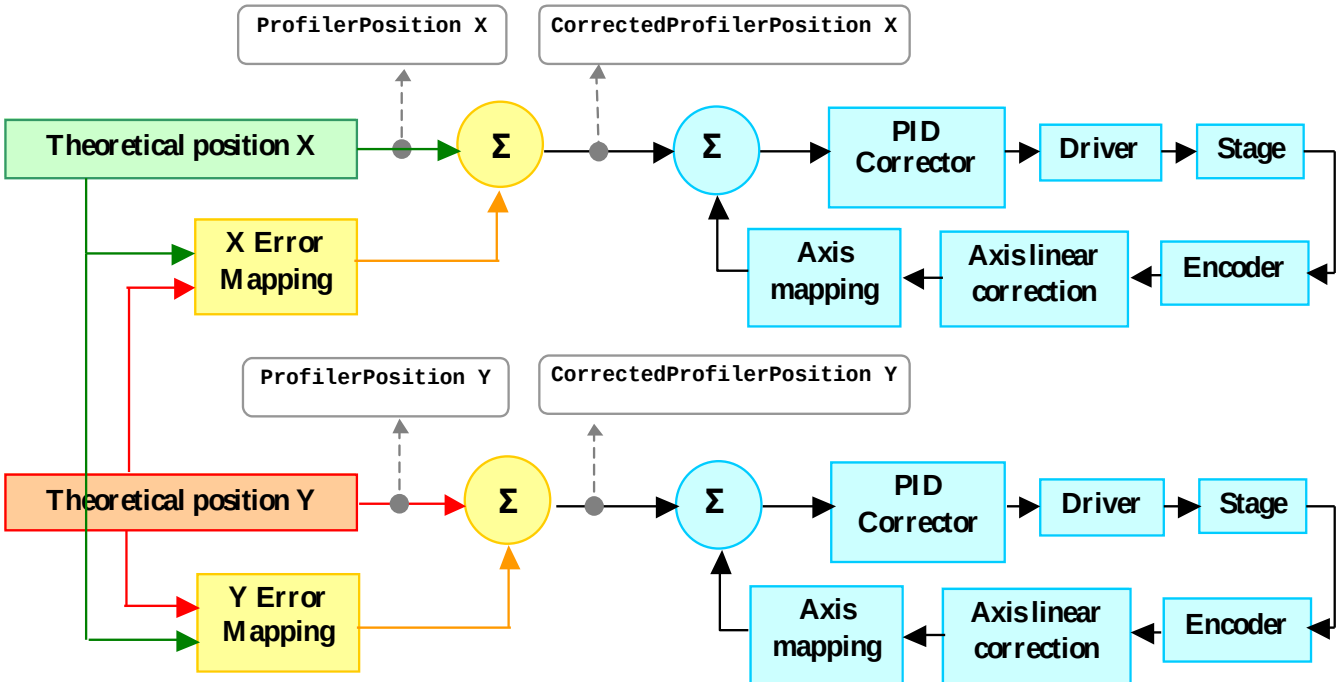
XYGroupPositionCorrectedProfilerGet – Gets the corrected profiler position for all positioners of an XY group.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Valids object type: (-8)
- Valids group type (must be an XY group): (-18)
- Invalid group name: (-19)

Description

This function gets the corrected position which is the theoretical position recalculated with the XY mapping correction.



This function applies the XY mapping on the theoretical user-defined positions and returns the corrected positions.

Prototype

int **XYGroupPositionCorrectedProfilerGet**(

int SocketID,

char * GroupName,

double PositionX,

double PositionY,

double * CorrectedPositionX,

double * CorrectedPositionY

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.
PositionX	double	Theoretical position X.
PositionY	double	Theoretical position Y.

Output parameters

CorrectedPositionX	double *	Corrected theoretical position X.
CorrectedPositionY	double *	Corrected theoretical position Y.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.
- -19: GroupName doesn't exist or unknown command.

7.2.1.402 XYGroupPositionPCORawEncoderGet

Name

XYGroupPositionPCORawEncoderGet – Gets the PCO raw encoder positions for an XY group.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Valids object type: (-8)
- Valids group type (must be an XY group): (-18)
- Invalid group name: (-19)

Description

This function returns the PCO raw encoder positions X and Y from the user specified positions X and Y.

Prototype

int **XYGroupPositionPCORawEncoderGet**(

int SocketID,

char * GroupName,

double PositionX,

double PositionY,

double * PCORawPositionX,

double * PCORawPositionY

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.
PositionX	double	User corrected position X.
PositionY	double	User corrected position Y.

Output parameters

PCORawPositionX	double *	PCO Raw position X.
PCORawPositionY	double *	PCO Raw position Y.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.
- -19: GroupName doesn't exist or unknown command.

7.2.1.403 XYLineArcExecution

Name

XYLineArcExecution – Executes a LineArc trajectory.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks trajectory file name length: (-3)
- Checks group type (must be a XY group): (-8)
- Checks input value (number of executions must >0): (-17)
- Checks input value (Velocity and Acceleration >0): (-17)
- Checks group name: (-19)
- Group state must be "READY": (-22)
- Checks backlash (must not be enabled): (-46)
- Checks BaseVelocity (stages.ini, must = 0): (-48)
- Checks trajectory file existence or file reading: (-61)
- Checks the velocity (Velocity must ≤TrajectoryMaximumVelocity): (-68)
- Checks the acceleration (Acceleration must ≤TrajectoryMaximumAcceleration): (-69)
- Checks message queue: (-71)

Description

This function executes a LineArc trajectory. The trajectory file must be stored in the folder "\Admin\Public\Trajectory" of the XPS controller. If the trajectory cannot be initialized (message queue or task error) then (-72) is returned.

Before a trajectory execution, it is recommended to check whether the trajectory is within the positioner motion capabilities by using "XYLineArcVerification" and "XYLineArcVerificationResultGet" functions.

During the trajectory execution, if a positioner reaches one of travel limits, the trajectory execution will stop and the (-25) error is generated in the positioner errors.

NOTE

In case of (-33) error, (-25) error or (-44) error, the group state becomes DISABLE. To help determine the error source, check the positioner errors, the hardware status and the driver status.

Prototype

int **XYLineArcExecution**(
int SocketID,
char GroupName[250],
char FileName[250],
double Velocity,
double Acceleration,
int ExecutionNumber
)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.
FileName	char *	Trajectory file name.
Velocity	double	Trajectory velocity (units/s).
Acceleration	double	Trajectory acceleration (units/s²).
ExecutionNumber	int	Number of trajectory executions.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -3: String too long.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -19: Group name doesn't exist or unknown command.
- -22: Not allowed action.
- -25: Following Error.
- -33: Motion done timeout.
- -44: Slave error disabling master.
- -46: Not allowed action due to backlash.
- -48: BaseVelocity must be null.
- -61: Error file corrupt or file doesn't exist.
- -68: Velocity on trajectory is too big.
- -69: Acceleration on trajectory is too big.
- -71: Error read from or write in message queue.
- -72: Error trajectory initialization.

7.2.1.404 XYLineArcParametersGet

Name

XYLineArcParametersGet – Gets LineArc trajectory parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks group type (must be a XY group): (-8)
- Checks group name: (-19)
- Checks current executing trajectory type (must be LineArc): (-22)

Description

This function returns the LineArc trajectory parameters (trajectory name, trajectory velocity, trajectory acceleration, current executing element number) of the current LineArc trajectory.

Prototype

int **XYLineArcParametersGet**(
int SocketID,
char GroupName[250],
char * FileName,
double * Velocity,
double * Acceleration,
int * CurrentElementNumber
)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.

Output parameters

FileName	char *	Currently executing trajectory file name.
Velocity	double *	Trajectory velocity (units/s).
Acceleration	double *	Trajectory acceleration (units/s²).
CurrentElementNumber	int *	Currently executing element number.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -19: Group name doesn't exist or unknown command.
- -22: Not allowed action.

7.2.1.405 XYLineArcPulseOutputGet

Name

XYLineArcPulseOutputGet – Gets the configuration of pulse generation of a LineArc.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks group type (must be a XY group): (-8)
- Checks group name: (-19)

Description

This function returns the last configuration of pulse generation of a LineArc trajectory, that was previously set by *XYLineArcPulseOutputSet().*

The pulse output configuration is defined by a pulse start trajectory curved length, a pulse end trajectory curved length, and a pulse trajectory curved length interval.

Example:

XYLineArcPulseOutputSet(MyGroup, 10, 30, 0.01)

XYLineArcPulseOutputGet(MyGroup) => 0,10,30,0.01 (0 is error return, means OK)

One pulse will be generated every 10 µm on the LineArc trajectory between 10 mm and 30 mm trajectory curved lengths.

- Pulse start trajectory curved length = 10 mm
- Pulse end trajectory curved length = 30 mm
- Pulse trajectory curved length interval = 0.01 mm.

Prototype

```
int XYLineArcPulseOutputGet(
    int SocketID,
    char GroupName[250],
    double * StartLength,
    double * EndLength,
    double * PathLengthInterval
    )
```

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.

Output parameters

StartLength	double *	Pulse start length (units).
EndLength	double *	Pulse end length (units).
PathLengthInterval	double *	Pulse length interval (units).

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -19: Group name doesn't exist or unknown command.

7.2.1.406 XYLineArcPulseOutputSet

Name

XYLineArcPulseOutputSet – Sets the configuration of pulse generation of a LineArc trajectory.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks group type (must be a XY group): (-8)
- Checks group name: (-19)
- Controller initialization failed: (-20)
- Checks the pulse generation must not be in progress: (-22)

Description

This function configures and activates the pulse generation of a LineArc trajectory. The pulse generation is defined by a start element, an end element, and a time interval in seconds. If a pulse generation is already activated on the selected LineArc trajectory then this function returns -22 ("Not allowed action") error.

Please note that the pulse output settings are automatically removed when the trajectory is over. Hence, with the execution of every new trajectory, it is required to define the pulse output settings again.

This capability allows to generate pulses at constant pulse trajectory curved length intervals on a LineArc trajectory. The pulses are generated between a pulse start trajectory curved length and a pulse end trajectory curved length. All lengths are calculated in an orthogonal XY coordination system.

The trajectory pulses are generated on the following GPIO ouputs:

GPIO signals	ISA XPS controller	PCI XPS controller (for example XPS-RL) with basic GPIO board	PCI XPS controller (for example XPS-RL) with extended GPIO board
Window	GPIO2, pin 11	GPIO1.DO6	GPIO5.DO14
Pulses	GPIO2, pin 12	GPIO1.DO7	GPIO5.DO15

To find the GPIO connector pin number from GPIOx.DOy, refer to XPS User's Manual, Appendix / General I/O Description.

Example:

XYLineArcPulseOutputSet(Group1, 10, 30, 0.01)

One pulse will be generated every 10 µm on the LineArc trajectory between 10 mm and 30 mm trajectory curved lengths.

Pulse start trajectory curved length = 10 mm

Pulse end trajectory curved length = 30 mm

Pulse trajectory curved length interval = 0.01 mm

Prototype

int **XYLineArcPulseOutputSet**(
int SocketID,
char GroupName[250],
double StartLength,
double EndLength,
double PathLengthInterval
)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.
StartLength	double	Pulse start length (units).
EndLength	double	Pulse end length (units).
PathLengthInterval	double	Pulse length interval (units.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -19: Group name doesn't exist or unknown command.
- -22: Not allowed action.

7.2.1.407 XYLineArcVerification

Name

XYLineArcVerification – Checks a LineArc trajectory data file.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks trajectory file name length (must ≤250): (-3)
- Checks group type (must be a XY group): (-8)
- Checks group name: (-19)
- Checks trajectory file existence and the file format: (-61)
- Checks trajectory element (*Radius ≥1e-14*): (-63)
- Checks trajectory element (*SweepAngle ≥1e-14*): (-64)
- Checks trajectory element (|XElementDistance | ≥1e-14, | YElementDistance | ≥1e-14, TangentOut ≠ 1.797e308): (-65)
- Checks trajectory (number of elements must >0): (-66)
- Checks keys ("*FirstTangent*" and "*DiscontinuityAngle*") in trajectory file: (-74)

Description

This function verifies the execution of a LineArc trajectory. The results of the verification can be got with the "XYLineArcVerificationResultGet" function. The trajectory file must be stored in the folder "\ADMIN\Public\Trajectory" of the XPS controller. If the trajectory cannot be initialized (task error) then the (-72) error is returned.

This function can be executed at any time and is independent of the trajectory execution. It performs the following:

- Checks the trajectory file for data coherence.
- Calculates the trajectory limits, which are: the required travel per positioner, the maximum possible trajectory velocity and the maximum possible trajectory acceleration. This function helps define the parameters for the trajectory execution.
- The required travel values (MinimumPosition and MaximumPosition) are calculated relative to the position zero, not to the current position. So before executing a LineArc trajectory, the user must pay attention to the current position of the positioners to make sure that the trajectory will not exceed the positioner travel limits.
- If all is OK, it returns "SUCCESS" (0). Otherwise, it returns a corresponding error.

NOTE

The "XYLineArcVerification" function is independent from the "XYLineArcExecution" function, but it is highly recommended to execute this function before executing a LineArc trajectory.

Prototype

int **XYLineArcVerification**(
int SocketID,
char GroupName[250],
char FileName[250]
)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.
FileName	char *	Trajectory file name.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -3: String too long.
- -8: Wrong object type for this command.
- -19: Group name doesn't exist or unknown command.
- -61: Error file corrupt or file doesn't exist.
- -63: Wrong XY trajectory element arc radius.
- -64: Wrong XY trajectory element sweep angle.
- -65: Trajectory line element discontinuity error or new element is too small.
- -66: Trajectory doesn't contain any element.
- -72: Error trajectory initialization.
- -74: Error file parameter key not found.

7.2.1.408 XYLineArcVerificationResultGet

Name

XYLineArcVerificationResultGet – Gets the results of the "XYLineArcVerification" function.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks positioner name length (must ≤250): (-3)
- Checks positioner name: (-18)
- Checks the last XY LineArcVerification (must be done): (-22)

Description

This function returns the results of the previous "XYLineArcVerification" function, positioner by positioner. The results are the travel requirements (min and max values), the possible maximum velocity and the possible maximum acceleration.

If no verification was previously done then the (-22) error is returned.

Prototype

int **XYLineArcVerificationResultGet**(

SocketID,

char PositionerName[250],

char * TrajectoryFileName,

double * MinimumPosition,

double * MaximumPosition,

double * MaximumVelocity,

double * MaximumAcceleration

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.

Output parameters

TrajectoryFileName	char *	Examined trajectory file name.
MinimumPosition	double *	Minimum position (units).
MaximumPosition	double *	Maximum position (units).
MaximumVelocity	double *	Maximum velocity (units/s).
MaximumAcceleration	double *	Maximum acceleration (units/s²).

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -3: String too long.
- -18: Positioner name doesn't exist or unknown command.
- -22: Not allowed action.

7.2.1.409 XYMappingGet

Name

XYMappingGet – Read data of a line of an XY mapping matrix in the controller.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the positioner name (must be a XY positioner): (-18)
- Checks the secondary positioner (must not be a secondary positioner): (-24)
- Checks MappingNumber (must be > 0 and ≤ 1 (standard firmware) or 3 (Precision Platform firmware)): (-9)
- Checks LineNumber (must be ≥ 1 and ≤ MappingLineNumber): (-9)
- Checks the number of parameters (must be > 3 and ≤ MappingColumnNumber+3): (-9)
- Checks mapping enable state (must be Enabled): (-121)

Description

Read data of a line of a XY mapping matrix in the controller.

Example:

0	-3.00	-2.00	-1.00	0.00	1.00	2.00	3.00	
-3.00	-0.00192	-0.00534	-0.00254	0.00023	0.00254	0.00534	0.00192	(Line 1)
-2.00	-0.00453	-0.00322	-0.00676	0.00049	0.00676	0.00322	0.00453	
-1.00	-0.00331	-0.00845	-0.00769	0.00102	0.00769	0.00845	0.00331	
0.00	-0.00787	-0.00228	-0.00787	**0**	0.00787	0.00228	0.00787	
1.00	-0.00232	-0.00210	-0.00342	0.00089	0.00342	0.00210	0.00232	
2.00	-0.00134	-0.00308	-0.00675	0.00101	0.00675	0.00308	0.00134	
3.00	-0.00789	-0.00148	-0.00234	0.00121	0.00234	0.00148	0.00789	

Prototype

int **XYMappingGet**(

int SocketID,

char * PositionerName,

int* MappingNumber,

int* LineNumber,

double* Value1,

double* Value2,

…

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	XY positioner name.
MappingNumber	int	XY mapping matrix number.
LineNumber	int	Mapping line to read.

Output parameters

Value1	double *	Data of column #1 of line #*LinerNumber* of the mapping file #*MappingNumber*.
Value2	double *	Data of column #2 of line #*LinerNumber* of the mapping file #*MappingNumber*.
…	double *	One data per column of of line #*LinerNumber* of the mapping file #*MappingNumber*.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -9: Wrong number of parameters in the command.
- -17: Parameter out of range or incorrect.
- -18: PositionerName doesn't exist or unknown command.
- -24: Not available in this configuration (secondary positioner is not allowed).
- -121: Function is not allowed due to mapping disabled.

7.2.1.410 XYMappingSet

Name

XYMappingSet – Change data of a line of an XY mapping matrix in the controller.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the positioner name (must be a XY positioner): (-18)
- Checks the secondary positioner (must not be a secondary positioner): (-24)
- Checks MappingNumber (must be > 0 and ≤ 1 (standard firmware) or 3 (Precision Platform firmware)): (-9)
- Checks LineNumber (must be ≥ 1 and ≤ MappingLineNumber): (-9)
- Checks the number of parameters (must be > 3 and ≤ MappingColumnNumber+3): (-9)
- Checks the group status (must be NOTINIT or DISABLE): (-22)
- Checks mapping enable state (must be Enabled): (-121)
- Checks group state (must be NOTINIT, DISABLE or READY at HomePreset position): (-205)

Description

Change data of a line of a XY mapping matrix.

It's possible to execute this function only when the XY group is in one of following states (*otherwise API returns error -205*) :

- NOTINIT
- DISABLE
- READY and all positioners (X and Y) are at HomePreset position.

Example:

0	-3.00	-2.00	-1.00	0.00	1.00	2.00	3.00	
-3.00	-0.00192	-0.00534	-0.00254	0.00023	0.00254	0.00534	0.00192	(Line 1)
-2.00	-0.00453	-0.00322	-0.00676	0.00049	0.00676	0.00322	0.00453	
-1.00	-0.00331	-0.00845	-0.00769	0.00102	0.00769	0.00845	0.00331	
0.00	-0.00787	-0.00228	-0.00787	**0**	0.00787	0.00228	0.00787	
1.00	-0.00232	-0.00210	-0.00342	0.00089	0.00342	0.00210	0.00232	
2.00	-0.00134	-0.00308	-0.00675	0.00101	0.00675	0.00308	0.00134	
3.00	-0.00789	-0.00148	-0.00234	0.00121	0.00234	0.00148	0.00789	

Prototype

int **XYMappingSet**(
int SocketID,
char * PositionerName,
int MappingNumber,
int LineNumber,
double Value1,
double Value2,
…
)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	XY positioner name.
MappingNumber	int	XY mapping matrix number.
LineNumber	int	Mapping line to change.
Value1	double	Data of column #1 of line #*LinerNumber* of the mapping file #*MappingNumber*
Value2	double	Data of column #2 of line #*LinerNumber* of the mapping file #*MappingNumber*
…	double	One data per column of of line #*LinerNumber* of the mapping file #*MappingNumber*

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -9: Wrong number of parameters in the command.
- -17: Parameter out of range or incorrect.
- -18: PositionerName doesn't exist or unknown command.
- -22: Not allowed action
- -24: Not available in this configuration (secondary positioner is not allowed).
- -121: Function is not allowed due to mapping disabled.
- -205: Not enable in your configuration.

7.2.1.411 XYPTExecution [Extended]

Name

XYPTExecution – Executes a PT trajectory.

Input tests

- Refer to section 7.1: “Input Tests Common to all XPS Functions”.
- Checks trajectory file name length: (-3)
- Checks group type (must be a XY group): (-8)
- Checks input value (number of executions must >0): (-17)
- Checks group name: (-19)
- Group state must be "READY”: (-22)
- Checks backlash (must not be enabled): (-46)
- Checks BaseVelocity (stages.ini, must = 0): (-48)
- Checks trajectory file existence or file reading: (-61)
- Checks message queue: (-71)
- Not available in this configuration (PrecisionPlatform firmware only): (-24)

Description

This function executes a PT (Position Time) trajectory. The trajectory file must be stored in the folder “\Admin\Public\Trajectory” of the XPS controller. If the trajectory cannot be initialized (message queue or task error) then (-72) is returned.

Before a trajectory execution, it is recommended to check whether the trajectory is within the positioner motion capabilities by using “XYPTVerification” and “XYPTVerificationResultGet” functions.

During the trajectory execution, if a positioner reaches one of travel limits, the trajectory execution will stop and the (-25) error is generated in the positioner errors.

NOTES

In case of (-33) error, (-25) error or (-44) error, the group state becomes DISABLE. To help determine the error source, check the positioner errors, the hardware status and the driver status.

This function can be used only with the XPS-Q Precision Platform controller.

Prototype

int **XYPTExecution**(

int SocketID,

char GroupName[250],

char FileName[250],

int ExecutionNumber

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.
FileName	char *	Trajectory file name.
ExecutionNumber	int	Number of trajectory executions.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -3: String too long.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -19: Group name doesn't exist or unknown command.
- -22: Not allowed action.
- -24: Not available in this configuration.
- -25: Following Error.
- -33: Motion done timeout.
- -44: Slave error disabling master.
- -46: Not allowed action due to backlash.
- -48: BaseVelocity must be null.
- -61: Error file corrupt or file doesn't exist.
- -71: Error read from or write in message queue.
- -72: Error trajectory initialization.

7.2.1.412 XYPTLoadToMemory [Extended]

Name

XYPTLoadToMemory – Load some lines of PT trajectory to the controller memory.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks trajectory data (data length must >0 and ≤400): (-3) or (-17)
- Checks group type (must be a XY group): (-8)
- Checks group name: (-19)
- Not available in this configuration (PrecisionPlatform firmware only): (-24)

Description

This function loads some lines of PT trajectory into XPS controller memory. Each trajectory element must be separated by a comma. The trajectory lines are separated between them by a "\n" (LF) character. To verify or to execute the PT trajectory loaded in memory, use the string "**FromMemory**" instead of a file name.

NOTE

All of the PT functions, when called with the string "FromMemory" instead of a FileName, will perform the same operation as the PT trajectory in RAM as it does from a disk.

Example:

XYPTLoadToMemory(socketId,myGroup,"dT1,dX11,dX12\n…dTn,dXn1,dXn2\n")

XYPTVerification (socketId,myGroup,FromMemory)

XYPTExecution(socketId,myGroup,FromMemory,1).

Prototype

int **XYPTLoadToMemory**(
int SocketID,
char GroupName[250],
char TrajectoryData[400]
)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.
TrajectoryData	char *	Trajectory data lines.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -3: String too long.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -19: Group name doesn't exist or unknown command.
- -24: Not available in this configuration.

7.2.1.413 XYPTParametersGet [Extended]

Name

XYPTParametersGet – Gets PT trajectory parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks group type (must be a XY group): (-8)
- Checks group name: (-19)
- Checks current executing trajectory type (must be PT): (-22)
- Not available in this configuration (PrecisionPlatform firmware only): (-24)

Description

This function returns the PT trajectory parameters (trajectory name and current executing element number) of the current PT trajectory.

Prototype

int **XYPTParametersGet**(

int SocketID,

char GroupName[250],

char * FileName,

int * CurrentElementNumber

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.

Output parameters

FileName	char *	Currently executing trajectory file name.
CurrentElementNumber	int *	Currently executing element number.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -19: Group name doesn't exist or unknown command.
- -22: Not allowed action.
- -24: Not available in this configuration.

7.2.1.414 XYPTPulseOutputGet [Extended]

Name

XYPTPulseOutputGet – Gets the configuration of pulse generation of a PT trajectory.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks group type (must be a XY group): (-8)
- Checks group name: (-19)
- Not available in this configuration (PrecisionPlatform firmware only): (-24)

Description

This function returns the last configuration of pulse generation of a PT trajectory, that was previously set by *XYPTPulseOutputSet().*

The pulse output configuration is defined with a start element, an end element, and a time interval in seconds.

Example:

XYPTPulseOutputSet(MyGroup, 3, 5, 0.01)

XYPTPulseOutputGet(MyGroup) => 0,3,5,0.01 (0 is error return, means OK)

One pulse will be generated every 10 ms between the start of the 3rd element and the end of the 5th element.

Start element= 3

End element = 5

Time interval = 0.01 seconds.

Prototype

int **XYPTPulseOutputGet**(

int SocketID,

char GroupName[250],

int * StartElement,

int * EndElement,

double * TimeInterval

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.

Output parameters

StartElement	int *	Start pulse element number.
EndElement	int *	End pulse element number.
TimeInterval	double *	Time interval between pulses (seconds).

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -19: Group name doesn't exist or unknown command.
- -24: Not available in this configuration.

7.2.1.415 XYPTPulseOutputSet [Extended]

Name

XYPTPulseOutputSet – Sets the configuration of pulse generation of a PT trajectory.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks group type (must be a XY group): (-8)
- Checks group name: (-19)
- Checks the pulse generation must not be in progress: (-22)
- Not available in this configuration (PrecisionPlatform firmware only): (-24)

Description

This function configures and activates the pulse generation of a PT trajectory. The pulse generation is defined by a start element, an end element, and a time interval in seconds. If a pulse generation is already activated on the selected PT trajectory then this function returns -22 ("Not allowed action") error.

Please note that the pulse output settings are automatically removed when the trajectory is over. Hence, with the execution of every new trajectory, it is required to define the pulse output settings again.

This capability allows output of pulses at constant time intervals on a PT trajectory. The pulses are generated between the first and the last trajectory element. The minimum possible time interval is CorrectorISRPeriod value (*system.ref*).

The trajectory pulses are generated on the following GPIO ouputs:

GPIO signals	ISA XPS controller	PCI XPS controller (for example XPS-RL) with basic GPIO board	PCI XPS controller (for example XPS-RL) with extended GPIO board
Window	GPIO2, pin 11	GPIO1.DO6	GPIO5.DO14
Pulses	GPIO2, pin 12	GPIO1.DO7	GPIO5.DO15

To find the GPIO connector pin number from GPIOx.DOy, refer to XPS User's Manual, Appendix / General I/O Description.

Example:

XYPTPulseOutputSet(Group1, 3, 5, 0.01)

One pulse will be generated every 10 ms between the start of the 3rd element and the end of the 5th element.

Prototype

int **XYPTPulseOutputSet**(

int SocketID,

char GroupName[250],

int StartElement,

int EndElement,

double TimeInterval

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.
StartElement	int	Start pulse element number.
EndElement	int	End pulse element number.
TimeInterval	double	Time interval between pulses (seconds).

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -19: Group name doesn't exist or unknown command.
- -22: Not allowed action.
- -24: Not available in this configuration.

7.2.1.416 XYPTResetInMemory [Extended]

Name

XYPTResetInMemory – Deletes the content of the PT trajectory buffer in the controller memory.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks group type (must be a XY group): (-8)
- Checks group name: (-19)
- Not available in this configuration (PrecisionPlatform firmware only): (-24)

Description

This function deletes the PT trajectory buffer in the controller memory, that was previously loaded with the "XYPTLoadToMemory" function.

Prototype

int **XYPTResetInMemory**(

int SocketID,

char GroupName[250]

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -3: String too long.
- -8: Wrong object type for this command.
- -19: Group name doesn't exist or unknown command.
- -24: Not available in this configuration.

7.2.1.417 XYPTVerification [Extended]

Name

XYPTVerification – Checks a PT trajectory data file.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks trajectory file name length (must ≤250): (-3)
- Checks group type (must be a XY group): (-8)
- Checks group name: (-19)
- Not available in this configuration (PrecisionPlatform firmware only): (-24)
- Checks BaseVelocity value (must = 0): (-48)
- Checks trajectory file existence and the file format: (-61)
- Checks trajectory (number of elements must >0): (-66)
- Checks velocity (MinimumVelocity ≤ Velocity ≤ MaximumVelocity): (-68)
- Checks acceleration (MinimumAcc. ≤ Acceleration ≤ MaximumAcc.): (-69)
- Checks end output velocity (must = 0): (-70)
- Checks delta time (DeltaTime must >0): (-75)

Description

This function verifies the execution of a PT trajectory. The results of the verification can be got with the "XYPTVerificationResultGet" function. The trajectory file must be stored in the folder "\ADMIN\Public\Trajectory" of the XPS controller. If the trajectory cannot be initialized (task error) then the (-72) error is returned.

- This function can be executed at any time and is independent of the trajectory execution. It performs the following:
- Checks the trajectory file for data coherence.
- Calculates the trajectory limits, which are: the required travel per positioner, the maximum possible trajectory velocity and the maximum possible trajectory acceleration. This function helps define the parameters for the trajectory execution.
- The required travel values (MinimumPosition and MaximumPosition) are calculated relative to the position zero, not to the current position. So before executing a PT trajectory, the user must pay attention to the current position of the positioners to make sure that the trajectory will not exceed the positioner travel limits.
- If all is OK, it returns "SUCCESS" (0). Otherwise, it returns a corresponding error.

NOTES

Because of the PT trajectory internal calculation of elements end velocity, a correct PT trajectory file must have at least two lines with zero displacements at the trajectory end. Otherwise, the "XYPTVerification" function returns the (-70) error.

The "XYPTVerification" function is independent from the "XYPTExecution" function, but it is highly recommended to execute this function before executing a PT trajectory.

This function can be used only with the XPS-Q Precision Platform controller.

Prototype

int **XYPTVerification**(
int SocketID,
char GroupName[250],
char FileName[250]
)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.
FileName	char *	Trajectory file name.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -3: String too long.
- -8: Wrong object type for this command.
- -19: Group name doesn't exist or unknown command.
- -24: Not available in this configuration.
- -61: Error file corrupt or file doesn't exist.
- -66: Trajectory doesn't content any element.
- -68: Acceleration on trajectory is too big.
- -69: Acceleration on trajectory is too big.
- -70: Final velocity on trajectory is not zero.
- -72: Error trajectory initialization.
- -75: Trajectory element has a negative or null delta T.

7.2.1.418 XYPTVerificationResultGet_[Extended]

Name

XYPTVerificationResultGet – Gets the results of the "XYPTVerification" function.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks positioner name length (must ≤250): (-3)
- Checks positioner name: (-18)
- Checks the last XY PTVerification (must be done): (-22)
- Not available in this configuration (PrecisionPlatform firmware only): (-24)

Description

This function returns the results of the previous "XYPTVerification" function, positioner by positioner. The results are the travel requirements (min and max values), the possible maximum velocity and the possible maximum acceleration.

If no verification was previously done then the (-22) error is returned.

Prototype

int **XYPTVerificationResultGet**(

int SocketID,

char PositionerName[250],

char * TrajectoryFileName,

double * MinimumPosition,

double * MaximumPosition,

double * MaximumVelocity,

double * MaximumAcceleration

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.

Output parameters

TrajectoryFileName	char *	Examined trajectory file name.
MinimumPosition	double *	Minimum position (units).
MaximumPosition	double *	Maximum position (units).
MaximumVelocity	double *	Maximum velocity (units/s).
MaximumAcceleration	double *	Maximum acceleration (units/s²).

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -3: String too long.
- -18: Positioner name doesn't exist or unknown command.
- -22: Not allowed action.
- -24: Not available in this configuration.

7.2.1.419 XYPVTExecution [Extended]

Name

XYPVTExecution – Executes a PVT trajectory.

Input tests

- Refer to section 7.1: “Input Tests Common to all XPS Functions”.
- Checks trajectory file name length: (-3)
- Checks group type (must be a XY group): (-8)
- Checks input value (number of executions must >0): (-17)
- Checks group name: (-19)
- Group state must be "READY”: (-22)
- Not available in this configuration (PrecisionPlatform firmware only): (-24)
- Checks backlash (must not be enabled): (-46)
- Checks BaseVelocity (stages.ini, must = 0): (-48)
- Checks trajectory file existence or file reading: (-61)
- Checks message queue: (-71)

Description

This function executes a PVT (Position Velocity Time) trajectory. The trajectory file must be stored in the folder “\Admin\Public\Trajectory” of the XPS controller. If the trajectory cannot be initialized (message queue or task error) then (-72) is returned.

Before a trajectory execution, it is recommended to check whether the trajectory is within the positioner motion capabilities by using “XYPVTVerification” and “XYPVTVerificationResultGet” functions.

During the trajectory execution, if a positioner reaches one of travel limits, the trajectory execution will stop and the (-25) error is generated in the positioner errors.

NOTES

In case of an (-33) error, an (-25) error or (-44) error, the group state becomes DISABLE. To help determine the error source, check the positioner errors, the hardware status and the driver status.

Prototype

int **XYPVTExecution**(

int SocketID,

char GroupName[250],

char FileName[250],

int ExecutionNumber

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.
FileName	char *	Trajectory file name.
ExecutionNumber	int	Number of trajectory executions.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -3: String too long.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -19: Group name doesn't exist or unknown command.
- -22: Not allowed action.
- -24: Not available in this configuration.
- -25: Following Error.
- -33: Motion done timeout.
- -44: Slave error disabling master.
- -46: Not allowed action due to backlash.
- -48: BaseVelocity must be null.
- -61: Error file corrupt or file doesn't exist.
- -71: Error read from or write in message queue.
- -72: Error trajectory initialization.

7.2.1.420 XYPVTLoadToMemory [Extended]

Name

XYPVTLoadToMemory – Load some lines of PVT trajectory to the controller memory.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks trajectory data (data length must >0 and ≤400): (-3) or (-17)
- Checks group type (must be a XY group): (-8)
- Checks group name: (-19)
- Not available in this configuration (PrecisionPlatform firmware only): (-24)

Description

This function loads some lines of PVT trajectory into XPS controller memory. Each trajectory element must be separated by a comma. The trajectory lines are separated between them by a "\n" (LF) character. To verify or to execute the PVT trajectory loaded in memory, use the string "**FromMemory**" instead of a file name.

NOTE

All of the PVT functions, when called with the string "FromMemory" instead of a FileName, will perform the same operation as the PVT trajectory in RAM as it does from a disk.

Example:

XYPVTLoadToMemory(socketId,myGroup,"dT1,dX11,Vout11,dX12,Vout12\n…dTn,dXn1,Voutn1,dXn2,Voutn2\n")

XYPVTVerification (socketId,myGroup,FromMemory)

XYPVTExecution(socketId,myGroup,FromMemory,1).

Prototype

int **XYPVTLoadToMemory**(
int SocketID,
char GroupName[250],
char TrajectoryData[400]
)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.
TrajectoryData	char *	Trajectory data lines.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -3: String too long.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -19: Group name doesn't exist or unknown command.
- -24: Not available in this configuration.

7.2.1.421 XYPVTParametersGet [Extended]

Name

XYPVTParametersGet – Gets PVT trajectory parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks group type (must be a XY group): (-8)
- Checks group name: (-19)
- Checks current executing trajectory type (must be PVT): (-22)
- Not available in this configuration (PrecisionPlatform firmware only): (-24)

Description

This function returns the PVT trajectory parameters (trajectory name and current executing element number) of the current PVT trajectory.

Prototype

int **XYPVTParametersGet**(

int SocketID,

char GroupName[250],

char * FileName,

int * CurrentElementNumber

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.

Output parameters

FileName	char *	Currently executing trajectory file name.
CurrentElementNumber	int *	Currently executing element number.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -19: Group name doesn't exist or unknown command.
- -22: Not allowed action.
- -24: Not available in this configuration.

7.2.1.422 XYPVTPulseOutputGet [Extended]

Name

XYPVTPulseOutputGet – Gets the configuration of pulse generation of a PVT trajectory.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks group type (must be a XY group): (-8)
- Checks group name: (-19)
- Not available in this configuration (PrecisionPlatform firmware only): (-24)

Description

This function returns the last configuration of pulse generation of a PVT trajectory, that was previously set by *XYPVTPulseOutputSet().*

The pulse output configuration is defined with a start element, an end element, and a time interval in seconds.

Example:

XYPVTPulseOutputSet(MyGroup, 3, 5, 0.01)

XYPVTPulseOutputGet(MyGroup) => 0,3,5,0.01 (0 is error return, means OK)

One pulse will be generated every 10 ms between the start of the 3rd element and the end of the 5th element.

Start element= 3

End element = 5

Time interval = 0.01 seconds.

Prototype

int **XYPVTPulseOutputGet**(

int SocketID,

char GroupName[250],

int * StartElement,

int * EndElement,

double * TimeInterval

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.

Output parameters

StartElement	int *	Start pulse element number.
EndElement	int *	End pulse element number.
TimeInterval	double *	Time interval between pulses (seconds).

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -19: Group name doesn't exist or unknown command.
- -24: Not available in this configuration.

7.2.1.423 XYPVTPulseOutputSet [Extended]

Name

XYPVTPulseOutputSet – Sets the configuration of pulse generation of a PVT trajectory.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks group type (must be a XY group): (-8)
- Checks group name: (-19)
- Checks the pulse generation must not be in progress: (-22)
- Not available in this configuration (PrecisionPlatform firmware only): (-24)

Description

This function configures and activates the pulse generation of a PVT trajectory. The pulse generation is defined by a start element, an end element, and a time interval in seconds. If a pulse generation is already activated on the selected PVT trajectory then this function returns -22 ("Not allowed action") error.

Please note that the pulse output settings are automatically removed when the trajectory is over. Hence, with the execution of every new trajectory, it is required to define the pulse output settings again.

This capability allows output of pulses at constant time intervals on a PVT trajectory. The pulses are generated between the first and the last trajectory element. The minimum possible time interval is CorrectorISRPeriod value (*system.ref*).

The trajectory pulses are generated on the following GPIO ouputs:

GPIO signals	ISA XPS controller	PCI XPS controller (for example XPS-RL) with basic GPIO board	PCI XPS controller (for example XPS-RL) with extended GPIO board
Window	GPIO2, pin 11	GPIO1.DO6	GPIO5.DO14
Pulses	GPIO2, pin 12	GPIO1.DO7	GPIO5.DO15

To find the GPIO connector pin number from GPIOx.DOy, refer to XPS User's Manual, Appendix / General I/O Description.

Example:

XYPVTPulseOutputSet(Group1, 3, 5, 0.01)

One pulse will be generated every 10 ms between the start of the 3rd element and the end of the 5th element.

Prototype

int **XYPVTPulseOutputSet**(

int SocketID,

char GroupName[250],

int StartElement,

int EndElement,

double TimeInterval

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.
StartElement	int	Start pulse element number.
EndElement	int	End pulse element number.
TimeInterval	double	Time interval between pulses (seconds).

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -19: Group name doesn't exist or unknown command.
- -22: Not allowed action.
- -24: Not available in this configuration.

7.2.1.424 XYPVTResetInMemory [Extended]

Name

XYPVTResetInMemory – Deletes the content of the PVT trajectory buffer in the controller memory.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks group type (must be a XY group): (-8)
- Checks group name: (-19)
- Not available in this configuration (PrecisionPlatform firmware only): (-24)

Description

This function deletes the PVT trajectory buffer in the controller memory, that was previously loaded with the "XYPVTLoadToMemory" function.

Prototype

int **XYPVTLoadToMemory**(

int SocketID,

char GroupName[250],

char FileName[250],

char TrajectoryData[400]

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.
FileName	char *	Trajectory file name.
TrajectoryData	char *	Trajectory data lines.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -3: String too long.
- -8: Wrong object type for this command.
- -19: Group name doesn't exist or unknown command.
- -24: Not available in this configuration.

7.2.1.425 XYPVTVerification [Extended]

Name

XYPVTVerification – Checks a PVT trajectory data file.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks trajectory file name length (must ≤250): (-3)
- Checks group type (must be a XY group): (-8)
- Checks group name: (-19)
- Not available in this configuration (PrecisionPlatform firmware only): (-24)
- Checks BaseVelocity value (must = 0): (-48)
- Checks trajectory file existence and the file format: (-61)
- Checks trajectory (number of elements must >0): (-66)
- Checks velocity (Minimum Velocity ≤Velocity ≤Maximum Velocity): (-68)
- Checks acceleration (Minimum acc. ≤acceleration ≤Maximum acc.): (-69)
- Checks end output velocity (must = 0): (-70)
- Checks delta time (DeltaTime must >0): (-75)

Description

This function verifies the execution of a PVT trajectory. The results of the verification can be got with the "XYPVTVerificationResultGet" function. The trajectory file must be stored in the folder "\ADMIN\Public\Trajectory" of the XPS controller. If the trajectory cannot be initialized (task error) then the (-72) error is returned.

This function can be executed at any time and is independent of the trajectory execution. It performs the following:

- Checks the trajectory file for data coherence.
- Calculates the trajectory limits, which are: the required travel per positioner, the maximum possible trajectory velocity and the maximum possible trajectory acceleration. This function helps define the parameters for the trajectory execution.
- The required travel values (MinimumPosition and MaximumPosition) are calculated relative to the position zero, not to the current position. So before executing a PVT trajectory, the user must pay attention to the current position of the positioners to make sure that the trajectory will not exceed the positioner travel limits.
- If all is OK, it returns "SUCCESS" (0). Otherwise, it returns a corresponding error.

NOTE

The "XYPVTVerification" function is independent from the "XYPVTExecution" function, but it is highly recommended to execute this function before executing a PVT trajectory.

Prototype

int **XYPVTVerification**(

int SocketID,

char GroupName[250],

char FileName[250]

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.
FileName	char *	Trajectory file name.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -3: String too long.
- -8: Wrong object type for this command.
- -19: Group name doesn't exist or unknown command.
- -24: Not available in this configuration.
- -61: Error file corrupt or file doesn't exist.
- -66: Trajectory doesn't content any element.
- -68: Velocity on trajectory is too big.
- -69: Acceleration on trajectory is too big.
- -70: Final velocity on trajectory is not zero.
- -72: Error trajectory initialization.
- -75: Trajectory element has a negative or null delta T.

7.2.1.426 XYPVTVerificationResultGet [Extended]

Name

XYPVTVerificationResultGet – Gets the results of the "XYPVTVerification" function.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks positioner name length (must ≤250): (-3)
- Checks positioner name: (-18)
- Checks the last XY PVTVerification (must be done): (-22)
- Not available in this configuration (PrecisionPlatform firmware only): (-24)

Description

This function returns the results of the previous "XYPVTVerification" function, positioner by positioner. The results are the travel requirements (min and max values), the possible maximum velocity and the possible maximum acceleration.

If no verification was previously done then the (-22) error is returned.

Prototype

```
int XYPVTVerificationResultGet(
    int SocketID,
    char PositionerName[250],
    char * TrajectoryFileName,
    double * MinimumPosition,
    double * MaximumPosition,
    double * MaximumVelocity,
    double * MaximumAcceleration
    )
```

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.

Output parameters

TrajectoryFileName	char *	Examined trajectory file name.
MinimumPosition	double *	Minimum position (units).
MaximumPosition	double *	Maximum position (units).
MaximumVelocity	double *	Maximum velocity (units/s).
MaximumAcceleration	double *	Maximum acceleration (units/s²).

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -3: String too long.
- -18: Positioner name doesn't exist or unknown command.
- -22: Not allowed action.
- -24: Not available in this configuration.

7.2.1.427 XYZGroupPositionCorrectedProfilerGet

Name

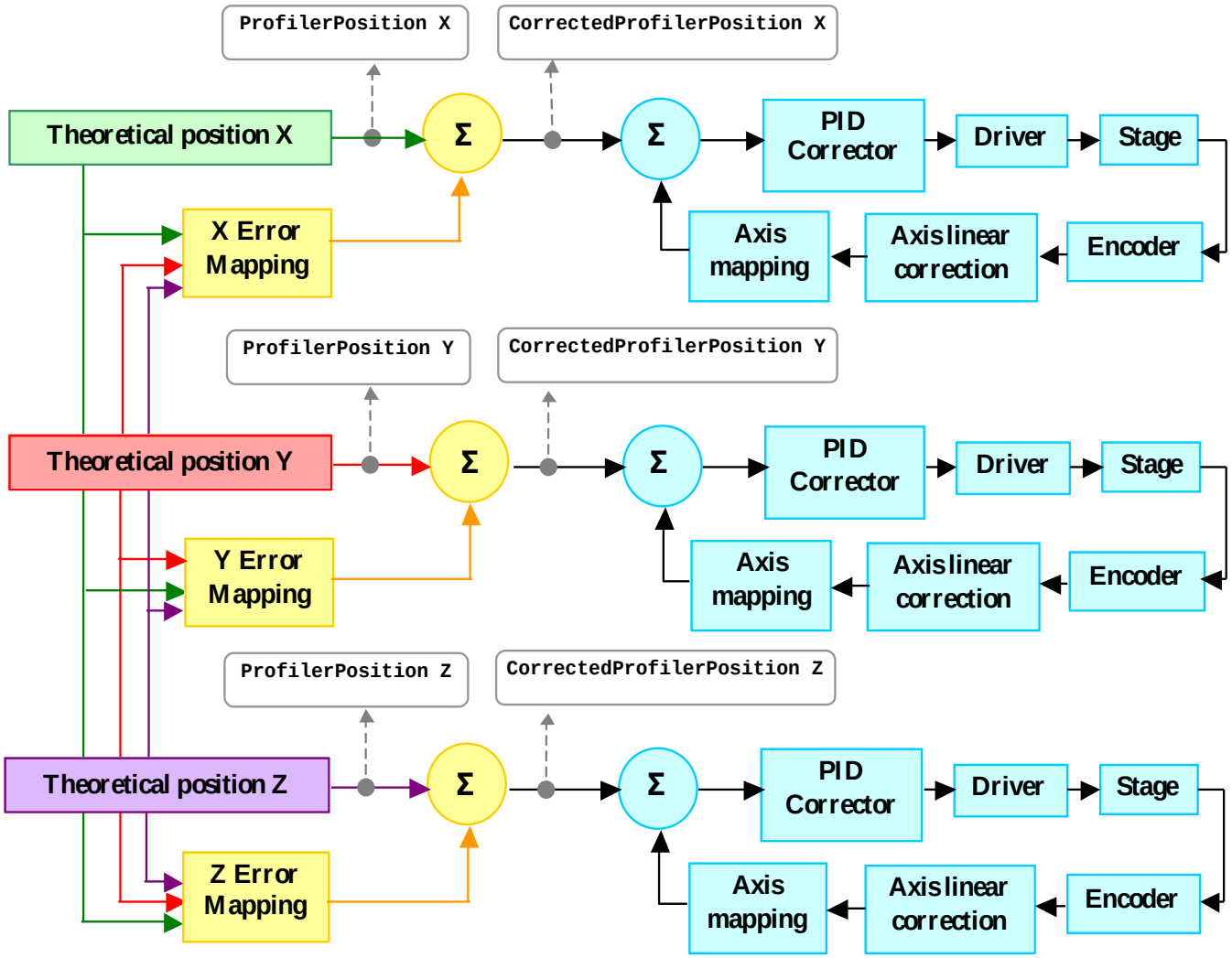
XYZGroupPositionCorrectedProfilerGet – Gets the corrected profiler position for all positioners of an XYZ group.

Input tests

- Refer to section 7.1: “Input Tests Common to all XPS Functions”.
- Valids object type: (-8)
- Valids group type (must be an XYZ group): (-18)
- Invalid group name: (-19)

Description

This function corrects a theoretical position wich is recalculated with the XYZ mapping correction.



This function applies the XYZ mapping on the theoretical user positions and returns the corrected positions. These corrected profiler positions (X, Y and Z) take the XYZ mapping correction into account.

NOTE

This function is only allowed with an XYZ group.

Prototype

int **XYZGroupPositionCorrectedProfilerGet**(
int SocketID,
char * GroupName,
char * FileName,
double PositionX,
double PositionY,
double PositionZ,
double * CorrectedPositionX,
double * CorrectedPositionY,
double * CorrectedPositionZ
)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	XYZ group name.
PositionX	double	Theoretical position X.
PositionY	double	Theoretical position Y.
PositionZ	double	Theoretical position Z.

Output parameters

CorrectedPositionX	double *	Corrected theoretical position.
CorrectedPositionY	double *	Corrected theoretical position Y.
CorrectedPositionZ	double *	Corrected theoretical position Z.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -3: String too long.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.
- -19: GroupName doesn't exist or unknown command.

7.2.1.428 XYZGroupPositionPCORawEncoderGet

Name

XYZGroupPositionPCORawEncoderGet – Gets the PCO raw encoder positions of an XYZ group.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Valids object type: (-8)
- Valids group type (must be a XYZ group): (-18)
- Invalid group name: (-19)

Description

This function returns the X, Y and Z PCO raw encoder positions from the X, Y and Z user positions.

NOTE

This function is only allowed with a XYZ group.

Prototype

int **XYZGroupPositionPCORawEncoderGet**(

int SocketID,

char * GroupName,

double PositionX,

double PositionY,

double PositionZ,

double * PCORawPositionX,

double * PCORawPositionY,

double * PCORawPositionZ

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	XYZ group name.
PositionX	double	User position X.
PositionY	double	User position Y.
PositionZ	double	User position Z.

Output parameters

PCORawPositionX	double *	PCO Raw position X.
PCORawPositionY	double *	PCO Raw position Y.
PCORawPositionZ	double *	PCO Raw position Z.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -3: String too long.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.
- -19: GroupName doesn't exist or unknown command.

7.2.1.429 XYZSplineExecution

Name

XYZSplineExecution – Executes a Spline trajectory.

Input tests

- Refer to section 7.1: “Input Tests Common to all XPS Functions”.
- Checks trajectory file name length: (-3)
- Checks group type (must be a XYZ group): (-8)
- Checks input value (Velocity and Acceleration must >0): (-17)
- Checks group name: (-19)
- Group state must be "READY”: (-22)
- Checks backlash (must not be enabled): (-46)
- Checks BaseVelocity (stages.ini, must = 0): (-48)
- Checks trajectory file existence or file reading: (-61)
- Checks message queue: (-71)
- Checks the velocity (Velocity ≤TrajectoryMaximumVelocity): (-68)
- Checks the acceleration (Acceleration ≤TrajectoryMaximumAcceleration): (-69)

Description

This function executes a Spline trajectory. The trajectory file must be stored in the folder “\Admin\Public\Trajectory” of the XPS controller. If the trajectory cannot be initialized (message queue or task error) then (-72) is returned.

Before a trajectory execution, it is recommended to check whether the trajectory is within the positioner motion capabilities by using “XYZSplineVerification” and “XYZSplineVerificationResultGet” functions.

During the trajectory execution, if a positioner reaches one of travel limits, the trajectory execution will stop and the (-25) error is generated in the positioner errors.

NOTE

In case of an (-33) error, an (-25) error or (-44) error, the group state becomes DISABLE. To help determine the error source, check the positioner errors, the hardware status and the driver status.

Prototype

int **XYZSplineExecution**(
int SocketID,
char GroupName[250],
char FileName[250],
double Velocity,
double Acceleration
)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.
FileName	char *	Trajectory file name.
Velocity	double	Trajectory velocity (units/s).
Acceleration	double	Trajectory acceleration (units/s²).

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -3: String too long.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -19: Group name doesn't exist or unknown command.
- -22: Not allowed action.
- -25: Following Error.
- -33: Motion done timeout.
- -44: Slave error disabling master.
- -46: Not allowed action due to backlash.
- -48: BaseVelocity must be null.
- -61: Error file corrupt or file doesn't exist.
- -68: Velocity on trajectory is too big.
- -69: Acceleration on trajectory is too big.
- -71: Error read from or write in message queue.
- -72: Error trajectory initialization.

7.2.1.430 XYZSplineParametersGet

Name

XYZSplineParametersGet – Gets Spline trajectory parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks group type (must be a XYZ group): (-8)
- Checks group name: (-19)
- Checks current executing trajectory type (must be Spline): (-22)

Description

This function returns the Spline trajectory parameters (trajectory name, trajectory velocity, trajectory acceleration, current executing element number) of the current Spline trajectory.

Prototype

```
int XYZSplineParametersGet(
    int SocketID,
    char GroupName[250],
    char * FileName,
    double * Velocity,
    double * Acceleration,
    int * CurrentElementNumber
    )
```

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.

Output parameters

FileName	char *	Currently executing trajectory file name.
Velocity	double *	Trajectory velocity (units/s).
Acceleration	double *	Trajectory acceleration (units/s²).
CurrentElementNumber	int *	Currently executing element number.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -19: Group name doesn't exist or unknown command.
- -22: Not allowed action.

7.2.1.431 XYZSplinePulseOutputGet

Name

XYZSplinePulseOutputGet – Gets the configuration of pulse generation of a Spline trajectory.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks group type (must be a XYZ group): (-8)
- Checks group name: (-19)

Description

This function returns the last configuration of pulse generation of a Spline trajectory, that was previously set by *XYZSplinePulseOutputSet().*

The pulse output configuration is defined by a pulse start trajectory curved length, a pulse end trajectory curved length, and a pulse trajectory curved length interval.

Example:

XYZSplinePulseOutputSet(MyGroup, 10, 30, 0.01)

XYZSplinePulseOutputGet(MyGroup) => 0,10,30,0.01 (0 is error return, means OK)

One pulse will be generated every 10 µm on the Spline trajectory between 10 mm and 30 mm trajectory curved lengths.

Pulse start trajectory curved length = 10 mm

Pulse end trajectory curved length = 30 mm

Pulse trajectory curved length interval = 0.01 mm.

Prototype

int **XYZSplinePulseOutputGet**(

int SocketID,

char GroupName[250],

double * StartLength,

double * EndLength,

double * PathLengthInterval

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.

Output parameters.

StartLength	double *	Pulse start length (units).
EndLength	double *	Pulse end length (units).
PathLengthInterval	double *	Pulse length interval (units).

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -19: Group name doesn't exist or unknown command.

7.2.1.432 XYZSplinePulseOutputSet

Name

XYZSplinePulseOutputSet – Sets the configuration of pulse generation of a Spline trajectory.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks group type (must be a XYZ group): (-8)
- Checks group name: (-19)
- Checks the pulse generation must not be in progress: (-22)

Description

This function configures and activates the pulse generation of a Spline trajectory. The pulse generation is defined by a start element, an end element, and a time interval in seconds. If a pulse generation is already activated on the selected Spline trajectory then this function returns -22 ("Not allowed action") error.

Please note that the pulse output settings are automatically removed when the trajectory is over. Hence, with the execution of every new trajectory, it is required to define the pulse output settings again.

This capability allows to generate pulses at constant pulse trajectory curved length intervals on a Spline trajectory. The pulses are generated between a pulse start trajectory curved length and a pulse end trajectory curved length. All lengths are calculated in an orthogonal XYZ coordination system.

The trajectory pulses are generated on the following GPIO ouputs:

GPIO signals	ISA XPS controller	PCI XPS controller (for example XPS-RL) with basic GPIO board	PCI XPS controller (for example XPS-RL) with extended GPIO board
Window	GPIO2, pin 11	GPIO1.DO6	GPIO5.DO14
Pulses	GPIO2, pin 12	GPIO1.DO7	GPIO5.DO15

To find the GPIO connector pin number from GPIOx.DOy, refer to XPS User's Manual, Appendix / General I/O Description.

Example:

XYZSplinePulseOutputSet(Group1, 10, 30, 0.01)

One pulse will be generated every 10 µm on the Spline trajectory between 10 mm and 30 mm trajectory curved lengths.

Pulse start trajectory curved length = 10 mm

Pulse end trajectory curved length = 30 mm

Pulse trajectory curved length interval = 0.01 mm

Prototype

int **XYZSplinePulseOutputSet**(
int SocketID,
char GroupName[250],
double StartLength,
double EndLength,
double PathLengthInterval
)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.
StartLength	double	Pulse start length (units).
EndLength	double	Pulse end length (units).
PathLengthInterval	double	Pulse length interval (units).

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -19: Group name doesn't exist or unknown command.
- -22: Not allowed action.

7.2.1.433 XYZSplineVerification

Name

XYZSplineVerification – Checks a Spline trajectory data file.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks trajectory file name length (must ≤250): (-3)
- Checks group type (must be a XYZ group): (-8)
- Checks group name: (-19)
- Checks trajectory file existence and the file format: (-61)
- Checks trajectory (number of elements must >0): (-66)

Description

This function verifies the execution of a Spline trajectory. The results of the verification can be got with the "XYZSplineVerificationResultGet" function. The trajectory file must be stored in the folder "\ADMIN\Public\Trajectory" of the XPS controller. If the trajectory cannot be initialized (task error) then the (-72) error is returned.

This function can be executed at any time and is independent of the trajectory execution. It performs the following:

- Checks the trajectory file for data coherence.
- Calculates the trajectory limits, which are: the required travel per positioner, the maximum possible trajectory velocity and the maximum possible trajectory acceleration. This function helps define the parameters for the trajectory execution.
- The required travel values (MinimumPosition and MaximumPosition) are calculated relative to the position zero, not to the current position. So before executing a Spline trajectory, the user must pay attention to the current position of the positioners to make sure that the trajectory will not exceed the positioner travel limits.
- If all is OK, it returns "SUCCESS" (0). Otherwise, it returns a corresponding error.

NOTE

The "XYZSplineVerification" function is independent from the "XYZSplineExecution" function, but it is highly recommended to execute this function before executing a Spline trajectory.

Prototype

int **XYZSplineVerification**(

int SocketID,

char GroupName[250],

char FileName[250]

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.
FileName	char *	Trajectory file name.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -3: String too long.
- -8: Wrong object type for this command.
- -19: Group name doesn't exist or unknown command.
- -61: Error file corrupt or file doesn't exist.
- -66: Trajectory doesn't contain any element.
- -72: Error trajectory initialization.

7.2.1.434 XYZSplineVerificationResultGet

Name

XYZSplineVerificationResultGet – Gets the results of the "XYZSplineVerification" function.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks positioner name length (must ≤250): (-3)
- Checks positioner name: (-18)
- Checks the last XYZ SplineVerification (must be done): (-22)

Description

This function returns the results of the previous "XYZSplineVerification" function, positioner by positioner. The results are the travel requirements (min and max values), the possible maximum velocity and the possible maximum acceleration.

If no verification was previously done then the (-22) error is returned.

Prototype

int **XYZSplineVerificationResultGet**(

int SocketID,

char PositionerName[250],

char * TrajectoryFileName,

double * MinimumPosition,

double * MaximumPosition,

double * MaximumVelocity,

double * MaximumAcceleration

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.

Output parameters

TrajectoryFileName	char *	Examined trajectory file name.
MinimumPosition	double *	Minimum position (units).
MaximumPosition	double *	Maximum position (units).
MaximumVelocity	double *	Maximum velocity (units/s).
MaximumAcceleration	double *	Maximum acceleration (units/s²).

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -3: String too long.
- -18: Positioner name doesn't exist or unknown command.
- -22: Not allowed action.

7.2.1.435 XYScanShutterDisable [Extended]

Name

XYScanShutterDisable – disables shutter stage during scan.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks group type (must be a XY group): (-8)
- Checks group name: (-19)
- Check shutter group existence (-22)

Description

This function disables the use of shutter stage during scan for the selected XY group.

Prototype

int **XYScanShutterDisable** (

int SocketID,

char GroupName[250]

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.

Output parameters

None.

Return (In addition to the results of "Input Tests Common to all XPS Functions")

- 0: No error.
- -8: Wrong object type for this command.
- -19: Group name doesn't exist or unknown command.
- -22: Not allowed action.

7.2.1.436 XYScanShutterEnable [Extended]

Name

XYScanShutterEnable – enables shutter stage during scan.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks group type (must be a XY group): (-8)
- Checks group name: (-19)
- Check shutter group existence (-22)

Description

This function enables the use of shutter stage during scan for the selected XY group.

Prototype

int **XYScanShutterEnable** (

int SocketID,

char GroupName[250]

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.

Output parameters

None.

Return (In addition to the results of "Input Tests Common to all XPS Functions")

- 0: No error.
- -8: Wrong object type for this command.
- -19: Group name doesn't exist or unknown command.
- -22: Not allowed action.

7.2.1.437 XYShutterInterlockMonitoringDisable [Extended]

Name

XYShutterInterlockMonitoringDisable – disables shutter interlock monitoring.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks group type (must be a XY group): (-8)
- Checks group name: (-19)

Description

This function disables the shutter interlock monitoring for the selected XY group.

Prototype

int **XYShutterInterlockMonitoringDisable** (

int SocketID,

char GroupName[250]

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -19: Group name doesn't exist or unknown command.

7.2.1.438 XYShutterInterlockMonitoringEnable [Extended]

Name

XYShutterInterlockMonitoringEnable – enables shutter interlock monitoring.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks group type (must be a XY group): (-8)
- Checks group name: (-19)

Description

This function enables the shutter interlock monitoring for the selected XY group.

Prototype

int **XYShutterInterlockMonitoringEnable** (

int SocketID,

char GroupName[250]

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -19: Group name doesn't exist or unknown command.

7.2.1.439 XYShutterInterlockRectParametersGet [Extended]

Name

XYShutterInterlockRectParametersGet – gets rectangle shutter interlock parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks group type (must be a XY group): (-8)
- Checks group name: (-19)

Description

This function gets parameters of rectangle shutter interlock.

Prototype

int **XYShutterInterlockRectParametersGet** (

```
int SocketID,
char GroupName[250],
double *ImageRefX,
double *ImageRefY,
double *wl1, double *wl2, double *wl3, double *wl4,
double *wr1, double *wr2, double *wr3, double *wr4,
double *sL1, double *sL2, double *sL3, double *sL4,
double *sR1, double *sR2, double *sR3, double *sR4,
double *wMeanPeriod, double *wMeanVelocityMin,
double *wMeanVelocityInitial,
double *sMeanPeriod, double *sMeanVelocityMin,
double *sMeanVelocityInitial,
double *oMeanPeriod, double *oMeanVelocityMin,
double *oMeanVelocityInitial,
double *mL1, double *mL2, double *mR
)
```

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.

Output parameters

ImageRefX	double *	Image reference in X coordination.
ImageRefY	double *	Image reference in Y coordination.
wl1,wl2,wl3,wl4	double *	Wafer zone longer l1.l2, l3 and l4
wr1,wr2,wr3,wr4	double *	Wafer zone radius r1. r2, r3 and r4
sL1,sL2,sL3,sL4	double *	Skirt zone longer L1.L2, L3 and L4
sR1,sR2,sR3,sR4	double *	Skirt zone radius R1. R2, R3 and R4
wMeanPeriod	double *	Wafer zone mean period
wMeanVelocityMin	double *	Wafer zone mean velocity minimum
wMeanVelocityInitial	double *	Wafer zone mean velocity initial
sMeanPeriod	double *	Skirt zone mean period

sMeanVelocityMin	double *	Skirt zone mean velocity minimum
sMeanVelocityInitial	double *	Skirt zone mean velocity initial
oMeanPeriod	double *	Other zone mean period
oMeanVelocityMin	double *	Other zone mean velocity minimum
oMeanVelocityInitial	double *	Other zone mean velocity initial
mL1, mL2, mR	double *	Mirror zone longer (X,Y) and radius

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -19: Group name doesn't exist or unknown command.

7.2.1.440 XYShutterInterlockRectParametersSet [Extended]

Name

XYShutterInterlockRectParametersSet – sets rectangle shutter interlock parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks group type (must be a XY group): (-8)
- Checks group name: (-19)
- Checks if *ShutterInterlockMonitoringFlag = false* (-22 otherwise)
- Checks wl1,wl2,wl3,wl4, wr1,wr2,wr3,wr4 >= 0: (-17 otherwise)
- Checks sL1,sL2,sL3,sL4, sR1,sR2,sR3,sR4 >= 0: (-17 otherwise)
- Checks –wl1 + wr1 <= wl2 – wr2: (-17 otherwise)
- Checks –wl1 + wr3 <= wl2 – wr4: (-17 otherwise)
- Checks –wl4 + wr3 <= wl3 – wr1: (-17 otherwise)
- Checks –wl4 + wr4 <= wl3 – wr2: (-17 otherwise)
- Checks –sL1 + sR1 <= sL2 – sR2: (-17 otherwise)
- Checks –sL1 + sR3 <= sL2 – sR4: (-17 otherwise)
- Checks –sL4 + sR3 <= sL3 – sR1: (-17 otherwise)
- Checks –sL4 + sR4 <= sL3 – sR2: (-17 otherwise)
- Checks wMeanPeriod >= *10*CorrectorISRPeriod*ProfileGeneratorISRRatio*: (-17 otherwise)
- Checks wMeanVelocityMin >= 0: (-17 otherwise)
- Checks sMeanPeriod >= *10*CorrectorISRPeriod*ProfileGeneratorISRRatio*: (-17 otherwise)
- Checks sMeanVelocityMin >= 0: (-17 otherwise)
- Checks oMeanPeriod >= *10*CorrectorISRPeriod*ProfileGeneratorISRRatio*: (-17 otherwise)
- Checks oMeanVelocityMin >= 0: (-17 otherwise)

Description

This function sets parameters of rectangle shutter interlock.

Prototype

```
int XYShutterInterlockRectParametersSet (
    int SocketID,
    char GroupName[250],
    double ImageRefX,
    double ImageRefY,
    double wl1, double wl2, double wl3, double wl4,
    double wr1, double wr2, double wr3, double wr4,
    double sL1, double sL2, double sL3, double sL4,
    double sR1, double sR2, double sR3, double sR4,
    double wMeanPeriod, double wMeanVelocityMin,
    double wMeanVelocityInitial,
    double sMeanPeriod, double sMeanVelocityMin,
    double sMeanVelocityInitial,
    double oMeanPeriod, double oMeanVelocityMin,
    double oMeanVelocityInitial,
    double mL1, double mL2, double mR
    )
```

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.

ImageRefX	double	Image reference in X coordination.
ImageRefY	double	Image reference in Y coordination.
wl1,wl2,wl3,wl4	double	Wafer zone longer l1.l2, l3 and l4
wr1,wr2,wr3,wr4	double	Wafer zone radius r1. r2, r3 and r4
sL1,sL2,sL3,sL4	double	Skirt zone longer L1.L2, L3 and L4
sR1,sR2,sR3,sR4	double	Skirt zone radius R1. R2, R3 and R4
wMeanPeriod	double	Wafer zone mean period
wMeanVelocityMin	double	Wafer zone mean velocity minimum
wMeanVelocityInitial	double	Wafer zone mean velocity initial
sMeanPeriod	double	Skirt zone mean period
sMeanVelocityMin	double	Skirt zone mean velocity minimum
sMeanVelocityInitial	double	Skirt zone mean velocity initial
oMeanPeriod	double	Other zone mean period
oMeanVelocityMin	double	Other zone mean velocity minimum
oMeanVelocityInitial	double	Other zone mean velocity initial
mL1, mL2, mR	double	Mirror zone longer (X,Y) and radius

Output parameters

None

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -19: Group name doesn't exist or unknown command.
- -22: Not allowed action.

7.2.1.441 XYScanNextGet [Extended]

Name

XYScanNextGet – gets XY Scan parameters.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks group type (must be a XY group): (-8)
- Checks group name: (-19)

Description

This function gets parameters of the Scan feature.

Prototype

int **XYScanNextGet** (

int SocketID,
char GroupName[250],
double *MinStartVelocity,
double *MaxStartVelocity,
double *StartCheckingTime,
double *MinPositionForLaserEnable,
double *MaxPositionForLaserEnable,
double *MinPositionForNotchStart,
double *MaxPositionForNotchEnd

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.

Output parameters

MinStartVelocity	double *	Minimum start velocity.
MaxStartVelocity	double *	Maximum start velocity.
StartCheckingTime	double *	Start checking time.
MinPositionForLaserEnable	double *	Laser enable minimum position.
MaxPositionForLaserEnable	double *	Laser enable maximum position.
MinPositionForNotchStart	double *	Notch start minimum position.
MaxPositionForNotchEnd	double *	Notch end maximum position.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -19: Group name doesn't exist or unknown command.

7.2.1.442 XYScanNextSet [Extended]

Name

XYScanNextSet – sets parameters used for next scan.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks group type (must be a XY group): (-8)
- Checks group name: (-19)
- Checks that the system is not scanning (-22 otherwise)
- Checks MaximumStartVelocity ≥ MinimumStartVelocity ≥ 0 (-17 otherwise)
- Checks StartCheckingTime ≥ 0 (-17 otherwise)
- Checks MaximumPositionForLaserEnable >= MinimumPositionForLaserEnable (-17 otherwise)
- Checks MaximumPositionForNotchEnd >= MinimumPositionForNotchStart (-17 otherwise)

Description

This function sets the scan parameters used for next scan.

Prototype

int **XYScanNextSet** (

int SocketID,
char GroupName[250],
double MinStartVelocity,
double MaxStartVelocity,
double StartCheckingTime,
double MinPositionForLaserEnable,
double MaxPositionForLaserEnable,
double MinPositionForNotchStart,
double MaxPositionForNotchEnd

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.
MinStartVelocity	double	Minimum start velocity.
MaxStartVelocity	double	Maximum start velocity.
StartCheckingTime	double	Start checking time.
MinPositionForLaserEnable	double	Laser enable minimum position.
MaxPositionForLaserEnable	double	Laser enable maximum position.
MinPositionForNotchStart	double	Notch start minimum position.
MaxPositionForNotchEnd	double	Notch end maximum position.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.

- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -19: Group name doesn't exist or unknown command.
- -22: Not allowed action.

7.2.1.443 XYScanMoveAbsolute_[Extended]

Name

XYScanMoveAbsolute – makes a group absolute move for scan purpose.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks group type (must be a XY group): (-8)
- Checks group name: (-19)
- Checks target position in relation with the travel limits :
  - TargetPositionX ≥ MinimumTargetPosition (-17 otherwise)
  - TargetPositionX ≤ MaximumTargetPosition (-17 otherwise)
  - TargetPositionY ≥ MinimumTargetPosition (-17 otherwise)
  - TargetPositionY ≤ MaximumTargetPosition (-17 otherwise)
- Checks start position in relation with the current position and the target position (-17 otherwise)
- Checks that XYScanNextSet API was executed previously (-22 otherwise)
- Checks group status must be "READY": (-22 otherwise)

Description

This function makes a group absolute move to X and Y target positions for scan purpose.
The absolute move refers to the acceleration, velocity, minimum jerk time and maximum jerk time predefined in the "stages.ini" or redefined with the "PositionerSGammaParametersSet" API.

Prototype

int **XYScanMoveAbsolute** (

int SocketID,
char GroupName[250],
double TargetPositionX,
double TargetPositionY,
double StartPosition,
int *ScanErrorCode,
double *MinimumRecordedVelocity,
double *MaximumRecordedVelocity,
double *AverageScanVelocity

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.
TargetPositionX	double	X target position.
TargetPositionY	double	Y target position.
StartPosition	double	Start position.

Output parameters

ScanErrorCode	int *	Scan error code.
MinimumRecordedVelocity	double *	Minimum recorded velocity.
MaximumRecordedVelocity	double *	Maximum recorded velocity.

AverageScanVelocity	double *	Average scan velocity.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -19: Group name doesn't exist or unknown command.
- -22: Not allowed action.
- -25: Following Error.
- -26: Kill command or Emergency signal: check each positioners and each slave positioners, check that motion does not exceed software limits when combined with mapping and other features.
- -27: Move Aborted.
- -33: Motion done timeout.

7.2.1.444 XYScanMoveRelative [Extended]

Name

XYScanMoveRelative – makes a group relative move for scan purpose.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks group type (must be a XY group): (-8)
- Checks group name: (-19)
- Checks target position in relation with the travel limits :
  - TargetPositionX ≥ MinimumTargetPosition (-17 otherwise)
  - TargetPositionX ≤ MaximumTargetPosition (-17 otherwise)
  - TargetPositionY ≥ MinimumTargetPosition (-17 otherwise)
  - TargetPositionY ≤ MaximumTargetPosition (-17 otherwise)
- Checks start position in relation with the current position and the target position (-17 otherwise)
- Checks that XYScanNextSet API was executed previously (-22 otherwise)
- Checks group status must be "READY": (-22 otherwise)

Description

This function makes a group relative move with X and Y target displacement for scan purpose.
The relative move refers to the acceleration, velocity, minimum jerk time and maximum jerk time predefined in the "stages.ini" or redefined with the "PositionerSGammaParametersSet" API.

Prototype

int **XYScanMoveRelative** (

int SocketID,
char GroupName[250],
double TargetDisplacementX,
double TargetDisplacementY,
double StartDisplacement,
int *ScanErrorCode,
double *MinimumRecordedVelocity,
double *MaximumRecordedVelocity,
double *AverageScanVelocity

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.
TargetDisplacementX	double	X target displacement.
TargetDisplacementX	double	Y target displacement.
StartDisplacement	double	Start displacement.

Output parameters

ScanErrorCode	int *	Scan error code.
MinimumRecordedVelocity	double *	Minimum recorded velocity.
MaximumRecordedVelocity	double *	Maximum recorded velocity.

AverageScanVelocity double * Average scan velocity.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -19: Group name doesn't exist or unknown command.
- -22: Not allowed action.
- -25: Following Error.
- -26: Kill command or Emergency signal: check each positioners and each slave positioners, check that motion does not exceed software limits when combined with mapping and other features.
- -27: Move Aborted.
- -33: Motion done timeout.

7.2.1.445 XYScanExecutePVT [Extended]

Name

XYScanExecutePVT – Executes a PVT trajectory for X and Y with scan activated.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks group type (must be a XY group): (-8)
- Checks group name: (-19)
- Check trajectory file name: (-61)
- Check execution number > 0: (-17 otherwise)
- Checks that XYScanNextSet API was executed previously: (-22 otherwise)
- Checks group status must be "READY": (-22 otherwise)

Description

This function executes a PVT trajectory for X and Y with scan activated.

Prototype

int **XYScanExecutePVT** (

int SocketID,
char GroupName[250],
char PVTTrajectoryFileName[250],
int ExecutionNumber,
int *ScanErrorCode,
double *MinimumRecordedVelocity,
double *MaximumRecordedVelocity,
double *AverageScanVelocity

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Group name.
PVTTrajectoryFileName	char *	PVT trajectory file name.
ExecutionNumber	int	Number of executions.

Output parameters

ScanErrorCode	int *	Scan error code.
MinimumRecordedVelocity	double *	Minimum recorded velocity.
MaximumRecordedVelocity	double *	Maximum recorded velocity.
AverageScanVelocity	double *	Average scan velocity.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -19: Group name doesn't exist or unknown command.

- -22: Not allowed action.
- -61: Error file corrupt or file doesn't exist.
- -72: Error trajectory initialization.

7.2.1.446 XYClampDisable [Extended]

Name

XYClampDisable – unclamps XY group.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Invalid object type (group): (-8)
- Invalid positioner name: (-18)
- Invalid group name: (-19)

Description

This function unclamps the selected XY group

The group must be in the CLAMPED state. If unclamping is successful, the group is unclamped and the group state becomes "READY".

Prototype

int **XYClampDisable**(

int SocketID,

char * GroupName

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	XY group name.

Output parameters

None.

Return (In addition to the results of "Input Tests Common to all XPS Functions")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.
- -19: GroupName doesn't exist or unknown command.
- -22: Not allowed action.

7.2.1.447 XYClampEnable [Extended]

Name

XYClampEnable – clamps a XY group.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Invalid object type (group): (-8)
- Invalid positioner name: (-18)
- Invalid group name: (-19)

Description

This function clamps the selected XY group.

The group must be in the READY state. If clamping is successful, the group is clamped and the group state becomes "CLAMPED".

Prototype

int **XYClampEnable**(

int SocketID,

char * GroupName

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	XY group name.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.
- -19: GroupName doesn't exist or unknown command.
- -22: Not allowed action.

7.2.1.448 MaskClampDisable [Extended]

Name

MaskClampDisable – Disables Mask clamping.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Invalid object type (group): (-8)
- Invalid positioner name: (-18)
- Invalid group name: (-19)

Description

This function unclamps the Mask group

The group must be in the CLAMPED state.

Prototype

int **MaskClampDisable**(

int SocketID,

char * GroupName

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Mask group name.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.
- -19: GroupName doesn't exist or unknown command.

7.2.1.449 MaskClampEnable [Extended]

Name

MaskClampEnable – Enables Mask clamping.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Invalid object type (group): (-8)
- Invalid positioner name: (-18)
- Invalid group name: (-19)

Description

This function enables Mask clamping.

Prototype

int **MaskClampEnable**(
int SocketID,
char * GroupName
)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Mask group name.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.
- -19: GroupName doesn't exist or unknown command.

7.2.1.450 MaskClampStateGet [Extended]

Name

MaskClampStateGet – Gets Mask clamping state.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Invalid object type (group): (-8)
- Invalid positioner name: (-18)
- Invalid group name: (-19)

Description

This function gets Mask clamping state.

TRUE = Mask clamp is enabled.

False = Mask clamp is disabled.

Prototype

int **MaskClampStateGet** (

int SocketID,

char * GroupName

bool * MaskState

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	Mask group name.

Output parameters

MaskState	bool *	Mask clamping state.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Positioner Name doesn't exist or unknown command.
- -19: GroupName doesn't exist or unknown command.

7.2.2 Special Functions

The functions described in this section are for a specific controller configuration, please contact Newport for further information.

7.2.2.1 AbortMove

Name

AbortMove – abort the motion or the jog in progress for the XY group.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".

Description

This function allows aborting a motion or a jog in progress. The group status must be "MOVING" or "JOGGING" else the (-22) error is returned.

If the group status is "MOVING", this function stops all motion in progress.

If the group status is "JOGGING", this function stops all "jog" motion in progress and disables the jog mode. After this "group move abort" action, the group status becomes "READY".

Prototype

int **AbortMove**(

int SocketID

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -27: Move Aborted.

7.2.2.2 EndJog

Name

EndJog – Disables the jog mode in the XY group.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Group must be "XY": (-8)
- Checks the group name: (-19)
- Group status must be "READY": (-22)

Description

This This function disables the Jog mode for the first declared XY group. To use this function, the group must be in the "JOGGING" state and all positioners must be idle (means velocity must be 0).

This function allows to exit the "JOGGING" state and to come back to the "READY" state. If the group state is not "JOGGING" or if the profiler velocity is not null then the (-22) error is returned.

NOTE

Use the "StartJog" function to enable the jog mode.

Prototype

```
int GetJogAcceleration(
    int SocketID
    )
```

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.

Output parameters

None.

Return (In addition to the results of "Input Tests Common to all XPS Functions")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Not allowed due to a positioner error or hardware status.
- -19: GroupName doesn't exist or unknown command.
- -22: Not allowed action.

7.2.2.3 GetAccParams

Name

GetAccParams – Gets acceleration parameters for X and Y axes.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".

Description

This API gets the current acceleration parameters for X and Y axes.

The smooth factor represents the jerk time and all parameters unit in milliseconds.

Prototype

int **GetAccParams**(

int SocketID,

int * XaccTime_ms,

int * XsmoothFactor_ms,

int * YaccTime_ms,

int * YsmoothFactor_ms

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.

Output parameters

XaccTime_ms	int *	X acceleration time in msec.
XsmoothFactor_ms	int *	X Smooth factor in msec (jerk time).
YaccTime_ms	int *	Y acceleration time in msec.
YsmoothFactor_ms	int *	Y Smooth factor in msec (jerk time).

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.

7.2.2.4 GetBrakeState

Name

GetBrakeState– Gets the brake status.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".

Description

This function reads the current brake command signal state from Inhibit or GPIO connector.

Brake command signal:

- 0 = Brake OFF
- 1 = Brake ON

Prototype

int **GetBrakeState**(
int SocketID,
int * BrakeStatus
)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.

Output parameters

BrakeStatus	int *	The brake status.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.

7.2.2.5 GetCurrentPosition

Name

GetCurrentPosition – Gets all current positions of X, X2 and Y.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the positioner name is valid: (-18)
- Not allowed due to configuration disabled: (-121)
- Not allowed because group is not initialized or not referenced: (-135)

Description

Read all current positions of Y, X, X2, Y laser and X laser.

Units:

Y and X positions: µm

X1 and X2 positions: counts

Y and X laser positions: counts

Prototype

int **GetCurrentPosition** (int SocketID, double * y_position_um, double * x_position_um, int * x1_position_cnts, int * x2_position_cnts, int * y_laser_position_cnts, int * x_laser_position_cnts)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.

Output parameters

y_position_um	double *	Y position in µm.
x_position_um	double *	X position in µm.
x1_position_cnts	int *	X1 position in counts.
x2_position_cnts	int *	X2 position in counts.
y_laser_position_cnts	int *	Y laser position in counts.
x_laser_position_cnts	int *	X laser position in counts.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -18: PositionerName doesn't exist or unknown command.
- -121: Not allowed due to configuration disabled.
- -135: Not allowed because group is not initialized or not referenced.

7.2.2.6 GetGantryMode

Name

GetGantryMode – Gets Gantry mode.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the set option: (-17)
- Checks the group name is valid: (-19)
- Verifies gantry mode getting is allowed: (-22)

Description

Get the current gantry option. Three "gantry" options are available:

- Option0 = >Gantry standard.
- Option1 = >Gantry force balance.
- Option2 = >Gantry force balance with interferometer.

Prototype

int **GetGantryMode**(
int SocketID,
char * Option
)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.

Output parameters

Option	char *	Option selection(Option0, Option1 or Option2).

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -17: Parameter out of range or incorrect.
- -19: GroupName doesn't exist or unknown command.
- -22: Not allowed action.

7.2.2.7 GetJogAcceleration

Name

GetJogAcceleration – Gets the acceleration set by "SetJogAcceleration".

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Group must be "XY": (-8)
- Checks the positioner name: (-18)
- Checks the group name: (-19)

Description

This function returns the acceleration setting by the user to use the jog mode for one positioner or for all positioners of the XY group.

Prototype

int **GetJogAcceleration**(

int SocketID,

int * XaccelerationTime_ms,

int * XsmoothFactor_ms,

int * YaccelerationTime_ms,

int * YsmoothFactor_ms

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
XaccelerationTime_ms	int *	User jog Acceleration time for X in ms.
XsmoothFactor_ms	int *	User jog Smooth factor for X in ms.
YaccelerationTime_ms	int *	User jog Acceleration time for Y in ms.
YsmoothFactor_ms	int *	User jog Smooth factor for Y in ms.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Not allowed due to a positioner error or hardware status.
- -19: GroupName doesn't exist or unknown command.

7.2.2.8 GetJogVelocity

Name

GetJogVelocity – Changes "on the fly" the velocity in the jog mode.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Group must be "XY": (-8)
- Checks the positioner name: (-18)
- Checks the group name: (-19)

Description

This function returns jog velocities and the jog velocity acknowledge timeout in milliseconds used by the jog mode in the XY group.

Prototype

int **GetJogVelocity**(

int SocketID,

double * Xvelocity,

double * Yvelocity,

int * joystickAckTimeout_ms

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.

Output parameters

Xvelocity	double *	user jog velocity for X in µm/s.
Yvelocity	double *	user jog velocity for Y in µm/s.
joystickAckTimeout_ms	int *	user jog velocity acknowledge timeout in ms.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Not allowed due to a positioner error or hardware status.
- -19: GroupName doesn't exist or unknown command.

7.2.2.9 GetPistonState

Name

GetPistonState – Gets current status of Piston and Lift Pin.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".

Description

Read the current status of Piston and Lift Pin :

- Piston command status.
- Piston limit UP (Engaged).
- Piston limit DOWN (Released).
- Lift Pin UP.

Piston signal meaning :

Piston Command Status	**0**	Release piston
	1	Engage piston

Piston Engaged Status	**0**	Not Engaged
	1	Engaged

Piston Released Status	**0**	Not Released
	1	Released

Lift Pin UP Status	**0**	DOWN
	1	UP

Prototype

int **GetPistonState**(
int SocketID,
int * CommandState,
int * isEngaged,
int * isReleased,
int * LiftPinUPInterlock
)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.

Output parameters

CommandState	int *	Status of the Piston command (0 or 1).
isEngaged	int *	Status of the Piston Engaged (0 or 1).
isReleased	int *	Status of the Piston Released (0 or 1).
LiftPinUPInterlock	int *	Status of the Lift Pin UP (0 or 1).

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -7: Wrong format in the command string.
- -9: Wrong number of parameters in the command.
- -15: Wrong parameter type in the command string: int, short, int * or short * expected.

7.2.2.10 GetVarX

Name

GetVarX – Sets new value for a specified parameter name from stages.ini for Y positioner.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks input parameter value: (-17)
- Checks positioner name: (-18)
- Verifies the positioner is from a XY group: (-22)

Description

Get parameter value from stages.ini file for the X positioner.

Prototype

int **GetVarX**(

int SocketID,

char * ParameterName,

double * ParameterValue

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
ParameterName	char *	Stages.ini parameter name.

Output parameters

ParameterValue	double *	The value to be set for the "ParameterName".

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -17: Parameter out of range or incorrect.
- -18: Positioner Name doesn't exist or unknown command.
- -22: Not allowed action.

7.2.2.11 GetVarXSecondary

Name

GetVarXSecondary – Gets the configured value of the parameter name from stages.ini for X secondary positioner.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks input parameter value: (-17)
- Checks positioner name: (-18)
- Verifies the positioner is from a XY group: (-22)

Description

Get the configured value of the parameter name from stages.ini for X secondary positioner.

Prototype

int **GetVarXSecondary**(

int SocketID,

char * ParameterName,

double * ParameterValue

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
ParameterName	char *	Stages.ini parameter name.

Output parameters

ParameterValue	double *	The value to be set for the "ParameterName".

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -17: Parameter out of range or incorrect.
- -18: Positioner Name doesn't exist or unknown command.
- -22: Not allowed action.

7.2.2.12 GetVarY

Name

GetVarY – Gets the configured value of the parameter name from stages.ini for Y positioner.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks input parameter value: (-17)
- Checks positioner name: (-18)
- Verifies the positioner is from a XY group: (-22)

Description

Get the configured value of the parameter name from stages.ini for Y positioner.

Prototype

int **GetVarY**(

int SocketID,

char * ParameterName,

double * ParameterValue

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
ParameterName	char *	Stages.ini parameter name.

Output parameters

ParameterValue	double *	The value to be set for the "ParameterName".

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -17: Parameter out of range or incorrect.
- -18: Positioner Name doesn't exist or unknown command.
- -22: Not allowed action.

7.2.2.13 GetVelParams

Name

GetVelParams – Gets current velocity for X and Y axes.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks motion profile: (-8)

Description

This API updates the current acceleration parameters for X and Y axes.

The smooth factor represents the jerk time and all parameters unit in milliseconds.

Prototype

int **GetVelParams**(

int SocketID,

double * Xvelocity,

double * Yvelocity

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.

Output parameters

Xvelocity	double *	X velocity in µm/s.
Yvelocity	double *	Y velocity in µm/s.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.

7.2.2.14 GetVerCommand

Name

GetVerCommand – Return firmware version.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".

Description

This function returns the controller name and the firmware version number.

Example of returned version string: "XPS-Q8 Firmware V2.1.0"

- Controller name is XPS-Q8.
- Firmware version is V2.1.0.

Prototype

int **GetVerCommand**(

int SocketID,

char * Version

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.

Output parameters

Version	char *	The firmware version.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.

7.2.2.15 GetXVelParams

Name

GetXVelParams – This API returns the current velocity parameter in µm/s for X axis.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks motion profile: (-8)

Description

This API returns the current velocity parameter in µm/s for X axis.

Prototype

int **GetXVelParams**(
int SocketID,
double * Xvelocity
)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.

Output parameters

Xvelocity	double *	X velocity in µm/s.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.

7.2.2.16 GetYVelParams

Name

GetYVelParams – This API returns the current velocity parameter in µm/s for Y axis.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks motion profile: (-8)

Description

This API returns the current velocity parameter in µm/s for Y axis.

Prototype

int **GetYVelParams**(
int SocketID,
double * Yvelocity
)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.

Output parameters

Yvelocity	double *	Y velocity in µm/s.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.

7.2.2.17 GetZone

Name

GetZone – Gets current parameters of the defined circle zone.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the positioner name is valid: (-18)
- Not allowed due to configuration disabled: (-121)
- Not allowed because group is not initialized or not referenced: (-135)

Description

Get current parameters of the defined circle zone. A digital output is defined in the stage.ini file. It's always available after the home search. All parameters are defined in µm. The Radius and Hysteresis are defined to signal when going out the circle.

Prototype

int **GetZone** (int SocketID, double * x_center_um, double * y_center_um, double * radius_um, double * hysteresis_um)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.

Output parameters

x_center_um	double *	X center in µm.
y_center_um	double *	Y center in µm.
radius_um	double *	Radius in µs.
hysteresis_um	double *	Hysteresis in µm.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -18: PositionerName doesn't exist or unknown command.
- -121: Not allowed due to configuration disabled.
- -135: Not allowed because group is not initialized or not referenced.

7.2.2.18 InitializeAndHomeX

Name

InitializeAndHomeX – Do home search on X axis.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the set option: (-17)
- Verifies this command is allowed: (-22)
- Checks state of physical ends of run: (-113)
- Checks the opened socked is valid: (-200)
- Checks this command is enabled for the current controller configuration: (-205)

Description

Initializes the motor, calibrates the encoder and activates the servo loop of each positioner of the XY group.

Next, performs a home search on the X positioner and configures the gantry mode used after homing.

Once the home search is finished with success, the group must be in "READY" state only if the Y positioner is already referenced. If it's not the case, a home search on the Y positioner must be done.

To be "READY", all axes must be referenced.

NOTE

The home search routine for each positioner is defined in the "stages.ini" file by the "HomeSearchSequenceType" key.

The home search time out is defined in the "stages.ini" file by the "HomeSearchTimeOut" key.

Prototype

int **InitializeAndHomeX**(

int SocketID,

char * Option

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
Option	char *	Option selection(Option0, Option1 or Option2).

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -17: Parameter out of range or incorrect.
- -22: Not allowed action.
- -25: Following Error.
- -28: Home search timeout.
- -33: Motion done timeout.
- -35: Position is outside of travel limits.
- -49: Inconsistent mechanical zero during home search.
- -50: Motor initialization error. Check InitializationAccelerationLevel, ScalingAcceleration, MaximumJerkTime, EncoderResolution or EncoderScalePitch.
- -113: Both ends of run activated.
- -200: Invalid socket.
- -202: Not allowed action due to an external motion interlock.
- -205: Not enable in your configuration.
- -208: Not allowed action because piston is engaged.
- -1004: Zygo signal is not present.

7.2.2.19 InitializeAndHomeXY

Name

InitializeAndHomeXY – Do home search on X then Y axis.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the set option: (-17)
- Verifies this command is allowed: (-22)
- Checks state of physical ends of run: (-113)
- Checks the opened socked is valid: (-200)
- Checks this command is enabled for the current controller configuration: (-205)

Description

This function initializes the motor, calibrates the encoder and activates the servo loop of each positioner of the XY group. Then, it performs a home search on X positioner and after on Y positioner. It configures the gantry mode used after homing.

Once the home search is finished with success, the group must be in "READY" state.

NOTE

The selected gantry option during the initialization phase is Option0.

The home search routine for each positioner is defined in the "stages.ini" file by the "HomeSearchSequenceType" key.

The home search time out is defined in the "stages.ini" file by the "HomeSearchTimeOut" key.

The home search sequence is defined in the "stages.ini" file by the "InitializationAndHomeSearchSequence".The value must be "XthenY".

Prototype

int **InitializeAndHomeXY**(

int SocketID,

char * Option

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
Option	char *	Option selection(Option0, Option1 or Option2).

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -17: Parameter out of range or incorrect.
- -22: Not allowed action.
- -25: Following Error.
- -26: Kill command or Emergency signal: check each positioners and each slave positioners, check that motion does not exceed software limits when combined with mapping and other features.
- -27: Move Aborted.
- -28: Home search timeout.
- -33: Motion done timeout.
- -35: Position is outside of travel limits.
- -44: Slave error disabling master.
- -49: Inconsistent mechanical zero during home search.
- -50: Motor initialization error. Check InitializationAccelerationLevel, ScalingAcceleration, MaximumJerkTime, EncoderResolution or EncoderScalePitch.
- -113: Both ends of run activated.
- -120: Warning following error during move with position compare enabled.
- -200: Invalid socket.
- -205: Not enable in your configuration.

7.2.2.20 InitializeAndHomeY

Name

InitializeAndHomeY – Do home search on Y axis.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Verifies this command is allowed: (-22)
- Checks state of physical ends of run: (-113)
- Checks the opened socked is valid: (-200)
- Checks this command is enabled for the current controller configuration: (-205)

Description

This function initializes the motor, calibrates the encoder and activates the servo loop of each positioner of the XY group. Then, it performs a home search on the Y positioner.

Once the home search is finished with success, the group must be in "READY" state only if the X positioner is already referenced. If it's not the case, a home search on the X positioner must be done.

To be in "READY" state, all axes must be referenced.

NOTE

The home search routine for each positioner is defined in the "stages.ini" file by the "HomeSearchSequenceType" key.

The home search time out is defined in the "stages.ini" file by the "HomeSearchTimeOut" key.

Prototype

int **InitializeAndHomeY**(

int SocketID

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -22: Not allowed action.
- -25: Following Error.
- -28: Home search timeout.
- -33: Motion done timeout.
- 35: Position is outside of travel limits.
- -49: Inconsistent mechanical zero during home search.
- -50: Motor initialization error. Check InitializationAccelerationLevel, ScalingAcceleration, MaximumJerkTime, EncoderResolution or EncoderScalePitch.
- -113: Both ends of run activated.
- -200: Invalid socket.
- -202: Not allowed action due to an external motion interlock.
- -205: Not enable in your configuration.
- -208: Not allowed action because piston is engaged.
- -1004: Zygo signal is not present.

7.2.2.21 MoveAbsolute

Name

MoveAbsolute – Moves the stage to the end position. The positions are defined in um.

Input tests

- Refer to section 7.1: “Input Tests Common to all XPS Functions”.
- Invalid object type (group or positioner): (-8)
- Verifies target position in relation with the travel limits: (-17)
  - TargetPosition ≥MinimumTargetPosition.
  - TargetPosition ≤MaximumTargetPosition.
- Invalid positioner name: (-18)
- Invalid group name: (-19)
- Group status must be "READY” or “MOVING”: (-22)

Description

This function executes an absolute motion to go to a target XY position. The group state must be “READY” or “MOVING” else the (-22) error is returned. If the group is “READY” then the group status becomes “MOVING”.

Each “positioner” move refers to the acceleration, velocity, minimumTjerkTime and maximumTjerkTime as defined in the “Stages.ini” file or as redefined by the “PositionerSGammaParametersSet” function.

If a slave error or a following error is detected during the moving then (-25) or ERR_SLAVE (-44) error is returned. In this case, the motion in progress is stopped and the group status becomes “DISABLE”.

If a “MotionDoneMode” is defined as “VelocityAndPositionWindowMotionDone” then an (-33) error can be returned if the time out (defined by “MotionDoneTimeout” in the stages.ini file) is reached before the motion done.

If “AbortMove” or “GroupMoveAbort” is done, an (-27) error is returned. In this case, the motion in progress is stopped and the group status becomes “READY”.

If a “GroupKill” command, an emergency brake or an emergency stop is occurred, an (-26) error is returned. In this case, the motion in progress is stopped and the group status becomes “NOT INITIALIZED”.

NOTE

The asynchronous moves for positioners of the same group are possible through the use of different sockets to send the function.

Prototype

int **MoveAbsolute**(

int SocketID,

double PositonAbsoluteX_um,

double PositionAbsoluteY_um

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositonAbsoluteX_um	double	Target position in µm for X axis.
PositonAbsoluteY_um	double	Target position in µm for Y axis.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -17: Parameter out of range or incorrect.
- -18: Positioner Name doesn't exist or unknown command.
- -19: GroupName doesn't exist or unknown command.
- -22: Not allowed action.
- -25: Following Error.
- -26: Kill command or Emergency signal: check each positioners and each slave positioners, check that motion does not exceed software limits when combined with mapping and other features.
- -27: Move Aborted.
- -33: Motion done timeout.
- -44: Slave error disabling master.
- -120: Warning following error during move with position compare enabled.

7.2.2.22 MoveSlice

Name

MoveSlice – Executes a slice move on an XY group.

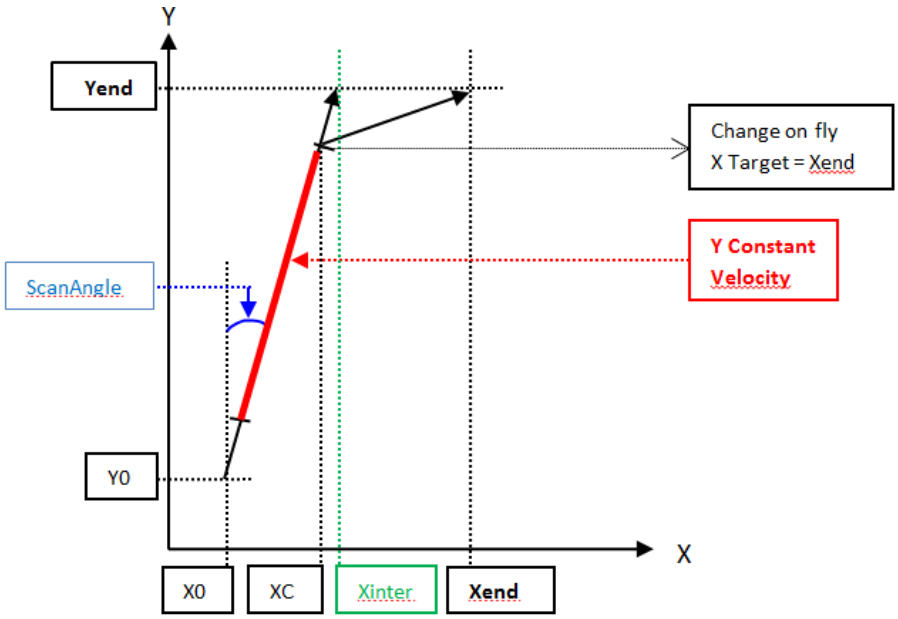
Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Verifies target position in relation with the travel limits: (-17)
- Checks the group status, it must be "READY" state: (-22)

Description

This API moves the stage to perform a "U-turn".

The slice move begins a linear interpolation to move to (Xinter, Yend) but when the stage has finished the constant velocity phase, the slice move changes the target position to go to (Xend, Yend).



Prototype

int **MoveSlice**(

int SocketID,

double Yend_um,

double Xend_um,

double ScanAngle_urad

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
Yend_um	double	y target position in µm.
Xend_um	double	x target position in µm.
ScanAngle_urad	double	Scan angle in µrad.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -5: Not allowed due to a positioner error or hardware status.
- -17: Parameter out of range or incorrect.
- -22: Not allowed action.
- -202: Not allowed action due to an external motion interlock.
- -208: Not allowed action because piston is engaged.
- -1004: Zygo signal is not present.

7.2.2.23 RequestType1

Name

RequestType1– Gets data collection Type 1.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".

Description

This function returns the data collection of type1.

Prototype

int **RequestType1**(
int SocketID,
char * Header,
charhex32 * TimeStamp,
charhex32 * 1DFe,
charhex32 * 1DPos,
charhex32 * XFe,
charhex32 * XPos,
charhex32 * YawFe,
charhex32 * YawPos,
charhex32 * YFe,
charhex32 * YPos,
charhex32 * XMotor,
charhex32 * YMotor,
charhex32 * XSinCos,
charhex32 * YSinCos
)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.

Output parameters

Header	char *	Type1, Type2 or Type3.
TimeStamp	charhex32 *	Internal counter in milliseconds.
1DFe	charhex32 *	1D+ following error in µm.
1DPos	charhex32 *	1D+ current position in µm.
XFe	charhex32 *	X following error in µm.
XPos	charhex32 *	Yaw following error in µm.
YawFe	charhex32 *	Yaw current position in µm.
YFe	charhex32 *	Y following error in µm.
YPos	charhex32 *	Y current position in µm.
XMotor	charhex32 *	X motor current in 1/10000 full scale.
YMotor	charhex32 *	Y motor current in 1/10000 full scale.
XSinCos	charhex32 *	X Sin Cos in Volts.
YSinCos	charhex32 *	Y Sin Cos in Volts.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -100: Internal error (memory allocation error, …).
- -136: Wrong parameter type in the command string: charhex32 * expected.

7.2.2.24 RequestType2

Name

RequestType2– Gets data collection Type 2.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".

Description

This function returns the data collection of type2.

Prototype

int **RequestType2**(

int SocketID,

char * Header,

charhex32 * TimeStamp,

charhex32 * ZygoLaserPower

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.

Output parameters

Header	char *	Type1, Type2 or Type3.
TimeStamp	charhex32 *	Internal counter in milliseconds.
ZygoLaserPower	charhex32 *	Zygo Laser Power (ON = 1, OFF = 0).

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -2: TCP timeout.
- -136: Wrong parameter type in the command string: charhex32 * expected.
- -205: Not enable in your configuration.
- -1000: Zygo command execution failed.
- -1001: The controller is not connected to Zygo TCP server. Run ZygoStartInterferometer API.
- Zygo errors: Refer to section 8.9: "Error List".

7.2.2.25 RequestType3

Name

RequestType3– Gets data collection Type 3.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".

Description

This function returns the data collection of type3.

Prototype

int **RequestType3**(
int SocketID,
char * Header,
charhex32 * TimeStamp,
charhex32 * ZygoSignalStrength1,
charhex32 * ZygoSignalStrength2
)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.

Output parameters

Header	char *	Type1, Type2 or Type3.
TimeStamp	charhex32 *	Internal counter in milliseconds.
ZygoSignalStrength1	charhex32 *	Zygo Signal Strength 1.
ZygoSignalStrength2	charhex32 *	Zygo Signal Strength 2.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -2: TCP timeout.
- -17: Parameter out of range or incorrect.
- -136: Wrong parameter type in the command string: charhex32 * expected.
- -205: Not enable in your configuration.
- -1000: Zygo command execution failed.
- -1001: The controller is not connected to Zygo TCP server. Run ZygoStartInterferometer API.
- Zygo errors: Refer to section 8.9: "Error List".

7.2.2.26 SetAccParams

Name

SetAccParams – Sets acceleration parameters for X and Y axes.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".

Description

This API updates the current acceleration parameters for X and Y axes.

The smooth factor represents the jerk time and all parameters unit in milliseconds.

Prototype

int **SetAccParams**(

int SocketID,

int XaccTime_ms,

int XsmoothFactor_ms,

int YaccTime_ms,

int YsmoothFactor_ms

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
XaccTime_ms	int	X acceleration time in msec.
XsmoothFactor_ms	int	X Smooth factor in msec (jerk time).
YaccTime_ms	int	Y acceleration time in msec.
YsmoothFactor_ms	int	Y Smooth factor in msec (jerk time).

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.

7.2.2.27 SetBrake

Name

SetBrake– Sets Brake command.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks if the break feature is enabled: (-205)

Description

This function sets brake command signal from Inhibit or GPIO connector.

Brake commands:

- 0 = Brake OFF
- 1 = Brake ON

Prototype

int **SetBrake**(
int SocketID,
int Command
)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
Command	int	Brake command (0 or 1).

Output parameters

None.

Return (In addition to the results of "Input Tests Common to all XPS Functions")

- 0: No error.
- -17: Parameter out of range or incorrect.
- -205: Not enable in your configuration.

7.2.2.28 SetGantryMode

Name

SetGantryMode – Sets Gantry mode (Option0, Option1 or Option2).

Input tests

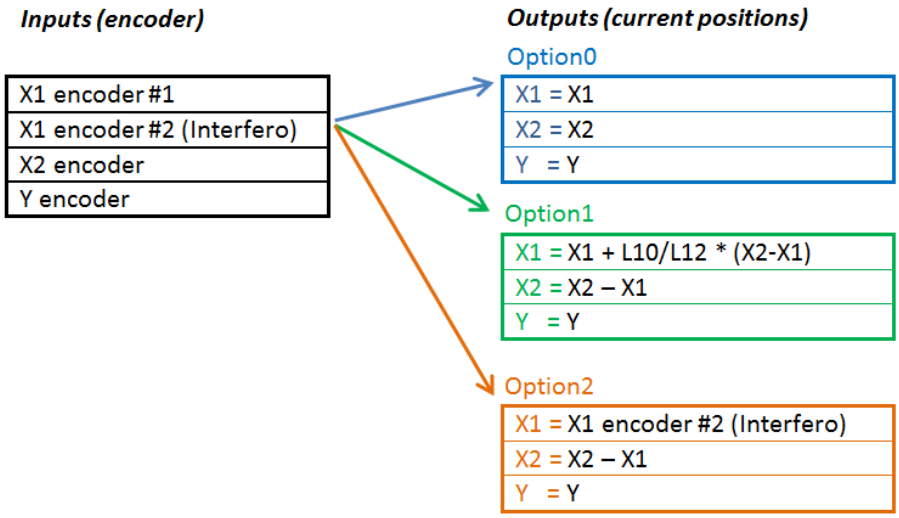
- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the set option: (-17)
- Checks the group name is valid: (-19)
- Checks if XY gantry mode is enabled: (-205)

Description

Set the gantry option to use. It's possible to configure the gantry mode only when the XY group is in "READY" or "DISABLE" state.

Three "gantry" options are available:

- Option0 = >Gantry standard.
- Option1 = >Gantry force balance.
- Option2 = >Gantry force balance with interferometer.



Prototype

int **SetGantryMode**(
int SocketID,
char * Option
)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
Option	char *	Option selection(Option0, Option1 or Option2).

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -17: Parameter out of range or incorrect.
- -19: GroupName doesn't exist or unknown command.
- -205: Not enable in your configuration.

7.2.2.29 SetJogAcceleration

Name

SetJogAcceleration – Changes the acceleration parameters in the jog mode.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Group must be "XY": (-8)
- Checks the positioner name: (-18)
- Checks the group name: (-19)
- Group status must be "JOGGING": (-22)

Description

This function allows changing the acceleration used by the jog mode. If an error occurs, each positioner stops and the velocity value is set to zero.

To use this function, the jog mode must be enabled (the call of "StartJog" function is required). If the group status is not "JOGGING" then the (-22) error is returned.

If a slave error or a following error is detected during the jog setting then (-25) error or (-44) error is returned. In this case, the motion is stopped, the jog mode is disabled and the group status becomes "DISABLE".

Prototype

int **SetJogAcceleration**(
int SocketID,
int XaccelerationTime_ms,
int XsmoothFactor_ms,
int YaccelerationTime_ms,
int YsmoothFactor_ms
)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
XaccelerationTime_ms	int	User jog Acceleration time for X in ms.
XsmoothFactor_ms	int	User jog Smooth factor for X in ms.
YaccelerationTime_ms	int	User jog Acceleration time for Y in ms.
YsmoothFactor_ms	int	User jog Smooth factor for Y in ms.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Not allowed due to a positioner error or hardware status.
- -19: GroupName doesn't exist or unknown command.
- -22: Not allowed action.

7.2.2.30 SetJogVelocity

Name

SetJogVelocity – Changes "on the fly" the velocity in the jog mode.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Group must be "XY": (-8)
- Checks the positioner name: (-18)
- Checks the group name: (-19)
- Group status must be "JOGGING": (-22)

Description

This function allows changing "on the fly" the velocity used by the jog mode in the XY group. If an error occurs, each positioner stops and the velocity value is set to zero.

To use this function, the jog mode must be enabled (the call of the "StartJog" function is required). If the group status is not "JOGGING" then the (-22) error is returned.

If a slave error or a following error is detected during the jog setting then the (-25) error or (-44) error is returned. In this case, the motion is stopped, the jog mode is disabled and the group status becomes "DISABLE".

NOTE

This function is available only for an XY group.

Prototype

int **SetJogVelocity**(
int SocketID,
double Xvelocity,
double Yvelocity,
int joystickAckTimeout_ms
)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
Xvelocity	double	user jog velocity for X in µm/s.
Yvelocity	double	user jog velocity for Y in µm/s.
joystickAckTimeout_ms	int	user jog velocity acknowledge timeout in ms.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Not allowed due to a positioner error or hardware status.
- -19: GroupName doesn't exist or unknown command.
- -22: Not allowed action.

7.2.2.31 SetPiston

Name

SetPiston – Sets command to engage or release piston.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks if the brake feature is enabled: (-205)
- Check if try to release piston when Lift Pin is UP: (-202)

Description

Send command to engage or release piston.

Piston commands:

- 0 = Release Piston
- 1 = Engage Piston

Prototype

int **SetPiston**(
int SocketID,
int Command
)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
Command	int	Piston command (0 or 1).

Output parameters

None.

Return (In addition to the results of "Input Tests Common to all XPS Functions")

- 0: No error.
- -17: Parameter out of range or incorrect.
- -202: Not allowed action due to an external motion interlock.
- -205: Not enable in your configuration.

7.2.2.32 SetVarX

Name

SetVarX – Sets new value for a specified parameter name from stages.ini for X positioner.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks input parameter value: (-17)
- Checks positioner name: (-18)
- Verifies the positioner is from a XY group: (-22)

Description

Set new value for the specified parameter name from stages.ini file for the X positioner.

Prototype

int **SetVarX**(

int SocketID,

char * ParameterName,

double ParameterValue

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
ParameterName	char *	Stages.ini parameter name.
ParameterValue	double	The value to be set for the "ParameterName".

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -17: Parameter out of range or incorrect.
- -18: Positioner Name doesn't exist or unknown command.
- -22: Not allowed action.

7.2.2.33 SetVarXSecondary

Name

SetVarXSecondary – Sets new value for a specified parameter name from stages.ini for X secondary positioner.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks input parameter value: (-17)
- Checks positioner name: (-18)
- Verifies the positioner is from a XY group: (-22)

Description

Set new value for the specified parameter name from stages.ini file for the X secondary positioner.

Prototype

int **SetVarXSecondary**(

int SocketID,

char * ParameterName,

double ParameterValue

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
ParameterName	char *	Stages.ini parameter name.
ParameterValue	double	The value to be set for the "ParameterName".

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -17: Parameter out of range or incorrect.
- -18: Positioner Name doesn't exist or unknown command.
- -22: Not allowed action.

7.2.2.34 SetVarY

Name

SetVarY – Sets new value for a specified parameter name from stages.ini for Y positioner.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks input parameter value: (-17)
- Checks positioner name: (-18)
- Verifies the positioner is from a XY group: (-22)

Description

Set new value for the specified parameter name from stages.ini file for the X secondary positioner.

Prototype

int **SetVarY**(

int SocketID,

char * ParameterName,

double ParameterValue

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
ParameterName	char *	Stages.ini parameter name.
ParameterValue	double	The value to be set for the "ParameterName".

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -17: Parameter out of range or incorrect.
- -18: Positioner Name doesn't exist or unknown command.
- -22: Not allowed action.

7.2.2.35 SetVelParams

Name

SetVelParams – Sets acceleration parameters for X and Y axes.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks motion profile: (-8)

Description

This API updates the current velocity parameters in µm/s for X and Y axes.

Prototype

int **SetAccParams**(
int SocketID,
double Xvelocity,
double Yvelocity
)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
Xvelocity	double	X velocity in µm/s.
Yvelocity	double	Y velocity in µm/s.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.

7.2.2.36 SetXVelParams

Name

SetXVelParams – Sets velocity for X axis.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks motion profile: (-8)

Description

This API updates the velocity parameter in µm/s for X axis.

Prototype

int **SetXVelParams**(
int SocketID,
double Xvelocity
)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
Xvelocity	double	X velocity in µm/s.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.

7.2.2.37 SetYVelParams

Name

SetYVelParams – Sets velocity for Y axis.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks motion profile: (-8)

Description

This API updates the velocity parameter in µm/s for Y axis.

Prototype

int **SetYVelParams**(
int SocketID,
double Yvelocity
)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
Yvelocity	double	Y velocity in µm/s.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.

7.2.2.38 SetZone

Name

SetZone – Sets parameters to define the circle zone.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the positioner name is valid: (-18)
- Not allowed due to configuration disabled: (-121)
- Not allowed because group is not initialized or not referenced: (-135)

Description

Set parameters to define a circle zone.

An output signal will be generated when the position is inside the circle.

The digital output is defined in the stage.ini file.

It's always available after the home search.

All parameters are defined in µm.
The Radius and Hysteresis are defined to signal when going out the circle.

Prototype

int **SetZone** (int SocketID, double x_center_um, double y_center_um, double radius_um, double hysteresis_um)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
x_center_um	double	X center in µm.
y_center_um	double	Y center in µm.
radius_um	double	Radius in µs.
hysteresis_um	double	Hysteresis in µm.

Output parameters

None.

Return (In addition to the results of "Input Tests Common to all XPS Functions")

- 0: No error.
- -18: PositionerName doesn't exist or unknown command.
- -121: Not allowed due to configuration disabled.
- -135: Not allowed because group is not initialized or not referenced.

7.2.2.39 StartJog

Name

StartJog – Enables the jog mode in XY group.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Group must be "XY": (-8)
- Checks the positioner name: (-18)
- Checks the group name: (-19)
- Group status must be "READY": (-22)
- Backlash must be not activated: (-46)

Description

This function enables the Jog mode for the first declared XY group. To use this function, the group must be in the "READY" state and all positioners must be idle (means velocity must be 0).

This function allows going to the "JOGGING" state. If the group state is not "READY", the (-22) error is returned.

NOTE

Use the "EndJog" function to disable the jog mode.

Prototype

int **GetJogAcceleration**(

int SocketID

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.

Output parameters

None.

Return (In addition to the results of "Input Tests Common to all XPS Functions")

- 0: No error.
- -8: Wrong object type for this command.
- -18: Not allowed due to a positioner error or hardware status.
- -19: GroupName doesn't exist or unknown command.
- -22: Not allowed action.
- -46: Not allowed action due to backlash.

7.2.2.40 WaitMotionEnd

Name

WaitMotionEnd – Wait the end of move (XY group only).

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Group must be "XY": (-8)
- Checks expected position after motion: (-211)

Description

This function allows waiting the real end of move (after a GroupMoveAbsolute, GroupMoveRelative or GroupMoveSlice).

NOTE

This function is available only for an XY group.

Prototype

int **WaitMotionEnd**(
int SocketID,
char * GroupName,
double TimeOutMs,
double YPosition,
double XPosition
)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
GroupName	char *	XY Group name.
TimeOutMs	double	Time out in milliseconds.
YPosition	double	Y position to check in microns.
XPosition	double	X position to check in microns.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -17: Parameter out of range or incorrect.
- -22: Not allowed action.
- -211: Not expected position after motion.

7.2.2.41 ZygoADCDiagnosticStatusGet

Name

ZygoADCDiagnosticStatusGet – Gets the diagnostic ADC status.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks Axis number and Zygo axis number: (-17)

Description

Returns the diagnostic ADC status in relation to the ADC Mux number.

Prototype

int **ZygoADCDiagnosticStatusGet**(
int SocketID,
int Axis,
int ADCMuxNumber,
char * ADCDiagStatus
)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
Axis	int	Zygo axis number (1 or 2).
ADCMuxNumber	int	ADC Mux (refer to table 4-12 from ZMI2402 manual).

Output parameters

ADCDiagStatus	char *	Raw value from Diag ADC Register.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -2: TCP timeout.
- -17: Parameter out of range or incorrect.
- -1000: Zygo command execution failed.
- -1001: The controller is not connected to Zygo TCP server. Run ZygoStartInterferometer API.
- Zygo errors: Refer to section 8.9: "Error List".

7.2.2.42 ZygoAmplitudeGet

Name

ZygoAmplitudeGet – Gets the reference channel status and measuring channel amplitude.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".

Description

Returns the reference channel status and the measuring channel amplitudes.

Prototype

int **ZygoAmplitudeGet**(

int SocketID,

int * ZygoReferenceSignalStatus,

int * Meas1Signal,

int * Meas2Signal

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.

Output parameters

EthernetCommunicationStatus	int *	1 = Connected, 0 = Not connected.
Meas1Signal	int *	Measure 1 Signal Strength (refer to ZMI 2402 Diagnostic ADC).
Meas2Signal	int *	Measure 2 Signal Strength (refer to ZMI 2402 Diagnostic ADC).

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -1001: The controller is not connected to Zygo TCP server. Run ZygoStartInterferometer API.

7.2.2.43 ZygoConnectToServer

Name

ZygoConnectToServer – Connect ZYGO to server.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the object type of this command is valid: (-8)
- Checks Zygo is enabled: (-205)

Description

This function opens a TCP/IP communication with a ZMI Measuring board.

Prototype

int **ZygoConnectToServer**(

int SocketID

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.
- -205: Not enable in your configuration.
- -1002: Connection to Zygo TCP server failed.
- -1003: The XPS controller is already connected to Zygo TCP server.

7.2.2.44 ZygoDisconnectFromServer

Name

ZygoDisconnectFromServer – Disconnect ZYGO from server.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".

Description

Close the TCP/IP communication opened with the ZYGO ZMI box.

Prototype

```
int ZygoDisconnectFromServer(
    int SocketID
    )
```

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.

7.2.2.45 ZygoErrorStatusGet

Name

ZygoErrorStatusGet – Gets the ZYGO error status code via Ethernet.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks Zygo axis value: (-17)
- Checks Zygo is enabled: (-205)

Description

This function returns the ZYGO axis error code.

The axis error codes are listed in the "Zygo error status list".

The description of the axis error code can be getting with the "ZygoErrorStatusStringGet" function.

Prototype

int **ZygoErrorStatusGet**(

int SocketID,

int Axis,

char * ErrorStatus

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
Axis	int	ZMI Axis number (1 = Y axis and 2 = X axis).

Output parameters

ErrorStatus	char *	ZMI Axis Error Status.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -2: TCP timeout.
- -17: Parameter out of range or incorrect.
- -205: Not enable in your configuration.
- -1000: Zygo command execution failed.
- -1001: The controller is not connected to Zygo TCP server. Run ZygoStartInterferometer API.
- Zygo errors: Refer to section 8.9: "Error List".

7.2.2.46 ZygoErrorStatusStringGet

Name

ZygoErrorStatusStringGet – Gets the ZYGO axis error status description via Ethernet.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks Zygo axis value: (-17)

Description

This function returns the ZYGO axis error status description.

Prototype

int **ZygoErrorStatusStringGet**(

int SocketID,

int Axis,

char * ErrorStatusDescription

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
Axis	int	ZMI Axis number (1 = Y axis and 2 = X axis).

Output parameters

ErrorStatusDescription	char *	ZMI Axis Error Status description.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -17: Parameter out of range or incorrect.

7.2.2.47 ZygoEthernetCommunicationStatusGet

Name

ZygoEthernetCommunicationStatusGet – Gets ZYGO Ethernet Connection Status.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".

Description

Get the Ethernet Communication Status: Connected or Not connected.

Prototype

int **ZygoEthernetCommunicationStatusGet**(
int SocketID,
int * EthernetCommunicationStatus
)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.

Output parameters

EthernetCommunicationStatus	int *	1 = Connected, 0 = Not connected.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.

7.2.2.48 ZygoGetPEGLastCommunicationTime

Name

ZygoGetPEGLastCommunicationTime – Gets the last communication time to configure Zygo PEG.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the XPS controller configuration: (-4)

Description

This function gets the last communication time to configure Zygo PEG in seconds.

Prototype

int **ZygoGetPEGLastCommunicationTime**(

int SocketID,

double * LastCommunicationTime,

)

Input parameters

SocketID	int	Socket identifier gets by the TCP_ConnectToServer" function.
ParamName	double *	Last communication time to configure PEG (s).

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -4: Unknown command.

7.2.2.49 ZygoGetVerInterfero

Name

ZygoGetVerInterfero – Gets firmware version of ZMI system (ZYGO interferometer) via Ethernet.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks Zygo is enabled: (-205)

Description

This function returns the ZMI system name and its firmware version number.

Prototype

int **ZygoGetVerInterfero**(

int SocketID,

char * Version

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.

Output parameters

Version	char *	ZMI system version.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -2: TCP timeout.
- -205: Not enable in your configuration.
- -1000: Zygo command execution failed.
- -1001: The controller is not connected to Zygo TCP server. Run ZygoStartInterferometer API.

7.2.2.50 ZygoInterferometerStatusGet

Name

ZygoInterferometerStatusGet – Gets ZYGO interferometer status.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".

Description

Get ZYGO interferometer status:

- Ethernet connection status.
- Axis #1 signal status.
- Axis #2 signal status.
- Reference signal status.
- P2 Board status.

Prototype

```
int ZygoInterferometerStatusGet(
    int SocketID,
    int * EthernetCommunicationStatus,
    int * ZygoAxis1MeasureSignal,
    int * ZygoAxis2MeasureSignal,
    int * ZygoReferenceSignalStatus,
    int * ZygoP2BoardStatus
    )
```

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.

Output parameters

EthernetCommunicationStatus	int *	1 = Connected, 0 = Not connected.
ZygoAxis1MeasureSignal	int *	1 = Axis #1 signal present, 0 = No signal.
ZygoAxis2MeasureSignal	int *	1 = Axis #2 signal present, 0 = No signal.
ZygoReferenceSignalStatus	int *	1 = Reference signal present, 0 = No Signal.
ZygoP2BoardStatus	int *	1 = P2 board ready, 0 = P2 board not ready or not present.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.

7.2.2.51 ZygoPositionGet

Name

ZygoPositionGet – Gets positions of Y and X axes from ZMI system via Ethernet.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks Zygo is enabled: (-205)

Description

This function returns positions (36-bits) of Y and X axes.

Prototype

int **ZygoPositionGet**(

int SocketID,

long long int * PositionY,

long long int * PositionX

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.

Output parameters

PositionY	long long int *	Current position of Y axis.
PositionX	long long int *	Current position of X axis.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -2: TCP timeout.
- -205: Not enable in your configuration.
- -1000: Zygo command execution failed.
- -1001: The controller is not connected to Zygo TCP server. Run ZygoStartInterferometer API.
- Zygo errors: Refer to section 8.9: "Error List".

7.2.2.52 ZygoReadLong

Name

ZygoReadLong – Read a long register from a ZMI Measuring board.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".

Description

This function reads a LONG register (max 32-bits) from a ZMI Measuring board.

Example

Read Control Register 1 on Axis 1:

ZygoReadLong (AXIS1, A)

ZMI Measuring board Response:

#H70

Prototype

int **ZygoReadLong**(

int SocketID,

char * AxisNum,

char * Register,

char * Response

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
AxisNum	char *	"AXIS1" or "AXIS2".
Register	char *	Register value in hexadecimal.

Output parameters

Response	char *	Response returned by the ZMI Measuring board.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -2: TCP timeout.
- -1000: Zygo command execution failed.
- -1001: The controller is not connected to Zygo TCP server. Run ZygoStartInterferometer API.
- Zygo errors: Refer to section 8.9: "Error List".

7.2.2.53 ZygoReadWord

Name

ZygoReadWord – Read a long register from a ZMI Measuring board.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".

Description

This function reads a WORD register data (max 16-bits) from a ZMI Measuring board.

Example

Read Control Register 1 on Axis 2:
ZygoReadWord (AXIS2, A)
ZMI Measuring board Response:
#H1

Prototype

int **ZygoReadWord**(

int SocketID,

char * AxisNum,

char * Register,

char * Response

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
AxisNum	char *	"AXIS1" or "AXIS2".
Register	char *	Register value in hexadecimal.

Output parameters

Response	char *	Response returned by the ZMI Measuring board.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -2: TCP timeout.
- -1000: Zygo command execution failed.
- -1001: The controller is not connected to Zygo TCP server. Run ZygoStartInterferometer API.
- Zygo errors: Refer to section 8.9: "Error List".

7.2.2.54 ZygoRegisterGet

Name

ZygoRegisterGet – Gets register value from P2 ZYGO board.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the object type of this command is valid: (-8)

Description

This function reads the register value from P2 ZYGO board.

Refer to the list of P2 interface registers.

Prototype

int **ZygoRegisterGet**(

int SocketID,

char * PositionerName,

int Register,

int * Value

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.
Register	int	Register value in hexadecimal.

Output parameters

Value	int *	Response returned by the ZMI Measuring board.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.

7.2.2.55 ZygoRegisterSet

Name

ZygoRegisterSet – Sets register value from P2 ZYGO board.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks the object type of this command is valid: (-8)

Description

This function sets the register value from P2 ZYGO board.

Refer to the list of P2 interface registers.

Prototype

int **ZygoRegisterSet**(

int SocketID,

char * PositionerName,

int Register,

int Value

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
PositionerName	char *	Positioner name.
Register	int	Register value in hexadecimal.
Value	int	Response returned by the ZMI Measuring board.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -8: Wrong object type for this command.

7.2.2.56 ZygoReset

Name

ZygoReset – Reset all Zygo axes.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks if Zygo mode is enabled: (-205)
- Checks Zygo TCP Server Connexion: (-1001)

Description

This function sends commands to Zygo ZMI 2402 to reset all Zygo axes (#1 and #2).

Prototype

int **ZygoReset**(

int SocketID

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -205: Not enable in your configuration.
- -1001: The controller is not connected to Zygo TCP server. Run ZygoStartInterferometer API.

7.2.2.57 ZygoResetX

Name

ZygoResetX – Reset X axis via Ethernet.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks Zygo is enabled: (-205)

Description

This function resets X axis (defined as Zygo axis #2).

The **Axis Reset** resets only the measurement function and error conditions, and does not affect axis configuration. An axis reset is identical to the combined effects of the **Position Reset**, **Time Reset**, and **Error Reset**.

The **Position Reset** reinitializes the position measurement function and sets the position register to zero.

The **Time Reset** immediately sets the time register to zero.

The **Error Reset** resets all errors.

NOTE

Due to minor timing differences, simultaneous multi-axis reset commands may result in some axes actually being reset one reference clock period (50 ns) later than other axes.

The allowable operating conditions and the time required for an axis reset depends on the settings in *Aux Control 0* as shown below.

The **reset time** is from the *Reset Axis* command until *Position Reset Complete* status.

This time includes the *Reset Delay* (RD) specified in *Control Register 2*. Table 3-8 specifies the *Reset Delay* choices.

Prototype

int **ZygoResetX**(
    int SocketID
)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -2: TCP timeout.
- -205: Not enable in your configuration.
- -1000: Zygo command execution failed.
- -1001: The controller is not connected to Zygo TCP server. Run ZygoStartInterferometer API.

7.2.2.58 ZygoResetY

Name

ZygoResetY – Reset Y axis via Ethernet.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks Zygo is enabled: (-205)

Description

This function resets Y axis (defined as Zygo axis #1).

The **Axis Reset** resets only the measurement function and error conditions, and does not affect axis configuration. An axis reset is identical to the combined effects of the **Position Reset**, **Time Reset**, and **Error Reset**.

The **Position Reset** reinitializes the position measurement function and sets the position register to zero.

The **Time Reset** immediately sets the time register to zero.

The **Error Reset** resets all errors.

NOTE

Due to minor timing differences, simultaneous multi-axis reset commands may result in some axes actually being reset one reference clock period (50 ns) later than other axes.

The allowable operating conditions and the time required for an axis reset depends on the settings in *Aux Control 0* as shown below.

Table 3-7 Axis Reset Conditions and Required Time

Enable Reset Finds Velocity Aux Control 0	*RFV Mode* Aux Control 0	Reset Time	Max Velocity during reset	Max Acceleration during reset
0	-	22 µs + RD	±0.1 m/s	10 g
1	0 (Diagnostic)	2.0 ms + RD	±2.1 m/s	0.1 g
1	1 (Default)	210 µs + RD	±2.1 m/s	10 g

The **reset time** is from the *Reset Axis* command until *Position Reset Complete* status.

This time includes the *Reset Delay* (RD) specified in *Control Register 2*. Table 3-8 specifies the *Reset Delay* choices.

Table 3-8 Reset Delay

RD2	RD1	RD0	Reset Delay (RD)
0	0	0	2 µs
0	0	1	6 µs
0	1	0	26 µs
0	1	1	102 µs
1	0	0	410 µs
1	0	1	1.6 ms
1	1	0	6.5 ms
1	1	1	26.2 ms

Prototype

int **ZygoResetY**(
int SocketID
)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -2: TCP timeout.
- -205: Not enable in your configuration.
- -1000: Zygo command execution failed.
- -1001: The controller is not connected to Zygo TCP server. Run ZygoStartInterferometer API.

7.2.2.59 ZygoSendAndReceive

Name

ZygoSendAndReceive – Send a command and read a response from ZYGO box.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".

Description

Send a command to ZYGO box and wait a response from ZYGO box.

The command string must be defined in the ZYGO format.

Prototype

int **ZygoSendAndReceive**(

int SocketID,

char * Command,

char * Response

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
Command	char *	"AXIS1" or "AXIS2".
Register	char *	Command to send to ZYGO box.

Output parameters

Response	char *	Response read from ZYGO box.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -2: TCP timeout.
- -1000: Zygo command execution failed.
- -1001: The controller is not connected to Zygo TCP server. Run ZygoStartInterferometer API.
- Zygo errors: Refer to section 8.9: "Error List".

7.2.2.60 ZygoSetOffsetX

Name

ZygoSetOffsetX – Sets offset value for X axis via Ethernet.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks input parameter type: (-127)
- Checks Zygo is enabled: (-205)

Description

This function sets the offset value for X (defined as Zygo axis #2).

The offset value is subtracted from the position value.

Prototype

int **ZygoSetOffsetX**(

int SocketID,

long Xoffset

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
Xoffset	long	Offset value for X.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -2: TCP timeout.
- -127: Wrong parameter type in the command string: long or long * expected.
- -205: Not enable in your configuration.
- -1000: Zygo command execution failed.
- -1001: The controller is not connected to Zygo TCP server. Run ZygoStartInterferometer API.

7.2.2.61 ZygoSetOffsetY

Name

ZygoSetOffsetY – Sets offset value for Y axis via Ethernet.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks input parameter type: (-127)
- Checks Zygo is enabled: (-205)

Description

This function sets the offset value for Y (defined as Zygo axis #1).

The offset value is subtracted from the position value.

Prototype

int **ZygoSetOffsetY**(

int SocketID,

long Yoffset

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
Yoffset	long	Offset value for Y.

Output parameters

None.

Return (In addition to the results of "Input Tests Common to all XPS Functions")

- 0: No error.
- -2: TCP timeout.
- -127: Wrong parameter type in the command string: long or long * expected.
- -205: Not enable in your configuration.
- -1000: Zygo command execution failed.
- -1001: The controller is not connected to Zygo TCP server. Run ZygoStartInterferometer API.

7.2.2.62 ZygoSetPEGParams

Name

ZygoSetPEGParams – Sets PEG parameters (ZYGO System) via Ethernet.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks input parameter type: (-127)
- Checks Zygo is enabled: (-205)

Description

This function sets PEG (Position Event Generator) parameters.

The PEG function generates an electronic signal when the internal position measurement meets criteria established by values programmed into the board by the host system.

The first pulse is output when the position value enters the active region between the P1 and P2 values.

Additional pulses are output each time the position changes by the prescribed *Delta 1*, or in *Delta 2* mode

For K1 number of PEG events, the increment value is *Delta 1*

For K2 number of PEG events, the increment value is *Delta 2*

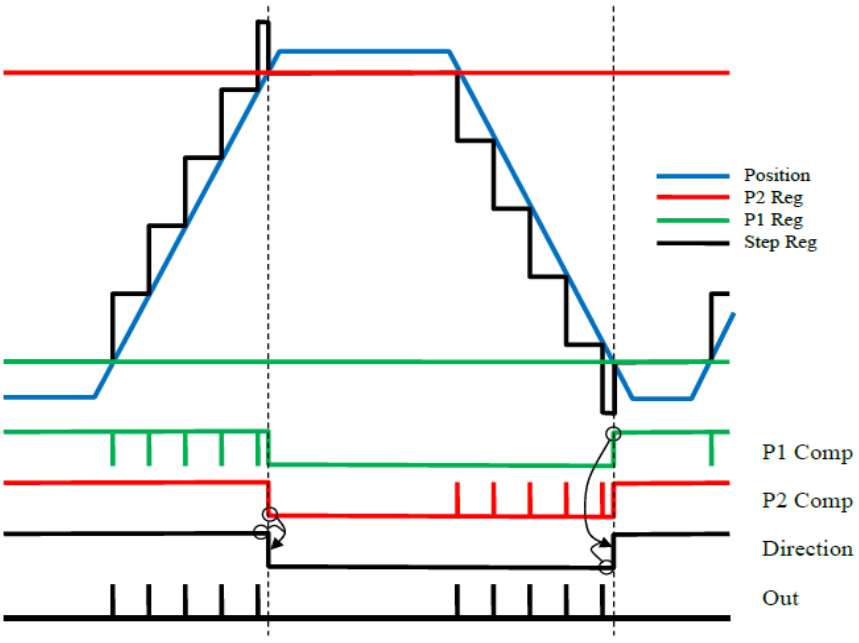
This repeats K1, K2, K1, K2, etc…

Pulses stop when the position leaves the active region between the P1 and P2 values.

This may be repeated for travel in either direction between P1 and P2.

A number of other features, such as signal polarity, axis select (for 2402), and pulse duration shall be programmable. Direction of motion is inferred by the position crossing the start and stop values. Starting operation at a point in between the start and stop values is undefined.

When entering at P1, the PEG starts with Delta 1. When entering at P2, the Delta is selectable by the *PEG P2 Delta* bit in the PEG Control register (refer to PEG Control register).



NOTE

This API is enabled only with a ZMI system equipped of PEG function.

Refer to ZYGO *ZMI 2400 with PEG Function (revision J)*.

Prototype

int **ZygoSetPEGParams**(
int SocketID,
long P1,
long P2,
unsigned int Delta1,
long K1,
unsigned int Delta2,
long K2,
int ControlWord
)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
P1	long	Start PEG region (+/- 660 mm).
P2	long	End PEG region (+/- 660 mm and P2 >P1).
Delta1	unsigned int	Increment value (max 20 µm).
K1	long	Number of PEG events.
Delta2	unsigned int	Increment value (max 20 µm).
K2	long	Number of PEG events.
ControlWord	int	PEG control (refer to PEG Control register).

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -2: TCP timeout.
- -127: Wrong parameter type in the command string: long or long * expected.
- -205: Not enable in your configuration.
- -1000: Zygo command execution failed.
- -1001: The controller is not connected to Zygo TCP server. Run ZygoStartInterferometer API.

7.2.2.63 ZygoStartBoardP2

Name

ZygoStartBoardP2– Starts ZYGO P2 board.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks input parameters value: (-17)

Description

This function allows initializing and starting the ZYGO P2 board.

Required settings to get the board up and running after power up:

Switch Settings

SW6-3:4 Set to ON ON for INT0 to deliver Axis 1 interrupts

SW6-5:6 Set to OFF ON for INT1 to deliver Axis 2 interrupts

SW6-7:8 Set to OFF OFF for sampling on SCLK1 falling edge

SW8-1:8 Set all to ON for a 00000000 base P2 address (recommendation)

This will correspond to required A11:4 on the P2 pins.

-Switch settings can be found on **2-9** in the manual.

Register Settings

Control Register 1 Set the desired P2_RESET * line behavior (bits 6:3)

Bit 8 (P2 latch Mode) = 0, External sample input

Bit 9 (P2 D16 Select) = 0, for 32-bit data path

- The above must be done for both axes.

Bit 10 (P2 Sclk0 Disable) = 1

Bit 11 (P2 Sclk0 Output Enable) = 1

- The above must be done for axis 1 only.

Control Register 2 Set the desired *Kp* digital filter (bits 6:4)

the desired *Kv* digital filter values, (bits 2:0)

- See section of ZMI manual for more information

Set the *Change Position Direction Sense* bit. This bit defines the interferometer direction.

Setting this bit reverses the direction sense of the position accumulator. An axis reset must be performed after changing the direction sense.

- All of the above must be done for both axes.

Data Age Adjust Program the appropriate data age adjust values
See detailed procedure below for more information

- This must be done for both axes.

P2 Interrupt Enable Select which errors will generate a signal on the P2_INT *

- This must be done for both axes.

Procedural Steps

Read the status register until *Reference Present* bit is present in the *Status* Register. This indicates that the laser is locked. Check the *Measure Present* bit on each axis; when this bit is active, perform an axis reset for that axis. Ensure Error Status Register is cleared. Position information should now be continuously updated, as long as there are no Fatal Errors.

Prototype

int **ZygoStartBoardP2**(

int SocketID,

int Kv,

int Kp,

bool ReverseDirectionSense,

int DataAgeAdjust

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
Kv	int	digital filter Kv gain = -7, -9, -11, -13, -15, -17, -19 or -32.
Kp	int	digital filter Kp gain = -2, -3,-4, -5, -6, -7, -8 or -9.
ReverseDirectionSense	bool	true = reversed direction, false = normal direction.
DataAgeAdjust	int	Data Age Adjust Register.

Output parameters

None.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -17: Parameter out of range or incorrect.
- -1001: The controller is not connected to Zygo TCP server. Run ZygoStartInterferometer API.

7.2.2.64 ZygoStartInterferometer

Name

ZygoStartInterferometer – Start ZYGO interferometer.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".

Description

Start ZYGO interferometer: Open Ethernet connection, Check signals, Start P2 Board

This API can take several minutes.

Prototype

int **ZygoADCDiagnosticStatusGet**(

int SocketID,

int Axis,

int ADCMuxNumber,

char * ADCDiagStatus

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
Axis	int	Zygo axis number (1 or 2).
ADCMuxNumber	int	ADC Mux (refer to table 4-12 from ZMI2402 manual).

Output parameters

ADCDiagStatus	char *	Raw value from Diag ADC Register.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -2: TCP timeout.
- -17: Parameter out of range or incorrect.
- -205: Not enable in your configuration.
- -1000: Zygo command execution failed.
- -1001: The controller is not connected to Zygo TCP server. Run. ZygoStartInterferometer API.
- -1002: Connection to Zygo TCP server failed.
- -1003: The XPS controller is already connected to Zygo TCP server.
- -1004: Zygo signal is not present.

7.2.2.65 ZygoStatusGet

Name

ZygoStatusGet – Gets the ZYGO axis status code via Ethernet.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks Zygo axis value: (-17)
- Checks Zygo is enabled: (-205)

Description

This function returns the ZYGO axis status code.

The axis status codes are listed in the "Zygo axis status list".

The description of the axis status code can be getting with the "ZygoStatusStringGet" function.

Prototype

int **ZygoErrorStatusGet**(

int SocketID,

int Axis, char * Status

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
Axis	int	ZMI Axis number (1 = Y axis and 2 = X axis).

Output parameters

Status	char *	ZMI Axis Status.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -2: TCP timeout.
- -17: Parameter out of range or incorrect.
- -205: Not enable in your configuration.
- -1000: Zygo command execution failed.
- -1001: The controller is not connected to Zygo TCP server. Run ZygoStartInterferometer API.
- Zygo errors: Refer to section 8.9: "Error List".

7.2.2.66 ZygoStatusStringGet

Name

ZygoStatusStringGet – Gets the ZYGO axis status description via Ethernet.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".
- Checks Zygo axis value: (-17)

Description

This function returns the ZYGO axis status description.

Prototype

int **ZygoStatusStringGet**(
int SocketID,
int Axis,
char * StatusDescription
)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
Axis	int	ZMI Axis number (1 = Y axis and 2 = X axis).

Output parameters

StatusDescription	char *	ZMI Axis Status description.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -17: Parameter out of range or incorrect.

7.2.2.67 ZygoWriteLong

Name

ZygoWriteLong – Write data to a long register of ZMI Measuring board.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".

Description

This function write data to a long register (max 32-bits) of ZMI Measuring board.

Example

Write 0x5000 to Control Register 1 on Axis 1:

ZygoWriteLong(AXIS1, A, 5000)

ZMI Measuring board Response:

OK

Prototype

int **ZygoWriteLong**(

int SocketID,

char * AxisNum,

char * Register,

char * Data,

char * Response

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
AxisNum	char *	"AXIS1" or "AXIS2".
Register	char *	Register value in hexadecimal.
Data	char *	Data value in hexadecimal in max-32bits.

Output parameters

Response	char *	Response returned by the ZMI Measuring board.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -2: TCP timeout.
- -1000: Zygo command execution failed.
- -1001: The controller is not connected to Zygo TCP server. Run ZygoStartInterferometer API.
- Zygo errors: Refer to section 8.9: "Error List".

7.2.2.68 ZygoWriteWord

Name

ZygoWriteWord – Write data to a word register of ZMI Measuring board.

Input tests

- Refer to section 7.1: "Input Tests Common to all XPS Functions".

Description

This function changes a word register data (max 16-bits) to a ZMI Measuring board.

Example

Write 0x0020 to Control Register 1 on Axis 1:

ZygoWriteWord(AXIS1, A, 20)

ZMI Measuring board Response:

OK

Prototype

int **ZygoWriteWord**(

int SocketID,

char * AxisNum,

char * Register,

char * Data,

char * Response

)

Input parameters

SocketID	int	Socket identifier gets by the "TCP_ConnectToServer" function.
AxisNum	char *	"AXIS1" or "AXIS2".
Register	char *	Register value in hexadecimal.
Data	char *	Data value in hexadecimal in max-16bits.

Output parameters

Response	char *	Response returned by the ZMI Measuring board.

Return (In addition to the results of "**Input Tests Common to all XPS Functions**")

- 0: No error.
- -2: TCP timeout.
- -1000: Zygo command execution failed.
- -1001: The controller is not connected to Zygo TCP server. Run ZygoStartInterferometer API.
- Zygo errors: Refer to section 8.9: "Error List".

8.0 Lists and Tables for XPS Functions

8.1 Event Triggers List

[Actor.]				[Category.]						Event Name	Parameters			
Group	Positioner	GPIO	TimerX	SGamma	Jog	XYLineArc	Spline	PVT	PT		1	2	3	4
										Immediate	0	0	0	0
										Always	0	0	0	0
			■							Timer	0	0	0	0
	■			■	■					MotionStart	0	0	0	0
	■			■	■					MotionEnd	0	0	0	0
	■			■	■					MotionState	0	0	0	0
	■			■						MotionDone	0	0	0	0
	■			■						MotionDoneTimeout	0	0	0	0
	■			■	■					ConstantVelocityStart	0	0	0	0
	■			■						ConstantVelocityEnd	0	0	0	0
	■			■	■					ConstantVelocityState	0	0	0	0
	■			■						ConstantAccelerationStart	0	0	0	0
	■			■						ConstantAccelerationEnd	0	0	0	0
	■			■						ConstantAccelerationState	0	0	0	0
	■			■						ConstantDecelerationStart	0	0	0	0
	■			■						ConstantDecelerationEnd	0	0	0	0
	■			■						ConstantDecelerationState	0	0	0	0
■						■	■	■	■	TrajectoryStart	0	0	0	0
■						■	■	■	■	TrajectoryEnd	0	0	0	0
■						■	■	■	■	TrajectoryState	0	0	0	0
■						■	■	■	■	ElementNumberStart	Element index	0	0	0
■						■	■	■	■	ElementNumberState	Element index	0	0	0
■						■	■	■	■	TrajectoryPulse	0	0	0	0
■						■	■	■	■	TrajectoryPulseState	0	0	0	0
		■								DILowState	Bit index	0	0	0
		■								DIHighState	Bit index	0	0	0
		■								DILowHigh	Bit index	0	0	0
		■								DIHighLow	Bit index	0	0	0
		■								DIToggled	Bit index	0	0	0
		■								ADCHighLimit	Value	0	0	0
		■								ADCLowLimit	Value	0	0	0
		■								ADCInWindow	min	max	0	0
		■								ADCOutWindow	min	max	0	0
	■									PositionerError	Mask	0	0	0
	■									PositionerHardwareStatus	Mask	0	0	0
	■									ExcitationSignalStart	0	0	0	0
	■									ExcitationSignalEnd	0	0	0	0
	■									WarningFollowingError	0	0	0	0
	■									WaitForPositionLeftToRight	Target position	0	0	0
	■									WaitForPositionRightToLeft	Target position	0	0	0
	■									WaitForPositionToggled	Target position	0	0	0
										DoubleGlobalArrayEqual	Global variable number	value	0	0
										DoubleGlobalArrayDifferent	Global variable number	value	0	0
										DoubleGlobalArrayInferiorOrEqual	Global variable number	value	0	0
										DoubleGlobalArraySuperiorOrEqual	Global variable number	value	0	0
										DoubleGlobalArrayInferior	Global variable number	value	0	0

										DoubleGlobalArraySuperior	Global variable number	value	0	0
										DoubleGlobalArrayInWindow	Global variable number	min	max	0
										DoubleGlobalArrayOutWindow	Global variable number	min	max	0

8.2 Actions List

[Actor.]				Action Name	Parameters			
Group	Positioner	GPIO	TimerX		1	2	3	4
		■		DACSet.CurrentPosition	Positioner name	Gain	Offset	0
		■		DACSet. CurrentVelocity	Positioner name	Gain	Offset	0
		■		DACSet. SetpointPosition	Positioner name	Gain	Offset	0
		■		DACSet. SetpointVelocity	Positioner name	Gain	Offset	0
		■		DACSet. SetpointAcceleration	Positioner name	Gain	Offset	0
		■		DACSet.Value	Value	0	0	0
		■		DOPulse	Mask	0	0	0
		■		DOToggle	Mask	0	0	0
		■		DOSet	Mask	Value	0	0
				EventRemove	Trigger identifier *(-1 for itself)*	0	0	0
				ExecuteCommand	Function name	Parameters *(Between {} and separator is the semi-column)*	Task name	
				ExecuteTCLScript	TCL file name	Task name	Arguments	
				ExternalGatheringRun	Nb of points	Divisor	0	0
				GatheringOneData	0	0	0	0
				GatheringRun	Nb of points	Divisor	0	0
				GatheringRunAppend	0	0	0	0
				GatheringStop	0	0	0	0
				GlobalArrayDoubleSet	Global variable number	Double value	0	0
				GlobalArrayStringSet	Global variable number	String value	0	0
				KillTCLScript	Task name	0	0	0
■				MoveAbort	0	0	0	0
■				MoveAbortFast	Deceleration multiplier	0	0	0
				SynchronizeProfiler	0	0	0	0

8.3 Gathering Data Types

PositionerName.CurrentAcceleration

PositionerName.CurrentPosition

PositionerName.CurrentVelocity

PositionerName.SetpointAcceleration

PositionerName.SetpointPosition

PositionerName.SetpointVelocity

PositionerName.FollowingError

PositionerName.FollowingErrorCompensation (*for precision platform only*)

PositionerName.InnerFollowingError (*for precision platform only*)

PositionerName.ExcitationSignalInput

PositionerName.CorrectedEncoderPosition

PositionerName.CorrectedSetpointPosition

PositionerName.CorrectorOutput

PositionerName.EstimatedVelocity

PositionerName.CorrectorOutput BeforeCompensation (*for precision platform only*)

PositionerName.CorrectorOutput BeforeCompensationFiltered (*precision platform*)

PositionerName.CorrectorOutput BeforeDamperFilter (*for precision platform only*)

PositionerName.CorrectorOutput DamperFilter (*for precision platform only*)

PositionerName.CorrectorOutputDualPID (*for precision platform only*)

PositionerName.CorrectorOutputPID (*for precision platform only*)

PositionerName.RawCorrectorOutput (*for precision platform only*)

PositionerName.RawCurrentPosition (*for precision platform only*)

PositionerName.FilteredPIDOutputBeforeFeedForward (*for precision platform only*)

PositionerName.GantryOption (*for precision platform only*)

[HXP-D] *(for Hexapod group only)*
PositionerName can be :

GROUPNAME.X
GROUPNAME.Y
GROUPNAME.Z
GROUPNAME.U
GROUPNAME.V
GROUPNAME.W

XPS-Q Hardware:

- GPIO1.DI
- GPIO1.DO
- GPIO2.DI
- GPIO3.DI
- GPIO3.DO
- GPIO4.DI
- GPIO4.DO
- GPIO2.ADC1
- GPIO2.ADC2
- GPIO2.ADC3

- GPIO2.ADC4
- GPIO2.DAC1
- GPIO2.DAC2
- GPIO2.DAC3
- GPIO2.DAC4

XPS-RL or XPS-D Hardware:

Basic GPIO board:

- GPIO1.DI
- GPIO1.DO
- GPIO2.ADC1
- GPIO2.ADC2
- GPIO2.DAC1
- GPIO2.DAC2

Extended GPIO board:

- GPIO3.DI
- GPIO3.DO
- GPIO5.DI
- GPIO5.DO
- GPIO6.DI
- GPIO6.DO
- GPIO4.ADC1
- GPIO4.ADC2
- GPIO4.ADC3
- GPIO4.ADC4
- GPIO4.ADC5
- GPIO4.ADC6
- GPIO4.ADC7
- GPIO4.ADC8
- GPIO4.DAC1
- GPIO4.DAC2
- GPIO4.DAC3
- GPIO4.DAC4
- GPIO4.DAC5
- GPIO4.DAC6
- GPIO4.DAC7
- GPIO4.DAC8

ISRCorrectorTimePeriod

ISRCorrectorTimeUsage

ISRProfilerTimeUsage

ISRServitudesTimeUsage

CPUTotalLoadRatio

8.4 External Gathering Data Types

PositionerName.ExternalLatchPosition

XPS-Q Hardware:

- GPIO2.ADC1
- GPIO2.ADC2
- GPIO2.ADC3
- GPIO2.ADC4
- GPIO2.DAC1
- GPIO2.DAC2
- GPIO2.DAC3
- GPIO2.DAC4

XPS-RL or XPS-D Hardware:

Basic GPIO board:

- GPIO2.ADC1
- GPIO2.ADC2
- GPIO2.DAC1
- GPIO2.DAC2

Extended GPIO board:

- GPIO4.ADC1
- GPIO4.ADC2
- GPIO4.ADC3
- GPIO4.ADC4
- GPIO4.ADC5
- GPIO4.ADC6
- GPIO4.ADC7
- GPIO4.ADC8
- GPIO4.DAC1
- GPIO4.DAC2
- GPIO4.DAC3
- GPIO4.DAC4
- GPIO4.DAC5
- GPIO4.DAC6
- GPIO4.DAC7
- GPIO4.DAC8

8.5 Positioner Error List

Bit #	Mask	Error description
0	1	General inhibition detected
1	2	Fatal following error detected
2	4	Home search time out
3	8	Motion done time out
4	16	Requested position exceed travel limits in trajectory or slave mode
5	32	Requested velocity exceed maximum value in trajectory or slave mode
6	64	Requested acceleration exceed maximum value in trajectory or slave mode
7	168	Clamping incoherence
8	256	Minus end of run activated
9	512	Plus end of run activated
10	1024	Minus end of run glitch
11	2048	Plus end of run glitch
12	4096	Encoder quadrature error
13	8192	Encoder frequency and coherancy error
14	16384	Sine and Cosine radius error
15	32768	X or Y correction is out of encoder correction limits
16	65536	Hard interpolator encoder error
17	131072	Hard interpolator encoder quadrature error
20	1048576	First driver in fault
21	2097152	Second driver in fault
22	4194304	AqB and Sine/Cosine out of phase
24	16777216	Home search mechanical zero inconsistency
25	33554432	Interferometer no signal error on axis or reference
26	67108864	Interferometer glitch error on axis or reference
27	134217728	Fatal internal error
28	268435456	GPIO transfer error
29	536870912	I2C transfer error

NOTE

The most significant bit is always set to 1. So, all positioner errors are negative.

8.6 Positioner Hardware Status List

Bit #	Mask	Error description
0	1	General inhibition detected
2	4	ZM high level
8	256	Minus end of run activated
9	512	Plus end of run activated
10	1024	Minus end of run glitch
11	2048	Plus end of run glitch
12	4096	Encoder quadrature error
13	8192	Encoder frequency or coherancy error
14	16384	Sine and Cosine radius error
15	32768	X or Y correction is out of encoder correction limits
16	65536	Hard interpolator encoder error
17	131072	Hard interpolator encoder quadrature error
20	1048576	First driver in fault
21	2097152	Second driver in fault
22	4194304	First driver powered on
23	8388608	Second driver powered on
24	16777216	Interferometer no signal error on axis or reference
25	33554432	Interferometer glitch error on axis or reference
26	67108864	PCO error (underrun)
27	134217728	PCO pulses ended
28	268435456	GPIO External gathering error
29	536870912	I2C transfer error
30	1073741824	External gathering error

NOTE

Positioner errors are used to trigger consequences on the system, for instance disable, emergency break, etc. Positioner hardware status information is mainly provided for information purposes.

Positioner hardware status description:

General inhibition detected: This refers to the General Inhibition connector at the rear panel or the Stop All button at the front panel of the XPS controller. The General Inhibiton connector is a safety feature and can be used for a custom STOP ALL emergency switch. Inhibition (pin#2), must always be connected to GND during normal operation of the controller. In this case, inhibition is not detected. An open circuit is equivalent to pressing STOP ALL on the front panel, in which case, inhibition is detected.

ZM high level: This refers to the mechanical zero signal used with some stages. The ZM signal is high during one part of the travel and low during the other part of the travel. The detection of the ZM high/low transition in combination with an encoder index pulse signal allows a fast and repeatable origin search (MechanicalZeroAndIndexHomeSearch).

Minus end of run activated: Refers to the hardware minus end of run limit switch. During normal operation, this end of run switch should never be activated and any motion will be stopped by the detection of the minus software limit.

Plus end of run activated: Refers to the hardware positive end of run limit switch. During normal operation, this end of run switch should never be activated and any motion will be stopped by the detection of the positive software limit.

Minus end of run glitch: Undesirable, momentary instability of the hardware minus end of run signal, for instance can be generated by ripple or noise.

Plus end of run glitch: Undesirable, momentary instability of the hardware positive end of run signal, for instance can be generated by ripple or noise.

Encoder quadrature error: Error generated when the signals of both encoder channels simultaneously change. In normal operation, only one quadrature signal changes state at a time. This error can occur due to an undesirable level change or a glitch as illustrated below.

Encoder freq. and coherency error: Error generated when the frequency of the signals is too high. The maximum frequency of the encoder input is 25MHz.

Hard interpolator encoder error: Error generated when the difference of the sine/cosine encoder signals from a unity circle is too large (for instance when signals are phase shifted or amplitude modified).

Hard interpolator quad. encoder error: Error generated when the signals of both encoder channels of the hardware interpolated encoder output simultaneously change. Same error as *Encoder quadrature error* except that the quadrature signals are those converted from the sine/cosine signals of the hard interpolator. The hardware interpolator is used only with AnalogInterpolated encoders to trigger the position compare output and to gather positions during external data gathering.

First driver in fault: problem with the first driver.

Second driver in fault: problem with the second driver in case two drivers are connected to one axis.

First driver powered on: First driver with motor ON after initialization.

Second driver powered on: Second driver with motor ON after initialization, in case two drivers are connected to one axis.

8.7 Positioner Driver Status List

Bit	code	DRV00x	DRV01	DRV02x	D6U	DRV03	DRVP1
0	**a**			Short-circuit	Short-circuit	Short-circuit	
1	**b**			Broken fuse	Broken fuse	Broken fuse	Voltage out of range
2	**c**			Thermistor fault	Thermistor fault		Over temperature
3	**d**			Initialization error	Initialization error	Initialization error	Initialization error
4	**e**			I^2T	I^2T	I^2T	Dynamic error
5	**f**			Current limit	Current limit		
6	**g**					TG is opened	No stage connected
7	**h**	Inhibition input	Inhibition input	Inhibition input	Inhibition input	Inhibition input	Inhibition input
8	**i**	Driver in fault	Driver in fault	Driver in fault	Driver in fault	Driver in fault	Driver in fault

8.8 Group Status List

Code	Description
0	NOTINIT state
1	NOTINIT state due to an emergency brake: see positioner status
2	NOTINIT state due to an emergency stop: see positioner status
3	NOTINIT state due to a following error during homing
4	NOTINIT state due to a following error
5	NOTINIT state due to an homing timeout
6	NOTINIT state due to a motion done timeout during homing
7	NOTINIT state due to a KillAll command
8	NOTINIT state due to an end of run after homing
9	NOTINIT state due to an encoder calibration error
10	Ready state due to an AbortMove command
11	Ready state from homing
12	Ready state from motion
13	Ready State due to a MotionEnable command
14	Ready state from slave
15	Ready state from jogging
16	Ready state from analog tracking
17	Ready state from trajectory
18	Ready state from spinning
19	Ready state due to a group interlock error during motion
20	Disable state
21	Disabled state due to a following error on ready state
22	Disabled state due to a following error during motion
23	Disabled state due to a motion done timeout during moving
24	Disabled state due to a following error on slave state
25	Disabled state due to a following error on jogging state
26	Disabled state due to a following error during trajectory
27	Disabled state due to a motion done timeout during trajectory
28	Disabled state due to a following error during analog tracking
29	Disabled state due to a slave error during motion
30	Disabled state due to a slave error on slave state
31	Disabled state due to a slave error on jogging state
32	Disabled state due to a slave error during trajectory
33	Disabled state due to a slave error during analog tracking
34	Disabled state due to a slave error on ready state
35	Disabled state due to a following error on spinning state
36	Disabled state due to a slave error on spinning state
37	Disabled state due to a following error on auto-tuning
38	Disabled state due to a slave error on auto-tuning
39	Disable state due to an emergency stop on auto-tuning state
40	Emergency braking
41	Motor initialization state
42	Not referenced state
43	Homing state
44	Moving state

45	Trajectory state
46	Slave state due to a SlaveEnable command
47	Jogging state due to a JogEnable command
48	Analog tracking state due to a TrackingEnable command
49	Analog interpolated encoder calibrating state
50	NOTINIT state due to a mechanical zero inconsistency during homing
51	Spinning state due to a SpinParametersSet command
52	NOTINIT state due to a clamping timeout
55	Clamped
56	Ready state from clamped
58	Disabled state due to a following error during clamped
59	Disabled state due to a motion done timeout during clamped
60	NOTINIT state due to a group interlock error on not reference state
61	NOTINIT state due to a group interlock error during homing
63	NOTINIT state due to a motor initialization error
64	Referencing state
65	Clamping initialization
66	NOTINIT state due to a perpendicularity error homing
67	NOTINIT state due to a master/slave error during homing
68	Auto-tuning state
69	Scaling calibration state
70	Ready state from auto-tuning
71	NOTINIT state from scaling calibration
72	NOTINIT state due to a scaling calibration error
73	Excitation signal generation state
74	Disable state due to a following error on excitation signal generation state
75	Disable state due to a master/slave error on excitation signal generation state
76	Disable state due to an emergency stop on excitation signal generation state
77	Ready state from excitation signal generation
78	Focus state
79	Ready state from focus
80	Disable state due to a following error on focus state
81	Disable state due to a master/slave error on focus state
82	Disable state due to an emergency stop on focus state
83	NOTINIT state due to a group interlock error
84	Disable state due to a group interlock error during moving
85	Disable state due to a group interlock error during jogging
86	Disable state due to a group interlock error on slave state
87	Disable state due to a group interlock error during trajectory
88	Disable state due to a group interlock error during analog tracking
89	Disable state due to a group interlock error during spinning
90	Disable state due to a group interlock error on ready state
91	Disable state due to a group interlock error on auto-tuning state
92	Disable state due to a group interlock error on excitation signal generation state
93	Disable state due to a group interlock error on focus state
94	Disabled state due to a motion done timeout during jogging
95	Disabled state due to a motion done timeout during spinning

96	Disabled state due to a motion done timeout during slave mode
97	Disabled state due to a ZYGO error during motion
98	Disabled state due to a master/slave error during trajectory
99	Disable state due to a ZYGO error on jogging state
100	Disabled state due to a ZYGO error during analog tracking
101	Disable state due to a ZYGO error on auto-tuning state
102	Disable state due to a ZYGO error on excitation signal generation state
103	Disabled state due to a ZYGO error on ready state
104	Driver initialization
105	Jitter initialization
106	Not initialized state due to an error with GroupKill or KillAll command
107	Not initialized state due to a clamp disable error
108	Not initialized state due to a clamp enable error
109	Scanning state
110	Ready state from scan done
111	Ready state from scan error
112	Ready state from group interlock error during scan
113	Ready state from scan abort
114	Disabled state due to an error during scan
115	Disabled state due to a following error during scan
116	Disabled state due to a motion done timeout during scan
117	Disabled state due to a group interlock error during scan
118	Disabled state due to a ZYGO error during scan
119	Disabled state due to a master/slave error during scan
120	PVT scanning state
121	Ready state from PVT scan done
122	Ready state from group interlock error during PVT scan
123	Ready state from PVT scan abort
124	Disabled state due to a following error during PVT scan
125	Disabled state due to a motion done timeout during PVT scan
126	Disabled state due to a group interlock error during PVT scan
127	Disabled state due to a ZYGO error during PVT scan
128	Disabled state due to a master/slave error during PVT scan
129	Shutter enable ready state
130	Shutter enable moving state
131	Ready state from shutter done
132	Ready state from shutter error
133	Ready state from shutter disable
134	Ready state due to a group interlock error during shutter enable
135	Disabled state due to a following error during shutter enable
136	Disabled state due to a motion done timeout during shutter moving

8.9 Error List

code	Error description
2	Error to ignore
1	TCL interpretor error: wrong syntax
0	Successful command
-1	Busy socket: previous command not yet finished
-2	TCP timeout
-3	String command too long
-4	Unknown command
-5	Not allowed due to a positioner error
-7	Wrong format in the command string
-8	Wrong object type for this command
-9	Wrong number of parameters in the command
-10	Wrong parameter type in the command string
-11	Wrong parameters type in the command string: word or word * expected
-12	Wrong parameter type in the command string: bool or bool * expected
-13	Wrong parameter type in the command string: char * expected
-14	Wrong parameter type in the command string: double or double * expected
-15	Wrong parameter type in the command string: int or int * expected
-16	Wrong parameter type in the command string: unsigned int or unsigned int * expected
-17	Parameter out of range
-18	Positioner Name doesn't exist
-19	GroupName doesn't exist or unknown command
-20	Fatal Error during initialization, read the error.log file for more details
-21	Controller in initialization
-22	Not allowed action
-23	Position compare not set
-24	Not available in this configuration
-25	Following Error
-26	Emergency signal
-27	Move Aborted
-28	Home search timeout
-29	Mnemonic gathering type doesn't exist
-30	Gathering not started
-31	Home position is out of user travel limits
-32	Gathering not configurated
-33	Motion done timeout
-35	Not allowed: home preset outside travel limits
-36	Unknown TCL file
-37	TCL interpretor doesn't run
-38	TCL script can't be killed
-39	Mnemonic action doesn't exist
-40	Mnemonic event doesn't exist
-41	Slave-Master mode not configurated
-42	Jog value out of range

-43	Gathering running
-44	Slave error disabling master
-45	End of run activated
-46	Not allowed action due to backlash
-47	Wrong TCL task name: each TCL task name must be different
-48	BaseVelocity must be null
-49	Inconsistent mechanical zero during home search
-50	Motor initialization error: check InitializationAcceleration
-51	Spin value out of range
-52	Group interlock
-53	Not allowed action due to a group interlock
-60	Error during file writing or file doesn't exist
-61	Error during file reading or file doesn't exist
-62	Wrong trajectory element type
-63	Wrong XY trajectory element arc radius
-64	Wrong XY trajectory element sweep angle
-65	Trajectory line element discontinuity error or new element is too small
-66	Trajectory doesn't content any element or not loaded
-68	Velocity on trajectory is too high
-69	Acceleration on trajectory is too high
-70	Final velocity on trajectory is not zero
-71	Error write or read from message queue
-72	Error during trajectory initialization
-73	End of file
-74	Error file parameter key not found
-75	Time delta of trajectory element is negative or null
-80	Event not configured
-81	Action not configured
-82	Event buffer is full
-83	Event ID not defined
-85	Secondary positioner index is too far from first positioner
-90	Focus socket not reseved or closed
-91	Focus event scheduler is busy
-95	Error of executing an optional module
-96	Error of stopping an optional module
-98	Error of unloading an optional module
-99	Fatal external module load: see error.log
-100	Internal error (memory allocation error, …)
-101	Relay Feedback Test failed: No oscillation
-102	Relay Feedback Test failed: Signal too noisy
-103	Relay Feedback Test failed: Signal data not enough for analyse
-104	Error of tuning process initialization
-105	Error of scaling calibration initialization
-106	Wrong user name or password
-107	This function requires to be logged in with Administrator rights
-108	The TCP/IP connection was closed by an administrator
-109	Group need to be homed at least once to use this function (distance mesured during home search)

-110	Execution not allowed for Gantry configuration
-111	Gathering buffer is full
-112	Error of excitation signal generation initialization
-113	Both ends of run activated
-114	Clamping timeout
-115	Function is not supported by current hardware
-116	Error during external driver initialization, read error.log file for more details
-117	Function is only allowed in DISABLED group state
-118	Not allowed action driver not initialized
-119	Position is outside of travel limits on secondary positioner
-120	Warning following error during move with position compare enabled
-121	Function is not allowed due to configuration disabled
-122	Data incorrect (wrong value, wrong format, wrong order or inexistent)
-123	Action not allowed, an Administrator is already logged in
-124	Error during move of secondary positioner: check positioners errors for details
-125	Check tcl task name is not empty
-126	Wrong parameter type in the command string: short or short * expected
-127	Wrong parameter type in the command string: long or long * expected
-128	Wrong parameter type in the command string: unsigned short or unsigned short * expected
-129	Wrong parameter type in the command string: unsigned long or unsigned long * expected
-130	Wrong parameter type in the command string: float or float * expected
-131	Wrong parameter type in the command string: long long int or long long int * expected
-132	Wrong parameter type in the command string: unsigned long long or unsigned long long * expected
-133	Error when creating actions tasks
-134	Changing the loop status is allowed in DISABLE state only
-135	Function is not allowed because group is not initialized or not referenced
-136	Wrong parameter type in the command string: charhex32 * expected
-137	Event&Action: action threads number exceeds limit (must be ≤20)
-138	Event&Action: action thread is running
-139	Event&Action: Always event is not compatible with associated action
-200	Invalid socket
-201	The group is already in this mode
-202	Not allowed action due to an external motion interlock
-204	Function is not allowed because the feed forward is enabled
-205	Not enable in your configuration
-206	Dual encoder position error
-207	Gantry mode error: check Encoder Matrix and Decoupling Motor Matrix
-208	Not allowed action because piston is engaged
-209	INT board command failed: invalid card number or initialization not done
-210	Not allowed action due to (XStart ≤Xangle ≤XEnd) is not true

-211	Not expected position after motion
-212	MagneticTrackPositionAtHome value is out of tolerance and can not be applied.
-213	Clamp disable error
-214	Clamp enable error
-215	Not allowed action because group is not in NOTINIT nor in DISABLE state
-1000	Zygo command execution failed
-1001	The controller is not connected to Zygo TCP server. Run ZygoStartInterferometer API.
-1002	Connection to Zygo TCP server failed
-1003	The XPS controller is already connected to Zygo TCP server
-1004	Zygo signal is not present
-1005	Zygo PEG configuration failed
-1006	Zygo error detected

8.10 Controller Status List

Controller status code	code	Controller status description
CONTROLLER_STATUS_OK	0x00000000	Controller status OK
CONTROLLER_STATUS_INITIALIZATION_FAILED	0x00000001	Controller initialization failed
CONTROLLER_STATUS_NB_OPENED_SOCKETS_REACHED_MAXIMUM_ALLOWED	0x00000002	Number of currently opened sockets reached maximum allowed number
CONTROLLER_STATUS_CPU_OVERLOAD	0x00000004	Controller CPU is overloaded
CONTROLLER_STATUS_CORRECTOR_OVER_CALCULATED	0x00000008	Current measured corrector calculation time exceeds the corrector period
CONTROLLER_STATUS_PROFILER_OVER_CALCULATED	0x00000010	Profile generator calculating time exceeds ProfileGeneratorISRRatio * IRSCorrectorPeriod
CONTROLLER_STATUS_CORRECTOR_INTERRUPT_LOST	0x00000020	Controller has lost a corrector interrupt
CONTROLLER_STATUS_INTERFERO_SIGNAL_NOT_PRESENT	0x00000040	Zygo interferometer signal is not present
CONTROLLER_STATUS_INTERFERO_INITIALISATION_FAILED	0x00000080	Zygo interferometer Ethernet initialisation failed
CONTROLLER_STATUS_INTERFERO_ERROR_STATUS	0x00000100	Zygo interferometer error detected. Please check ZYGO Error Status
CONTROLLER_STATUS_MOTION_VELOCITY_LIMITED	0x00000200	Motion velocity is limited
CONTROLLER_STATUS_LIFT_PIN_UP	0x00000400	Lift pin is UP

NOTE

Within about 5 minutes after the controller startup, due to the hardware thermal stabilization, the CONTROLLER_STATUS_CORRECTOR_OVER_CALCULATED,

CONTROLLER_STATUS_CORRECTOR_INTERRUPT_LOST ,

CONTROLLER_STATUS_PROFILER_OVER_CALCULATED, CONTROLLER_STATUS_CPU_OVERLOAD or CONTROLLER_STATUS_NB_OPENED_SOCKETS_REACHED_MAXIMUM_ALLOWED status flags may be raised.

These flags are automatically reset after a controller status reading using the *ControllerStatusGet()* command.

Another way to avoid these flags during the 5 first minutes after boot is to set the following parameter in system.ref to 300 (seconds):

DelayBeforeStartup = 300 ; Controller boots completely after 300 seconds

8.11 "ExternalInterlockA" error list

Error Bit #	Mask	Error description
0	1	Lift pin not down
1	2	Invalid Lift pin state
2	4	Hold signal
3	8	Door is opened
4	16	Shutter is opened
5	32	Invalid Shutter state
6	64	WRT not retracted
7	128	Not in loading position
8	256	Not in safety position
9	512	Not used
…	…	Not used
15	32768	Not used

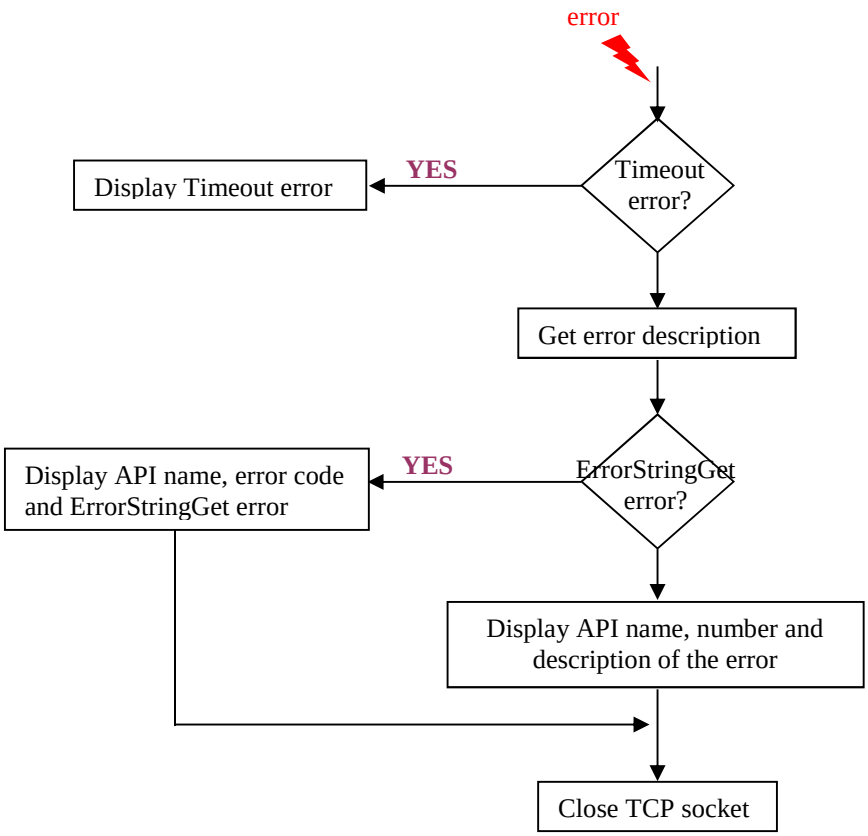
9.0 Process Examples

This section provides examples of programming sequences. The next diagrams show the order of use of the different Functions. To see programming code examples, please refer to the TCL Manual for TCL scripts.

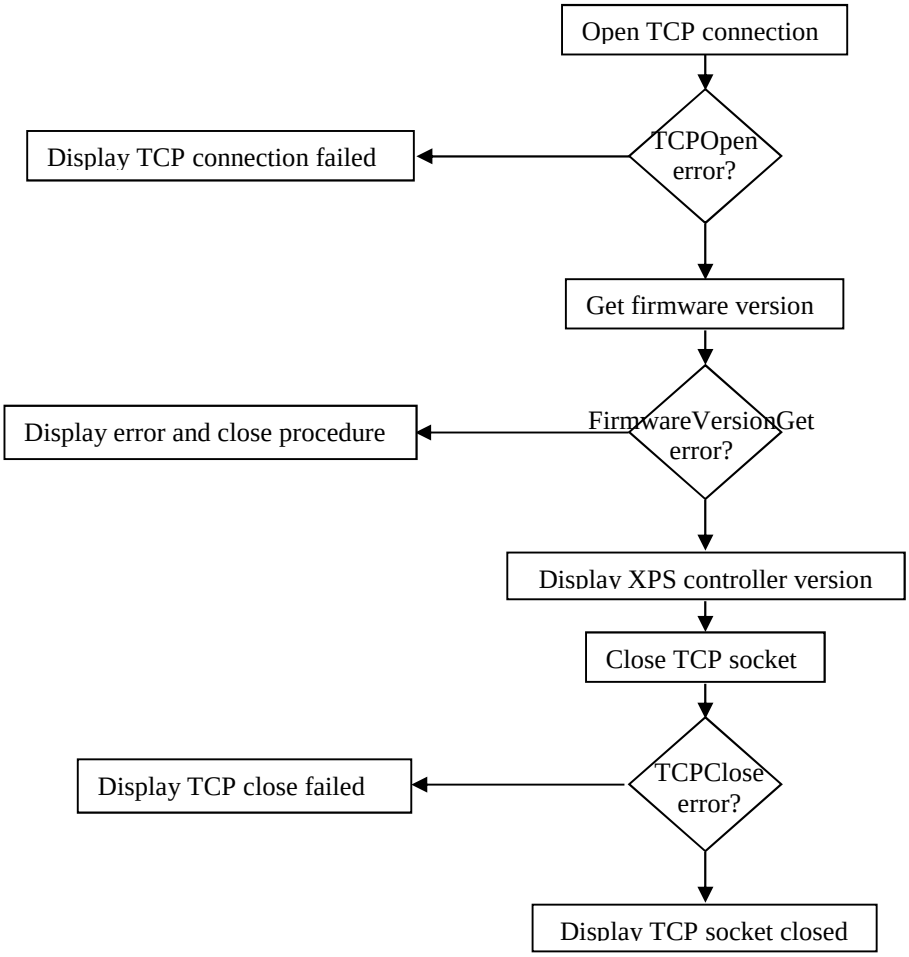
9.1 Management of Errors Example

When an error occurs, it is desirable to analyze and fix the error. The following error display and socket closing procedure is useful to detect and display the errors during the execution of a program. This sequence could be added to each program and called each time users need to test certain parts of a program.

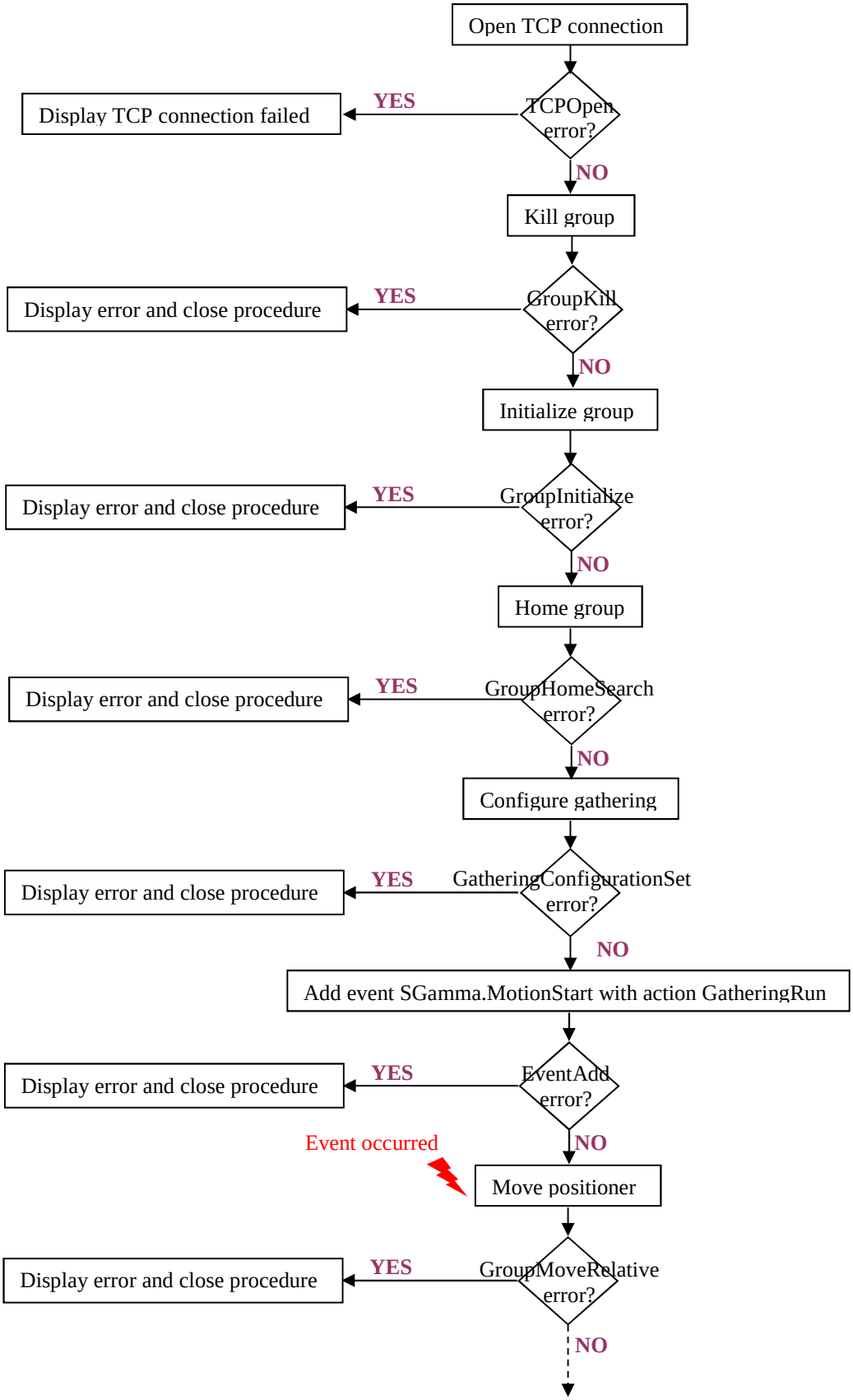
Display error and close procedure:

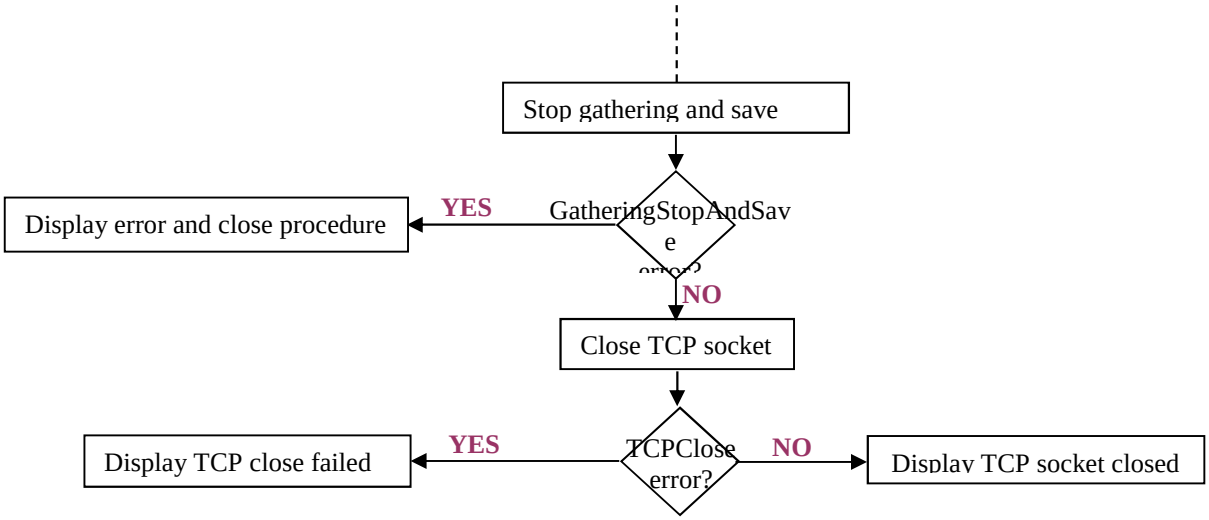


9.2 Firmware Version Example

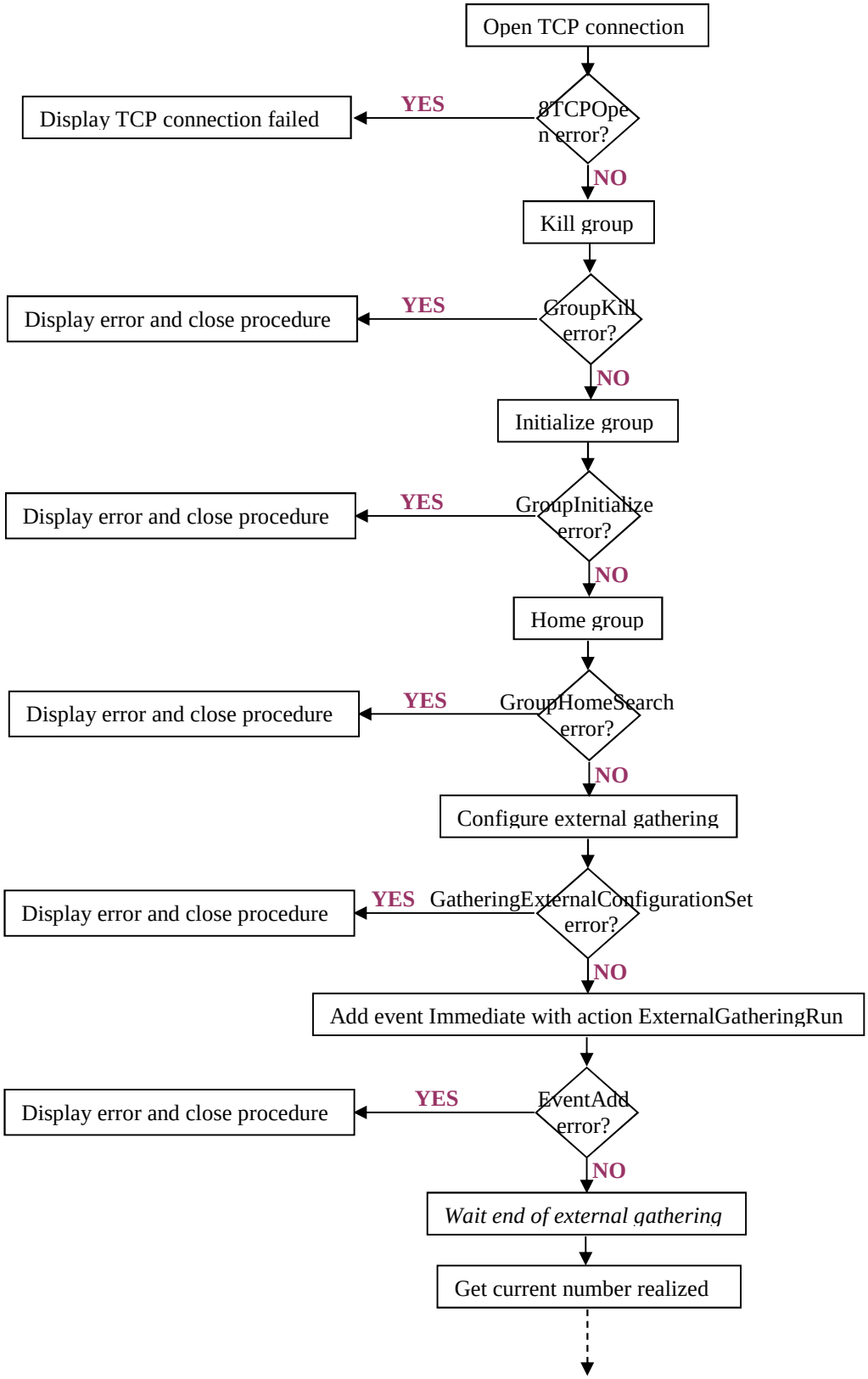


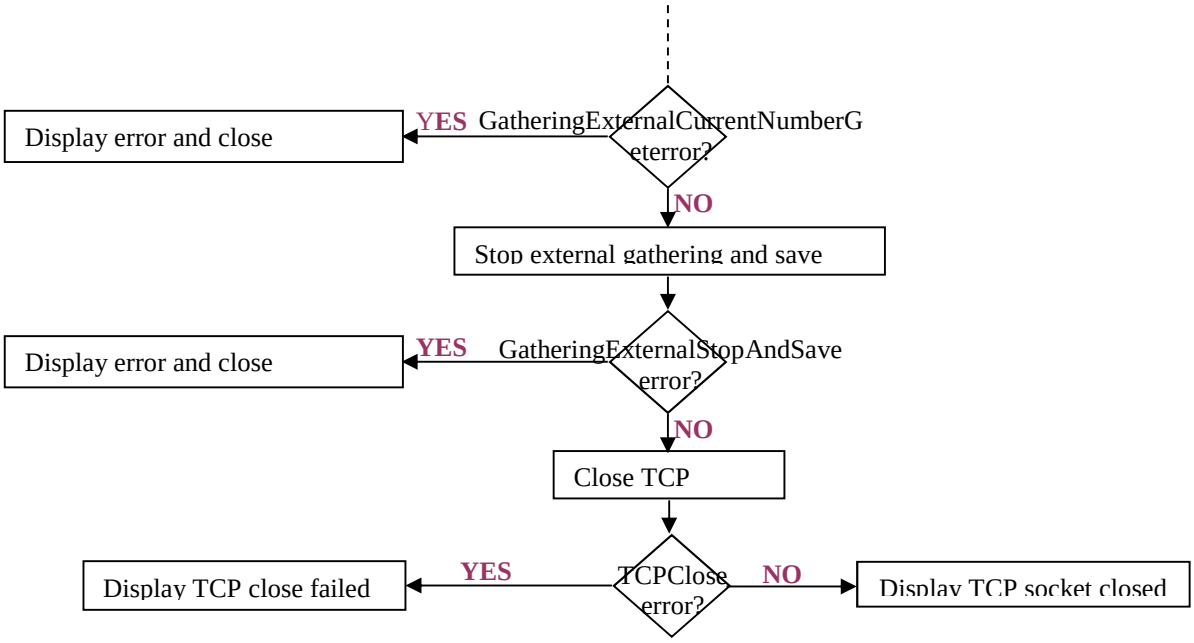
9.3 Gathering with Motion Example



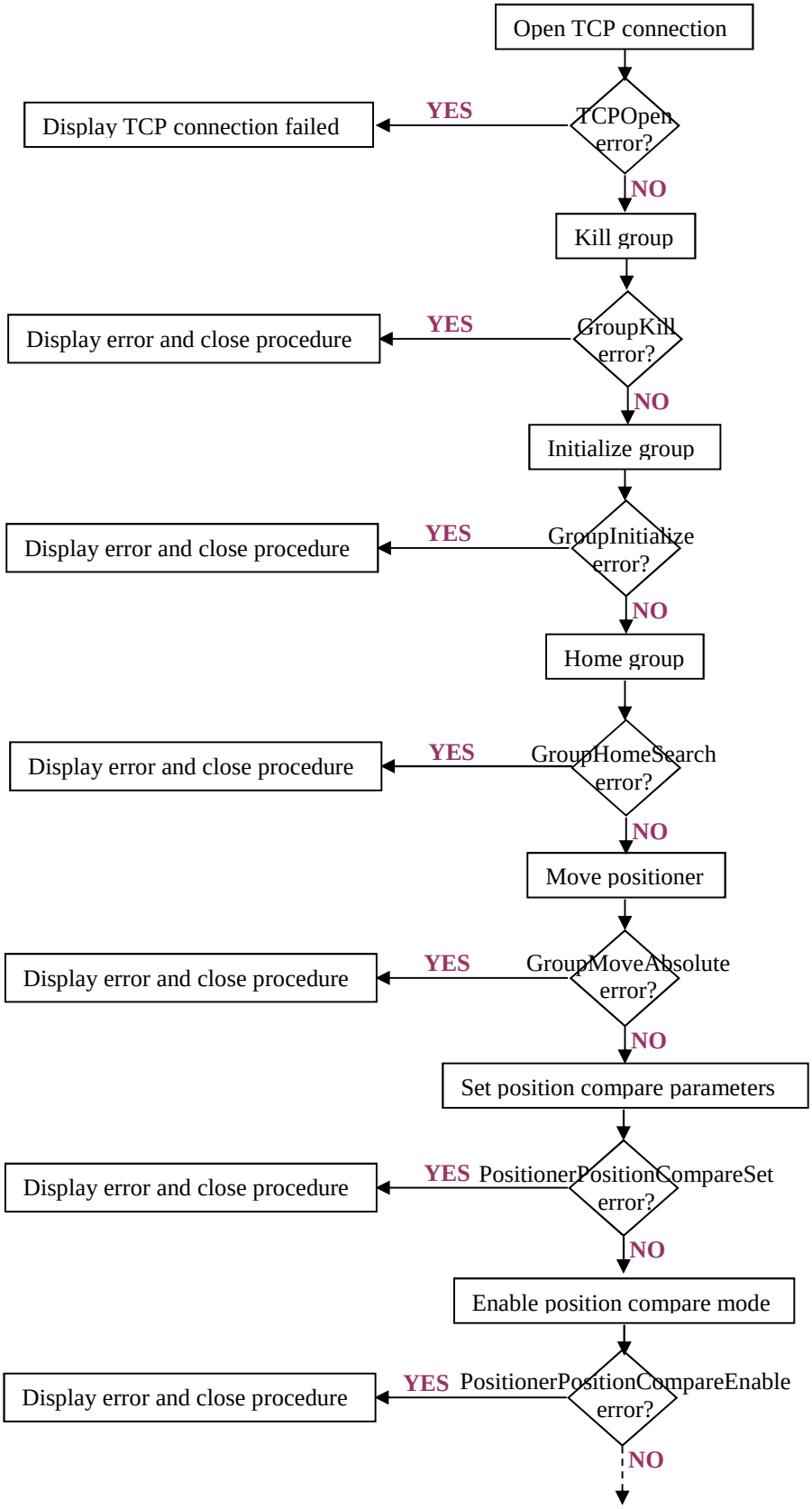

Stop gathering and save
GatheringStopAndSave error?
YES
Display error and close procedure
NO
Close TCP socket
TCPClose error?
YES
Display TCP close failed
NO
Display TCP socket closed

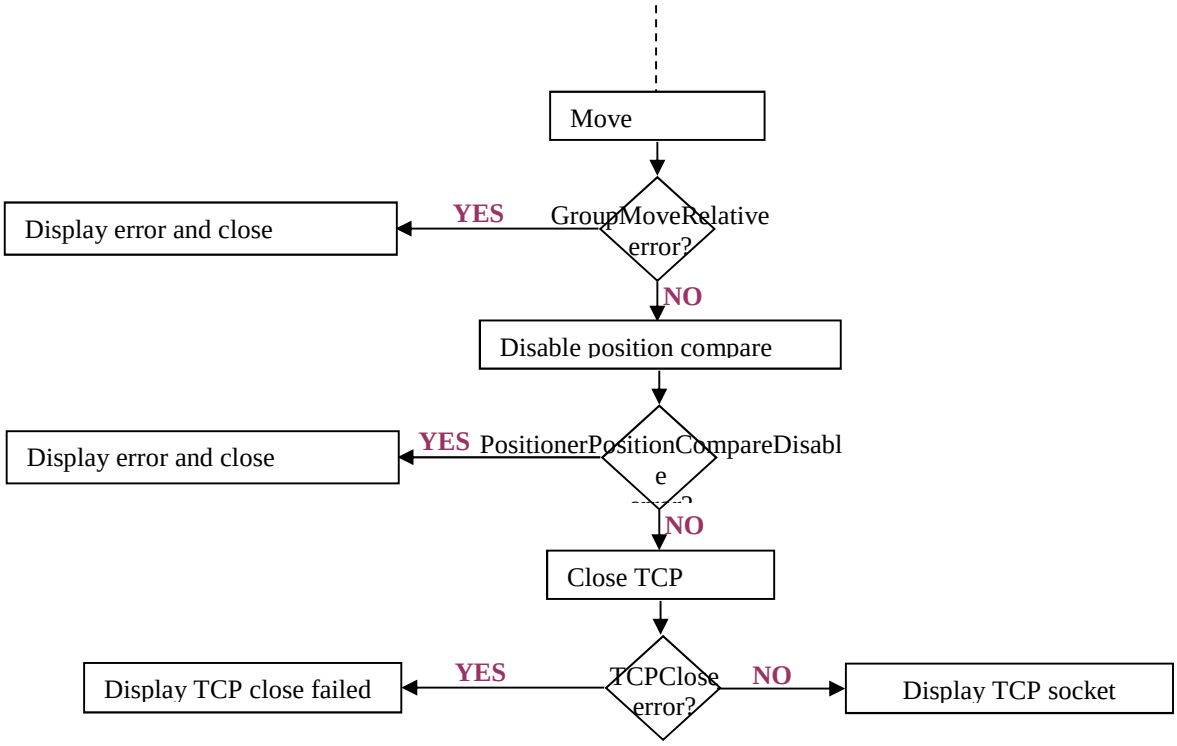
9.4 External Gathering Example



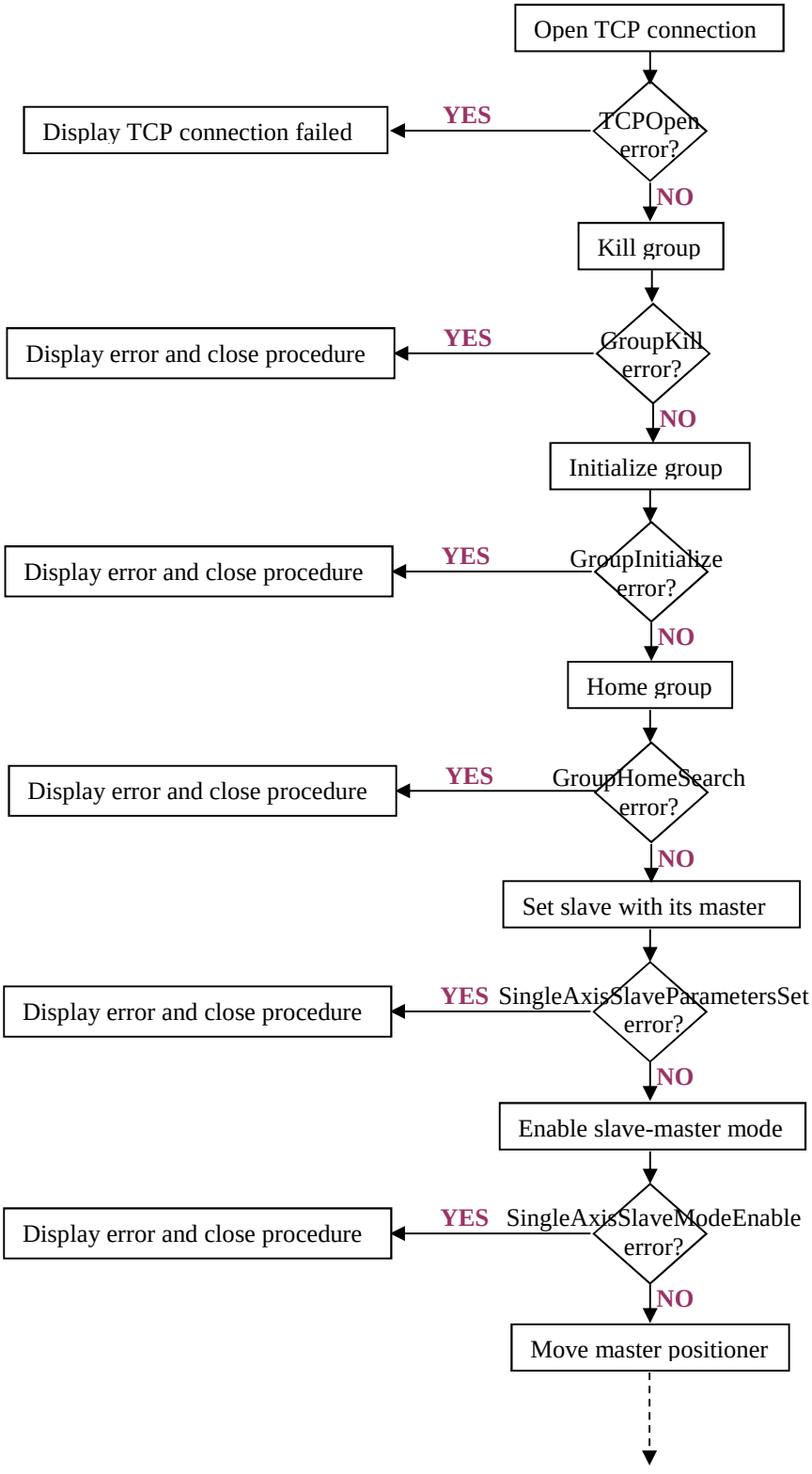

GatheringExternalCurrentNumberGeterror?
YES
Display error and close
NO
Stop external gathering and save
GatheringExternalStopAndSaveerror?
YES
Display error and close
NO
Close TCP
TCPCloseerror?
YES
Display TCP close failed
NO
Display TCP socket closed

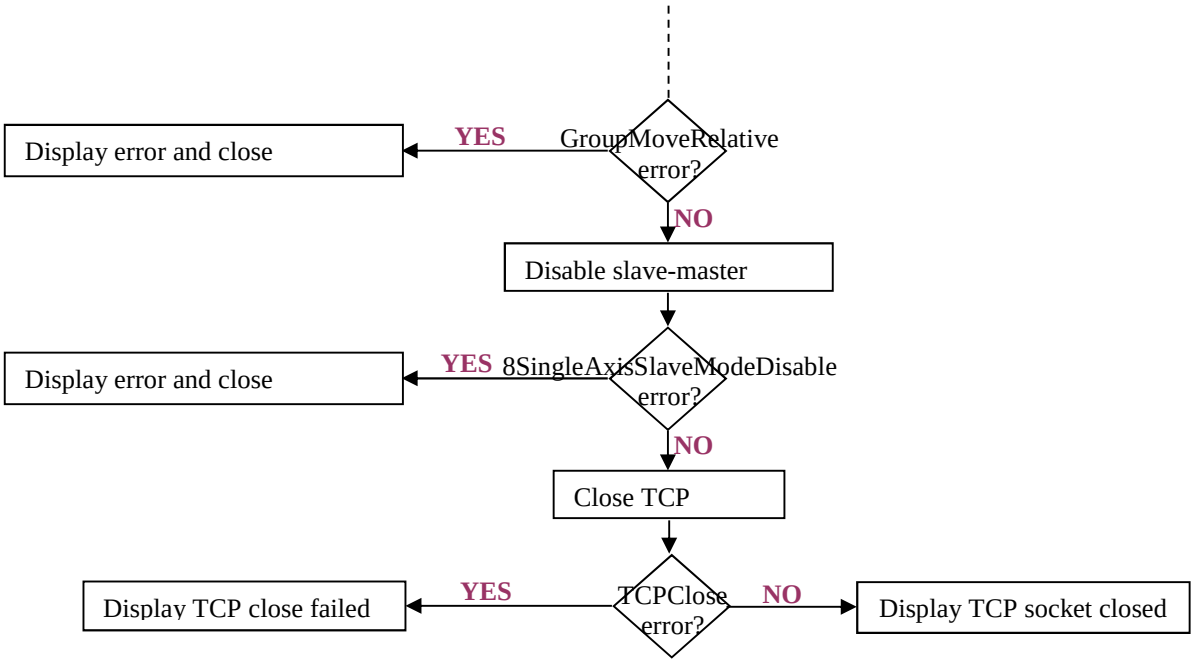
9.5 Position Output Compare Example



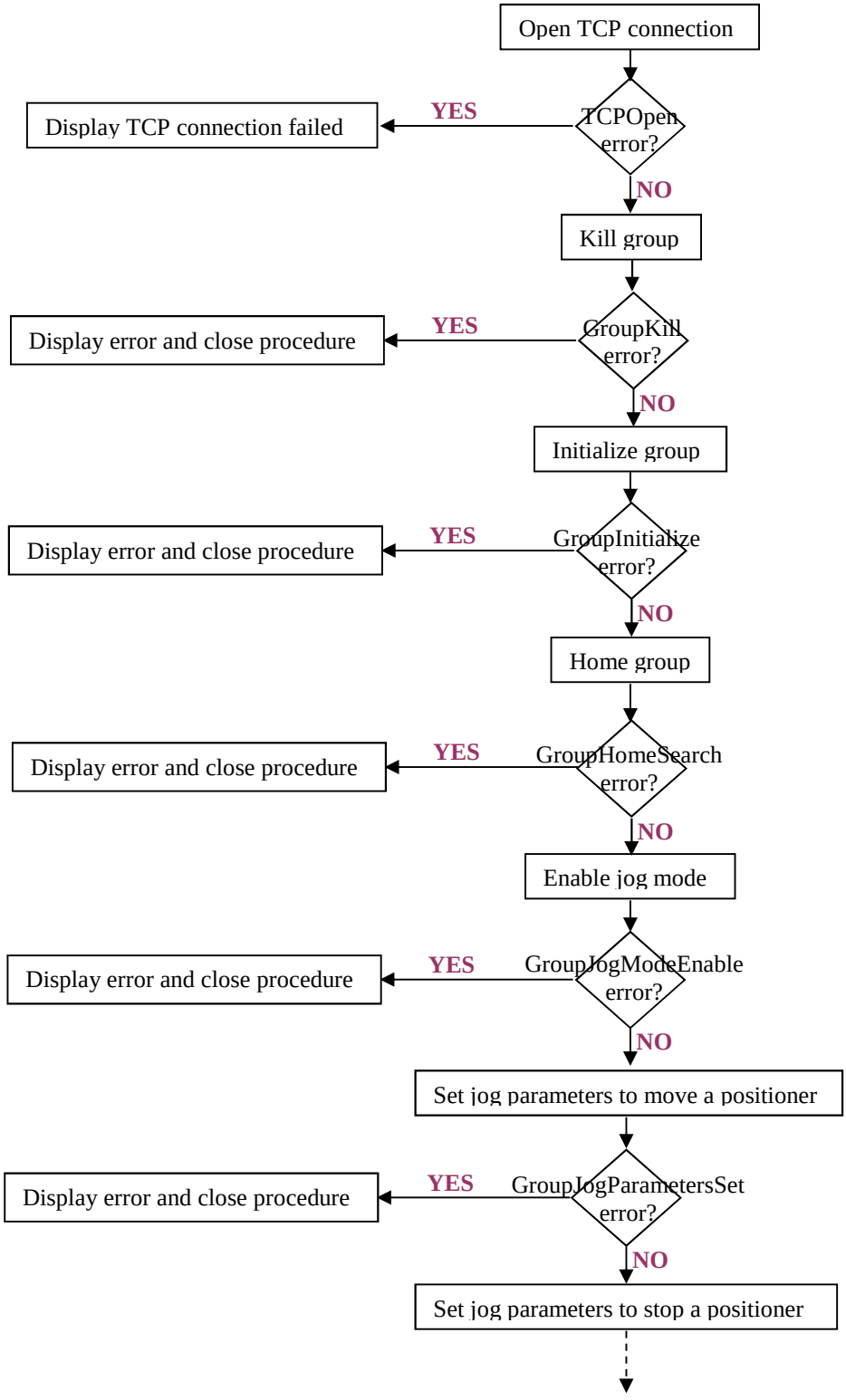

Move
GroupMoveRelative error?
YES
Display error and close
NO
Disable position compare
PositionerPositionCompareDisable
YES
Display error and close
NO
Close TCP
TCPClose error?
YES
Display TCP close failed
NO
Display TCP socket

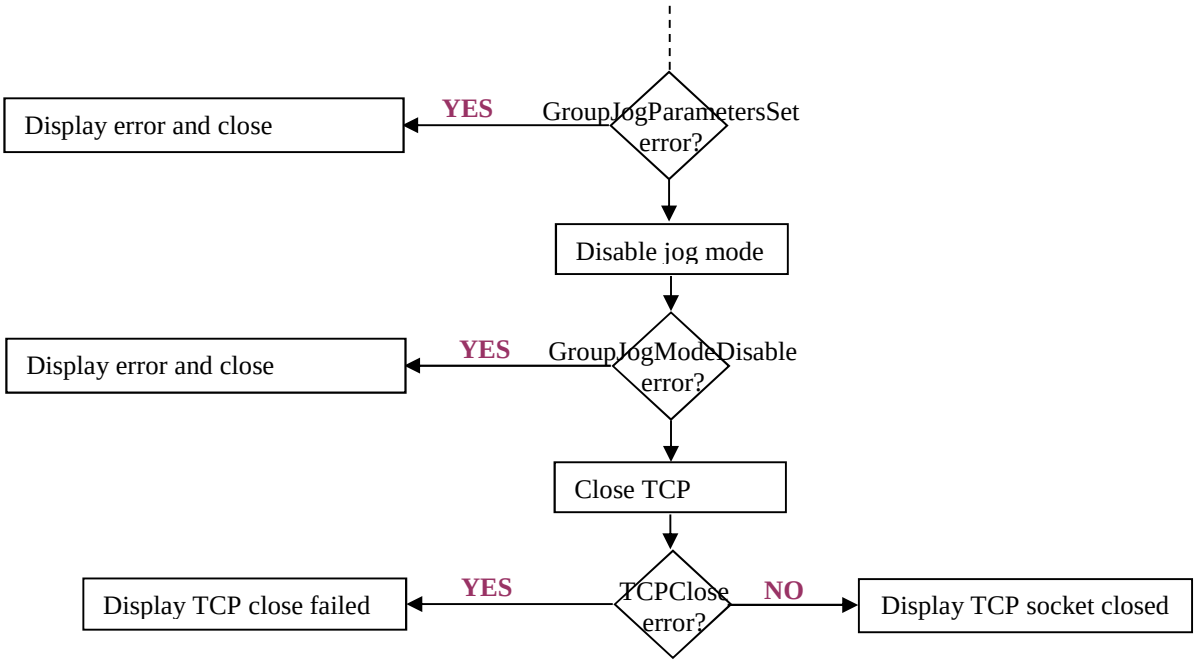
9.6 Slave-Master Mode Example



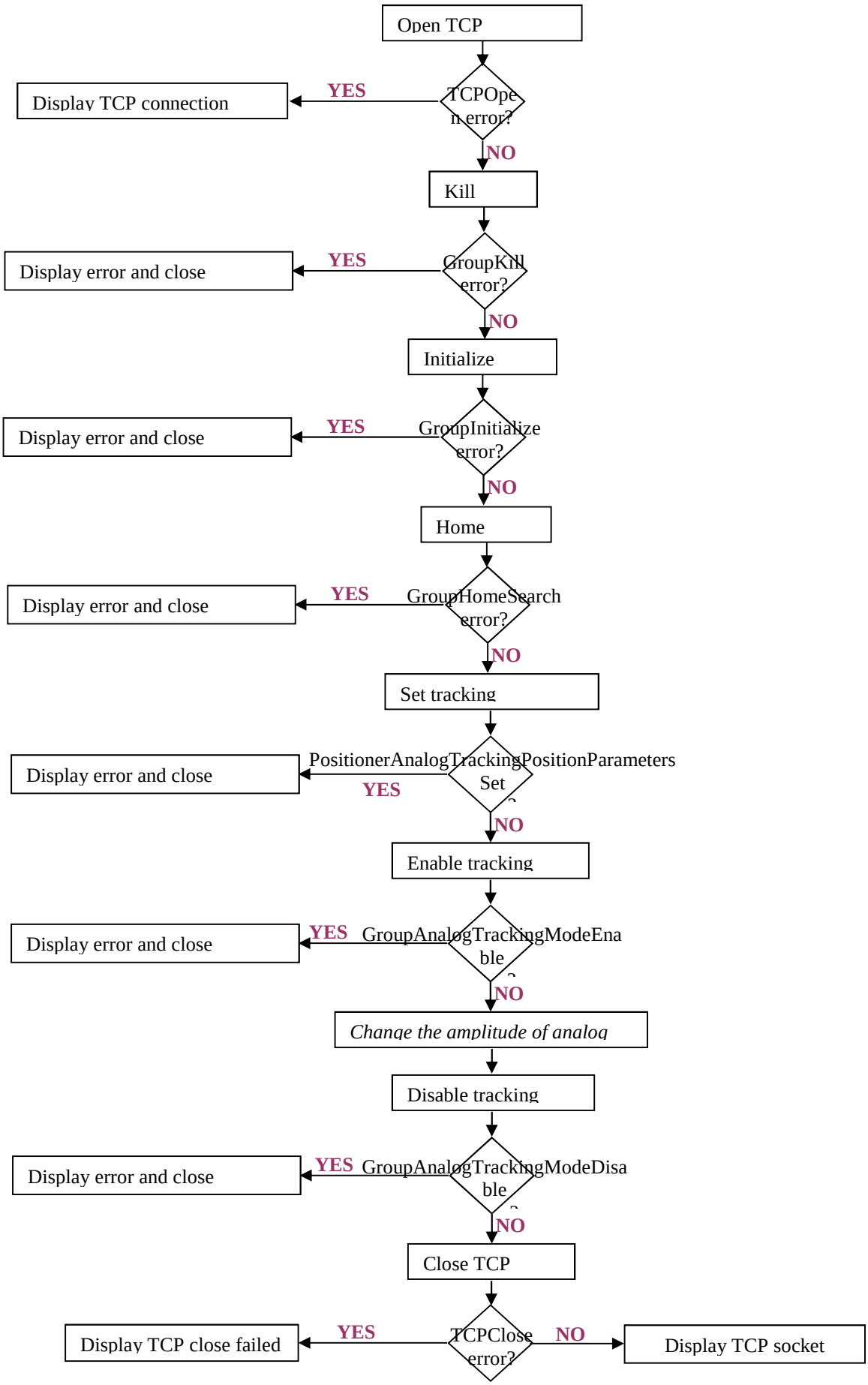

GroupMoveRelative error?
YES
Display error and close
NO
Disable slave-master
8SingleAxisSlaveModeDisable error?
YES
Display error and close
NO
Close TCP
TCPClose error?
YES
Display TCP close failed
NO
Display TCP socket closed

9.7 Jogging Example

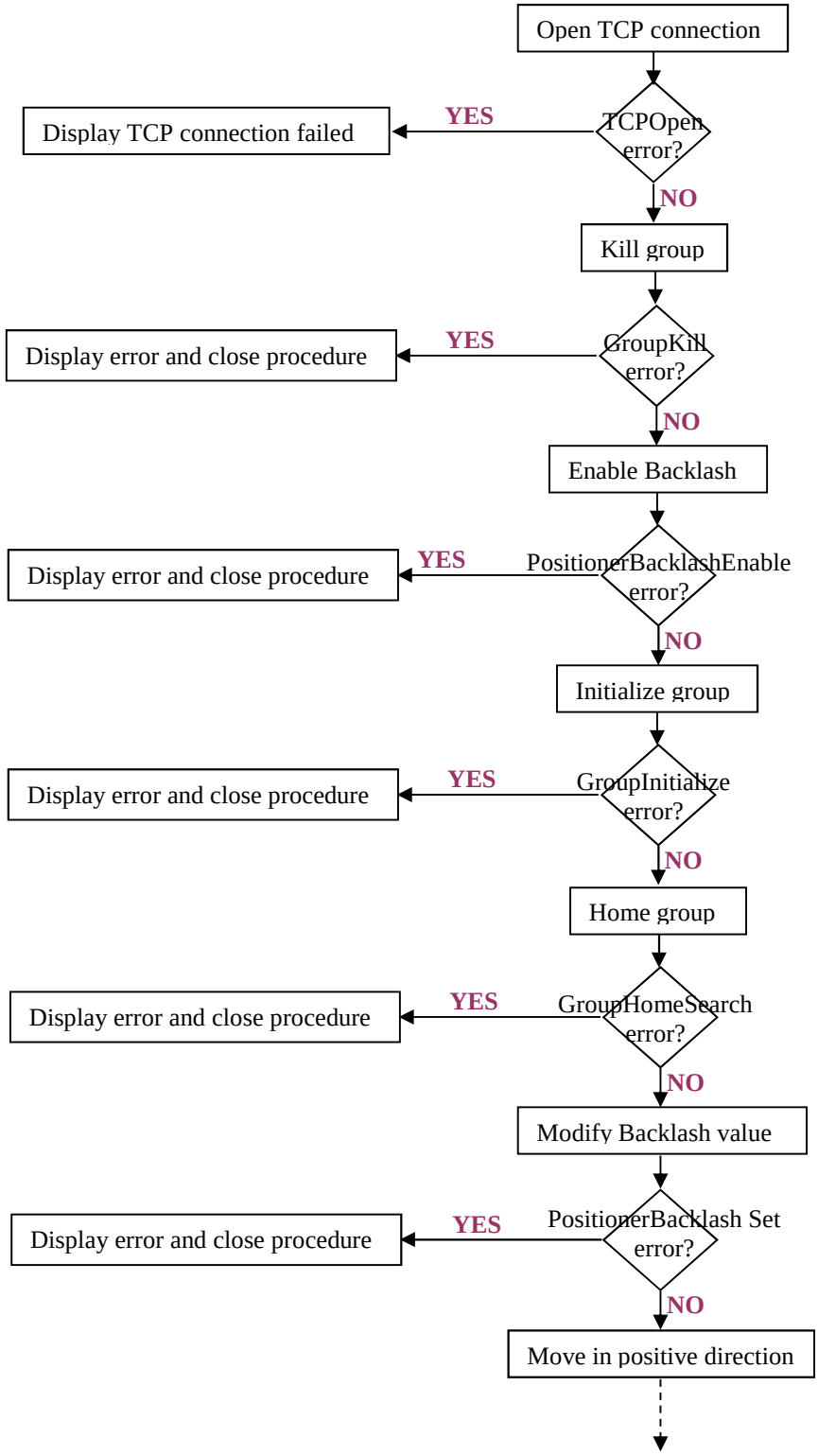


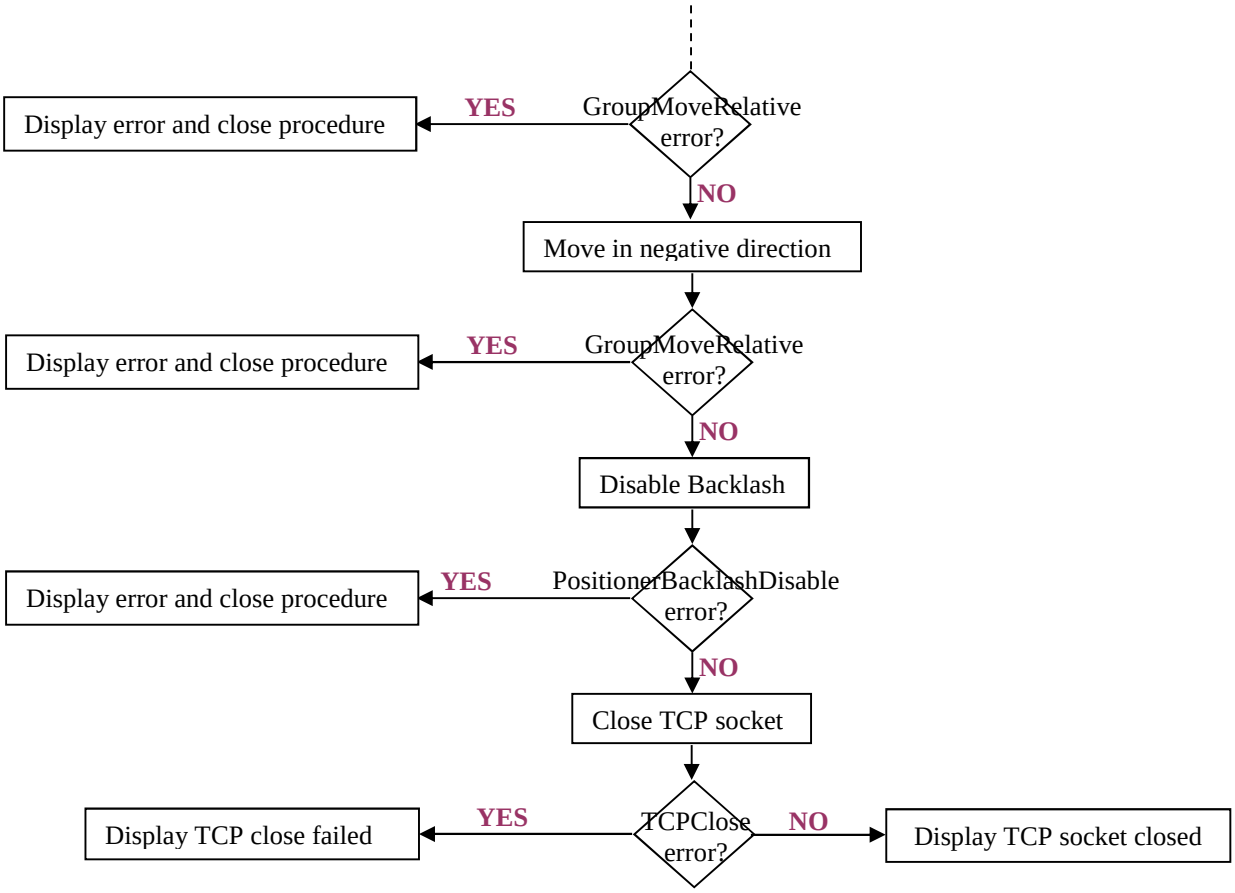

GroupJogParametersSet error?
YES
Display error and close
Disable jog mode
GroupJogModeDisable error?
YES
Display error and close
Close TCP
TCPClose error?
YES
Display TCP close failed
NO
Display TCP socket closed

9.8 Tracking Example

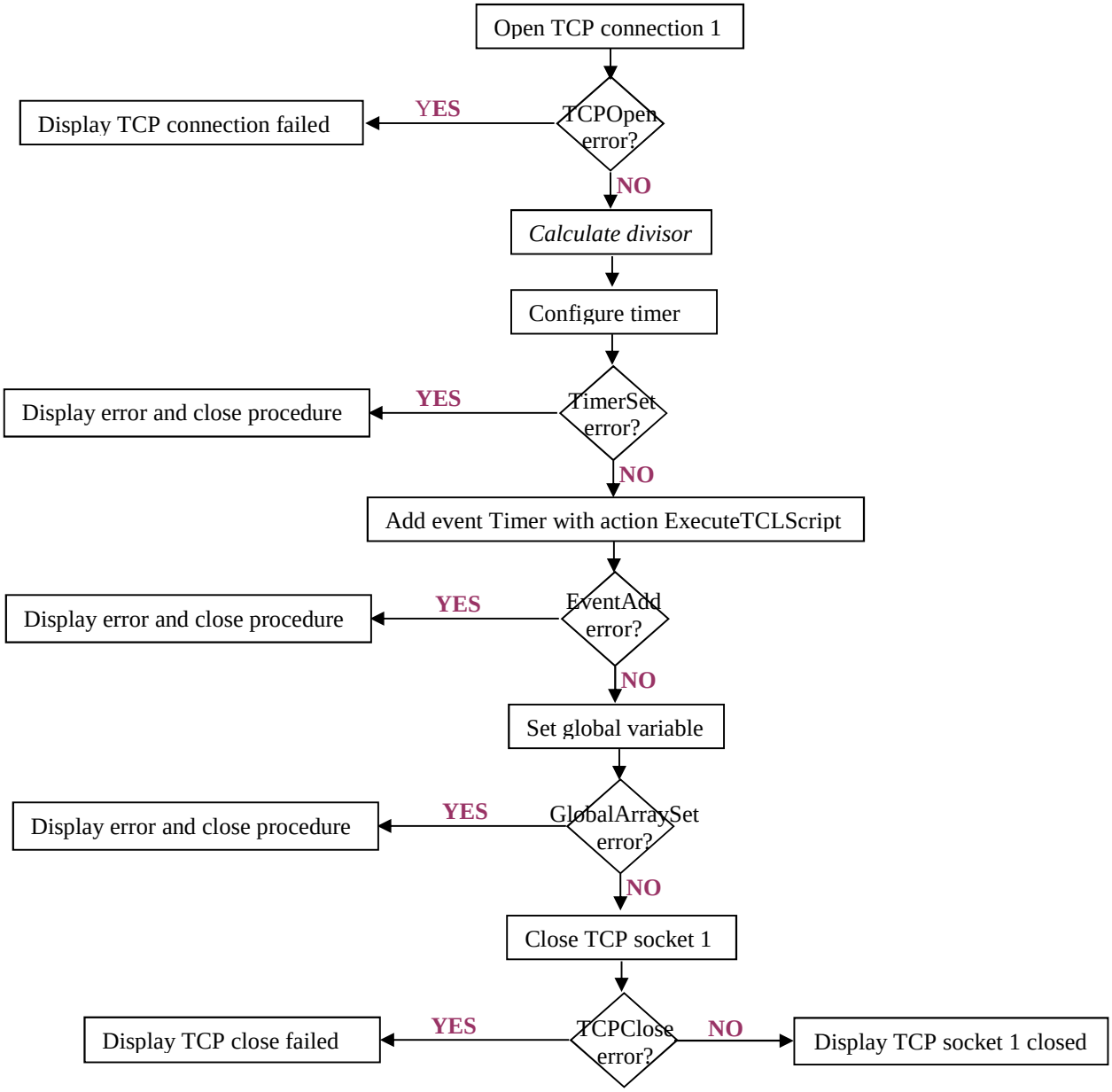


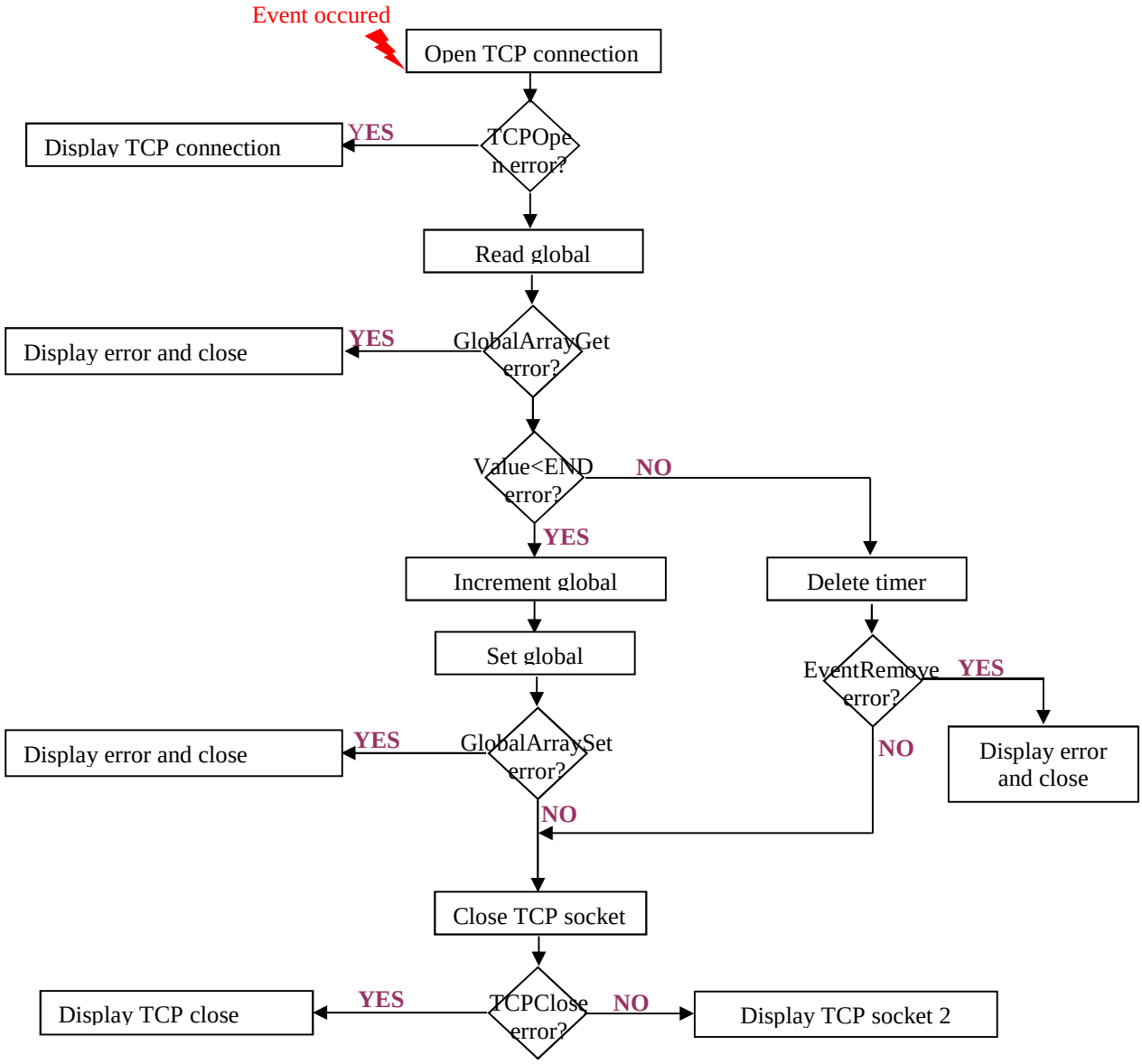
9.9 Backlash


Open TCP connection
TCPOpen error?
YES
Display TCP connection failed
NO
Kill group
GroupKill error?
YES
Display error and close procedure
NO
Enable Backlash
PositionerBacklashEnable error?
YES
Display error and close procedure
NO
Initialize group
GroupInitialize error?
YES
Display error and close procedure
NO
Home group
GroupHomeSearch error?
YES
Display error and close procedure
NO
Modify Backlash value
PositionerBacklash Set error?
YES
Display error and close procedure
NO
Move in positive direction


GroupMoveRelative error?
YES
Display error and close procedure
NO
Move in negative direction
GroupMoveRelative error?
YES
Display error and close procedure
NO
Disable Backlash
PositionerBacklashDisable error?
YES
Display error and close procedure
NO
Close TCP socket
TCPClose error?
YES
Display TCP close failed
NO
Display TCP socket closed

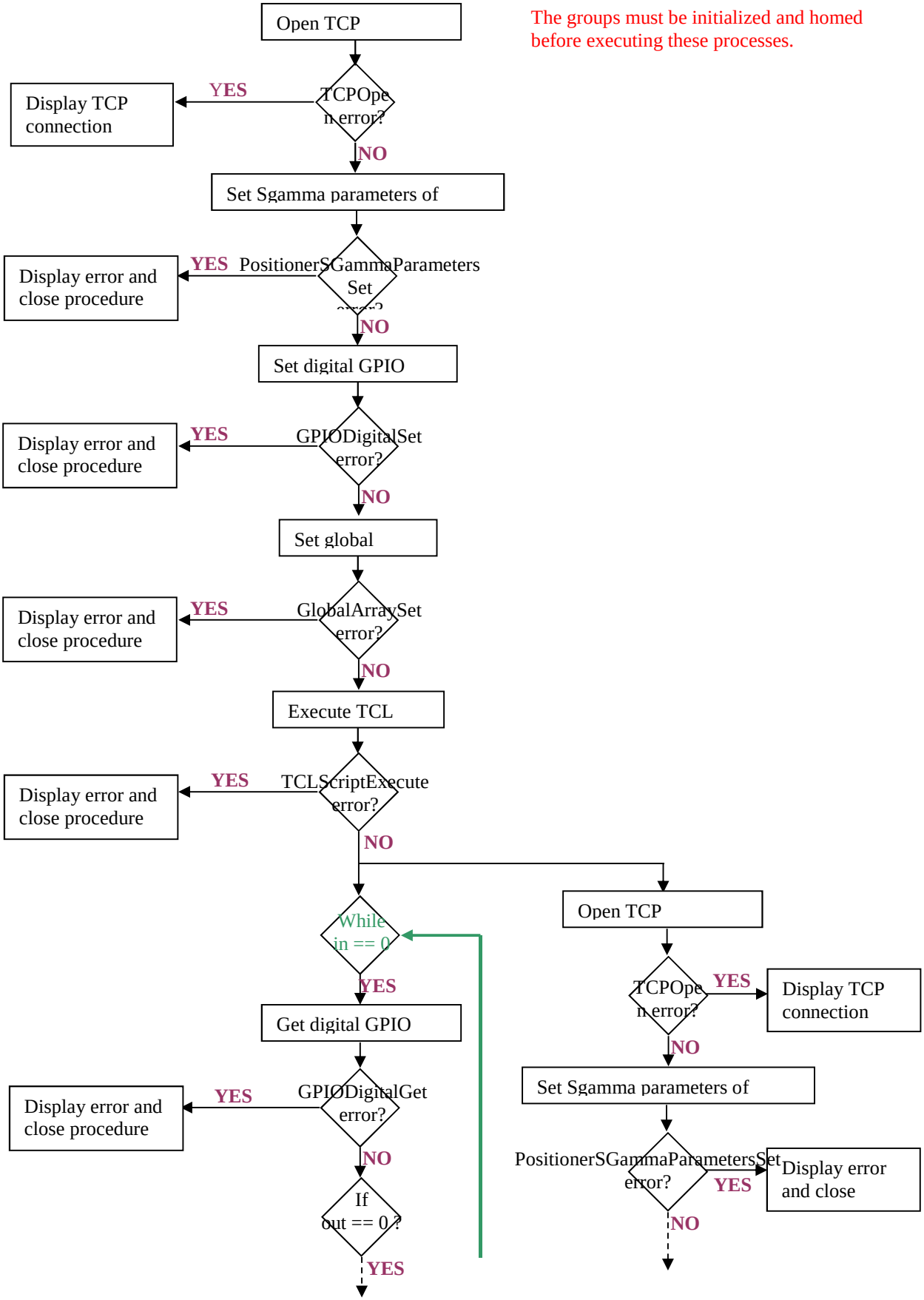
9.10 Timer Event and Global Variables

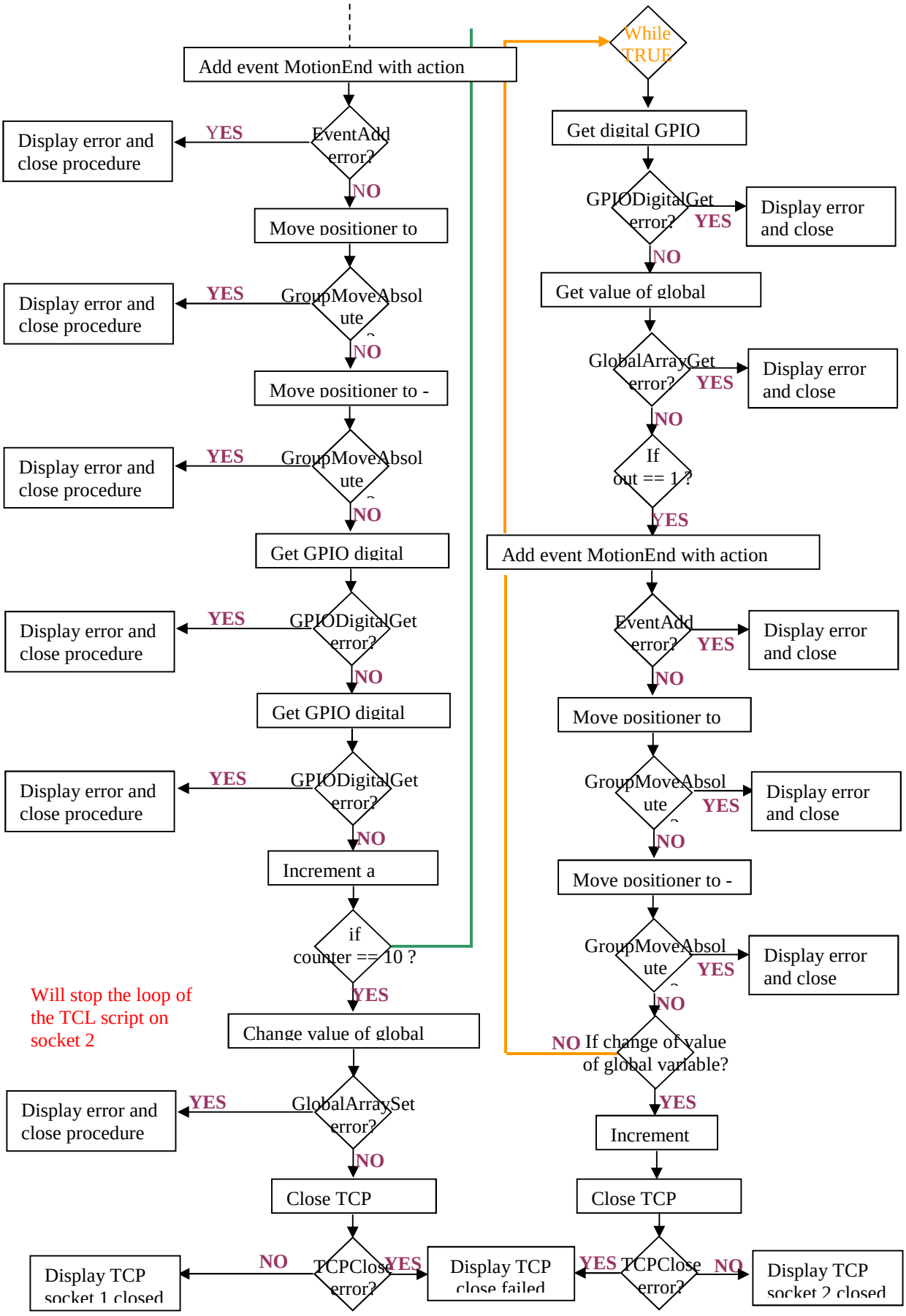



Event occured
Open TCP connection
TCPOpen error?
YES
Display TCP connection
Read global
GlobalArrayGet error?
YES
Display error and close
Value<END error?
NO
YES
Increment global
Delete timer
Set global
EventRemove error?
YES
NO
Display error and close
GlobalArraySet error?
YES
Display error and close
NO
Close TCP socket
TCPClose error?
YES
Display TCP close
NO
Display TCP socket 2

9.11 Running Several Motion Processes Simultaneously

The groups must be initialized and homed before executing these processes.




Add event MotionEnd with action
EventAdd error?
YES
Display error and close procedure
NO
Move positioner to
GroupMoveAbsolute
YES
Display error and close procedure
NO
Move positioner to -
GroupMoveAbsolute
YES
Display error and close procedure
NO
Get GPIO digital
GPIODigitalGet error?
YES
Display error and close procedure
NO
Get GPIO digital
GPIODigitalGet error?
YES
Display error and close procedure
NO
Increment a
if counter == 10 ?
YES
Will stop the loop of the TCL script on socket 2
Change value of global
GlobalArraySet error?
YES
Display error and close procedure
NO
Close TCP
TCPClose error?
YES
Display TCP close failed
NO
Display TCP socket 1 closed
While TRUE
Get digital GPIO
GPIODigitalGet error?
YES
Display error and close
NO
Get value of global
GlobalArrayGet error?
YES
Display error and close
NO
If out == 1 ?
YES
Add event MotionEnd with action
EventAdd error?
YES
Display error and close
NO
Move positioner to
GroupMoveAbsolute
YES
Display error and close
NO
Move positioner to -
GroupMoveAbsolute
YES
Display error and close
NO
NO If change of value of global variable?
YES
Increment
Close TCP
TCPClose error?
YES
Display TCP socket 2 closed
NO

Service Form

Your Local Representative

Tel.: _____

Fax:_____

Name: _____

Company:_____

Address:_____

Country:_____

P.O. Number:_____

Item(s) Being Returned:_____

Model#: _____

Return authorization #: _____
(Please obtain prior to return of item)

Date: _____

Phone Number: _____

Fax Number: _____

Serial #: _____

Description: _____

Reasons of return of goods (please list any specific problems): _____

Visit Newport Online at:
www.newport.com

North America & Asia
Newport Corporation
1791 Deere Ave.
Irvine, CA 92606, USA
Sales
Tel.: (800) 222-6440
e-mail: sales@newport.com
Technical Support
Tel.: (800) 222-6440
e-mail: tech@newport.com
Service, RMAs & Returns
Tel.: (800) 222-6440
e-mail: service@newport.com

Europe
MICRO-CONTROLE Spectra-Physics S.A.S
9, rue du Bois Sauvage
91055 Évry CEDEX
France

Sales
Tel.: +33 (0)1.60.91.68.68
e-mail: france@newport.com

Technical Support
e-mail: tech_europe@newport.com

Service & Returns
Tel.: +33 (0)2.38.40.51.55

mks
Newport® Ophir® Spectra-Physics®