Instruction Manual XENAX® with PROFINET® and SIMOTION®

Version 1.4

Edition February 2018

XENAX® Ethernet servo controller with PROFINET® Busmodul

Functional Safety, TÜV certified
Force processes with „Force Limitation“, „Force Monitoring“ and „Force Control“

General

This manual describes the connection of a XENAX® Xvi 75V8 or XENAX® Xvi 48V8 Servo controller to a Siemens SIMOTION PLC with SIMOTION Scout

This document contains an example of the configuration, program integration and test run.

Contents

1 Development Environment

1.1 Tools, SIMOTION, XENAX®

SCOUT

In order to program the Siemens SIMOTION, the engineering software SCOUT is needed.
All explanations in this instruction manual are based on Siemens SIMOTION SCOUT V4.3 SP1.

SIMOTION Controller

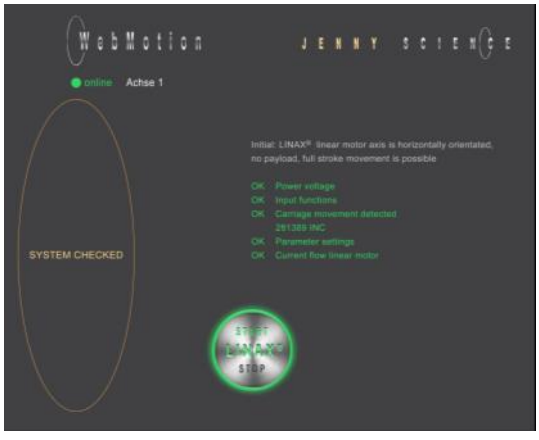
With the Siemens Motion Control System SIMOTION various motion controls are possible. You can do simple point-to-point movements or complex interpolation applications.

PROFIdrive

The PROFIdrive profile is the application profile for motion control based on PROFIBUS and PROFINET.
As a supplier-independent drive profile the PROFIdrive profile covers all industrially relevant applications.

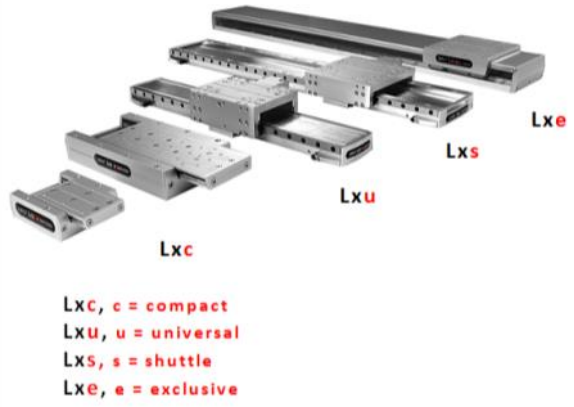
WebMotion®

This is the graphical user interface. It is stored in the embedded Web server of the XENAX® servo controller as a Java applet.
WebMotion ® is launched with a web browser by entering the corresponding TCP/IP address of XENAX®.
LINAX® linear motor axes and ELAX® linear motor slides are automatically recognized. The corresponding controller parameters are saved and loaded automatically. With the Quick Start button, the linear motors can operate immediately. No user manual is needed.

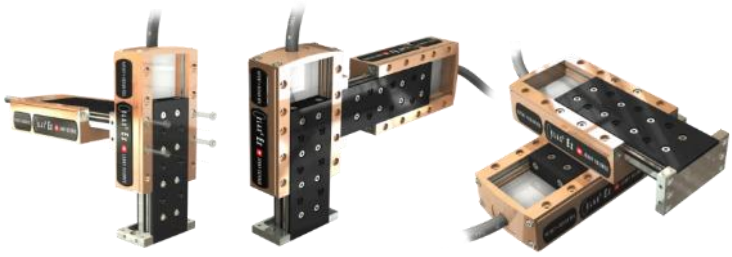


XENAX® servo controller
with optional PROFINET bus module.

LINAX® Linear motor axes
There are different series available. The LINAX® linear motor axes are highly modular and can be combined flexibly amongst each other. The XENAX® servo controller identifies the connected LINAX® linear motor respect. the ELAX® linar motor slider and configures the controller parameters automatically. Each XENAX® can control one linear motor axis.



ELAX® Linear motor Slides
Specifically designed for handling and pick&place job's with strokes from 30 up to 150mm. The configuration is extremely modular. And there is only one cable for connection to the servo controller
The XENAX® servo controller makes an identification of the connected linear motor slide. After that, all the motor parameters are set-up automatically.



Note:
In the following document the XENAX® Xvi75V8 and the XENAX® Xvi48V8 is named as Xvi. Every explanation is valid for both servo controllers if nothing else noted.

2 SCOUT

SIMOTION SCOUT is used for programming the SIMOTION controller product family from Siemens.

This instruction manual and the example application have been created with SCOUT Version 4.3.1.1.
The creation of a project and the configuration of the hardware will be explained step by step at the end of this document with the help of an application example.

2.1 Additional Data

The following data is needed for a successful operation of the XENAX® servo controller with a PROFINET bus module:

Name	Description
JSC_GSD_PROFINET.zip	Jenny Science GSD file for the HW-configuration The GSD-file can be downloaded in the Internet under http://www.jennyscience.de/en/download/ **PROFINET_Xvi_Vx.xx**
JSC_Demoproject_Xenax_SIMOTION.zip	Example Project explained step by step in chapter 8. Application Example for two axis connected to the SIMOTION.
JSC_PROFIdrive_Parameter.pdf	Description of all available PROFIdrive parameters for the XENAX® servo controller with PROFINET bus module

3 SIMOTION Controller

The XENAX® servo controller Xvi with PROFINET bus module can be connected to any SIMOTION with a PROFINET I/O interface.

This instruction manual and the example project were created for a SIMOTION D425-2 DP/PN (6AU1 425-2AD00-0AA0).
In case you are using another SIMOTION controller, the hardware configuration has to be adjusted to fit its requirements.

4 PROFIdrive

The drive profile PROFIdrive describes the drive interface from the perspective of the control application as well as the its mapping to the communication system. PROFIdrive is available for PROFIBUS and PROFINET. PROFIdrive covers the scenarios from straightforward frequency converters to highly dynamic servo-controls in six application classes. The XENAX® Xvi with PROFINET bus module supports the application class AC3 basic positioner with the PROFIdrive standard telegram 9 and the application class AC4 (with DSC) central interpolation with PROFIdrive standard telegram 5.

4.1 Telegram 5

The cyclic data between the SIMOTION and the XENAX® servo controller is exchanged through the PROFIdrive standard telegram 5. The telegram 5 is designed for drives with "Dynamic Servo Control" DSC support. The telegram is set up as follows:

IO Data number	Set point SPS -> Drive	Actual value Drive -> SPS
1	STW1	ZSW1
2	NSOLL_B	NIST_B
3		
4	STW2	ZSW2
5	G1_STW	G1_ZSW
6	XERR	G1_XIST1
7		
8	KPC	G1_XIST2
9		

4.1.1 STW1 (Control Word 1)

Bit	Name	Comment
0	ON / OFF	0 = Off 1 = On
1	No Coast Stop / Coast Stop	0 = Coast Stop 1 = No Coast Stop
2	No Quick Stop / Quick Stop	0 = Quick Stop 1 = No Quick Stop
3	Enable Operation	Enable Operation
4	Enable Ramp Generator	Not relevant for the XENAX®
5	Unfreeze Ramp Generator	Not relevant for the XENAX®
6	Enable Setpoint	Not relevant for the XENAX®
7	Fault Acknowledge	Fault Acknowledge, positive edge
8	Jog_1	Jog 1 (not supported)
9	Jog_2	Jog 1 (not supported)
10	Control by PLC	Control By PLC
11	Device-specific	Not relevant for the XENAX®
12-15	res	Device-specific

4.1.2 ZSW1 (Status Word 1)

Bit	Name	Comment
0	Ready To Switch On	Ready To Switch On
1	Ready To Operate	Ready To Operate
2	Operation Enabled	Operation Enabled
3	Fault Present	Fault Present
4	Coast Stop Not Activated	Coast Stop Not Activated
5	Quick Stop Not Activated	Quick Stop Not Activated
6	Switching On Inhibited	Switching On Inhibited
7	Warning Present	Warning Present
8	Speed Error Within Tolerance Range	Following Error Within Tolerance Range (not supported)
9	Control Requested	Control Requested
10	Set Point Reached Or Exceeded	Target Position Reached
11-15	Device-specific	Not relevant for the XENAX®

4.1.3 STW2 (Control Word 2)

Bit	Name	Comment
0-11	Device-specific	Not relevant for the XENAX®
12-15	Controller Sign-Of-Life	Controller Sign-of-Life

4.1.4 ZSW2 (Status Word 2)

Bit	Name	Comment
0-9	Device-specific	Not relevant for the XENAX®
10	pulses_enabled	Power stage enabled
12-15	DO Sign-Of-Life	XENAX Sign-of-Life

4.1.5 G1_STW

Bit	Name	Comment
0-7		Not supported
8-10		Reserved
11-12		Not supported
13	Request absolute value cyclically	Request of additional cyclic transmission of the absolute actual position in Gx_XIST2.
14	Activate parking sensor	Request to switch off monitoring of the measuring system and the actual value measurements in the drive.
15	Acknowledging a sensor error	Request to reset a sensor error (Gx_ZSW, bit 15)

4.1.6 G1_ZSW

Bit	Name	Comment
0-12		Not supported
13	Transmit absolut value cyclically	Indication of cyclic transmission of the absolute position in Gx_XIST2.
14	Parking sensor active	Acknowledgement for “activate parking sensor” (Gx_STW, bit 14)
15	Sensor error	Signalises a sensor error or an error in the actual value measurement.

4.1.7 Set Point/Actual Values

Signal	Description	Unit	Datatyp
NSOLL_B	Speed setpoint B (Not supported by the XENAX®)	inc	Integer 32
NIST_B	Speed actual value B (calculated)	inc/s	Integer 32
XERR	System deviation	inc	Integer 32
KPC	Position controller, gain factor (Not supported by the XENAX® but must be >= 1)		Integer 32
G1_XIST1	Sensor 1 position actual value 1	inc	Integer 32
G2_XIST2	Sensor 1 position actual value 2 or error code	inc	Integer 32

The new target position for the XENAX® is calculated internally with actual position + XERR.

4.1.8 Offset Adjustment

The absolute value G1_XIST2 of the telegram 5 has an offset of 100000 Inc. This offset has to be set for each axis once after referencing (refer to chapter 8.3.1).

4.1.9 Reference

The reference of the LINAX® linear motor axis is completed automatically when the basic state machine is set to the state „Operation“. The reference has been completed correctly when the “Bit 13” in “G1_ZSW” switches to “TRUE”.

4.2 Supplementary Data

To get more data form the XENAX® Xvi for an optimal use of the “Force process” and the “Functional Safety SMU” functionality you can configure supplementary Data in Slot 1, Subslot 3 (Possible with PROFINET Firmware >= v1.81). The following supplementary Data are available.

Supplementary process data 1

IO Data number	**Set point SPS -> XENAX®**	**Actual value XENAX® -> SPS**
1	Limit I_Force	Motor Current Actual Value
2	Following Position Error Window	I_Force Actual
3		
4	Target Position Window	Process Status Register
5		
6	Digital Output	Actual Position Following Error
7		
8		Digital Input
9		
10		Digital Output
11		

Supplementary process data 2

IO Data number	Set point SPS -> XENAX®	Actual value XENAX®-> SPS
1	Digital Output	Process Status Register
2		
3		Digital Input
4		
5		Digital Output
6		

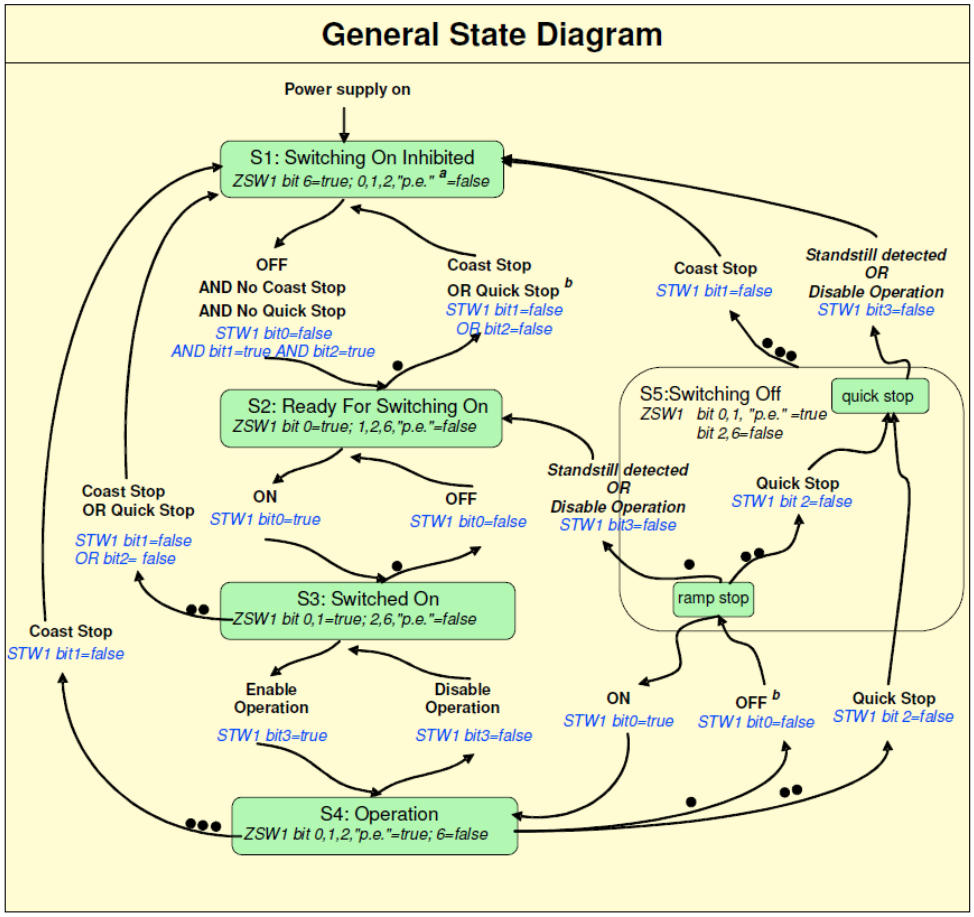
Supplementary process data 3

IO Data number	Set point SPS -> XENAX®	Actual value XENAX®-> SPS
1	Limit I_Force	I_Force Actual
2		
3		Process Status Register
4		

Signal	Description	Unit	Datatyp
Limit I_Force	Force proportional current value setpoint	10 mA	Unsigned 16
Following Position Error Window	Maximum position deviation in encoder increments („DP“ ASCII Command)	inc	Unsigned 32
Target Position Window	Permissible deviation in target point („DTP“ ASCII Command)	inc	Unsigned 32
Digital Output	Digital Outputs set, read	-	DWORD (Unsigned 32)
Motor Current Actual Value	Actual not filtered motor current	mA	Integer 16
I_Force Actual	Force proportional IST-current value filtered	mA	Integer 32
Process Status Reg.	Process Status Register XENAX („TPSR“ ASCII Command)	-	DWORD (Unsigned 32)
Actual Position Following Error	Actual position deviation	inc	Integer 32
Digital Input	Digital Inputs read	-	DWORD (Unsigned 32)

4.3 General State Machine

The basic state machine has to be set to “State S4 Operation” in order to turn on the power stage of the XENAX® Xvi and to be able to move the LINAX® linear motor axis.
Via “STW1” the basic state machine can be switched to each individual state. The current state is visible in “ZSW1”. Normally the SIMOTION will control the “STW1” and you have no permission to manipulate the “STW1”.



4.4 Parameter

PROFIdrive offers the possibility to parameterize the XENAX® servo controller via acyclic data exchange.
These provided parameters correspond to the ASCII command set of the XENAX®. Specific PROFIdrive parameters are also available. All supported parameters can be found in the document “*JSC_PROFIdrive_Parameter.pdf*”.

5 WebMotion®

5.1 WebMotion® TCP/IP Connection

The parametrization of the XENAX® servo controller is done via an Ethernet TCP/IP connection.
You can find the default IP address on the back of the XENAX®.

Web address:
http://192.168.2.xxx/XENAX.html

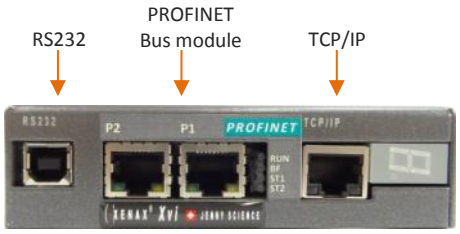
For more information on the TCP/IP connection please refer to the user manual *"XENAX_Xvi75V8_Manual_EN.pdf"* or the Tutorial Video *"TCP/IP connection"* that can be found on http://www.jennyscience.de/en/video-tutorials/

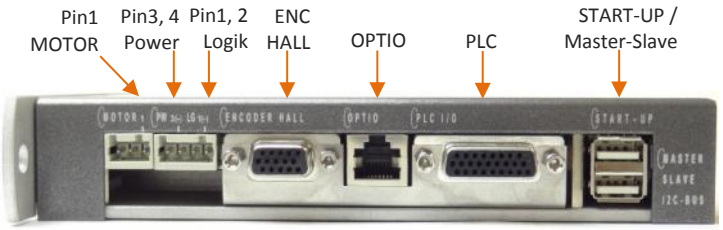
5.2 XENAX® Set-Up

Before the XENAX® controller can be used with the SIMOTION PLC via PROFINET, a set-up must be made via WebMotion®. This includes the definition of a payload, soft limits, etc.
For further information on the set-up of a linear motor axis please refer to the instruction manual *"XENAX® Xvi75V8 Manual"* or the tutorial video *"Set-Up Single Axis"* that can be found on http://www.jennyscience.de/video-tutorials/

6 XENAX® Servo Controller

6.1 Electrical Connections XENAX®





6.1.1 Status LEDs of PROFINET bus module

LED Status	RUN	ERR (BF)	ST1 state 1	ST2 state 2
<OFF>	Initialisation state or no power	-	-	-
<ON>	Bus module correctly started	No connection to a PLC	Firmware CRC check during a bus module update	Bootloader active
<BLINK>	-	-	-	Node flash test active/ Firmware update active

If the status LED ERR (BF) (bus error) lights up, check the configuration on the controller. Make sure that the device name of the XENAX® servo controller is the same as in the project configuration (name of the XENAX® is visible in PROFINET device properties, refer to chapter 8.2.2).

6.2 Firmware Update

For instructions on how to update the firmware please refer to the tutorial video "Firmware and *WebMotion Update"* that can be found on www.jennyscience.ch -> *"Turtorial Videos"*

Xvi75V8

Firmware	File *"Xv75V8_Vx.xxx.mot"*
WebMotion	File *"WebMotion_Vx.xx.lxi"*
PROFINET bus module	File *"Xenax_PROFINET_protocol_Vx.xx.flash"*

Xvi48V8

Firmware	File *„Xvi48V8_Vx.xx.mot"*
WebMotion	File *„WebMotion_Vx.xx.mot"*
PROFINET Busmodul	File *„Xenax_PROFINET_protocol_Vx.xx.flash"*

NOTE: The PROFINET bus module is only compatible with the servo controller firmware >= V3.58 and the WebMotion® Version >= V5.40.

NOTE: that the update of the PROFINET bus module firmware takes about 10 minutes.

7 LINAX® Linear Motor Axis

7.1 Connections

8 Application Example

This example application shows a configuration of a SIMOTION D425-2 DP/PN with SIMOTION SCOUT. The SIMOTION controller is able to communicate with the XENAX® servo controller via PROFINET bus module.

8.1 Preparation

In order to operate the XENAX® Xvi with a SIMOTION, SCOUT needs to be installed correctly and the PG/PC interface has to be configured for the communication with the SIMOTION PLC.

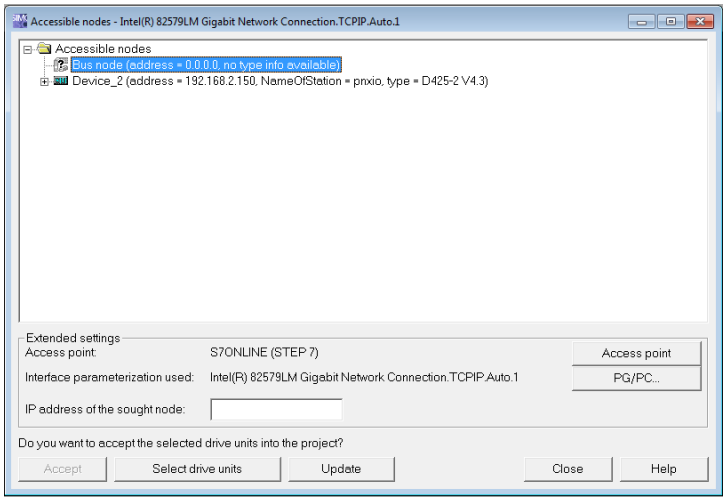
8.2 SIMOTION Configuration

SIMOTION SCOUT is the configuration and programming software for SIMOTION.

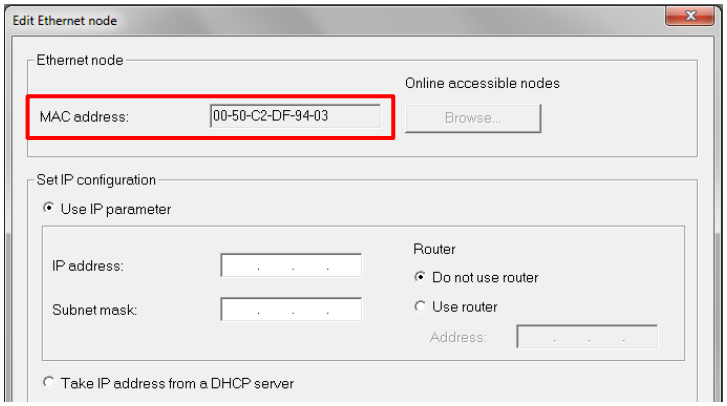
SIMOTION SCOUT is launched by clicking on this  icon:

Check first, if a connection with SCOUT to the SIMOTION and XENAX® is possible. For this purpose open the window “Accessible Nodes“ by pressing on the Icon or *Project -> Accessible Nodes*

The SIMOTION (“Device_2”) and one Bus node (XENAX®) should be visible in the *window “Accessible Nodes“.*



Right-Click on “Bus node” and press “Edit Ethernet node”. In the opened window you can find the MAC-address of the XENAX® PROFINET bus module which is connected to the SIMOTION.



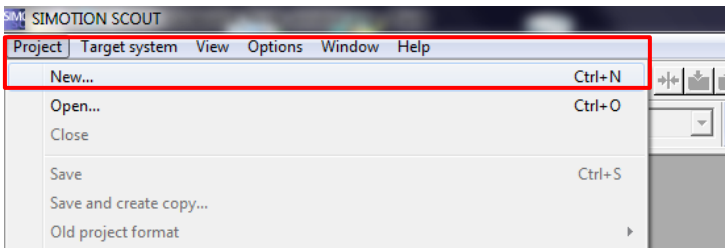
The MAC-Address of the PROFINET bus module can be found in the WebMotion® under
firmware -> version

Note:
Checking the following points is recommended, if the controller or XENAX® is not visible in the window *“Accessible Nodes”*:

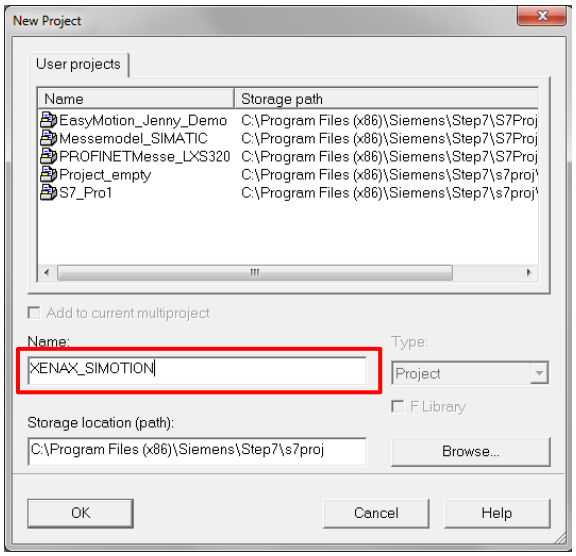
- Are both devices turned on?
- Is the cabling correct?
- Are the settings of the PG/PC interface correct?

8.2.1 Create a Project

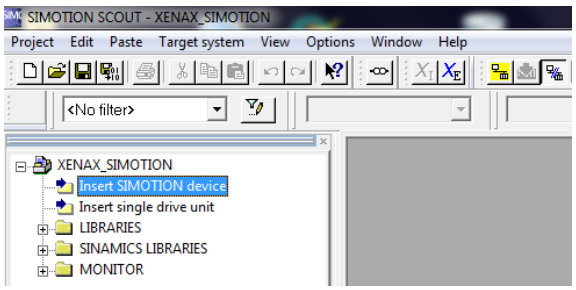
Project -> New…



The project name is freely selectable.
The default path can be changed if required.

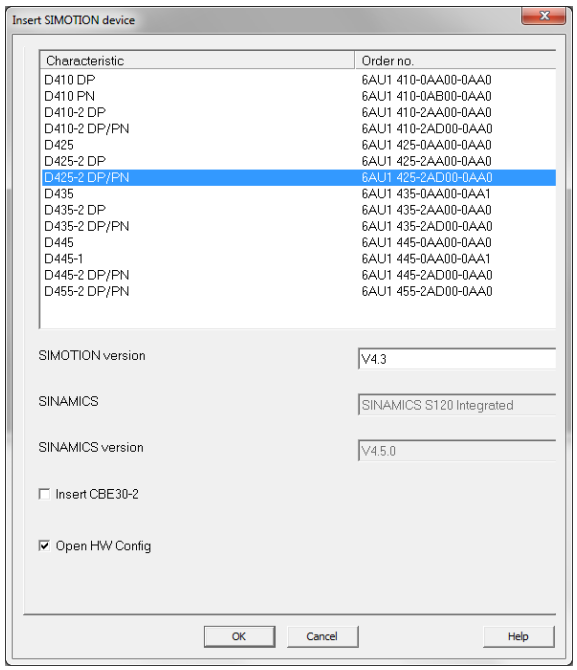


Insert a new SIMOTION device by double click on “Insert SIMOTION device”.



Select the corresponding SIMOTION PLC you are using in the window “Insert SIMOTION device” (here: D425-2 DP/PN).

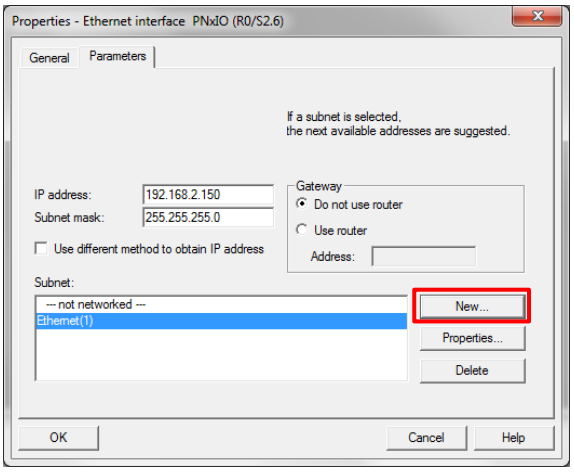
-> OK



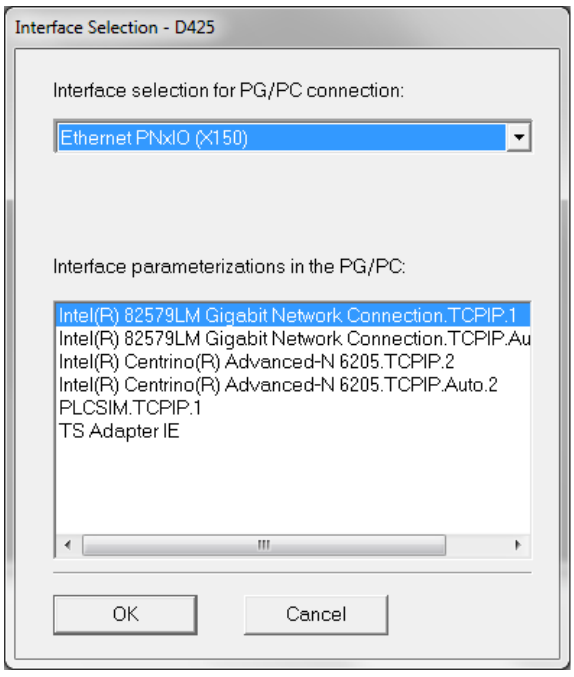
To make the PROFINET communication between the SIMOTION and XENAX® servo controller possible, a new PROFINET-IO system has to be created.

First, define the IP-address and subnet mask of the “SIMOTION PNxIO interface”, afterwards create a new PROFINET-IO-System by clicking on “New…”.

No further settings are needed.



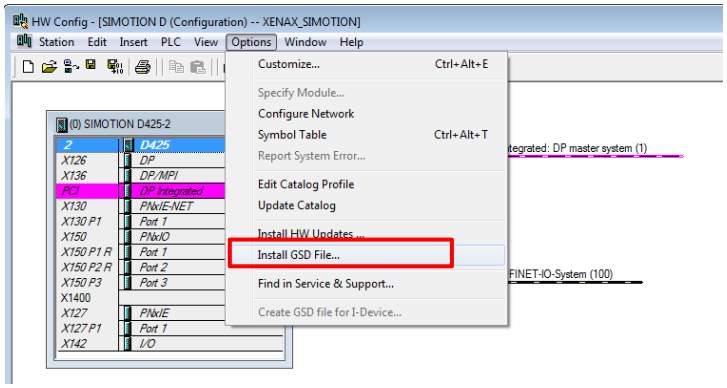
Select the interface which is connected to the PG/PC.



8.2.2 HW-Configuration

After inserting a new SIMOTION device the “HW-Config” window is opened.

The latest GSD-files have to be installed, before the XENAX® Xvi is available as a PROFINET device in the hardware catalogue. This can be done via: *Options->Install GSD-File...*



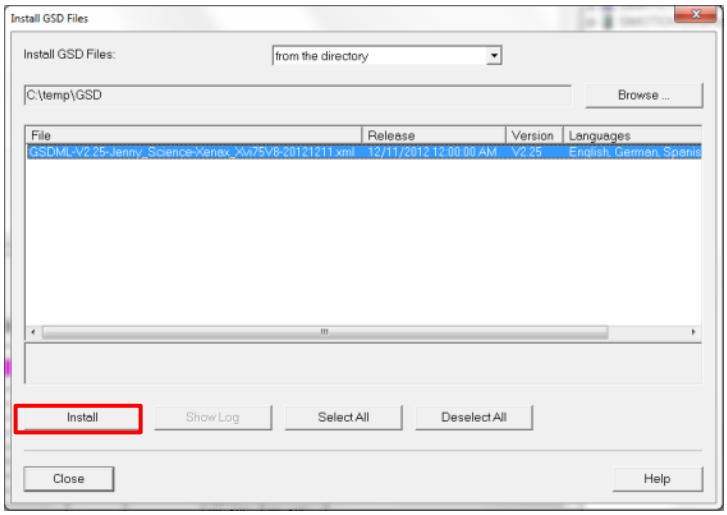
The GSD-file can be downloaded under:
http://www.jennyscience.de/en/download/
PROFINET_Xvi_Vx.xx
Save it locally to your Computer.

Navigate to the storage location of the current GSD file.

Select the desired file and click on “install”.

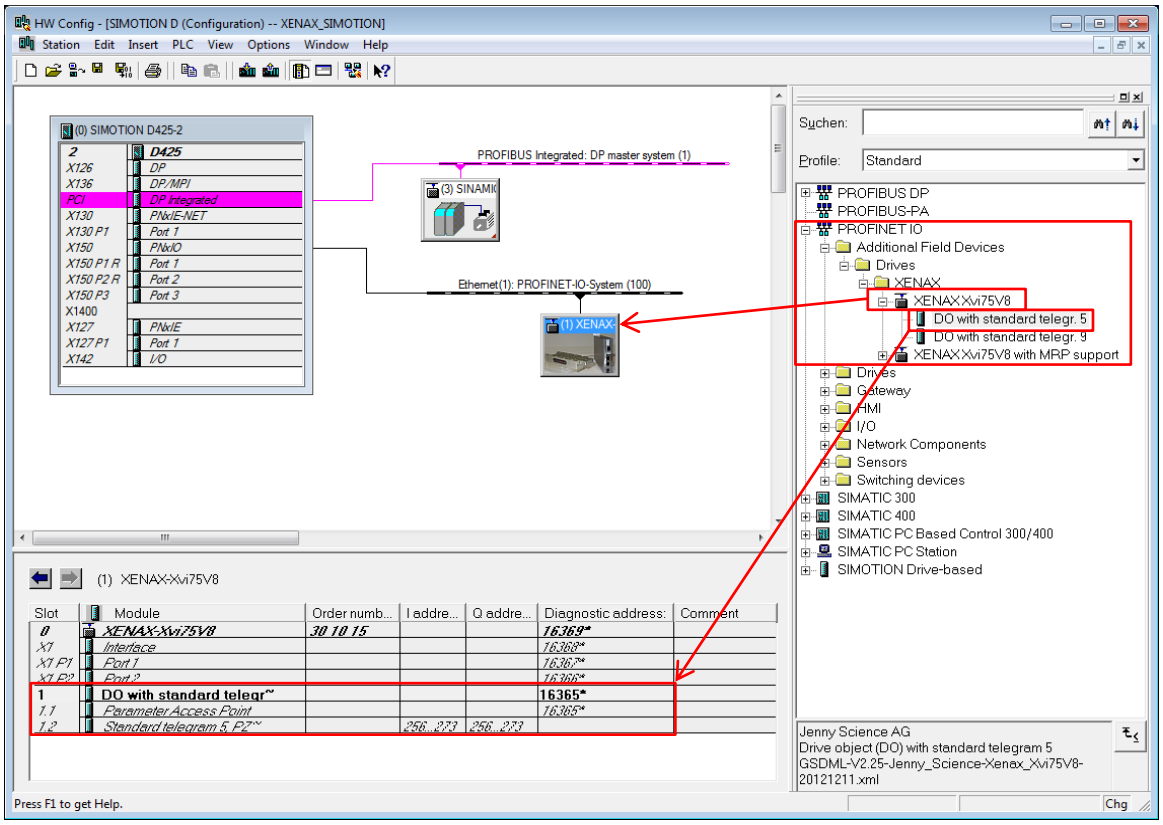
The XENAX® servo controller is now available in the hardware catalogue and can be found under: PROFINET IO-> Additional Field Devices -> Drives-> XENAX

Note: You have to install a separate GSD file for the XENAX® Xvi75V8 and the XENAX® Xvi48V8 deepens on which is used.



It is possible to select between a XENAX® with MRP (Media Redundancy Protocol) support or without MRP support. If MRP is not required, the XENAX® should be projected without MRP support.
Note: MRPD (Media Redundancy for Planned Duplication) can currently not be used with the XENAX® servo controller.

The desired XENAX Xvi can be added to the PROFINET-IO-System by drag&drop.
By drag&drop, telegram 5 can now be assigned to slot 1.
(Standard telegram 9 is designed for operation with a SIMATIC.)



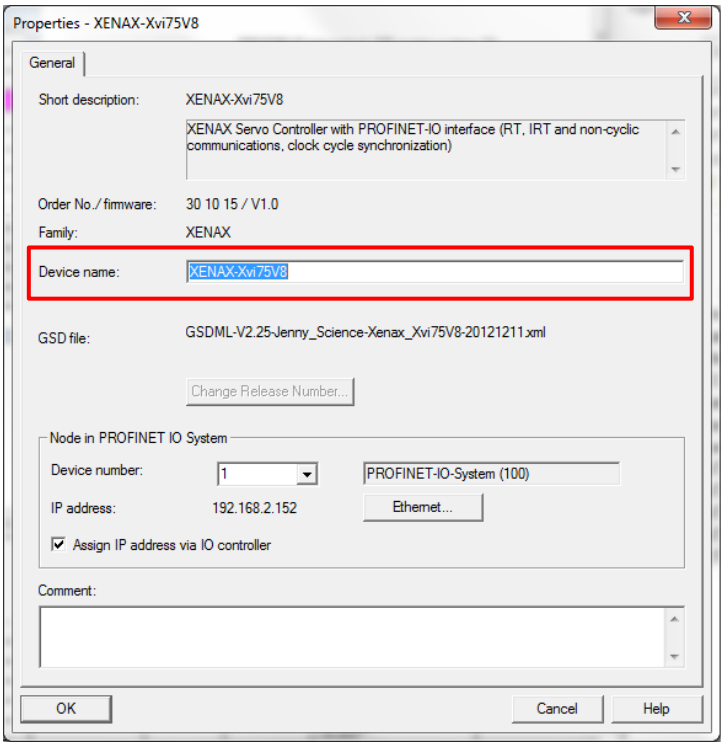
PROFINET devices are identified via their device name. If a XENAX® has never been connected to a control system before, it has no device name set by default. In order for the SIMOTION to communicate with the XENAX®, a device name must be assigned to the XENAX®. This device name must correspond to the projected name. The projected name can be found by:

Right mouse click on the XENAX® Icon -> Object Properties

The device name can be selected freely if it follows the DNS-conventions. They can be found under:

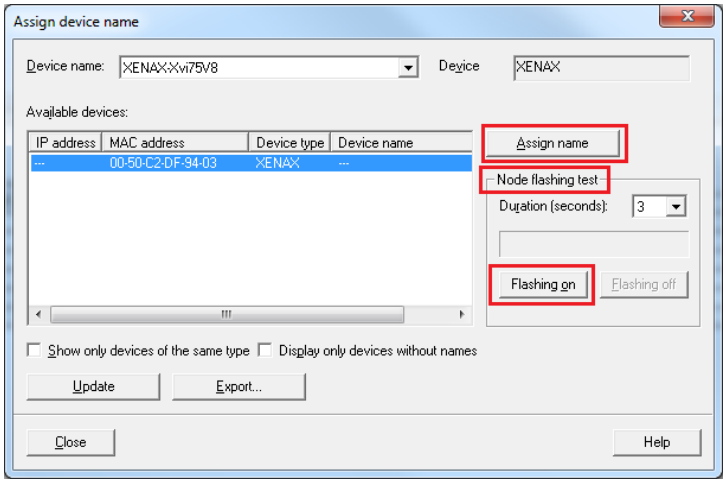
Help-> Contents… Keyword "device name"

Note: Each PROFINET device has to have a different device name.



The device name is assigned to the XENAX® via *PLC-> Ethernet->Assign Device Name*

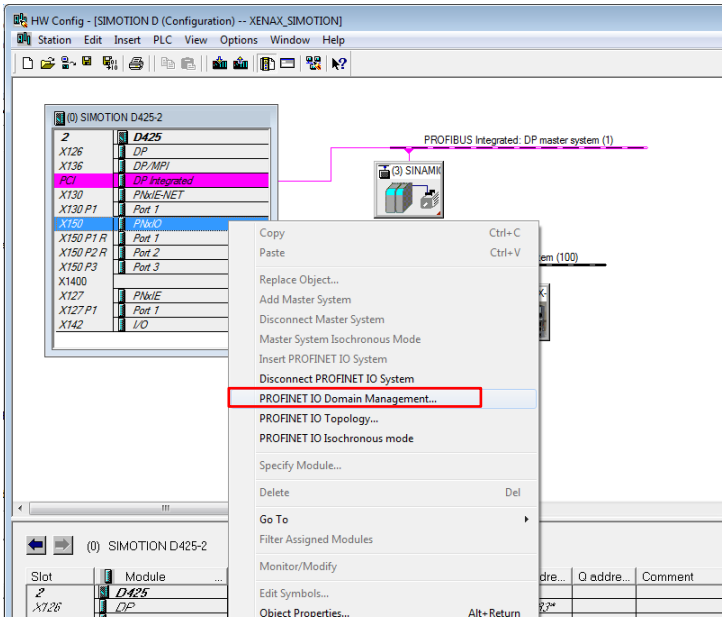
"Node flashing test" verifies if the device name is assigned to the XENAX® of your choice. When "Flashing on" is activated by click, the LED ST2 on the according XENAX® should be flashing(see chapter 6.1.1 "Status LED of PROFINET bus module").



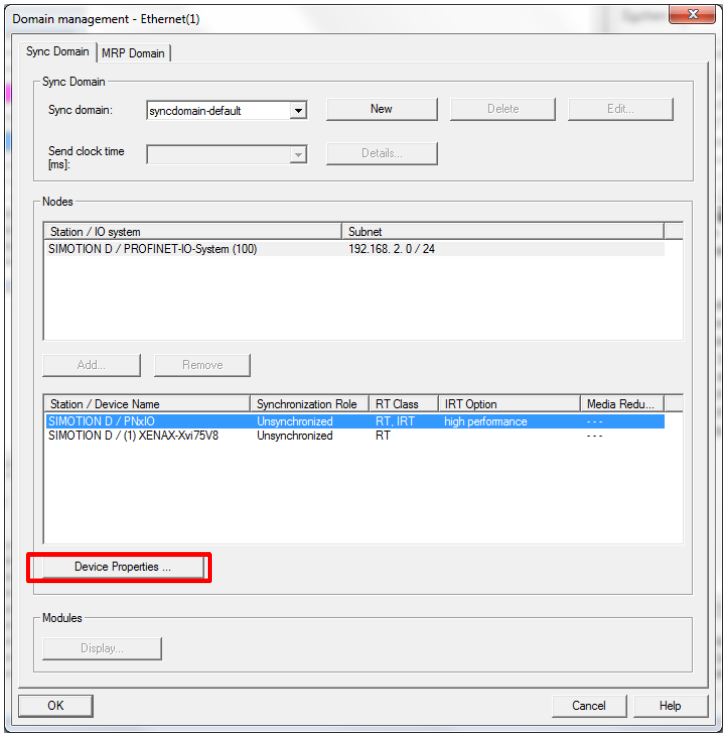
8.2.3 Configuring Isochronous Communication

In order to communicate isochronously which is necessary for SIMOTION, PROFINET IRT must be enabled. To do this, the PN interfaces must be synchronized and the PROFINET topology configured.

Open the "PROFINET IO Domain Management" in the context menu of the PROFINET interface under the SIMOTION D425-2.



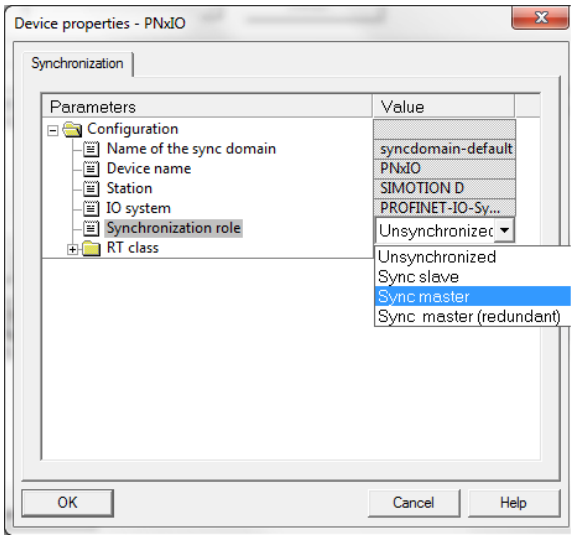
Mark the SIMOTION and open its properties.



Set the “Sync master” option as synchronization role for the SIMOTION.

Only one Sync master is permitted in each PROFINET network.

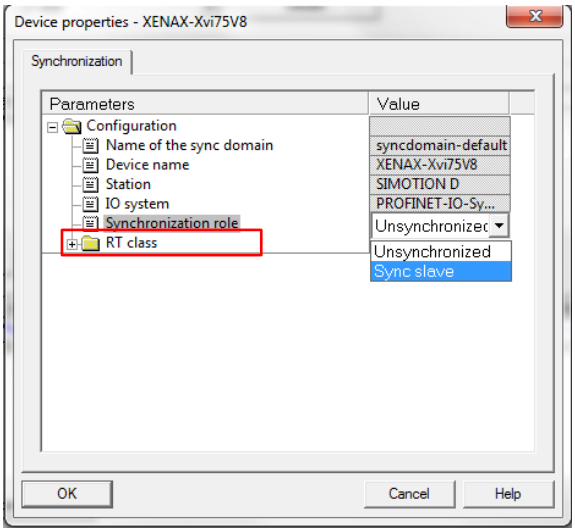
-> OK



Then open the properties of the XENAX® controller in the “Domain Management” and define it as “Sync slave”. A Sync slave synchronizes itself with the associated Sync master in the PROFINET network.

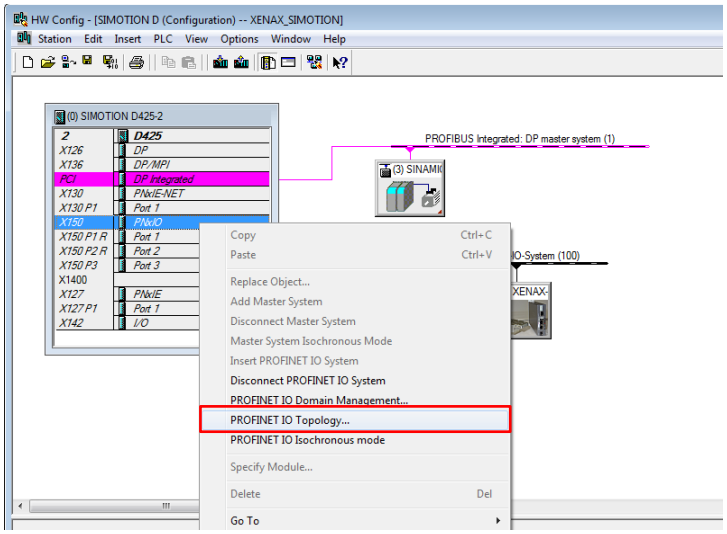
Ensure that “high performance” is selected in the “IRT” options under RT class.

-> OK

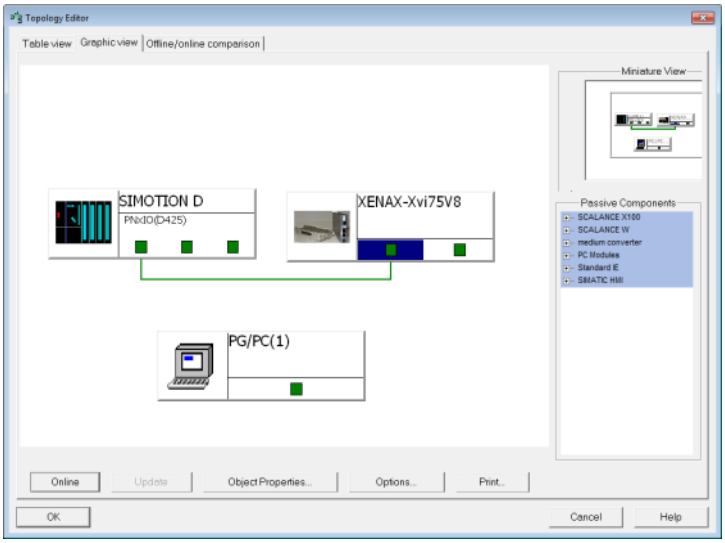


When using PROFINET IRT, the IO topology must be configured.

Open the “PROFINET IO Topology” in the context menu (right click to “PNxIO”) of the PROFINET interface of the SIMOTION.

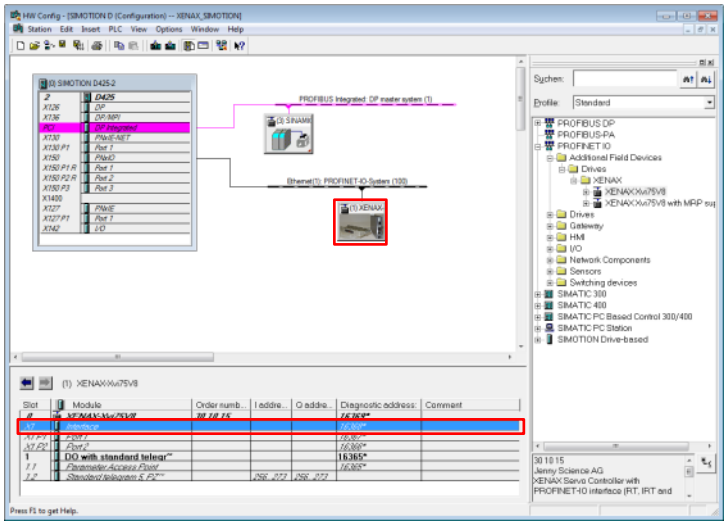


In the application example, port 1 of the SIMOTION is connected with port 1 of the XENAX® controller. Create the connection in the graphic view of the “Topology Editor”.

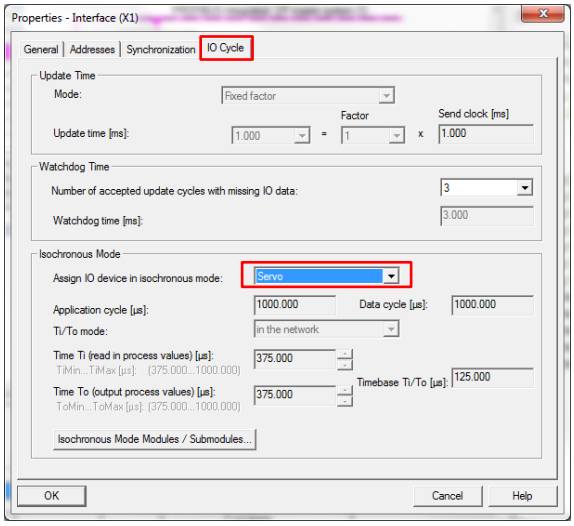


-> OK

To operate the XENAX® servo controller isochronously, mark the XENAX® icon, right click on PROFINET interface (Slot X1) and open the “Object Properties”.



Go to the “IO cycle” tab and select “Servo” as isochronous execution level for the XENAX® controller.



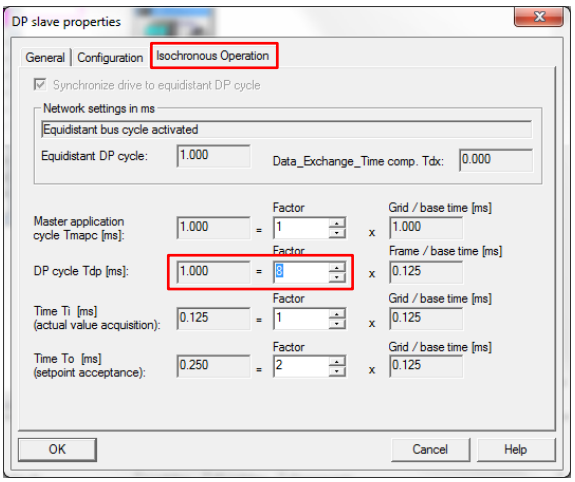
-> OK

When using PROFINET IRT, the PROFIBUS send cycle clock of the SINAMICS, Integrated in the SIMOTION controller must be the same as the servo send cycle clock.

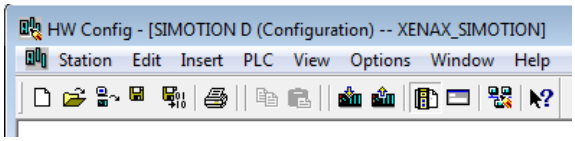
Double-click the SINAMICS_Integrated icon to open its properties and switch to the “Isochronous Operation” tab.

The servo send cycle clock is, for example, 1,000 ms.
Adjust the PROFIBUS send cycle clock accordingly to the servo send cycle clock.

-> OK

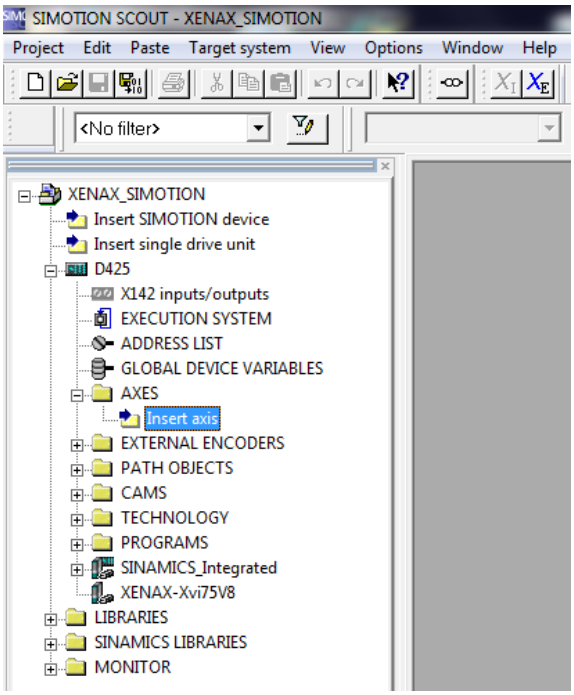


Now you can save and compile the HW configuration with the Icon  .



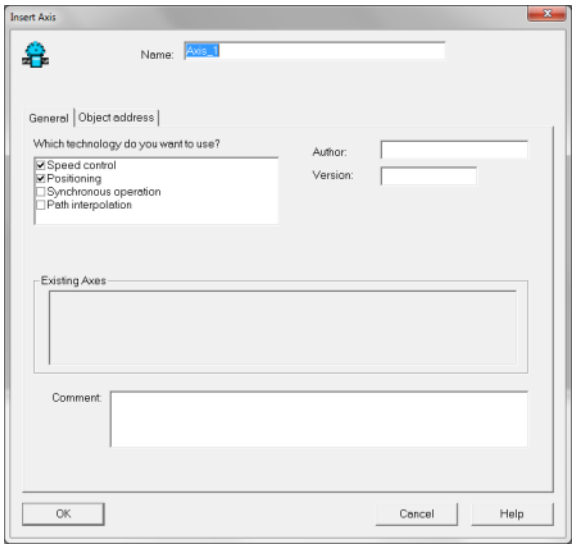
8.2.4 Insert an Axis

Back in the SIMOTION SCOUT window double-click on “Insert axis” to create a TO-axis (technology object axis).

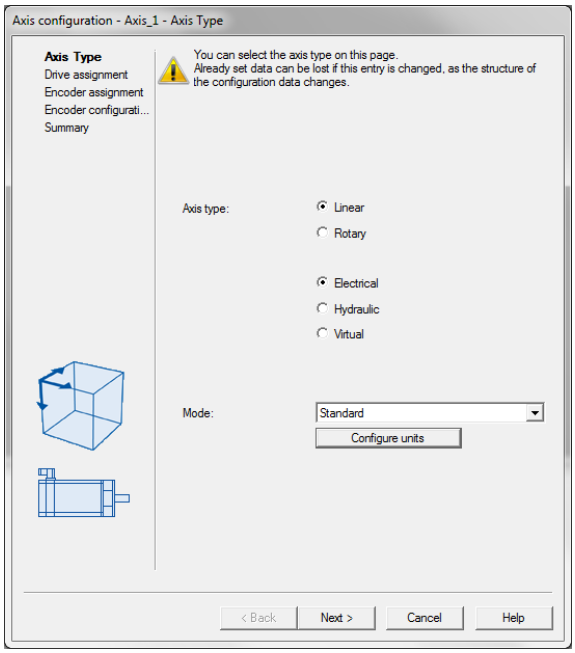


Enter any name for the axis you want and click OK to confirm the other standard settings. The axis configuration wizard will be displayed next.

-> OK



For linear axis connected to a XENAX® the default settings in the “Axis Type” window can be leave.



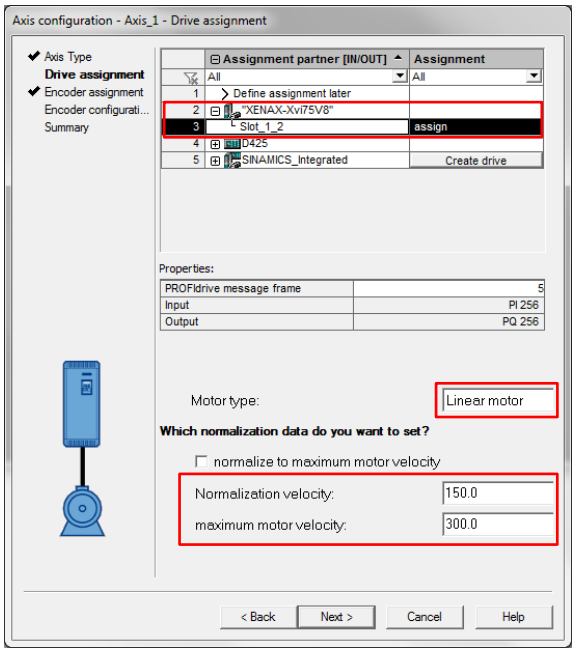
-> Next

Check if the drive assigned to the right XENAX®.

Change the motor type to “Linear motor” by the drop down menu.

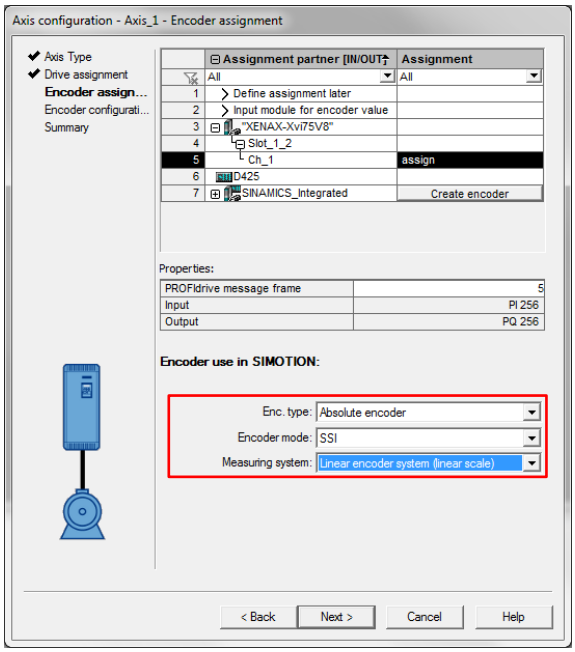
Set the “Normalization velocity” to 150m/min and the “maximum motor velocity” to 300m/min.

-> Next



In the window Encoder assignment make following adjustments:

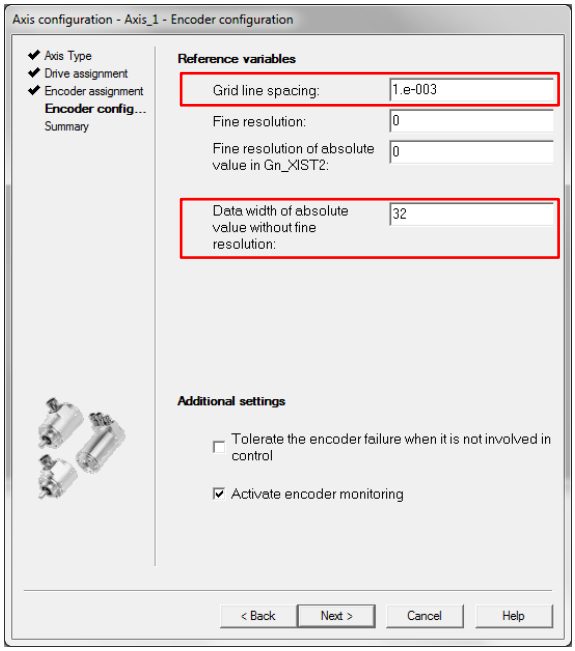
Enc type: Absolute Encoder
Encoder mode: SSI (Synchronous Serial Interface)
Measuring system: Linear encoder system



-> Next

"Grid line spacing" needs to correspond the resolution of the XENAX® servo controller and depends on the encoder system.
1.e-003 -> 1um
1.e-004 -> 100nm

Set „Data width" 32 Bit

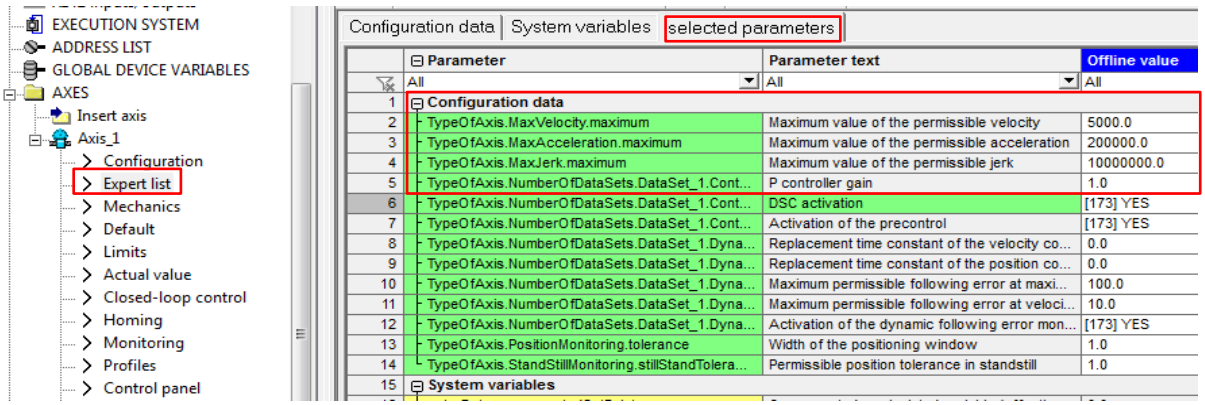


-> Next

After creating the axis you have to adjust the Configuration data for the LINAX® axis.

Double-click on “Expert list” under “Axis_1” to see the selected configuration parameters. Make following adjustments:

Parameter	Offline value
TypeOfAxis.MaxVelocity.maximum	5000 mm/s
TypeOfAxis.MaxAcceleration.maximum	200000 mm/s^2
Set TypeOfAxis.MaxJerk.maximum	10000000 mm/s^3
P Controller gain	1.0 (function currently not supported)

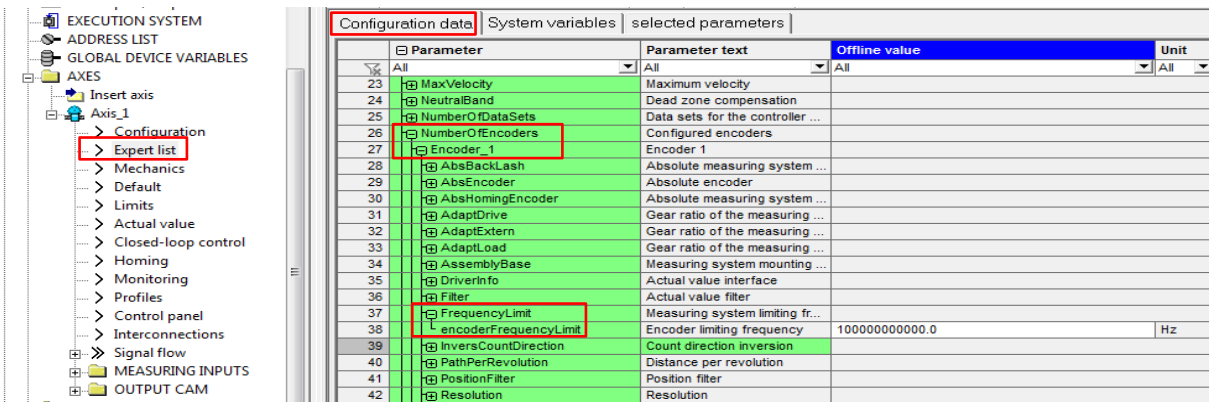


	Parameter	Parameter text	Offline value
1	Configuration data		
2	TypeOfAxis.MaxVelocity.maximum	Maximum value of the permissible velocity	5000.0
3	TypeOfAxis.MaxAcceleration.maximum	Maximum value of the permissible acceleration	200000.0
4	TypeOfAxis.MaxJerk.maximum	Maximum value of the permissible jerk	10000000.0
5	TypeOfAxis.NumberOfDataSets.DataSet_1.Cont...	P controller gain	1.0
6	TypeOfAxis.NumberOfDataSets.DataSet_1.Cont...	DSC activation	[173] YES
7	TypeOfAxis.NumberOfDataSets.DataSet_1.Cont...	Activation of the precontrol	[173] YES
8	TypeOfAxis.NumberOfDataSets.DataSet_1.Dyna...	Replacement time constant of the velocity co...	0.0
9	TypeOfAxis.NumberOfDataSets.DataSet_1.Dyna...	Replacement time constant of the position co...	0.0
10	TypeOfAxis.NumberOfDataSets.DataSet_1.Dyna...	Maximum permissible following error at maxi...	100.0
11	TypeOfAxis.NumberOfDataSets.DataSet_1.Dyna...	Maximum permissible following error at veloci...	10.0
12	TypeOfAxis.NumberOfDataSets.DataSet_1.Dyna...	Activation of the dynamic following error mon...	[173] YES
13	TypeOfAxis.PositionMonitoring.tolerance	Width of the positioning window	1.0
14	TypeOfAxis.StandStillMonitoring.stillStandTolera...	Permissible position tolerance in standstill	1.0
15	System variables		

Switch to the “Configuration data” Tap under:
TypeOfAxis -> NumberOfEncoders -> Encoder_1-> FrequencyLimit -> encoderFrequencyLimit

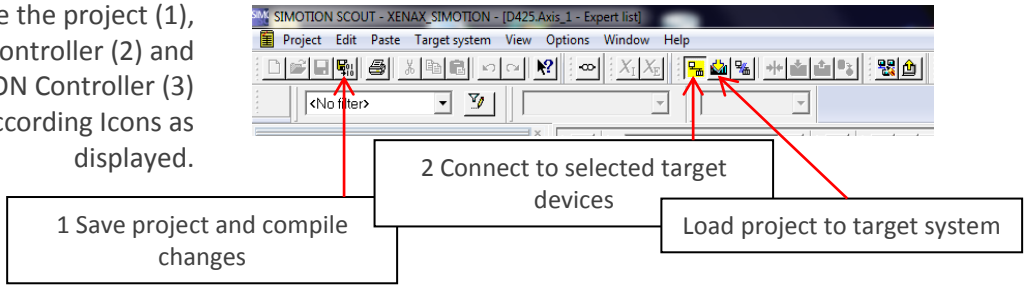
make following adjustment:

Parameter	Offline value
encoderFrequencyLimit	100000000000.0 Hz

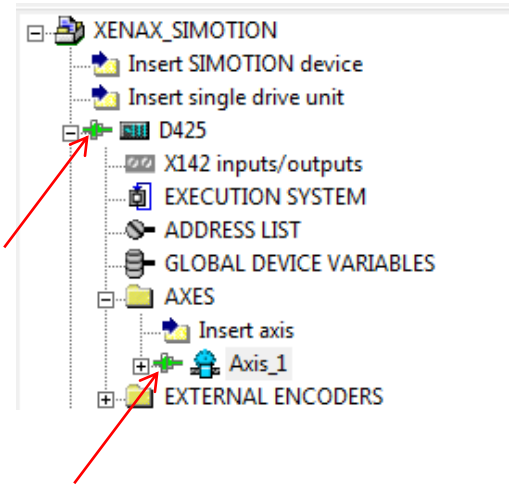


	Parameter	Parameter text	Offline value	Unit
23	MaxVelocity	Maximum velocity		
24	NeutralBand	Dead zone compensation		
25	NumberOfDataSets	Data sets for the controller ...		
26	NumberOfEncoders	Configured encoders		
27	Encoder_1	Encoder 1		
28	AbsBackLash	Absolute measuring system ...		
29	AbsEncoder	Absolute encoder		
30	AbsHomingEncoder	Absolute measuring system ...		
31	AdaptDrive	Gear ratio of the measuring ...		
32	AdaptExtern	Gear ratio of the measuring ...		
33	AdaptLoad	Gear ratio of the measuring ...		
34	AssemblyBase	Measuring system mounting ...		
35	DriverInfo	Actual value interface		
36	Filter	Actual value filter		
37	FrequencyLimit	Measuring system limiting fr...		
38	encoderFrequencyLimit	Encoder limiting frequency	100000000000.0	Hz
39	InversCountDirection	Count direction inversion		
40	PathPerRevolution	Distance per revolution		
41	PositionFilter	Position filter		
42	Resolution	Resolution		

Now you can save and compile the project (1), connect to the SIMOTION Controller (2) and load the project to the SIMOTION Controller (3) in this order with the according Icons as displayed.



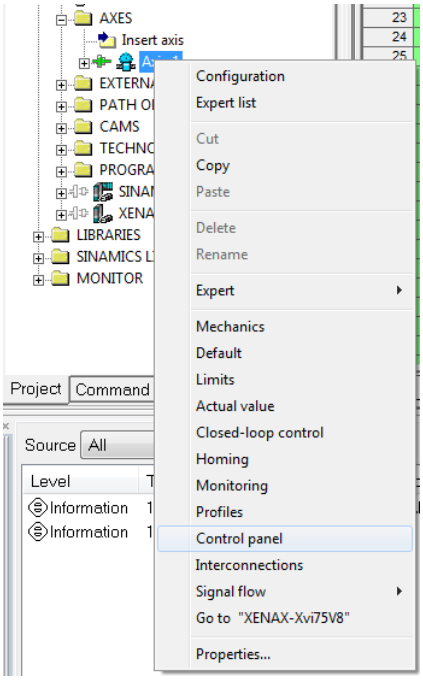
The symbols displayed on the right in front of "D425" and "Axis_1" light up green when the connection to the SIMOTION is OK and the project is successfully loaded.



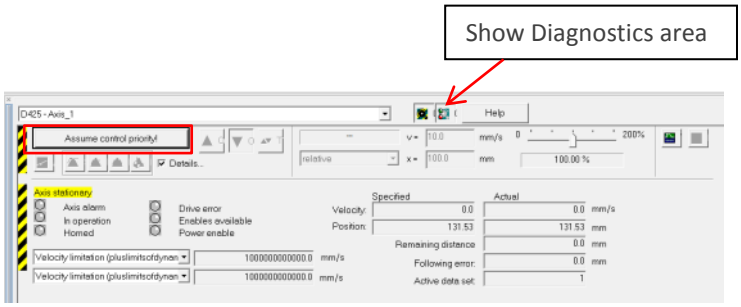
8.3 Control Panel

With the Control panel it is possible to move the axis without writing a program in “ST”, “MCC” or “KOP/FUP” to test the axis functionality.

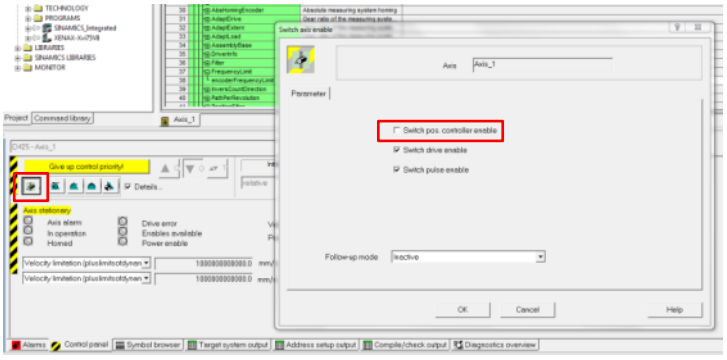
In the project navigator, Right-click on Axis_1 -> “Control panel” to open the control panel.



Click on this  Icon to show the diagnostic area.
To use the control panel you have to assume the control priority click on “Assume control priority”.



In order to complete a reference we need to enable the axis without position control. Click on the “enable”  icon and unselect “Switch pos. controller enable” press “OK”. Now the XENAX® controller enables the power stage and completes automatically a reference drive. When the reference is finished, press the „enable“  icon again and reselect „Switch pos. Controller enable“. Press OK
The linear motor axis is now enabled with position control.



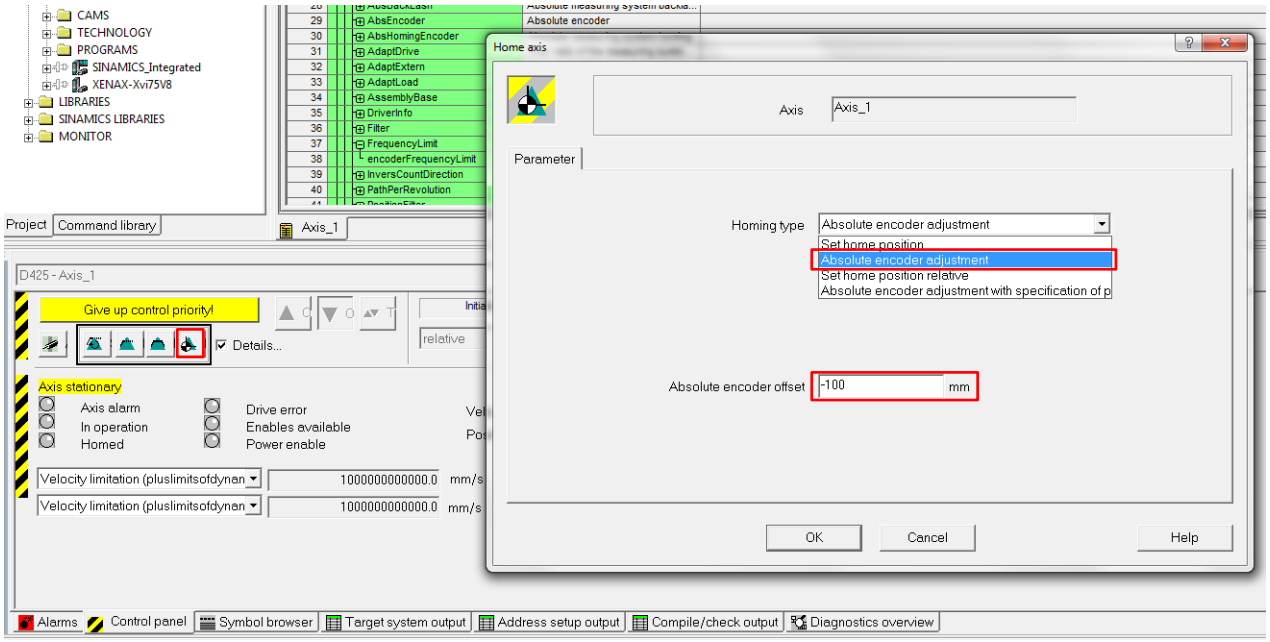
8.3.1 Offset Adjustment

The absolute encoder value form the XENAX® is transmitted with an offset of 100mm to respect this offset in the SIMOTION we have to do a homing of the axis.

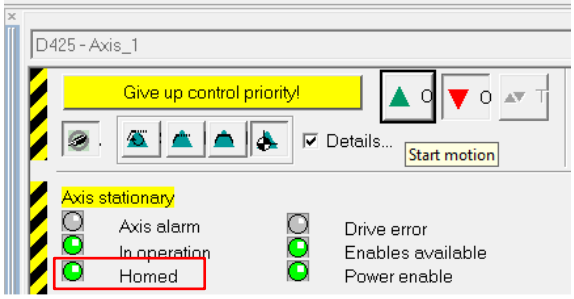
Click on the “Homing of the axis”  Icon and Choose “Absolute encoder adjustment”. Set the “Absolute encoder offset” to “-100mm”.

-> OK

Until no new project is loaded to the SIMOTION the offset value is stored in the remanent memory.



Press the “Start motion” button. After the successful homing, the status “Homed” lights up green. During the Homing the LINAX axis doesn’t move.



8.3.2 Motion Commands

The LINAX® linear motor axis can now be moved with the control panel.

“Position- controlled traversing of the axis” and “Relative/absolute positioning” can be used to move the axis.

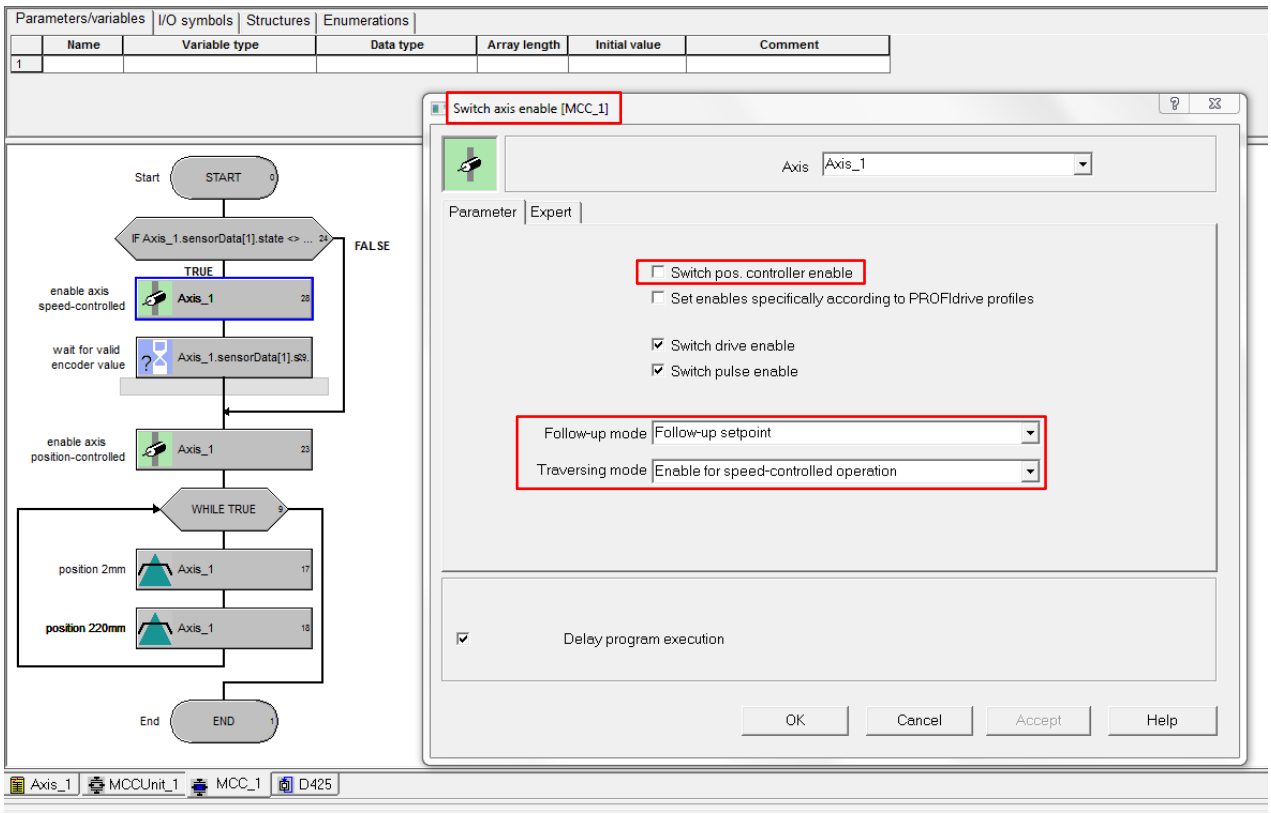
8.4 Program

Now your application is ready to be programmed and all functions of the TO-Axis are available.

One important thing you have to pay attention to is the correct initialisation of the XENAX® controller after the first start-up:

Because the XENAX® controller does not automatically know its absolute position, we need to complete a reference drive after each powering on.

To execute the reference drive, the axis must be enabled in “speed-controlled operation”. After finishing the reference drive the XENAX® has a valid encoder value and can be enabled in “position-controlled operation”. The following MCC chart shows an example procedure to enable the XENAX®.



The following sequence describes the “MCC_1” Chart.

1. Check if a valid encoder value is available.
2. Call “Switch axis enable”
    a. Remove the tick “Switch pos. controller enable
    b. Set “Follow-up mode” to “Follow up set point”
    c. Set “Traversing mode” to “Enable for speed-controlled operation”
3. Wait until a valid encoder value is available
4. Call “Switch axis enable” with default settings.
5. Call you motion commands for example “Position axis”

9 Application Example

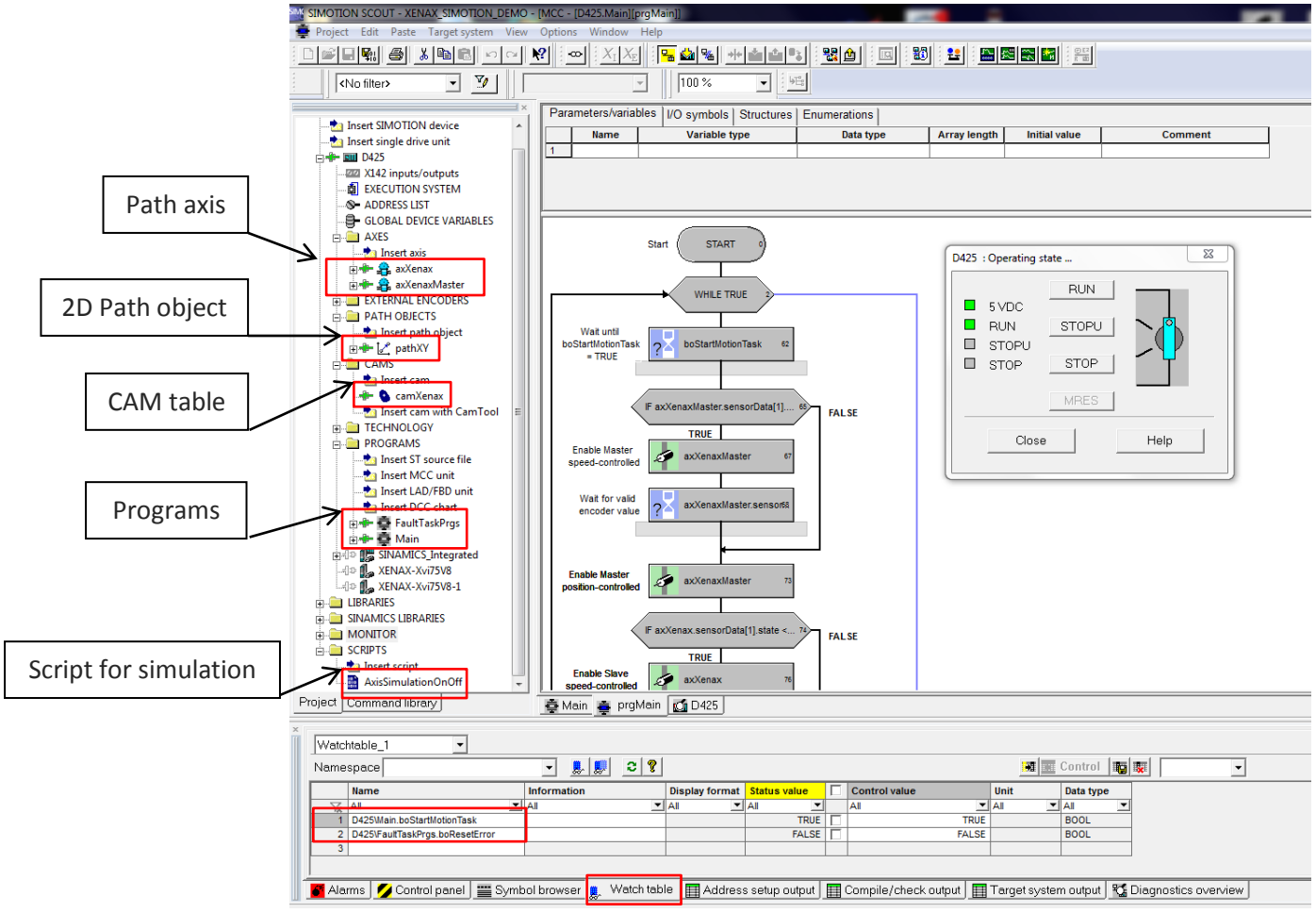
In the Application Example project "XENAX_SIMOTION_DEMO" there are two LINAX® linear motor axes used with a stroke length of 135mm.

Should you use linear motor axes with a smaller stroke you have to options:

1. Adjust the program according to the linear motor axes you are using.
2. Set the linear motor axes in "simulation mode" (please refer to chapter 9.2 "Simulation")

9.1 SIMOTION Project

In the application example there are multiple SIMOTION and XENAX® specific functions available.



NOTE: If you use a different SIMOTION you need to replace the “D425-2 DP/PN” SIMOTION with your hardware.

Under “Watchtable_1” you can find the variables with which you can load and start the project:
Main.boStartMotionTask = TRUE

If an error occurs you can reset with the following variable:
FaultTaskPrgs.boResetError = TRUE

Important: Before you start the demo application, be sure you have homed the axis as described in chapter *8.3 “Control Panel”.*

9.1.1 Main Program

All movements of the application example are completed in the “Motion Control Cart” (MCC) unit in the program “prgMain”.

In the “prgMain” program you can find the following information:

How to enable the power stage of the LINAX axis
How to execute single axis commands
How to enable gearing
How to enable a CAM
How to move two axes with a path object

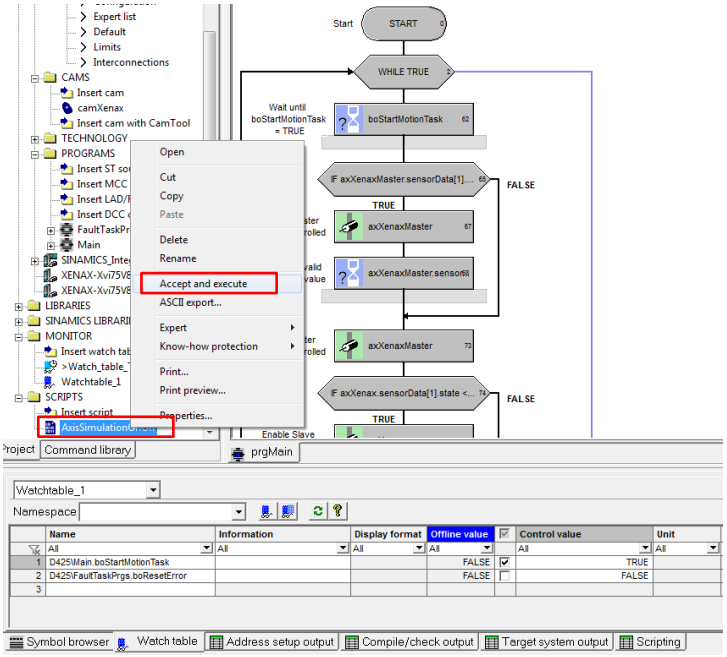
For more information on the motion commands and the SIMOTION functionality in general, please refer to the help content of SIMOTION SCOUT (press “F1”).

9.2 Simulation

Should you use a LINAX® linear motor axis with a smaller stroke than the mentioned 135mm and still want to use the application example, it's possible to set one axis in simulation mode.

To use the simulation mode a XENAX for all TO-Axis also that one which is in simulation mode is needed. Otherwise you have to change the hardware configuration.

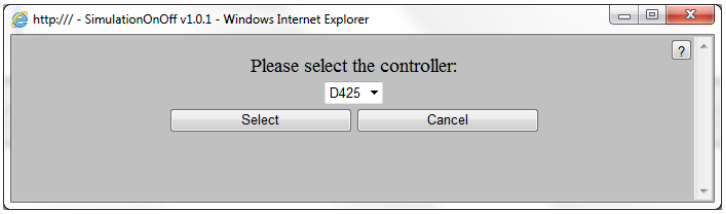
In order to execute the simulation script you need to be offline with the SIMOTION. You can go offline with the following symbol 



Right-click on the "AxisSimulationOnOff" in the SCRIPTS folders and then "Accept and execute".

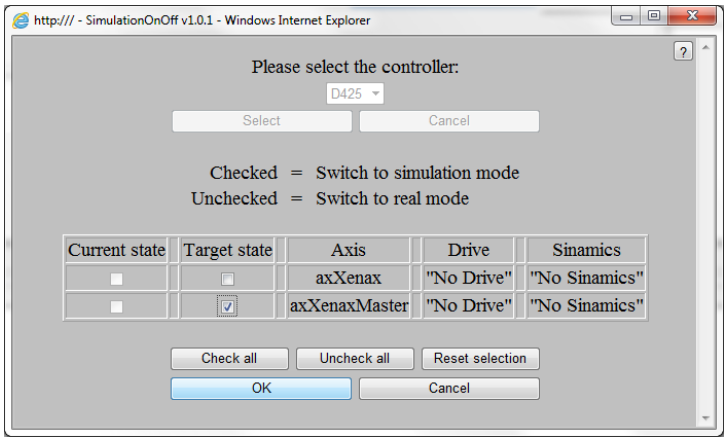
In the opened browser window select the SIMOTION controller in use.

-> Select

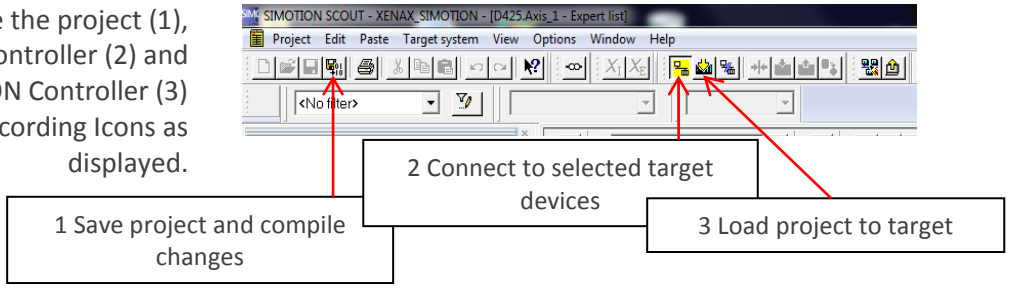


Select the LINAX® linear motor axis which you want to set in "simulation mode" and mark it with "target state".

-> OK



Now you can save and compile the project (1), connect to the SIMOTION Controller (2) and load the project to the SIMOTION Controller (3) in this order with the according Icons as displayed.



To start the program set the variable **Main.boStartMotionTask = TRUE**

Notes

Jenny Science AG
Sandblatte 7a
CH-6026 Rain

Phone +41 (0) 41 455 44 55
Fax +41 (0) 41 455 44 50

www.jennyscience.ch
info@jennyscience.ch