INOVANCE

2023

SV660F

Startup procedure

PROFINET INDUSTRIAL ETHERNET

PROFIdrive

INOVANCE TECHNOLOGY EUROPE

V1.1

TABLE OF CONTENTS

1 GENERAL DATA

Date: 27.07.2022

Hardware: SV660F

Software: InoDriverShop 3.7.1.8

Info: SV660F startup procedure

2 PURPOSE OF THIS DOCUMENT

The purpose of this document is to facilitate the start-up and programming of the **SV660F** PROFINET servo drive.

3 REVISION HISTORY

Revision	Date	Author	Description
1.0	05 May 23	SBT, RSR	First release
1.1	27 July 23	RSR	Add ActWarn and ActFault extra information

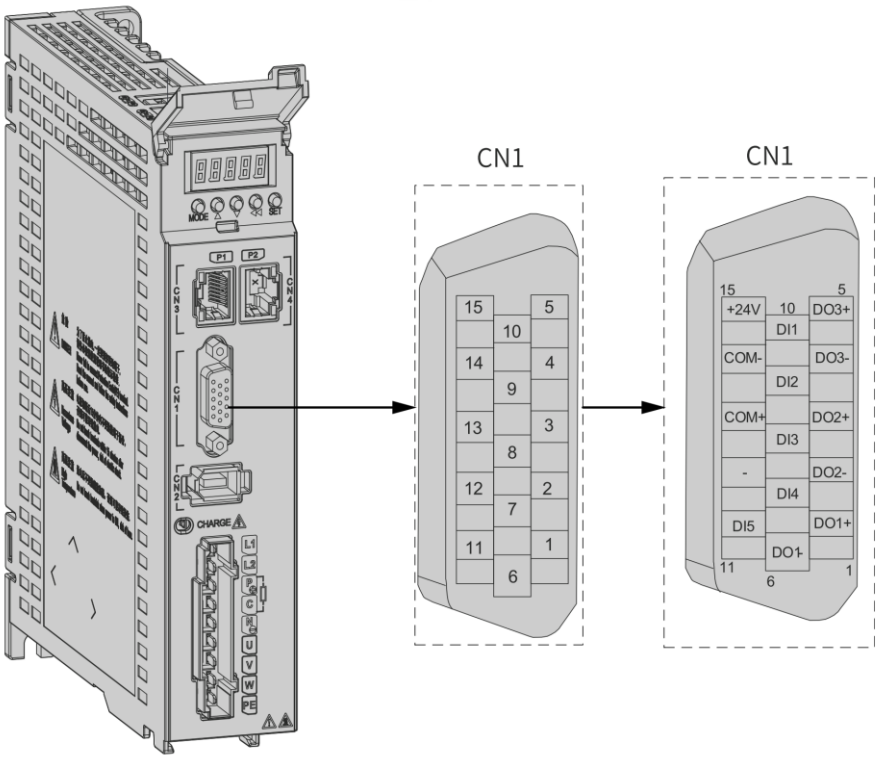
4 PROFINET SPECIFICATIONS

Item	Description
Protocol	PROFINET protocol
Process data	RT and IRT
Acyclic data	Support access to profile parameters and function code parameters
Bus cycle	RT mode: minimum 1ms IRT mode: minimum 500us
Sync jitter	<1us
Physical layer	100BASE-TX
Baud rate	100M Bit/S(100Base-TX)
Duplex mode	Full duplex
Topology	Ring, Line, Star, Tree
Transmission medium	Shielded Cat 5e or better network cable
Number of slave stations	The protocol supports up to 65535 (determined by PLC performance) Test the maximum number of slave stations 100
Communication Bit Error Rate	10-10 Ethernet standard
I&M data	I&M0 to I&M4
Configuration version	TIA Portal software V13 SPI or later STEP7 software V5.5 SP4 or later
PROFINET version	V2.4
PROFINET interface	Number of ports: 2
Alarm/diagnostic information	Supported
DCP CALL (find device)	Supported
MRP (ring network)	Supported
MRPD (Rapid Reconfiguration Ring)	Supported
PROFINET system redundancy	Supported
Priority start	Supported
Disable port	Supported
No configuration required when changing devices	Supported

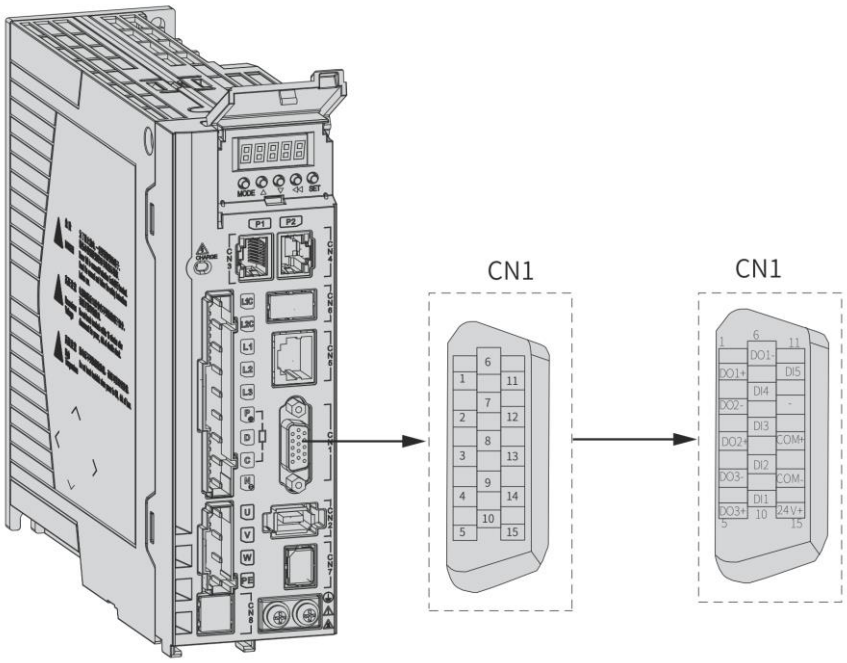
5 ELECTRICAL INSTALLATION

To install the drive, you can consult the installation guide for the SV660N (EtherCAT variant). This chapter only describes the electrical installation that differs from the SV660N.

5.1 CN1 CONTROL TERMINAL



Control terminals of servo drive (SIZE A & SIZE B)



Control terminals of servo drive (SIZE C & SIZE D & SIZE E)

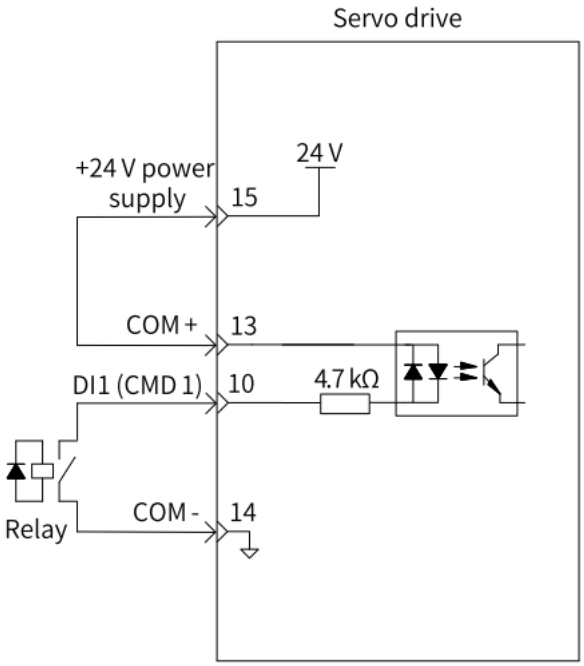
Signal name	Function	Pin No.	Description
DI1	P-OT	10	Positive limit switch
DI2	N-OT	9	Negative limit switch
DI3	Home Switch	8	Home switch
DI4	Emergency/Stop	7	
DI5	TouchProbe1	11	Touch probe 1
+24V		15	Internal 24 V power supply, voltage range: 20 V to 28 V, maximum output current: 200 mA
COM-		14	
COM+		13	Power input terminal (12 V to 24 V)
DO1+	S-RDY+	1	Servo ready
DO1-	S-RDY-	6	
DO2+	ALM+	3	Fault
DO2-	ALM-	2	
DO3+	BK+	5	Brake
DO3-	BK-	4	

1 DI circuit.

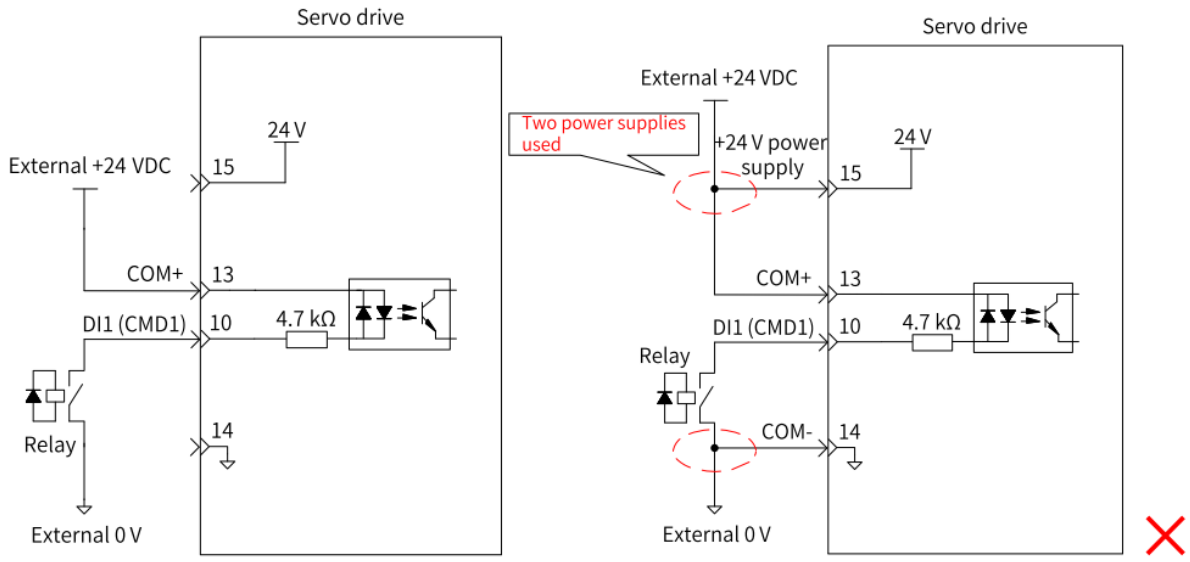
DI1 to DI5 circuits are the same. The following description takes DI1 circuit as an example.

1) The host controller provides relay output.

■ When using the internal 24 V power supply of the servo drive

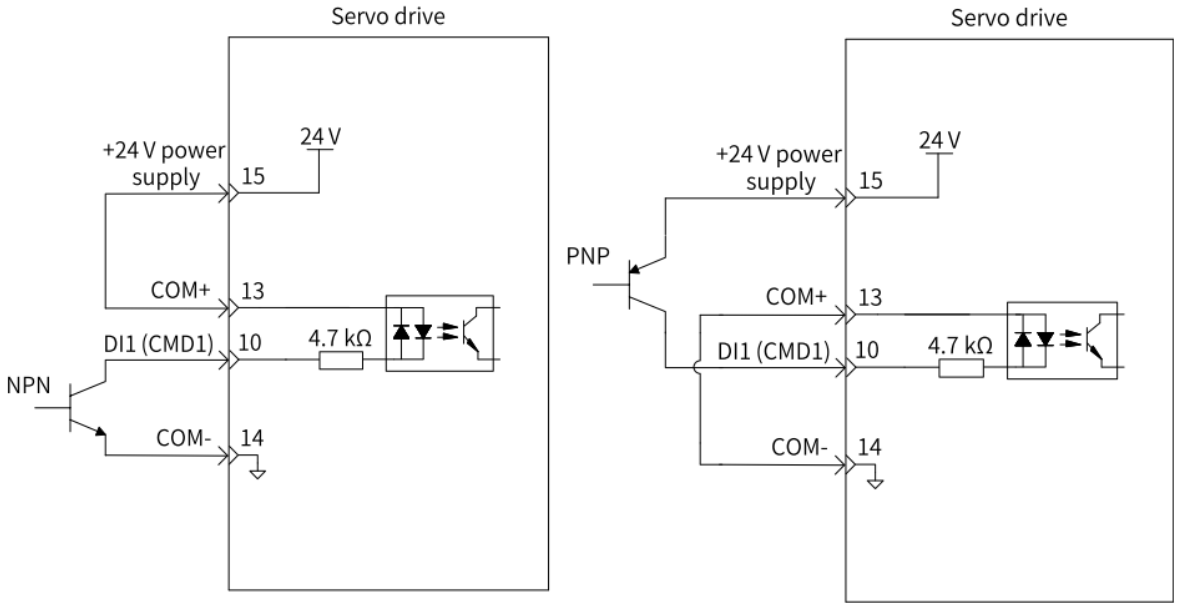


■ When using an external power supply

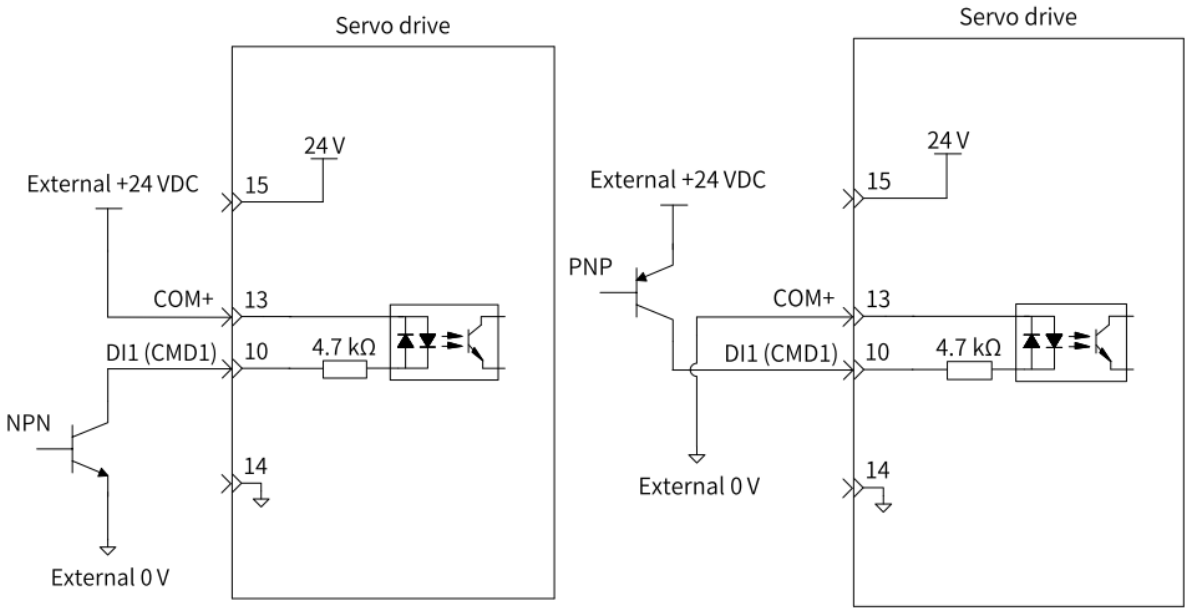


2) The host controller provides open-collector output.

■ When using the internal 24 V power supply of the servo drive



■ When using an external power supply

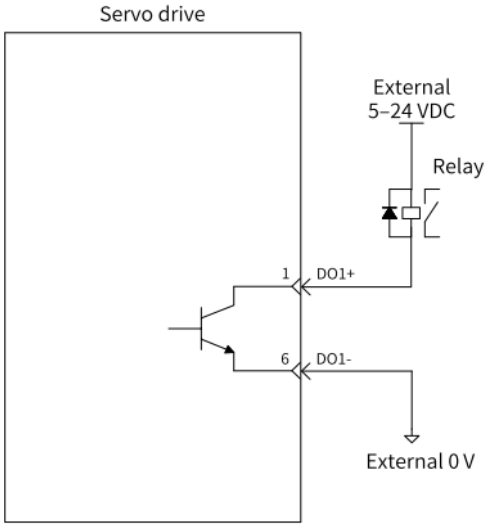


NOTE: PNP and NPN inputs cannot be mixed in the same servo drive.

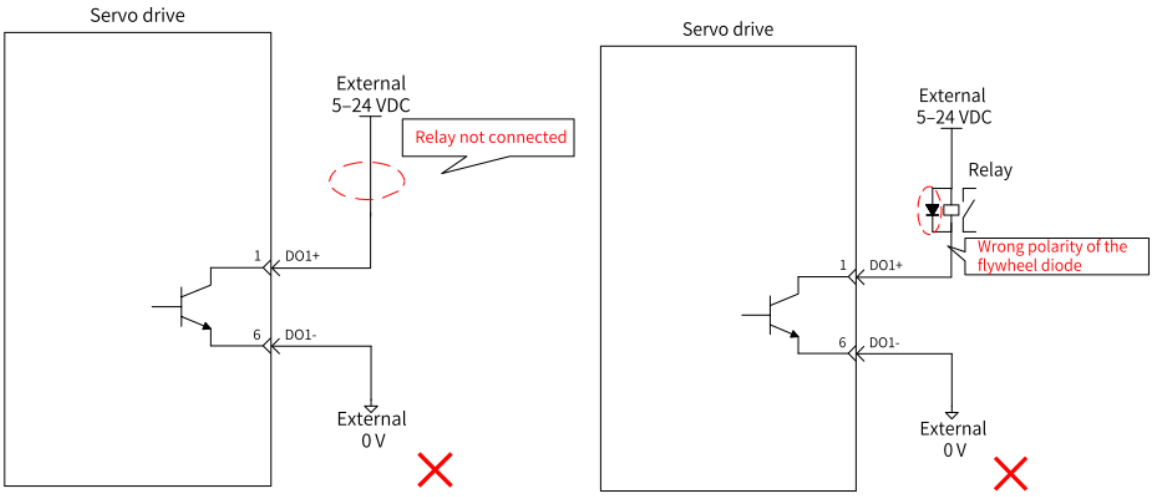
2 DO circuit.

DO1 to DO3 circuits are the same. The following description takes DO1 circuit as an example.

1) The output terminal is connected to a relay-type device.



NOTE: When the output terminal is connected to a relay-type device, a flywheel diode must be installed. Otherwise, the DO terminals may be damaged.



2) The output terminal is connected to an optocoupler-type device.

The maximum allowable voltage and current of the optocoupler output circuit inside the servo drive are as follows:

- Voltage: 30 VDC
- Current: DC 50 mA

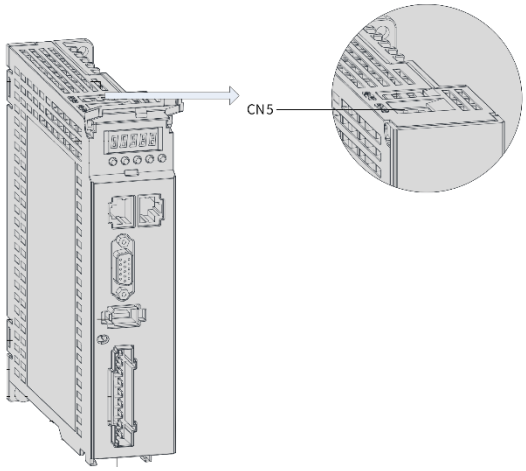
6 PC TOOL INODRIVERSHOP

The InoDriverShop software can communicate with the SV660F through the serial communication port or through the PROFINET network. To be able to communicate through the PROFINET network, it is necessary to install the WinCap software that is in the InoDRiverShop installation directory.

6.1 COMMUNICATION CABLE FOR SERIAL COMMUNICATION

Model	Material code	Description
SV660F		
S6-L-T00-3.0	15041243	Servo drive to PC (RS232) communication cable (3.0 m)
RJ45 connector drive side  D-sub 9 pin connector PC side (RS232)		

- **SV660F** uses the port **CN5 RJ45** (see image) for communication.



NOTE Most current laptops need a USB-RS232 adapter to be able to connect to the SV660F drive. Some of these adapters are not compatible with the InoDriverShop software. We recommend the use of adapters with the **FTDI FT232RL** chip.

6.1.1 S6-L-T00-3.0 CABLE PINOUT

RJ45 (Drive)	DB9 (Laptop)	
		
6	2	RS232-TXD
7	3	RS232-RXD
8	5	GND

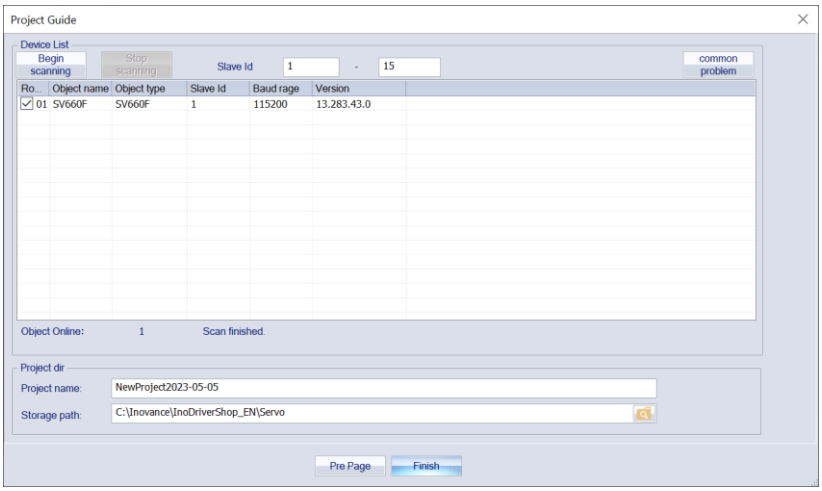
6.2 INODRIVERSHOP

The InoDriverShop software can communicate with the SV660F through the serial communication port or through the PROFINET network.

6.2.1 SERIAL COMMUNICATION

If serial communication is selected, it is necessary to use the S6-L-T00-3.0 cable and connect it to terminal CN5.

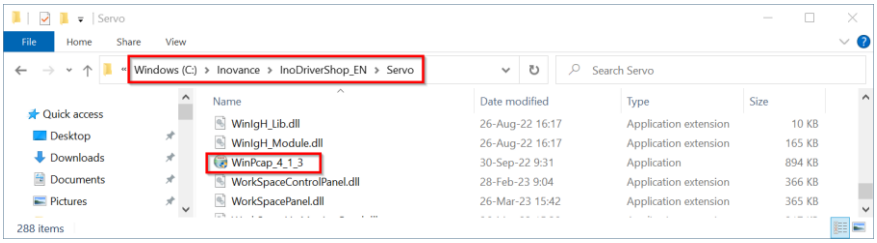
When selecting serial communication in the "communication type" field, the serial port configuration fields appear. The default values are sufficient to communicate with the drive. Click on Next to detect the drive.



6.2.2 PROFINET COMMUNICATION

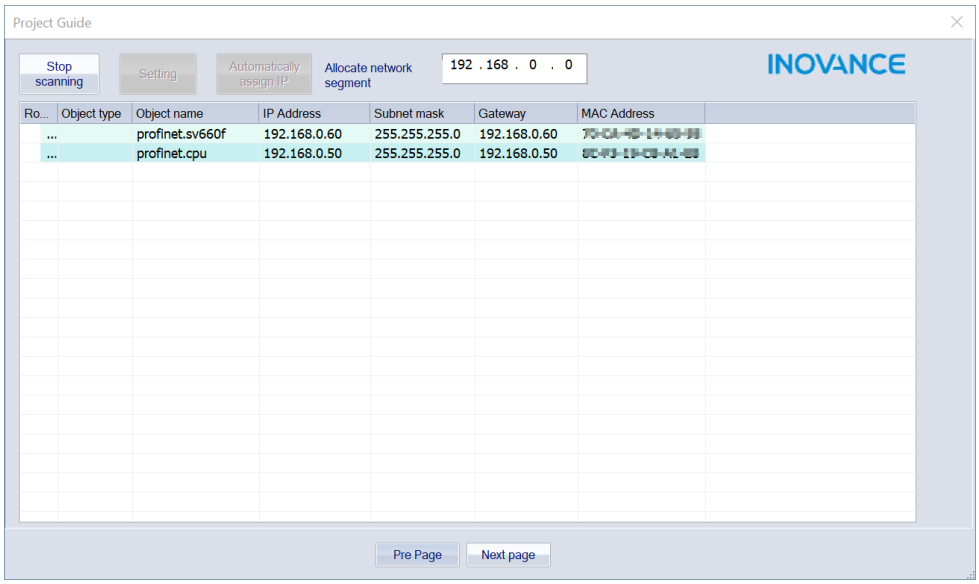
If PROFINET communication is selected, the "Network card" field is activated, where you can select the Ethernet interface of the PC where the PROFINET network is connected.

NOTE To be able to communicate through the PROFINET network, it is necessary to install the WinPCap software that is in the InoDRiverShop installation directory.

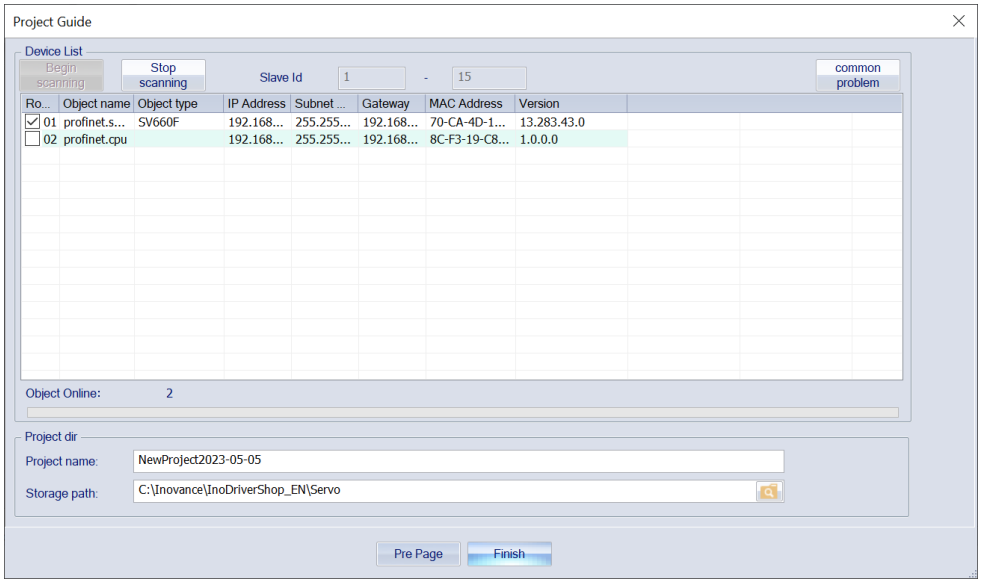


Select the network card and click on Next Page to detect the drives.

The following screen shows how the software has detected the Siemens PLC and the SV660F drive in the profinet network. Press next to continue.

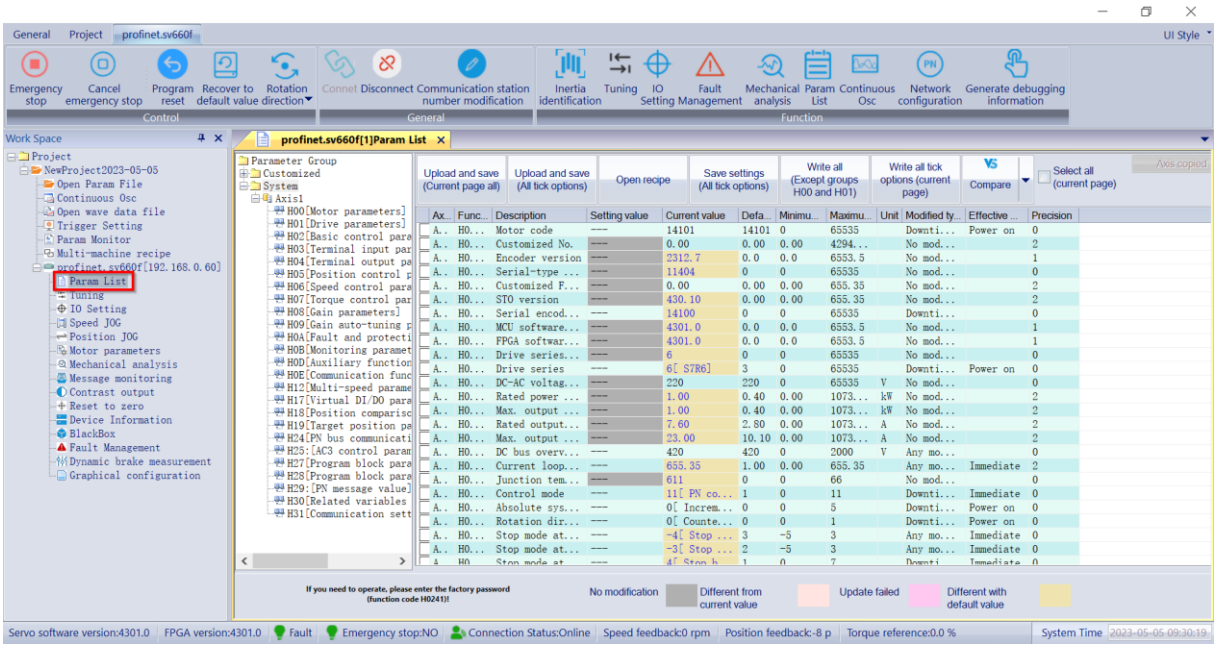


On the next screen select the SV660F to create a new project.

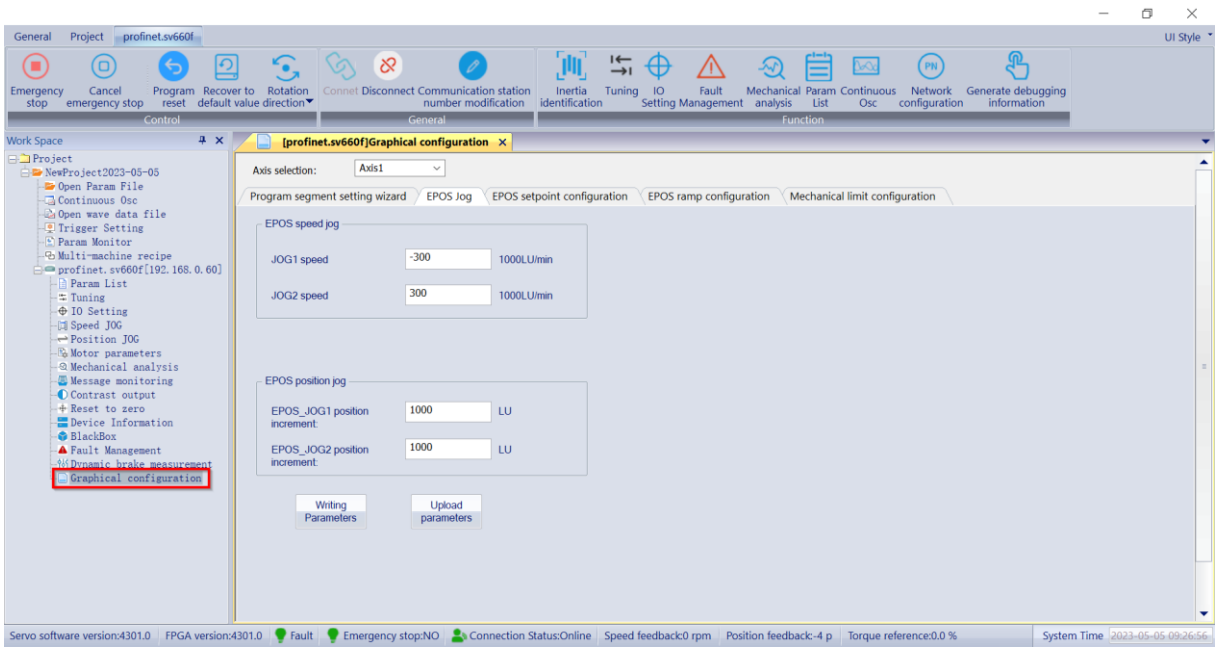


6.2.3 FUNCTIONALITIES

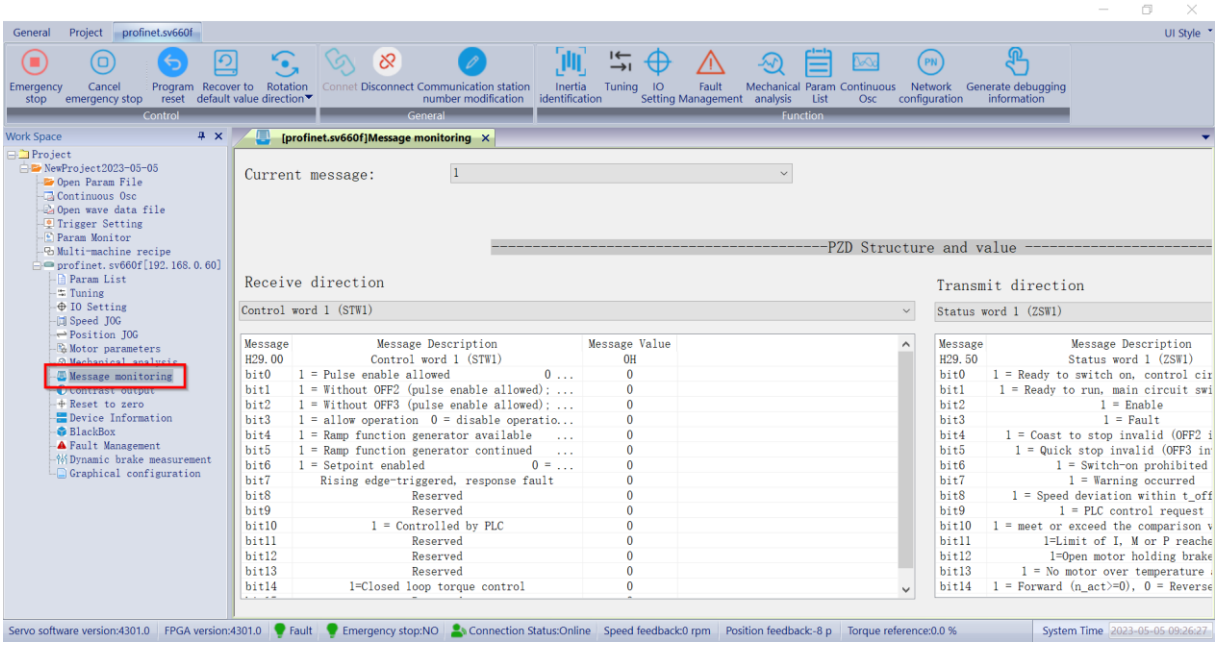
The InoDRiverShop allows you to monitor the drive parameters, as well as make backup copies of these parameters or load a set of parameters using the parameter list functionality.



In the Graphical configuration screen you can configure the parameters of the AC3 mode through a graphical interface.



The Message Monitoring section allows you to monitor the information that the drive exchanges with the PLC through the different telegrams configured in the PLC hardware.


General
Project
profinet.sv660f
UI Style
Emergency stop
Cancel emergency stop
Program reset
Recover to default value
Rotation direction
Control
Connet
Disconnect
Communication station number modification
General
Inertia identification
Tuning
IO Setting
Fault Management
Mechanical analysis
Param List
Continuous Osc
Network configuration
Generate debugging information
Function
Work Space
Project
NewProject2023-05-05
Open Param File
Continuous Osc
Open wave data file
Trigger Setting
Param Monitor
Multi-machine recipe
profinet.sv660f[192.168.0.60]
Param List
Tuning
IO Setting
Speed JOG
Position JOG
Motor parameters
Mechanical analysis
Message monitoring
Contrast output
Reset to zero
Device Information
BlackBox
Fault Management
Dynamic brake measurement
Graphical configuration
[profinet.sv660f]Message monitoring
Current message:
1
PZD Structure and value
Receive direction
Control word 1 (STW1)
Transmit direction
Status word 1 (ZSW1)
Message
Message Description
Message Value
H29.00
Control word 1 (STW1)
0H
bit0 1 = Pulse enable allowed 0 ... 0
bit1 1 = Without OFF2 (pulse enable allowed): ... 0
bit2 1 = Without OFF3 (pulse enable allowed): ... 0
bit3 1 = allow operation 0 = disable operatio... 0
bit4 1 = Ramp function generator available ... 0
bit5 1 = Ramp function generator continued ... 0
bit6 1 = Setpoint enabled 0 = ... 0
bit7 Rising edge-triggered, response fault 0
bit8 Reserved 0
bit9 Reserved 0
bit10 1 = Controlled by PLC 0
bit11 Reserved 0
bit12 Reserved 0
bit13 Reserved 0
bit14 1=Closed loop torque control 0
Message
Message Description
H29.50
Status word 1 (ZSW1)
bit0 1 = Ready to switch on, control cir
bit1 1 = Ready to run, main circuit swi
bit2 1 = Enable
bit3 1 = Fault
bit4 1 = Coast to stop invalid (OFF2 i
bit5 1 = Quick stop invalid (OFF3 in
bit6 1 = Switch-on prohibited
bit7 1 = Warning occurred
bit8 1 = Speed deviation within t_off
bit9 1 = PLC control request
bit10 1 = meet or exceed the comparison v
bit11 1=Limit of I, M or P reache
bit12 1=Open motor holding brake
bit13 1 = No motor over temperature
bit14 1 = Forward (n_act>=0), 0 = Reverse
Servo software version:4301.0
FPGA version:4301.0
Fault
Emergency stop:NO
Connection Status:Online
Speed feedback:0 rpm
Position feedback:-8 p
Torque reference:0.0 %
System Time
2023-05-05 09:26:27

7 PROFINET ON SV660F

PROFINET is an automation bus standard based on Industrial Ethernet technology released by PROFINET International. PROFINET provides two real-time communications: PROFINET IO RT and PROFINET IO IRT.

In the **PROFINET IO RT** channel, real-time data is transmitted via Priority Ethernet with no special hardware requirements.

The **PROFINET IO IRT** channel is suitable for transmitting data with more precise time requirements, and its cycle period can reach 500µs, but requires support for IO devices and switches with special hardware. All diagnostic and configuration data is transmitted through non-real-time channels.

None Real Time (NRT) <100ms cycle
• Acyclic
• Uses TCP/IP
• Left lane
Real Time (RT) <10ms cycle
• Cyclic
• Skips the TCP/IP layers
• Over taking lane
Isochronous Real Time (IRT) <1ms cycle
• Cyclic
• Reserved Bus lane

Function		IO-Controller		
Controller		NRT	RT	IRT
	S7-1500	✓	✓	✓
	S7-1200	✓	✓	✗
	S7-300 / S7-400	✓	✓	✓
	Open Controller	✓	✓	✓

Source: www.siemens.com

7.1 PROFIDRIVE APPLICATION PROFILE

PROFIdrive is a vendor-neutral application profile from PROFIBUS and PROFINET International (PI) which is focused on drives, encoders, motors, and their applications, which range from simple to very demanding motion control tasks. The PROFIdrive profile defines, as a supplement to the PROFIBUS and PROFINET standard, a unified device behaviour and access technique to the drive data by using a consistent drive interface:

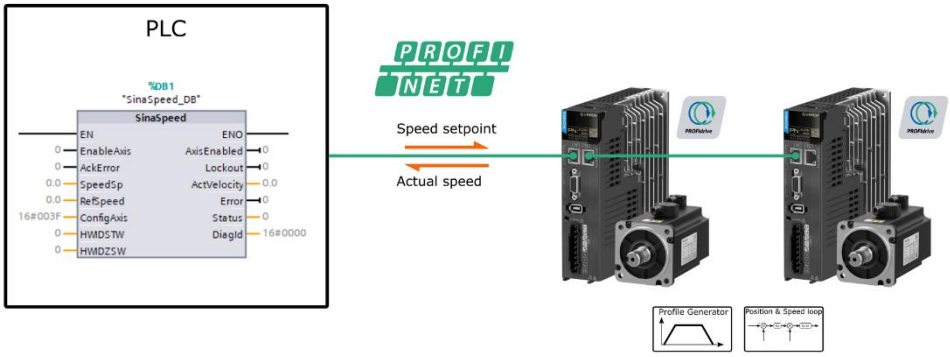
- State machine
- Application classes
- Telegrams for data transfer
- Diagnostic routines

How drives are integrated into automation solutions largely depends on the application. There is an extremely wide range of drive applications in automation solutions. SV660F can cover three classes of applications, depending on the market segment and device implementation. The application classes supported by the SV660F are described below.

PROFIdrive application classes (AC1, AC3, AC4)			
AC	Applications	RT	IRT
Application Class 1 (AC 1)	Pumps, fans, compressors Machine tools, robots Paper machines Conveyor belts, elevators, etc.	YES	
Application Class 3 (AC 3)	Single-axis positioning	YES	
Application Class 4 (AC 4)	Single-axis positioning	YES	
	Robots, machine tools, printing machines, packaging machines		YES

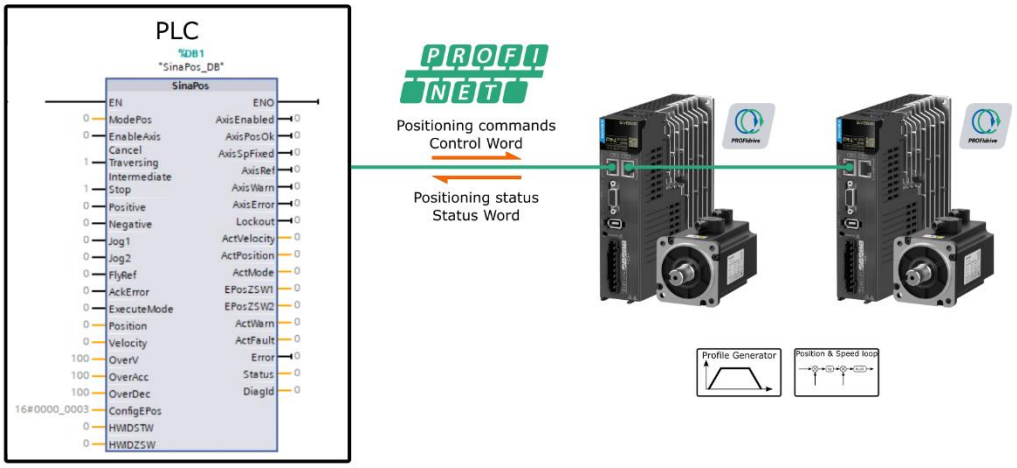
Application Class 1 (AC 1): Standard Drive

In the simplest case, the drive is controlled via a speed setpoint by **SinaSpeed** FB. The speed control is governed completely in the drive controller. The PLC includes all technological functions for the automation process. Especially suitable for drives with open/closed-loop speed ctr. (pumps, compress, conveyors ..)



Application Class (AC 3): Single Axis positioning drive with local Motion Control

The technology function **SinaPos** is still in the PLC. A single positioning request is started via a command from the PLC Controller. Interpolation and position control as well as speed control are implemented directly in the drive. Since in this variant, all time-critical control algorithms are hidden in the drive controller, Clock Synchronous Operation is only necessary if complex tracking for multiple axes shall be coordinated.

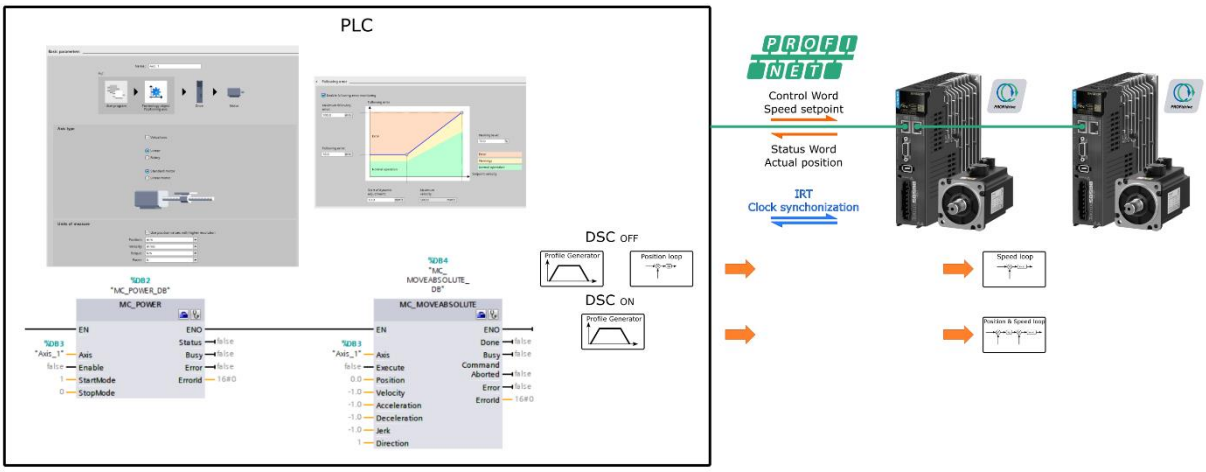


Application Class (AC 4): Motion Control with central interpolation and speed setpoint interface

In this mode the position loop is closed by the PLC controller. The PLC control is in charge of generating the trajectories and closing the position loop. The drive receives the speed setpoint from the PLC, calculates the speed loop and sends the current position to the PLC controller. **MC_Power**, **MC_MoveAbsolute** and other PLC Open standard program blocks are used for motion control.

This mode can be used in RT networks or in IRT. If the axes do not need synchronization, the RT mode can be used, but if synchronization between axes is needed, the IRT (Isochronous Real Time) mode must be enabled in the PLC.

DSC (Direct Servo Control) is a special mode for improving position control performance. With DSC activated, the controller sends a speed setpoint and the position error to the drive. The drive side is where the position control loop is executed, improving motion control performance, and freeing up resources from the PLC controller.



7.2 MESSAGE OVERVIEW

7.2.1 SUPPORTED MESSAGES

SV660F supports the application of AC1, AC3 and AC4, and supports standard reporting in speed control mode and basic positioning control mode.

Text and Siemens messages, auxiliary messages can only be used together with the main message and cannot be used alone. From the perspective of drive equipment

The received process data is the receiving word, and the process data to be sent is the sending word. The detailed description is shown in the table below.

Message	Maximum number of PZDs (one PZD = one word)	
	Receive word	Send word
Standard telegram 1	2	2
Standard telegram 2	4	4
Standard telegram 3	5	9
Siemens Telegram 102	6	10
Siemens Telegram 105	10	10
Siemens Telegram 111	12	12
Siemens telegram 750 (Auxiliary telegram)	3	1
Inovance message 850 (Auxiliary telegram)	1	1

Telegrams for speed control mode

Telegram	1		2		3		102		105	
Application Mode	AC1		AC1		AC4		AC4		AC4	
PZD1	STW1	ZSW1	STW1	ZSW1	STW1	ZSW1	STW1	ZSW1	STW1	ZSW1
PZD2	NSOLL_A	NIST_A	NSOLL_B	NIST_B	NSOLL_B	NIST_B	NSOLL_B	NIST_B	NSOLL_B	NIST_B
PZD3										
PZD4			STW2	ZSW2	ZSW2	STW2	ZSW2	STW2	ZSW2	STW2
PZD5					G1_STW	G1_ZSW	MOMRED	MELDW	MOMRED	MELDW
PZD6						G1_XIST1	G1_STW	G1_ZSW	G1_STW	G1_ZSW
PZD7								G1_XIST1	XERR	G1_XIST1
PZD8						G1_XIST2				

PZD9								G1_XIST2	KPC	G1_XIST2
PZD10										

Auxiliary message description

When using the telegram 750, if any of the following settings are made, the motor will accelerate uncontrollably:

- Set the torque limit via PZD M_LIMIT_POS to a negative value.
- Set the lower torque limit to a positive value via PZD M_LIMIT_NEG.

Telegram	750	
Application mode	-	
PZD1	M_ADD1	M_ACT
PZD2	M_LIMIT_POS	
PZD3	M_LIMIT_NEG	

When using the telegram 850, the user can customize the sending word and receiving word and select the function through H24-35 and H24-36.

Telegram	850	
Application mode		
PZD1	USER_SEND	USER_RECEIVE

Telegram for Basic Locator Mode

Telegram	111	
Application mode	AC3	
PZD1	STW1	ZSW1
PZD2	POS_STW1	POS_ZSW1
PZD3	POS_STW2	POS_ZSW2
PZD4	STW2	ZSW2
PZD5	OVERRIDE	MELDW
PZD6	MDI_TARPOS	XIST_A
PZD7		

PZD8	MDI_VELOCITY	NIST_B
PZD9		
PZD10	MDI_ACC	FAULT_CODE
PZD11	MDI_DEC	WARN_CODE
PZD12	user	user

User is the user-defined receiving word/sending word.

7.3 IO DATA SIGNAL

Signal	Description	Receive/Transmit word	Type of data	target
ZSW1	Status word 1	Sending word	U16	
ZSW2	Status word 2	Sending word	U16	
NSOLL_A	Set speed A value	Receiving word	I16	4000H≒Rated speed
NSOLL_B	Set speed B value	Receiving word	I32	40000000H≒Amount constant speed
NIST_A	Current speed A value	Sending word	I16	4000H≒Rated speed
NIST_B	Current Speed B value	Sending word	I32	40000000H≒Amount constant speed
G1_STW	Encoder 1 Control Word	Receiving word	U16	
G1_ZSW	Encoder 1 status word	Sending word	U16	
G1_XIST1	Encoder 1 actual position 1	Sending word	U32	
G1_XIST2	Encoder 1 actual position 2	Sending word	U32	
MOMRED	Torque reduction	Receiving word	I16	4000H≒Maximum torque moment
MELDW	message	Sending word	U16	
MDI_TARPOS	MDI position	Receiving word	I32	1H≒1 LU
MDI_VELOCITY	MDI speed	Receiving word	I32	1H≒1000 LU/ min
MDI_ACC	MDI acceleration multiplier	Receiving word	I16	4000H≒100%
MDI_DEC	MDI deceleration multiplier	Receiving word	I16	4000H≒100%

XIST_A	Position A actual value	Sending word	I32	1H≒1 LU
OVERRIDE	Position speed multiplier	Receiving word	I16	4000H≒100%
FAULT_CODE	Fault code	Sending word	U16	
WARN_CODE	Warning code	Sending word	U16	
user	User defined reception Character 0- no function 1- Additional torque	Receiving word	I16	4000H≒Motor most High torque/motor rating Torque*100%
user	User-defined sending Character 0 - no function 1- Actual torque 2- Actual current 3- DI status	Sending word	I16	4000H≒Motor most High torque/motor rating Torque*100%

7.4 CONTROL WORD DEFINITION

7.4.1 STW1 CONTROL WORD (FOR TELEGRAM 1, 2, 3, 102)

Signal	Description
STW1.0	1 = ON (pulse can be enabled) 0 = OFF1 (ramp stop, pulse suppression, ready to switch on)
STW1.1	1 = no OFF2 (pulse can be enabled) 0 = OFF2 (coast stop, pulse suppression, switch-on inhibited)
STW1.2	1 = no OFF3 (pulse can be enabled) 0 = OFF3 (quick stop, pulse suppression, switch-on inhibited)
STW1.3	1 = enable 0 = Disable operation (eliminates pulses)
STW1.4	1= Operating condition (ramp-function generator enabled) 0 = Freeze instruction disables the ramp-function generator (sets the output of the ramp-function generator to zero)
STW1.5	1 = continue ramp-function generator 0 = Freeze ramp-function generator output, AC4 not applicable
STW1.6	1 = enable setpoint 0 = disable setpoint (set input of ramp-function generator to 0)
STW1.7	Rising edge of STW1.7 is valid, fault response
STW1.8 - STW1.9	reserved

STW1.10	1 = controlled by PLC 0 = Not PLC controlled
STW1.11 - STW1.15	reserved

7.4.2 STW1 CONTROL WORD (FOR TELEGRAM 105)

Signal	Description
STW1.0	1 = ON (pulse can be enabled) 0 = OFF1 (ramp stop, pulse suppression, ready to switch on)
STW1.1	1 = no OFF2 (pulse can be enabled) 0 = OFF2 (coast stop, pulse suppression, switch-on inhibited)
STW1.2	1 = Operating condition (ramp-function generator enabled) 0 = Freeze instruction disables the ramp-function generator (sets the output of the ramp-function generator
STW1.3	1 = enable 0 = Disable operation (eliminates pulses)
STW1.4	1 = enable ramp-function generator 0 = Disable the ramp-function generator0 = Freeze instruction disables the ramp-function generator (sets the output of the ramp-function generator to zero)
STW1.5	1 = continue ramp-function generator 0 = Freeze ramp-function generator output, AC4 not applicable
STW1.6	1 = enable setpoint 0 = disable setpoint (set input of ramp-function generator to 0)
STW1.7	Rising edge of STW1.7 is valid, fault response
STW1.8 - STW1.9	reserved
STW1.10	1 = controlled by PLC 0 = Not PLC controlled
STW1.11 - STW1.13	reserved
STW1.14	1 = Closed-loop torque control takes effect 0 = Closed loop speed control takes effect
STW1.15	reserved

7.4.3 STW1 CONTROL WORD (FOR TELEGRAM 111)

Signal	Description
STW1.0	1 = ON (pulse can be enabled) 0 = OFF1 (ramp stop, pulse suppression, ready to switch on)
STW1.1	1 = no OFF2 (pulse can be enabled) 0 = OFF2 (coast stop, pulse suppression, switch-on inhibited)
STW1.2	1 = no OFF3 (pulse can be enabled) 0 = OFF3 (quick stop, pulse suppression, switch-on inhibite
STW1.3	1 = enable 0 = Disable operation (eliminates pulses)
STW1.4	1 = Do not refuse to perform tasks 0 = refuse to execute the task
STW1.5	1 = Do not suspend running tasks 0 = suspend running tasks
STW1.6	If the rising edge of STW1.6 is valid, activate the running task Rising edge of
STW1.7	Rising edge of STW1.7 is valid, fault response
STW1.8	1 = start JOG1 0 = disable JOG1
STW1.9	1 = start JOG12 0 = disable JOG2
STW1.10	1 = controlled by PLC 0 = Not PLC controlled
STW1.11 - STW1.12	reserved
STW1.13	External block switching
STW1.14	1 = closed loop torque control
STW1.15	reserved

7.4.4 STW2 CONTROL WORD (FOR TELEGRAMS 2, 3, 102, 105

Signal	Description
STW2.0- STW2.7	reserved

STW2.8	1 = Travel to fixed stop
STW2.9- STW2.11	reserved
STW2.12	PLC heartbeat count value, bit 0
STW2.13	PLC heartbeat count value, bit 1
STW2.14	PLC heartbeat count value, bit 2
STW2.15	PLC heartbeat count value, bit 3

7.4.5 G1_STW CONTROL WORD (FOR TELEGRAM 3, 102, 105)

<table>
<tr><th>Signal</th><th>Description</th></tr>
<tr><td>G1_STW.0</td><td>When G1_STW.7 = 0, search for reference point 1
When G1_STW.7 = 1, the rising edge of probe 1</td></tr>
<tr><td>G1_STW.1</td><td>When set to 1:
When G1_STW.7 = 0, search for reference point 2
When G1_STW.7 = 1, probe 1 falling edge</td></tr>
<tr><td>G1_STW.2</td><td>When set to 1:
When G1_STW.7 = 0, search for reference point 3
When G1_STW.7 = 1, the rising edge of probe 2</td></tr>
<tr><td>G1_STW.3</td><td>When set to 1:
When G1_STW.7 = 0, search for reference point 4
When G1_STW.7 = 1, the falling edge of probe</td></tr>
<tr><td>G1_STW.4
G1_STW.5
G1_STW.6</td><td>
<table>
<tr><th>G1_STW.4</th><th>G1_STW.5</th><th>G1_STW.6</th><th>Definition</th></tr>
<tr><td>0</td><td>0</td><td>0</td><td>No activation</td></tr>
<tr><td>0</td><td>0</td><td>1</td><td>Activate the selected function</td></tr>
<tr><td>0</td><td>1</td><td>0</td><td>read value</td></tr>
<tr><td>0</td><td>1</td><td>1</td><td>Cancel operation</td></tr>
</table>
</td></tr>
<tr><td>G1_STW.7</td><td>1 = real-time measurement
0 = search for reference point</td></tr>
<tr><td>G1_STW.8 - G1_STW.10</td><td>reserved</td></tr>
<tr><td>G1_STW.11</td><td>1 = relative position setting
0 = absolute position</td></tr>
<tr><td>G1_STW.12</td><td>Rising edge is valid, request to set zero bit</td></tr>
</table>

G1_STW.13	Rising edge active, request for cyclic transmission of the absolute position in G1_XIST2
G1_STW.14	Resident encoder
G1_STW.15	The rising edge of G1_STW.15 is valid, responding to encoder failure

7.4.6 POS_STW1 POSITION CONTROL WORD (FOR TELEGRAM 111)

Signal	Description
POS_STW1.0	Block selection, bit 0
POS_STW1.1	Block selection, bit 1
POS_STW1.2	Block selection, bit 2
POS_STW1.3	Block selection, bit 3
POS_STW1.4	Block selection, bit 4
POS_STW1.5	Block selection, bit 5
POS_STW1.6 -POS_STW1.7	reserved
POS_STW1.8	1 = absolute positioning 0 = relative positioning
POS_STW1.9	1 = run in positive direction
POS_STW1.10	1 = run in negative direction
POS_STW1.11	reserved
POS_STW1.12	1 = continuous transmission 0 = MDI block change is activated with a rising edge on the traversing block (STW1.6)
POS_STW1.13	reserved
POS_STW1.14	1 = set signal selected 0 = locate signal selected
POS_STW1.15	1 = MDI selection 0 = block submode

7.4.7 POS_STW2 POSITION CONTROL WORD (FOR TELEGRAM 111)

Signal	Description
POS_STW2.0	1 = tracking mode active
POS_STW2.1	1 = set reference point
POS_STW2.2 - POS_STW2.3	1 = reference cam active
POS_STW2.4	reserved
POS_STW2.5	1 = JOG incremental positioning takes effect 0 = Velocity active
POS_STW2.6 -POS_STW2.8	reserved
POS_STW2.9	1 = start reverse search reference point 0 = start forward search for reference point
POS_STW2.10-POS_STW2.13	reserved
POS_STW2.14	1 = activate software limit switch 0 = software limit switch off
POS_STW1.15	Activate stop dog

7.5 STATUS WORD DEFINITION

7.5.1 ZSW1 STATUS WORD (FOR TELEGRAM 1, 2, 3)

Signal	Description
ZSW1.0	1 = ready for switch on 0 = Ready not switched on
ZSW1.1	1 = ready for operation, main circuit powered 0 = not ready to run
ZSW1.2	1 = run enable 0 = no running enable
ZSW1.3	1 = Fault present 0 = no fault
ZSW1.4	1 = Coast to stop invalid 0 = Freewheel stop is active

ZSW1.5	1 = Fast stop is invalid 0 = quick stop active
ZSW1.6	1 = Prohibit switching on active 0 = Inhibit on Disabled
ZSW1.7	1 = Warning present 0 = no warning
ZSW1.8	1 = Speed error is within tolerance 0 = Velocity error is out of tolerance
ZSW1.9	1 = There is a control request 0 = no control request
ZSW1.10 - ZSW1.13	reserved
ZSW1.14	1 = Closed loop torque control active
ZSW1.15	reserved

7.5.2 ZSW1 STATUS WORD (FOR TELEGRAM 105)

Signal	Description
ZSW1.0	1 = ready to switch on 0 = Ready not switched on
ZSW1.1	1 = ready for operation, main circuit powered 0 = not ready to run
ZSW1.2	1 = run enable 0 = no running enable
ZSW1.3	1 = Fault present 0 = no fault
ZSW1.4	1 = Coast to stop invalid 0 = Freewheel stop is active
ZSW1.5	1 = Fast stop is invalid 0 = quick stop active
ZSW1.6	1 = Prohibit switching on active 0 = Inhibit on Disabled

ZSW1.7	1 = Warning present 0 = no warning
ZSW1.8	1 = Speed error is within tolerance 0 = Velocity error is out of tolerance
ZSW1.9	1 = There is a control request 0 = no control request
ZSW1.10	1 = reached or exceeded the frequency/speed comparison value 0 = The frequency/speed comparison value was not reached or exceeded
ZSW1.11	1 = I, M or P limit reached
ZSW1.12	1 = open motor holding brake
ZSW1.13	1 = No motor over temperature alarm
ZSW1.14	1 = Motor rotates forward (n_act ≥ 0) 0 = motor rotates in reverse (n_act<0)
ZSW1.15	1 = no overheating and overload alarm for power unit

7.5.3 ZSW1 STATUS WORD (FOR TELEGRAM 111)

Signal	Description
ZSW1.0	1 = ready to switch on 0 = Ready not switched on
ZSW1.1	1 = ready for operation, main circuit powered 0 = not ready to run
ZSW1.2	1 = run enable 0 = no running enable
ZSW1.3	1 = Fault present 0 = no fault
ZSW1.4	1 = Coast to stop invalid 0 = Freewheel stop is active
ZSW1.5	1 = Fast stop is invalid 0 = quick stop active

ZSW1.6	1 = Prohibit switching on active 0 = Inhibit on disabled
ZSW1.7	1 = Warning present 0 = no warning
ZSW1.8	1 = Speed error is within tolerance 0 = Velocity error is out of tolerance
ZSW1.9	1 = There is a control request 0 = no control request
ZSW1.10	1=target position reached 0 = target position not reached
ZSW1.11	1 = The reference point has been set, the reference point return has been executed, and the reference point position is valid 0 = no reference point set
ZSW1.12	1 = Rising edge move task confirmed, use rising edge to confirm acceptance of new move task or MDI set value
ZSW1.13	1 = Drive is parked 0 = Drive is running
ZSW1.14	1 = Axis accelerated
ZSW1.15	1 = Axis decelerated

7.5.4 ZSW2 STATUS WORD (FOR TELEGRAM 2, 3, 102, 105)

Signal	Description
ZSW2.0 - ZSW2.7	reserved
ZSW2.8	Travel to fixed stop
ZSW2.9	reserved
ZSW2.10	1 = pulse enable
ZSW2.11	reserved
ZSW2.12	Drive heartbeat count value, upload to PLC, bit 0
ZSW2.13	Drive heartbeat count value, upload to PLC, bit 1

ZSW2.14	Drive heartbeat count value, upload to PLC, bit 2
ZSW2.15	Drive heartbeat count value, upload to PLC, bit 3

7.5.5 G1_ZSW STATUS WORD (FOR TELEGRAM 3, 102, 105)

Signal	Description
G1_ZSW.0	1 = function 1 is activated
G1_ZSW.1	1 = function 2 is activated
G1_ZSW.2	1 = function 3 is activated
G1_ZSW.3	1 = function 4 is activated
G1_ZSW.4	Actual value 1 can be read
G1_ZSW.5	1 = actual value 2 can be read
G1_ZSW.6	1 = actual value 3 can be read
G1_ZSW.7	1 = actual value 4 can be read
G1_ZSW.8	Probe 1
G1_ZSW.9	Probe 2
G1_ZSW.10	reserved
G1_ZSW.11	Response encoder fault
G1_ZSW.12	Set zero response
G1_ZSW.13	Absolute position in G1_XIST2 for cyclic transfer
G1_ZSW.14	Park encoder activation
G1_ZSW.15	Encoder failure

7.5.6 POS_ZSW1 STATUS WORD (FOR TELEGRAM 111)

Signal	Description

POS_ZSW1.0	Block selection, bit 0
POS_ZSW1.1	Block selection, bit 1
POS_ZSW1.2	Block selection, bit 2
POS_ZSW1.3	Block selection, bit 3
POS_ZSW1.4	Block selection, bit 4
POS_ZSW1.5	Block selection, bit 5
POS_ZSW1.6 -POS_ZSW1.7	reserved
POS_ZSW1.8	1 = absolute positioning 0 = relative positioning
POS_ZSW1.9	1 = run in positive direction
POS_ZSW1.10	1 = run in negative direction
POS_ZSW1.11	reserved
POS_ZSW1.12	1 = continuous transmission 0 = MDI block change is activated with a rising edge on the traversing block (STW1.6)
POS_ZSW1.13	reserved
POS_ZSW1.14	1 = set signal selected 0 = locate signal selected
POS_ZSW1.15	1 = MDI selection 0 = block submode

7.5.7 POS_ZSW2 STATUS WORD (FOR TELEGRAM 111)

Signal	Description
POS_ZSW2.0	1 = tracking mode is enabled
POS_ZSW2.1	Block selection, bit 1
POS_ZSW2.2	Block selection, bit 2
POS_ZSW2.3	Block selection, bit 3
POS_ZSW2.4	Block selection, bit 4
POS_ZSW2.5	Block selection, bit 5

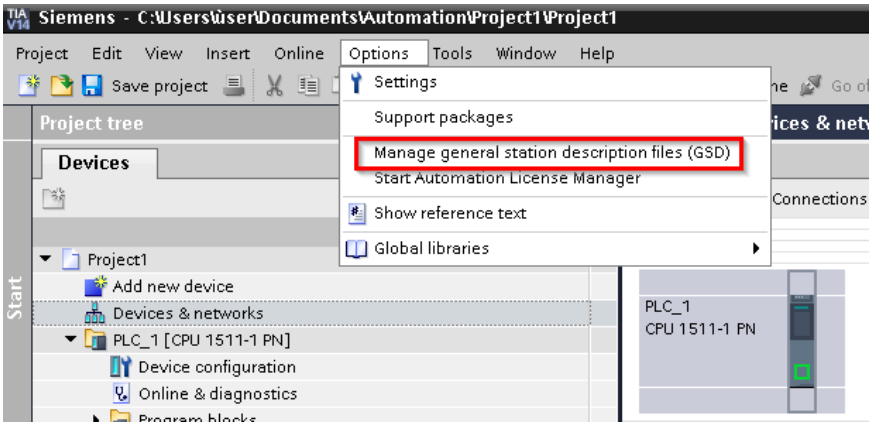
POS_ZSW2.6 -POS_ZSW2.7	reserved
POS_ZSW2.8	1 = absolute positioning 0 = relative positioning
POS_ZSW2.9	1 = run in positive direction
POS_ZSW2.10	1 = run in negative direction
POS_ZSW2.11	reserved
POS_ZSW2.12	1 = continuous transmission 0 = MDI block change is activated with a rising edge on the traversing block (STW1.6)
POS_ZSW2.13	reserved
POS_ZSW2.14	1 = set signal selected 0 = locate signal selected
POS_ZSW2.15	1 = MDI selection 0 = block submode

8 TIA PORTAL CONFIGURATION

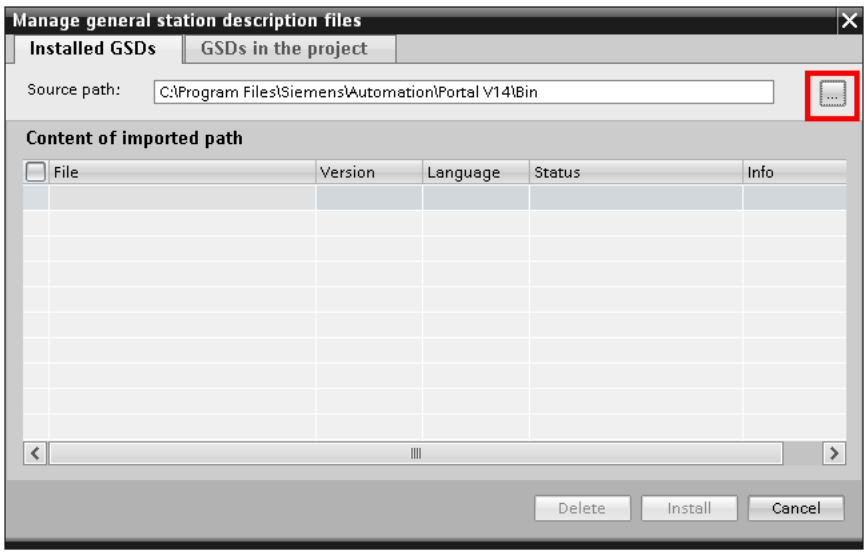
8.1 INSTALL GSDM FILE

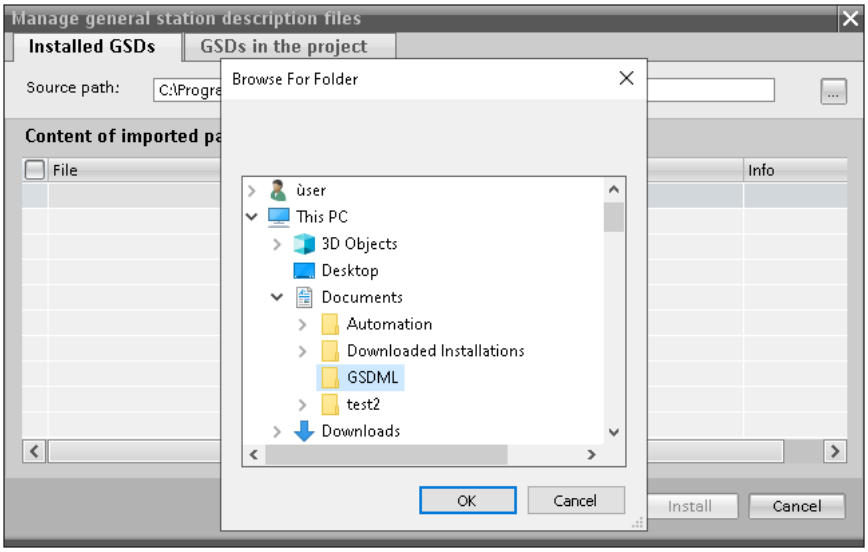
Before using the SV660F in the TIA portal project it is necessary to install the file ***GSDML-V2.4-Inovance-SV660F-20211110.xml***. To install the file follow the steps below:

1. Open the file description manager

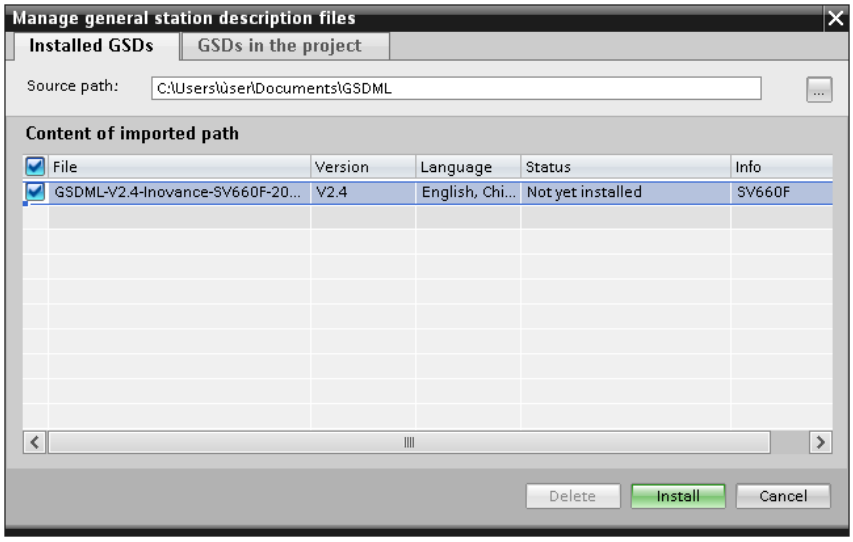


2. Select the folder where is located the GSDML file

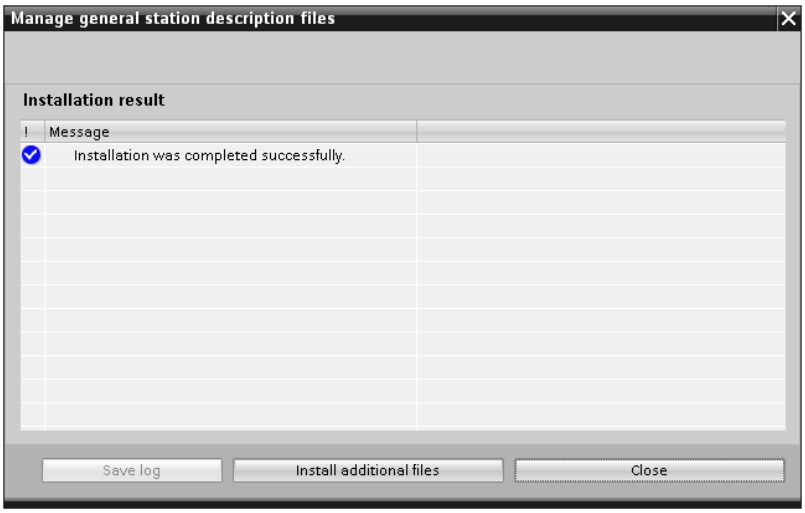




3. Select the file and click on the "Install" button



4. After a few seconds the file is already installed in the TIA portal environment.



8.2 PROFINET RT

8.2.1 AC1 MODE

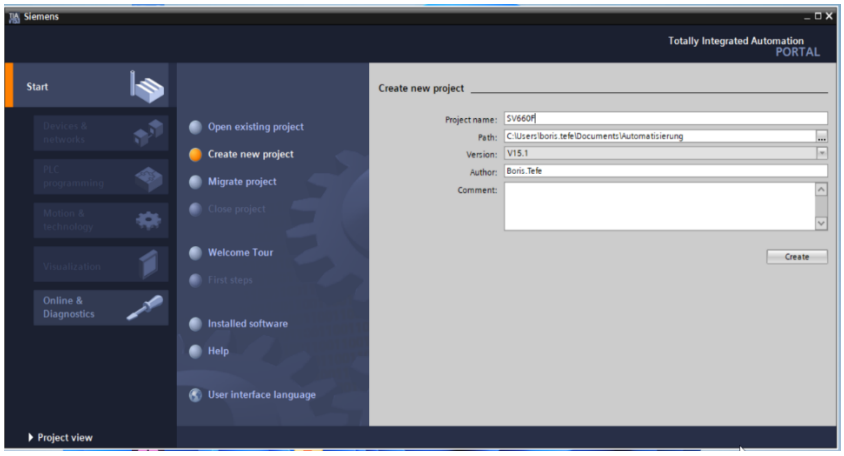
8.2.1.1 OVERVIEW

Siemens S7-200 Smart, S7-1200, S7-1500PLC can communicate with SV660F servo drive through PROFINET line speed control. Adopt the PROFINET RT communication method and use the standard message 1, the PLC performs start-stop and speed setting, the speed degree control is calculated in the servo drive.

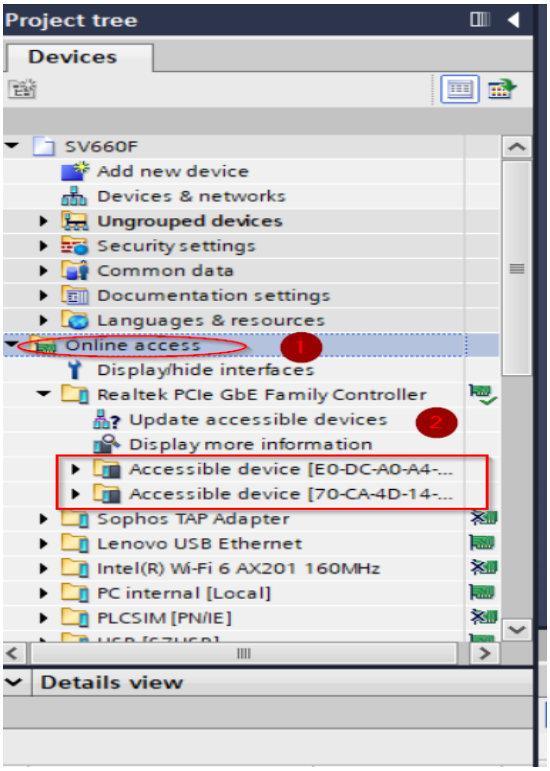
8.2.1.2 CONFIGURATION POINTS

1. Use a switch and use a communication network cable to connect of the SV660F servo drive through the CN3 or CN4 port, the PC to get access on Tia Portal, and the PLC.

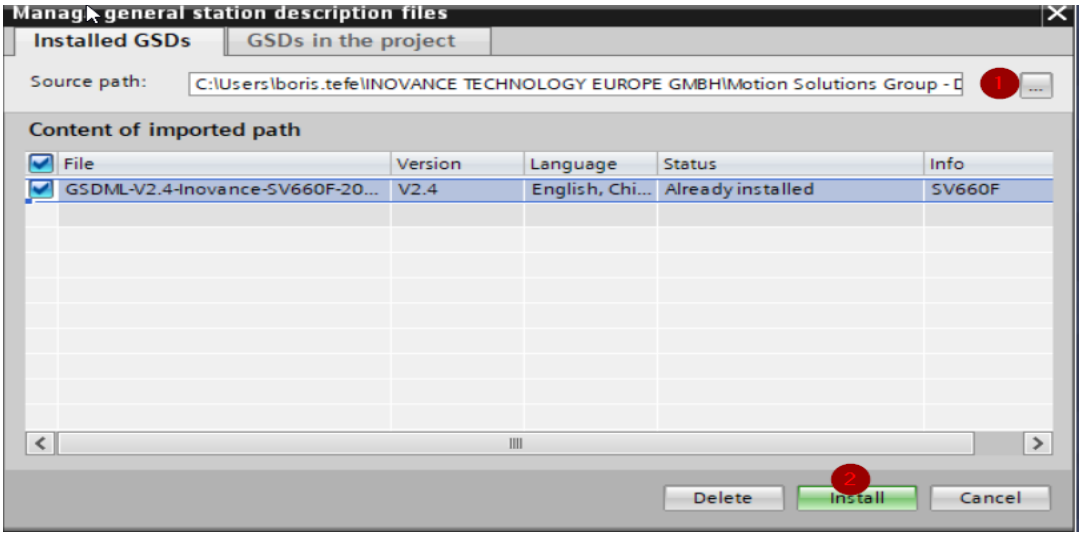
2. Open Tia Portal and create a project.



3. Switch on **Project view,** under **Online access** find the name of the ethernet card. Click on **Update accessible devices** to ping our devices and make sure that the wiring is ok and they are reachable.

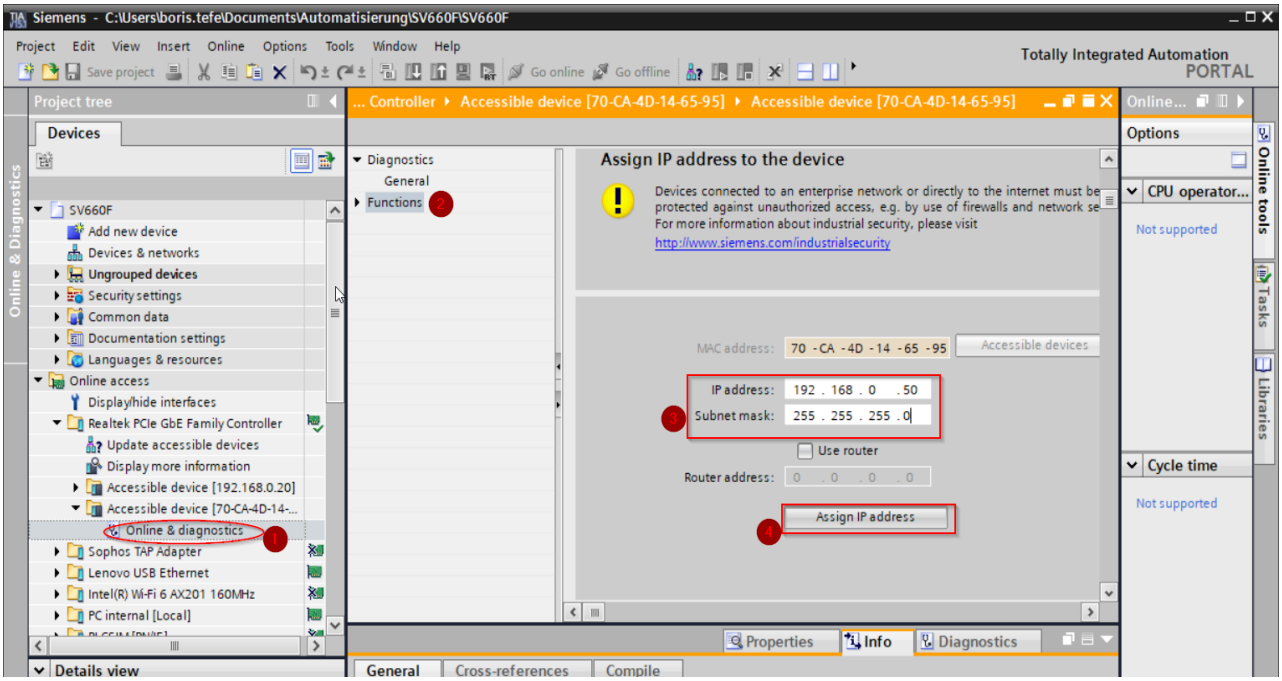


3. Install GSD file. On Tia portal→Options→Manage General Station Description File. Choose the Path where the GSD file is stored and install.



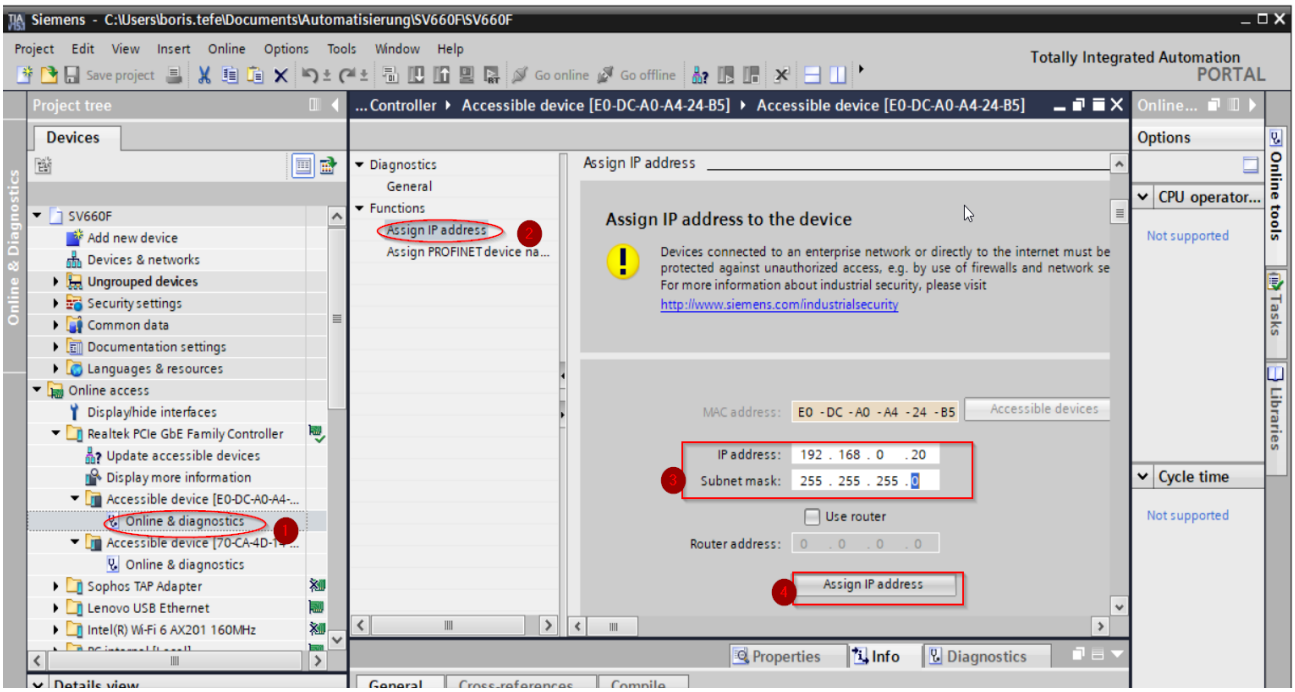
4. Assign IP address to our physical devices

IP address Servo drive



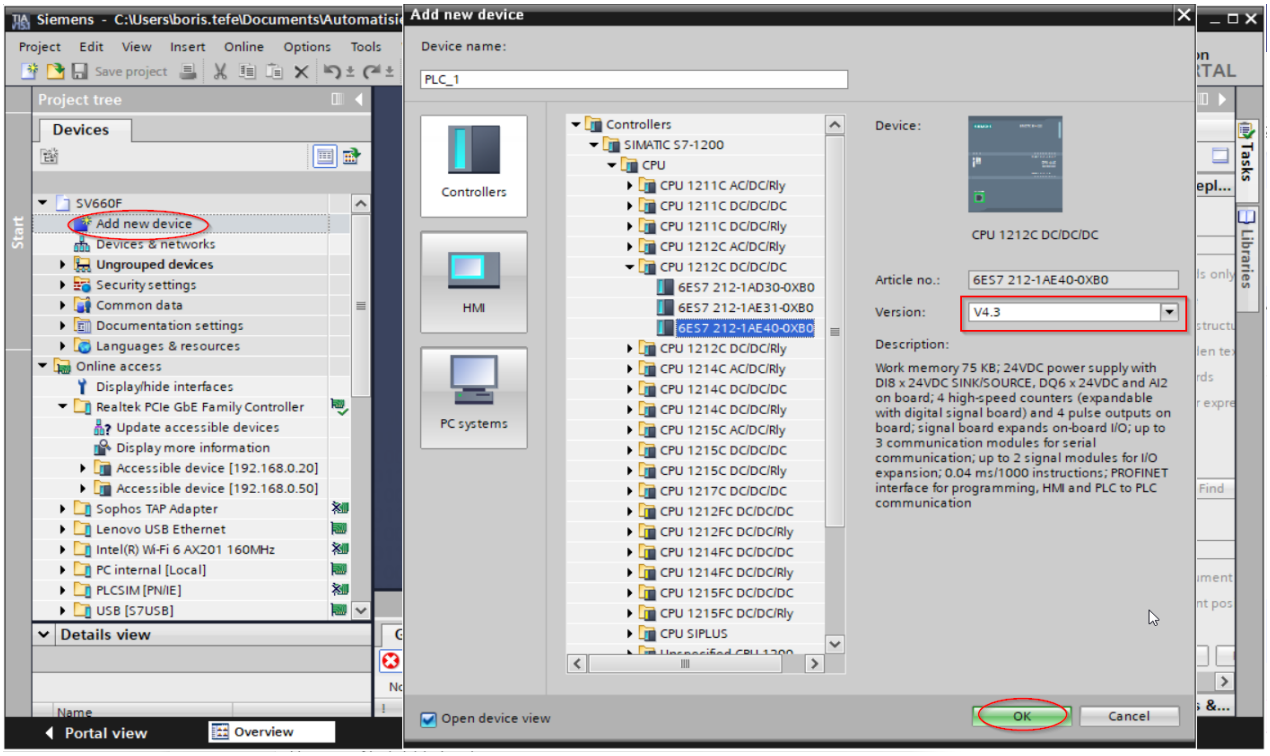
.

IP address PLC

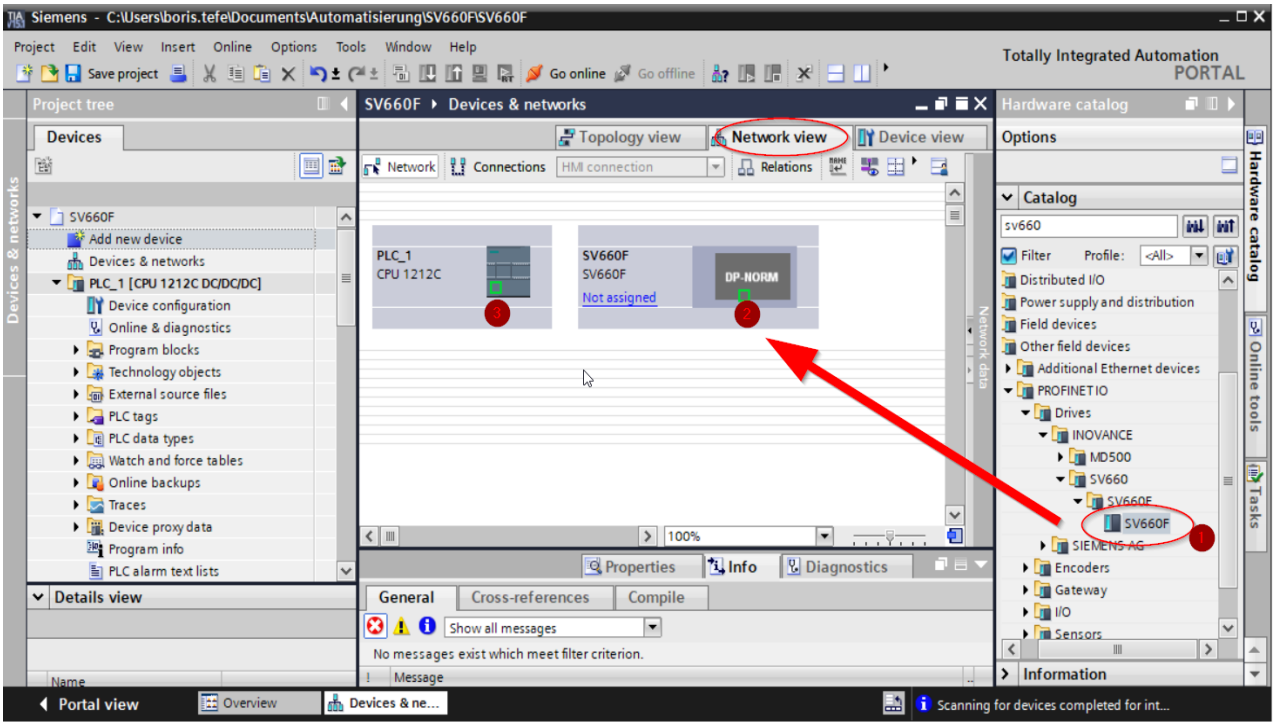


5. Add our devices to the project.

Add a PLC



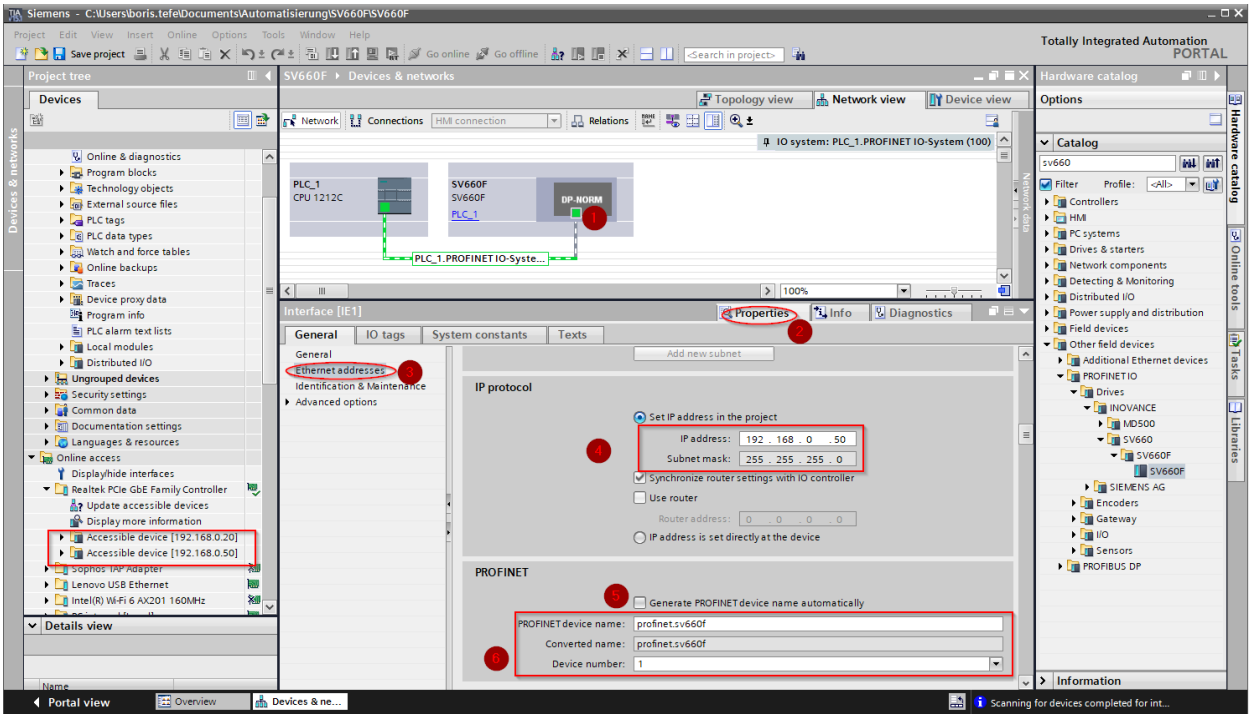
Add the Servo drive: Switch to network view and find the Servo drive in the list and double click and establish a connection with the PLC.



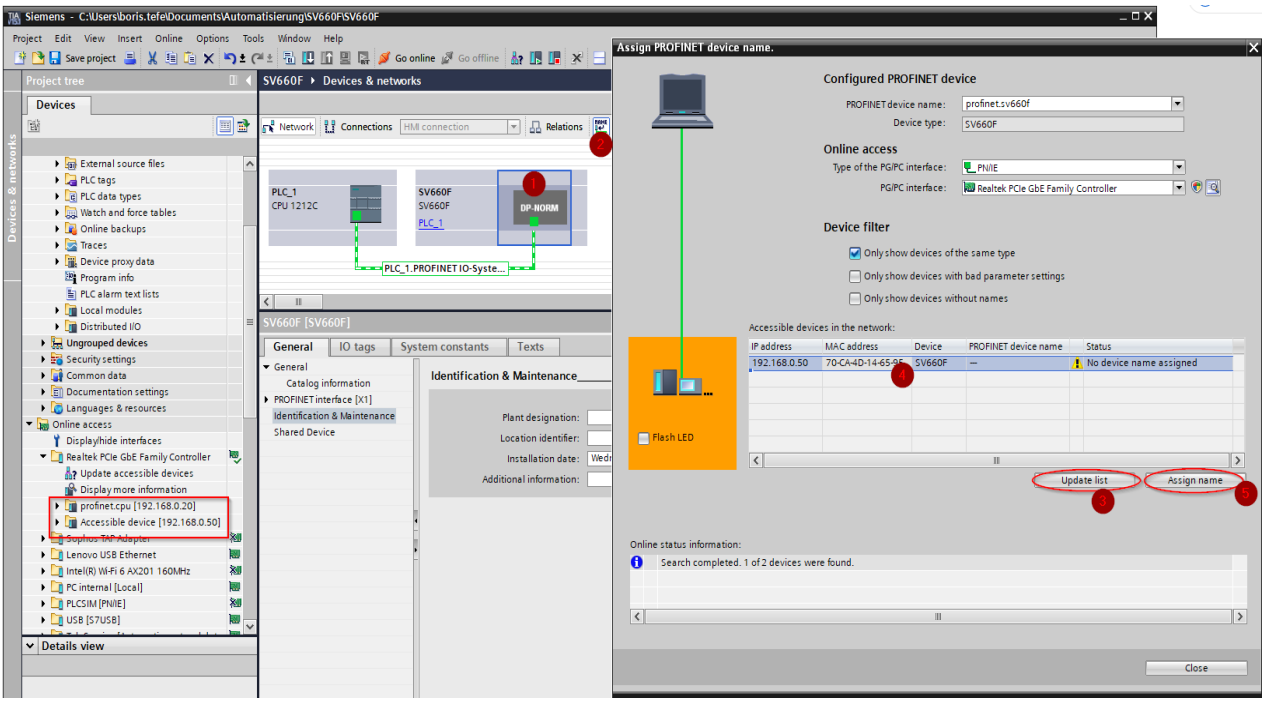
6. Setting up the PROFINET communication: We must enter the IP address that we assigned to our physical the device, give them a device name and a device number.

For the Servo drive

- Enter the IP address and give a valid device name.

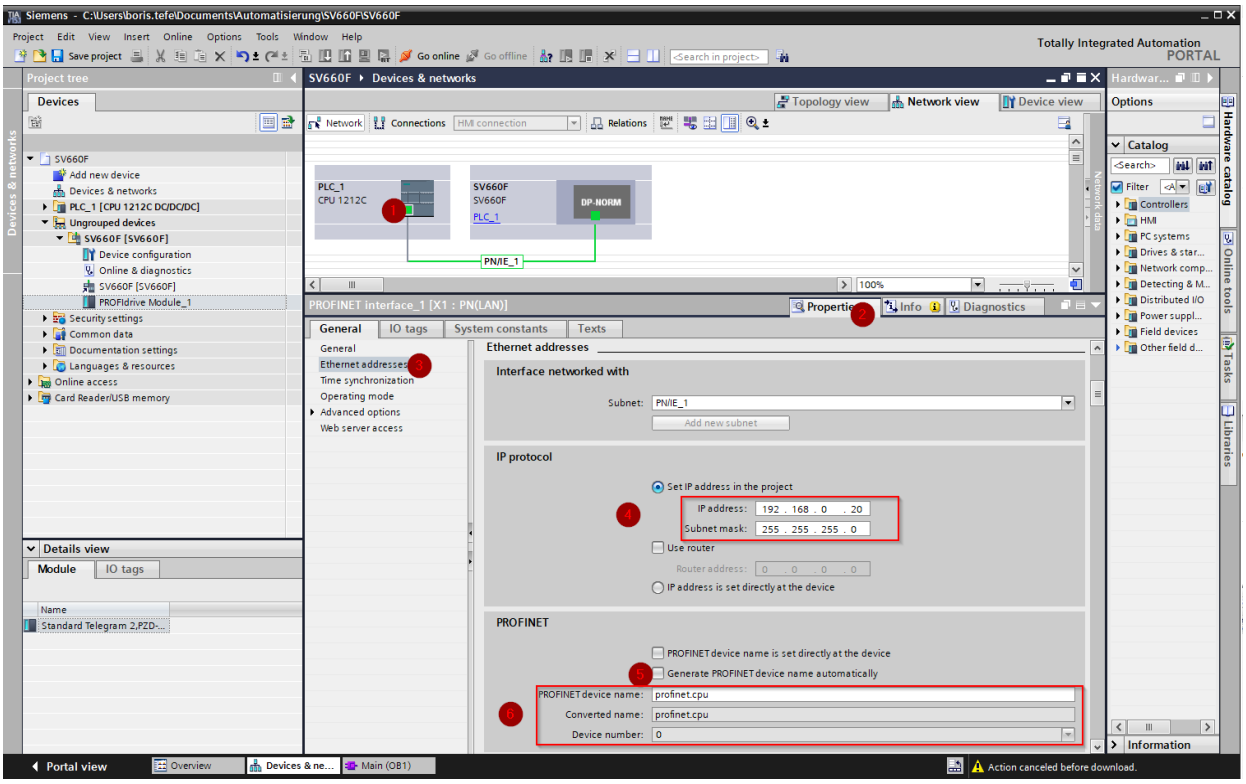


- Assign a device name

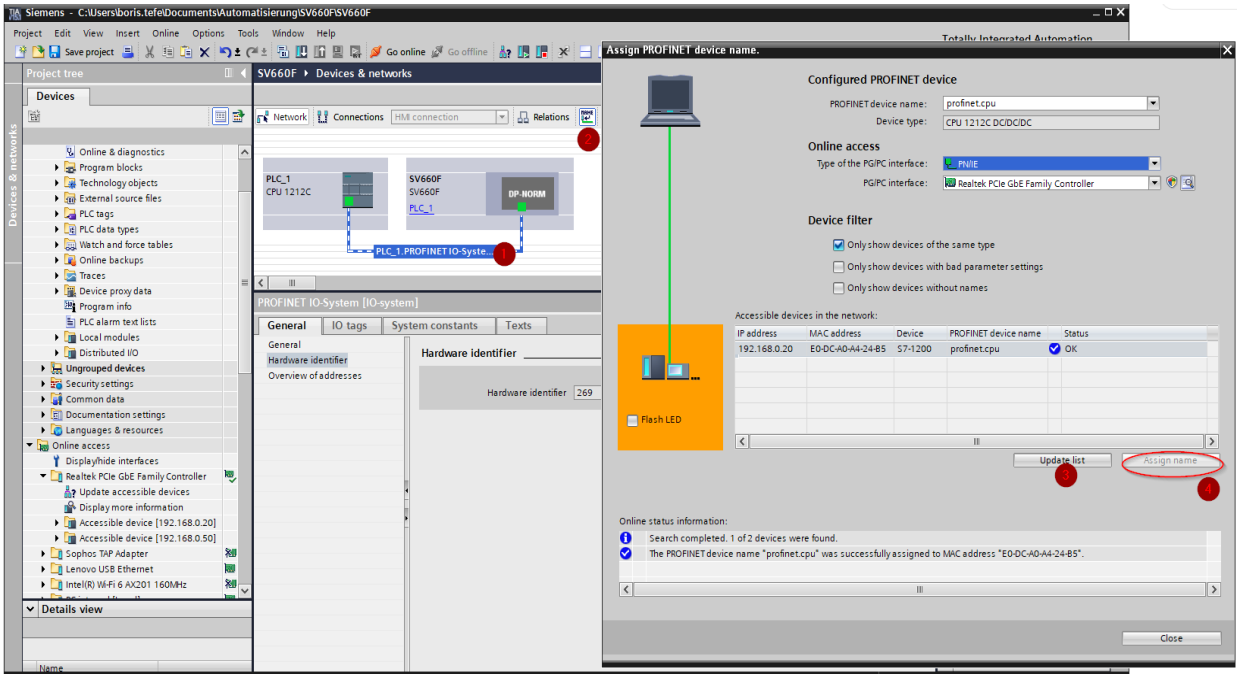


For the PLC

- Enter the IP address and give a valid device name.



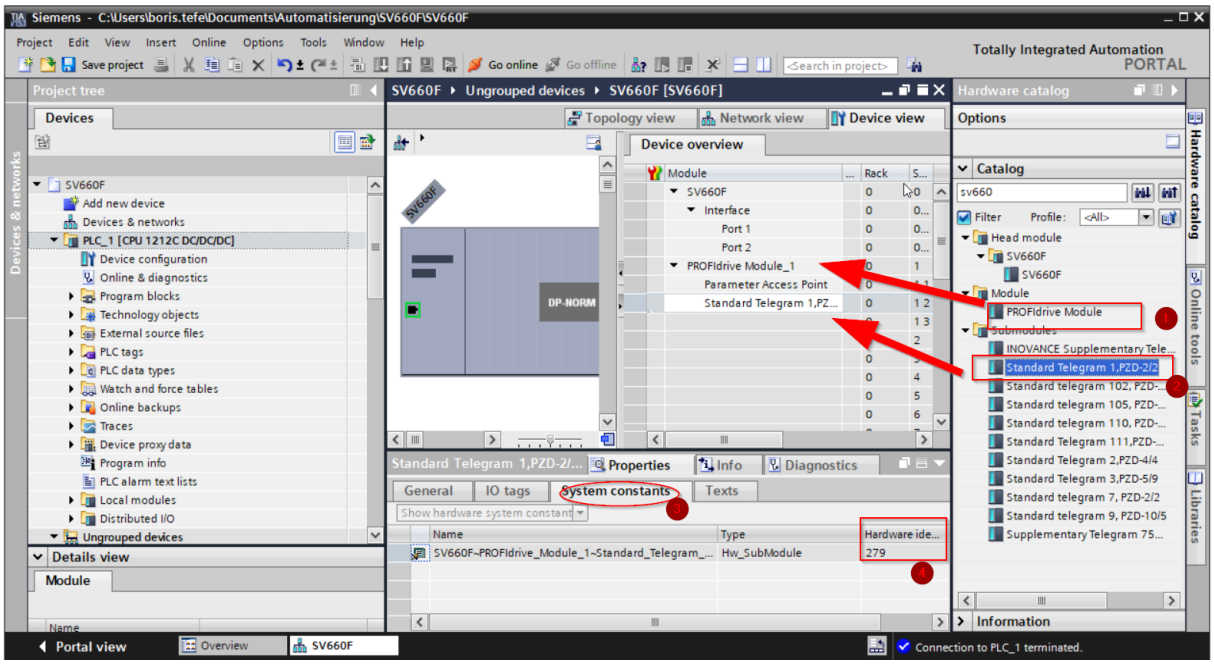
- Assign a device name.



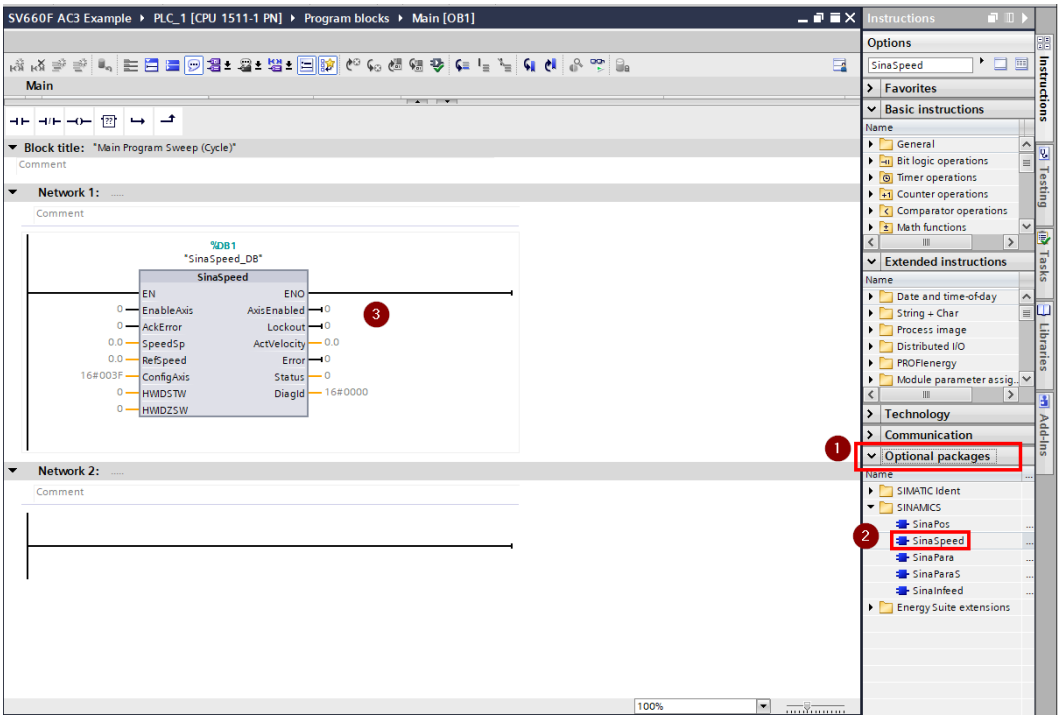
7. Compile and download in the PLC.

Note: In the device view, the configured IP address and device name need to be the same as the server IP address previously set in the background.

8. Find the hardware identifier: select message 1 → right-click properties → system constants → hardware identifier

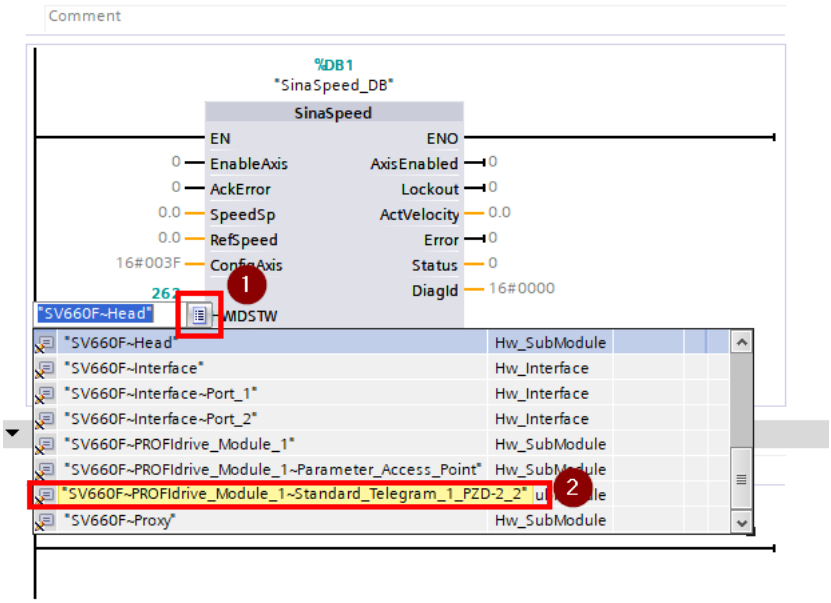


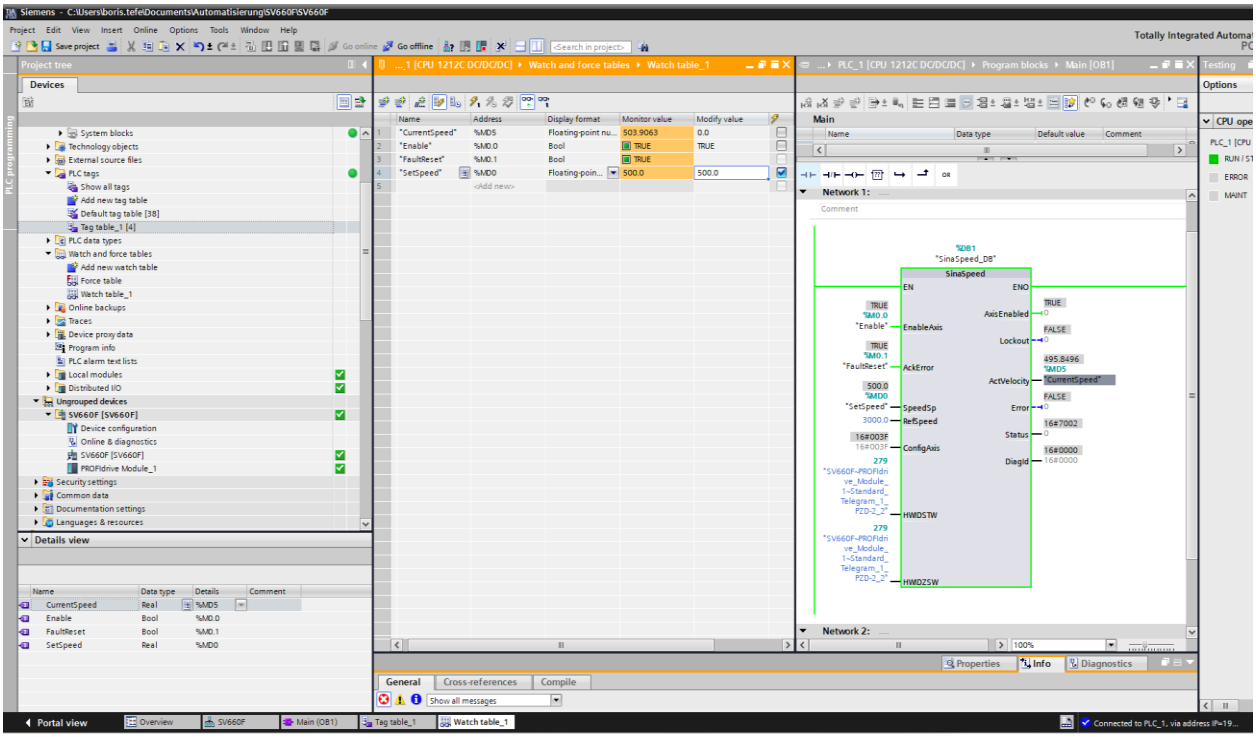
9.Drag and drop the SINA_Speed (FB285) (to find in the Sinamics library) function block into the programming network in OB1.



8.2.1.3 CALL FB285(SINA_SPEED) FUNCTION BLOCK AND TEST

The block inputs HWIDSTW and HWIDZSW must reference to the hardware ID of the standard telegram.


Comment
%DB1
"SinaSpeed_DB"
SinaSpeed
EN
ENO
0 EnableAxis
AxisEnabled 0
0 AckError
Lockout 0
0.0 SpeedSp
ActVelocity 0.0
0.0 RefSpeed
Error 0
16#003F ConfigAxis
Status 0
DiagId 16#0000
"SV660F~Head"
HWDSTW
1
2
"SV660F~Head" Hw_SubModule
"SV660F~Interface" Hw_Interface
"SV660F~Interface~Port_1" Hw_Interface
"SV660F~Interface~Port_2" Hw_Interface
"SV660F~PROFIdrive_Module_1" Hw_SubModule
"SV660F~PROFIdrive_Module_1~Parameter_Access_Point" Hw_SubModule
"SV660F~PROFIdrive_Module_1~Standard_Telegram_1_PZD-2_2"
"SV660F~Proxy" Hw_SubModule



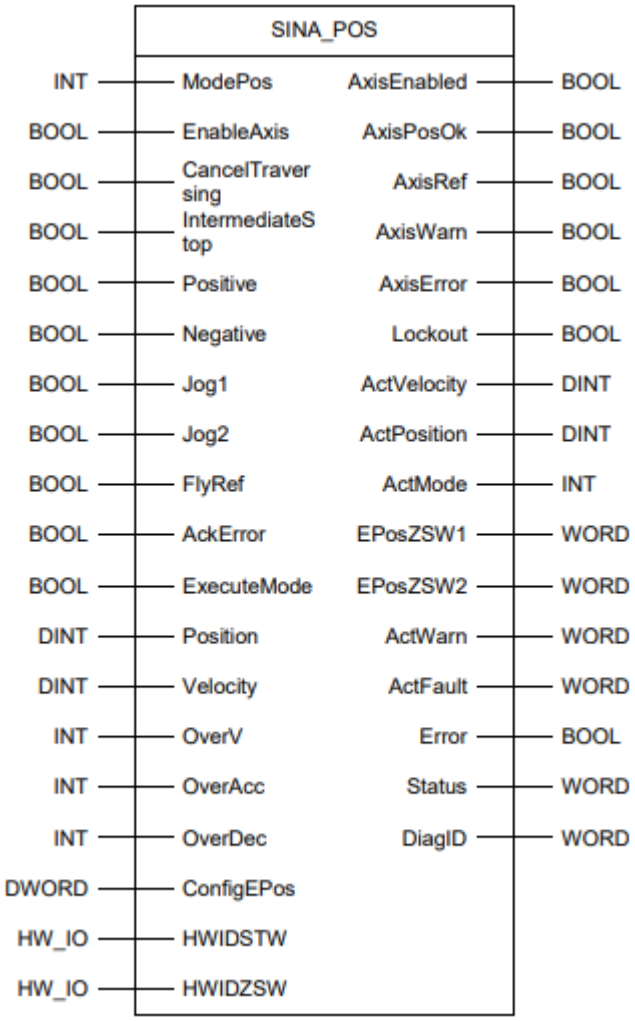
8.2.2 AC3 MODE

8.2.2.1 OVERVIEW

S7-1200, 1500PLC can connect to SV660F servo driver through PROFINET communication, after the control mode of the driver.

Set to "basic position control (EPOS)", the PLC uses the functions in the driver library provided by the **telegram 111** and TIA Portal

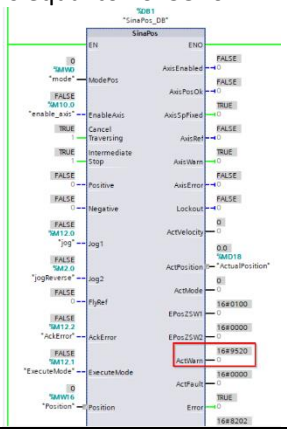
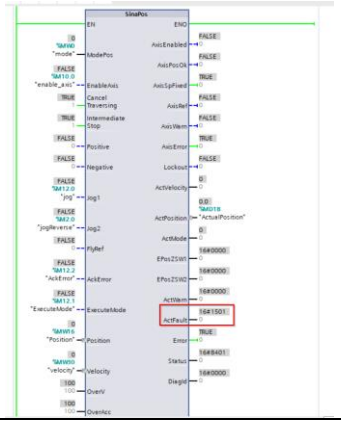
The block **SINA_POS** (FB284) implements basic positioning control.



Input parameters			
Name	Type	Start Value	Function
ModePos	INT	0	Operating mode: 1: Positioning, relative 2: Positioning, absolute 3: Positioning as setup 4: Homing – reference point approach 5: Homing – reference point definition 6: Move segment 0-16. 7: Jog mode 8: Jog mode, increment
EnableAxis	BOOL	FALSE	Start/stop the drive
CancelTraversing	BOOL	TRUE	FALSE: discard active positioning job TRUE: do not discard
IntermediateStop	BOOL	TRUE	FALSE: active move command is interrupted TRUE: no intermediate stop
Positive	BOOL	FALSE	positive direction
Negative	BOOL	FALSE	negative direction
Jog1	BOOL	FALSE	Jog mode, signal source 1
Jog2	BOOL	FALSE	Jog mode, signal source 2
AckError	BOOL	FALSE	Acknowledgment of errors
ExecuteMode	BOOL	FALSE	Enable positioning job or setpoint transfer
Position	DINT	0	Position setpoint value in Length Unit
Velocity	DINT	0	Speed setpoint value in Length Unit/min
OverV	INT	100	Velocity override 0 – 199%
OverAcc	INT	100	Acceleration override 0 – 100%
OverDec	INT	100	Deceleration override 0 – 100%
ConfigEPos	DWORD	16#00000003	The following bits of the control word of the drive are pre-assigned: Bit 1: OFF2 Bit 2: OFF3 The control bit of the transmission 111 message can be used to transmit signals such as hardware limit, enable, and origin switch. If the program assigns variables to this pin, it must be ensured that ConfigEpos.%X0 and ConfigEpos.%X1 are both 1 before the drive can run. ConfigEpos.%X0: OFF2 stop

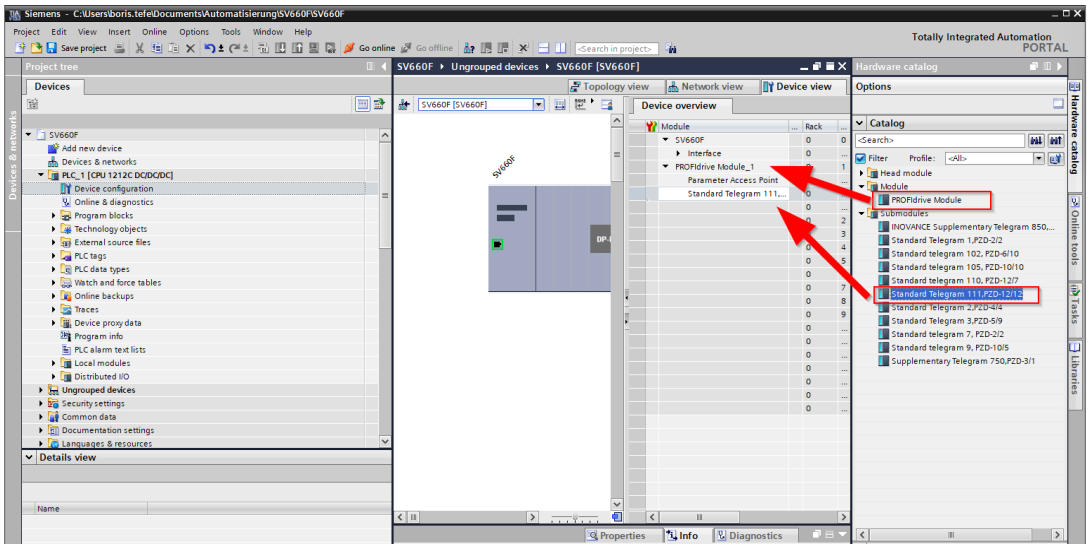
			ConfigEpos.%X1: OFF2 stop ConfigEpos.%X2: Activate software limits ConfigEpos.%X3: Activate hardware limits ConfigEpos.%X6: Reserved ConfigEpos.%X7: External program switching ConfigEpos.%X8: When ModePos=2, it supports continuous change of setting value and takes effect in real time
HWIDSTW	HW_IO	0	Hardware ID actual value
HWIDSTW	HW_IO	0	Hardware ID actual value

Output parameters			
Name	Type	Start Value	Function
Status	WORD	0	Display of status values: 16#7002: no fault 16#8401: Fault in the drive 16#8402: On-inhibit 16#8403: Homing on the fly could not be initiated 16#8600: DPRD_DAT error 16#8601: DPWR_DAT error 16#8202: incorrect mode selected 16#8203: incorrect setpoint values configured 16#8204: incorrect traversing block number selected
DiagID	WORD	0	Extended communication fault
AxisEnabled	BOOL	FALSE	Drive ready
AxisError	BOOL	FALSE	Drive fault active
AxisWarn	BOOL	FALSE	Drive warning active
AxisPosOk	BOOL	FALSE	Axis has reached target position
AxisRef	BOOL	FALSE	Reference point set
ActVelocity	DINT	0	Actual velocity in Length Unit/min
ActPosition	DINT	0	Actual position in Length Unit
ActMode	INT	0	Current active mode
Lockout	BOOL	FALSE	On-inhibit of the drive is active
EPosZSW1	WORD	0	Status of the EPos ZSW1

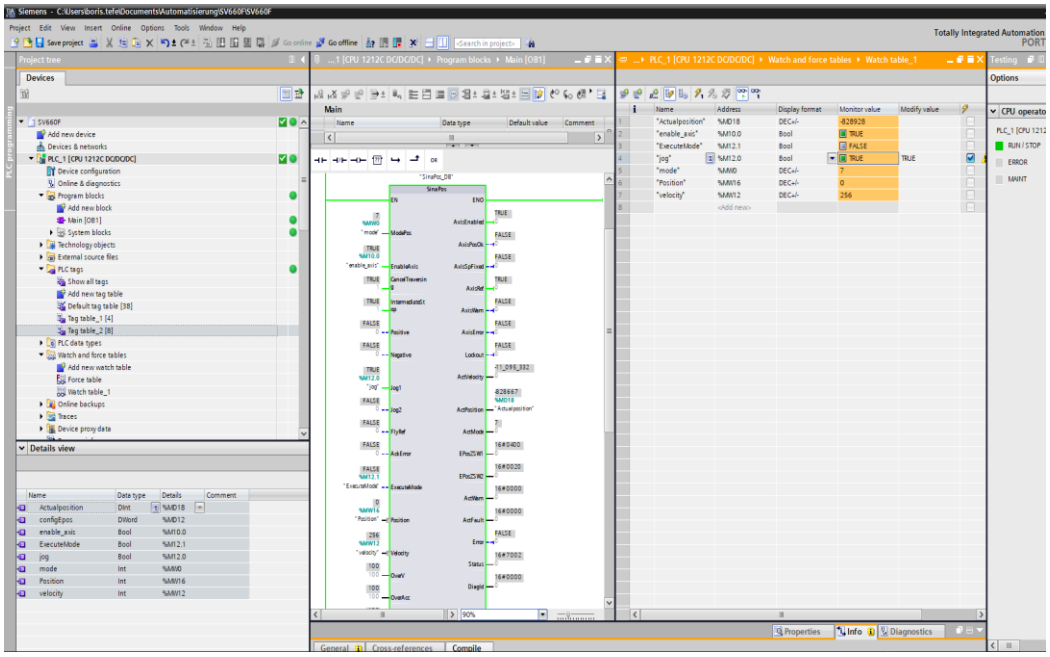
EPosZSW2	WORD	0	Status of the EPos ZSW2
ActWarn	WORD	0	Current warning number. This parameter shows the warning code of the drive. For example, the error *E952.0: Reverse overtravel warning* is shown as E952.0 on the SV660F display. When this error is active, the ActWarn parameter is equal to 16#9520. 
ActFault	WORD	0	Current fault number. This parameter shows the error code of the drive. For example, the error *E150.1: STO input state abnormal* is shown as E150.1 on the SV660F display. When this error is active, the ActFault parameter is equal to 16#1501. 

8.2.2.2 CONFIGURATION STEPS

For the configuration please just refer the seven points describe in the previous section. Then find the hardware identifier: select **telegram 111**→ right-click properties → system constant



8.2.2.3 CALL FB300 FUNCTION BLOCK (SINA_POS) AND TEST

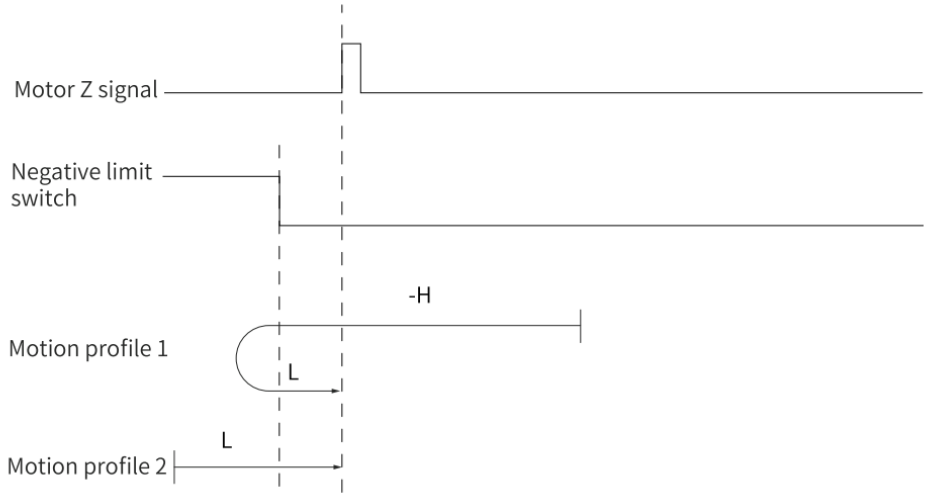


8.2.2.4 MESSAGE 111 RETURN TO ZERO MODE

H25.22=1

Mechanical home: Z signal

Deceleration point: negative limit switch



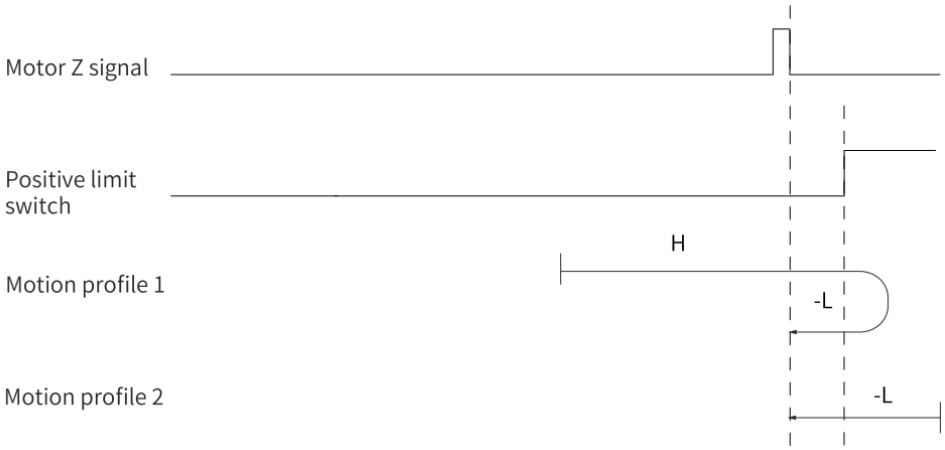
- Motion track 1: The deceleration point signal is invalid when zero return starts.
- Motion track 2: The deceleration point signal is valid when zero return starts.

NOTE: "H" in the figure represents high-speed H25.23, "L" represents low-speed H25.25, and "-" represents reverse operation.

H25.22=2

Home: motor Z signal

Deceleration point: positive limit switch



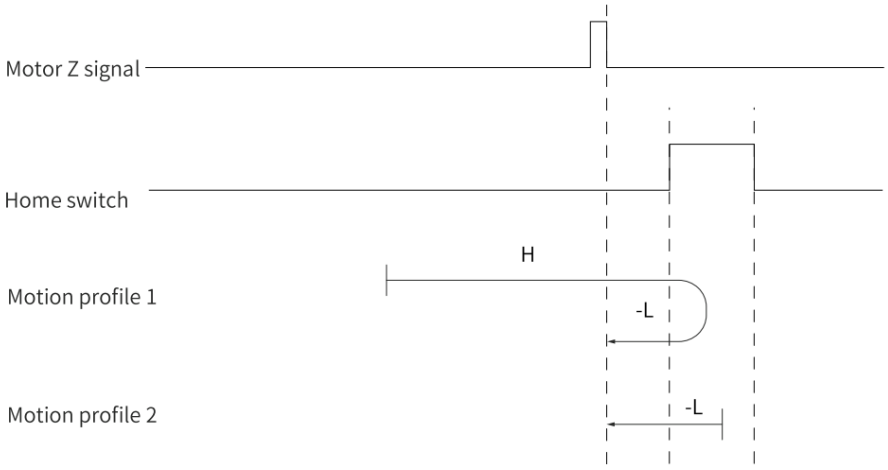
- Motion profile 1: deceleration point signal inactive at start.
- Motion profile 2: deceleration point signal active at start.

NOTE: "H" in the figure represents high-speed H25.23, "L" represents low-speed H25.25, and "-" represents reverse operation.

H25.22=3

Home: Z signal

Deceleration point: home switch (HW)



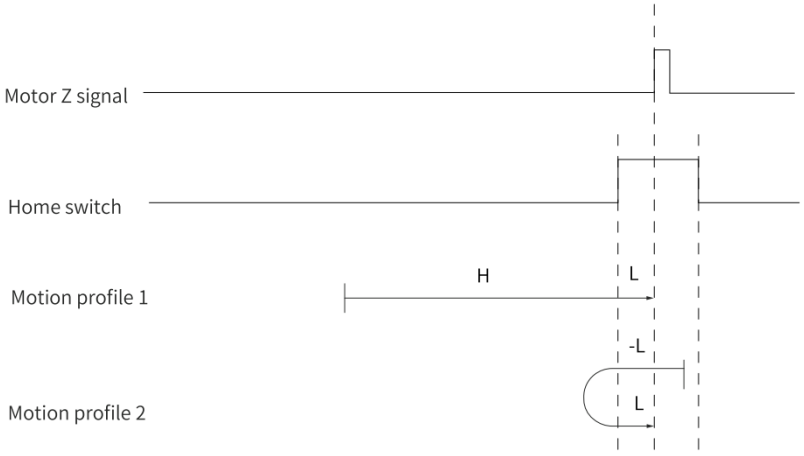
- Motion profile 1: deceleration point signal inactive at start
- Motion profile 2: deceleration point signal active at start.

NOTE: "H" in the figure represents high-speed H25.23, "L" represents low-speed H25.25, and "-" represents reverse operation.

H25.22=4

Home: Z signal

Deceleration point: home switch (HW)



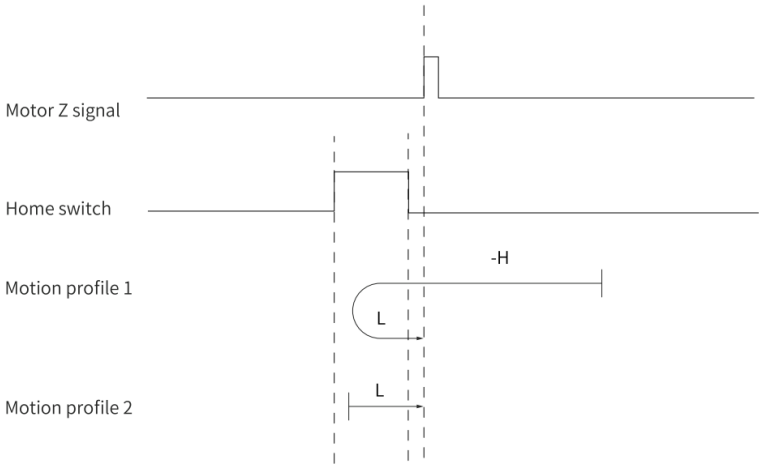
- Motion profile 1: deceleration point signal inactive at start
- Motion profile 2: deceleration point signal active at start.

NOTE: "H" in the figure represents high-speed H25.23, "L" represents low-speed H25.25, and "-" represents reverse operation.

H25.22=5

Home: Z signal

Deceleration point: home switch (HW)



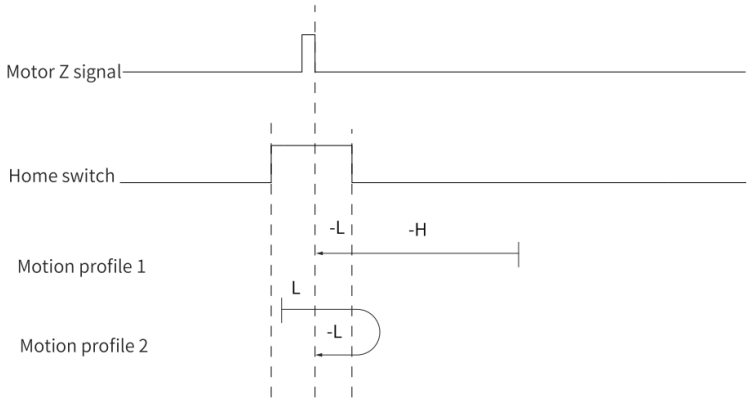
- Motion profile 1: deceleration point signal inactive at start
- Motion profile 2: deceleration point signal active at start.

NOTE: "H" in the figure represents high-speed H25.23, "L" represents low-speed H25.25, and "-" represents reverse operation.

H25.22=6

Home: Z signal

Deceleration point: home switch (HW)



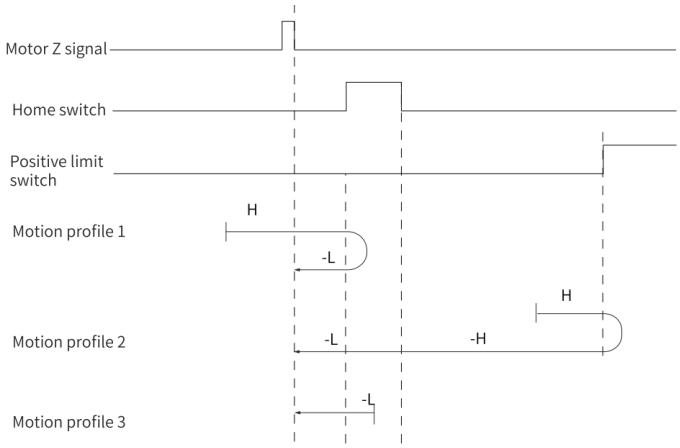
- Motion profile 1: deceleration point signal inactive at start
- Motion profile 2: deceleration point signal active at start.

NOTE: "H" in the figure represents high-speed H25.23, "L" represents low-speed H25.25, and "-" represents reverse operation.

H25.22=7

Home: Z signal

Deceleration point: home switch (HW)



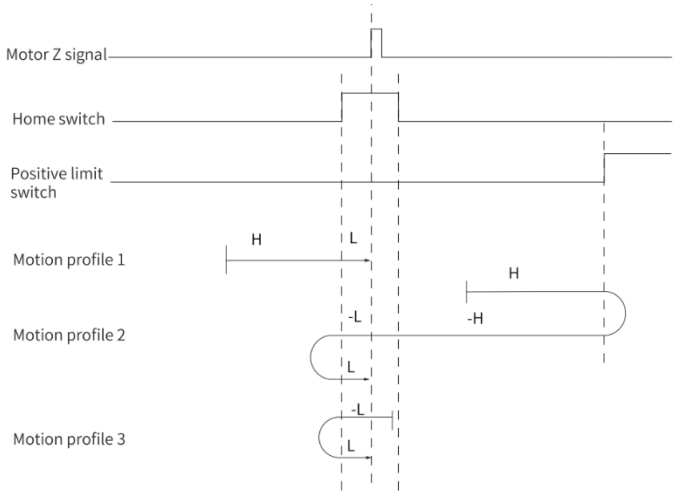
- Motion profile 1: deceleration point signal inactive at start, not hitting the positive limit switch.
- Motion profile 2: deceleration point signal inactive at start, hitting the positive limit switch.
- Motion profile 3: deceleration point signal active at start.

NOTE: "H" in the figure represents high-speed H25.23, "L" represents low-speed H25.25, and "-" represents reverse operation.

H25.22=8

Home: Z signal

Deceleration point: home switch (HW)



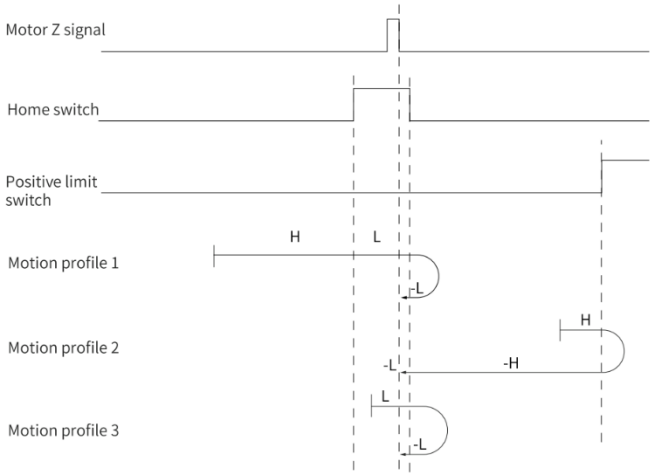
- Motion profile 1: deceleration point signal inactive at start, not hitting the positive limit switch.
- Motion profile 2: deceleration point signal inactive at start, hitting the positive limit switch.
- Motion profile 3: deceleration point signal active at start.

NOTE: "H" in the figure represents high-speed H25.23, "L" represents low-speed H25.25, and "-" represents reverse operation.

H25.22=9

Home: Z signal

Deceleration point: home switch (HW)



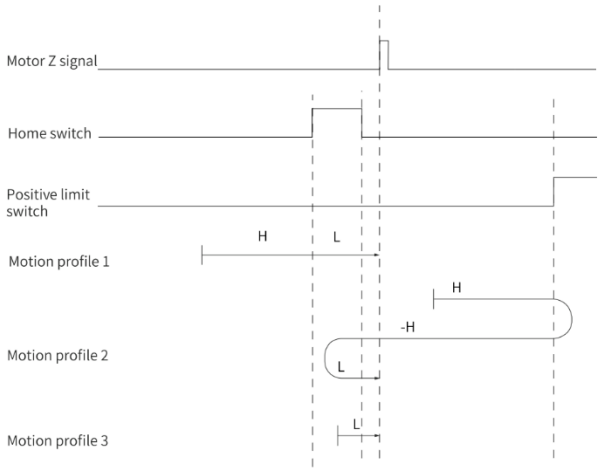
- Motion profile 1: deceleration point signal inactive at start, not hitting the positive limit switch.
- Motion profile 2: deceleration point signal inactive at start, hitting the positive limit switch.
- Motion profile 3: deceleration point signal active at start.

NOTE: "H" in the figure represents high-speed H25.23, "L" represents low-speed H25.25, and "-" represents reverse operation.

H25.22=10

Home: Z signal

Deceleration point: home switch (HW)



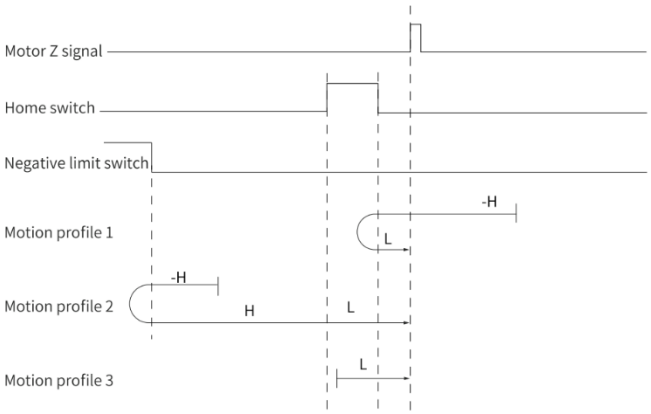
- Motion profile 1: deceleration point signal inactive at start, not hitting the positive limit switch.
- Motion profile 2: deceleration point signal inactive at start, hitting the positive limit switch.
- Motion profile 3: deceleration point signal active at start.

NOTE: "H" in the figure represents high-speed H25.23, "L" represents low-speed H25.25, and "-" represents reverse operation.

H25.22=11

Home: Z signal

Deceleration point: home switch (HW)



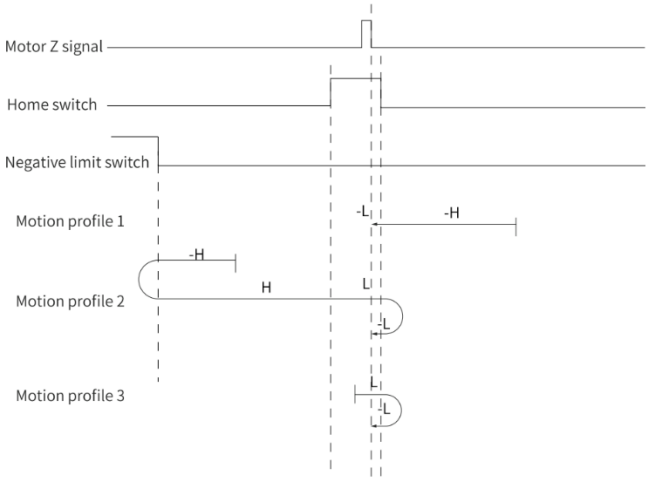
- Motion profile 1: deceleration point signal inactive at start, not hitting the positive limit switch.
- Motion profile 2: deceleration point signal inactive at start, hitting the positive limit switch.
- Motion profile 3: deceleration point signal active at start.

> **NOTE**: "H" in the figure represents high-speed H25.23, "L" represents low-speed H25.25, and "-" represents reverse operation.

H25.22=12

Home: Z signal

Deceleration point: home switch (HW)



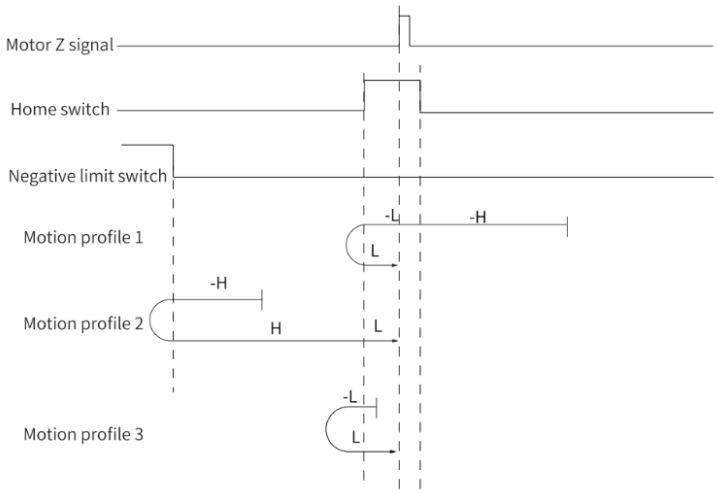
- Motion profile 1: deceleration point signal inactive at start, not hitting the positive limit switch.
- Motion profile 2: deceleration point signal inactive at start, hitting the positive limit switch.
- Motion profile 3: deceleration point signal active at start.

> **NOTE**: "H" in the figure represents high-speed H25.23, "L" represents low-speed H25.25, and "-" represents reverse operation.

H25.22=13

Home: Z signal

Deceleration point: home switch (HW)



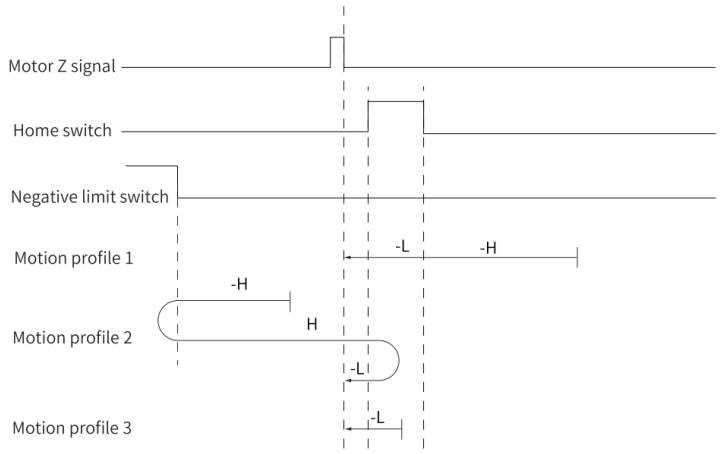
- Motion profile 1: deceleration point signal inactive at start, not hitting the positive limit switch.
- Motion profile 2: deceleration point signal inactive at start, hitting the positive limit switch.
- Motion profile 3: deceleration point signal active at start.

NOTE: "H" in the figure represents high-speed H25.23, "L" represents low-speed H25.25, and "-" represents reverse operation.

H25.22=14

Home: Z signal

Deceleration point: home switch (HW)



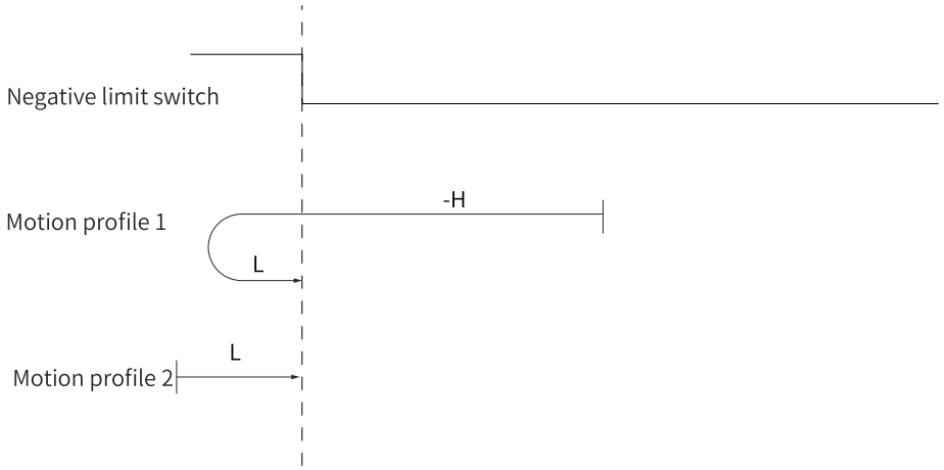
- Motion profile 1: deceleration point signal inactive at start, not hitting the positive limit switch.
- Motion profile 2: deceleration point signal inactive at start, hitting the positive limit switch.
- Motion profile 3: deceleration point signal active at start.

NOTE: "H" in the figure represents high-speed H25.23, "L" represents low-speed H25.25, and "-" represents reverse operation.

H25.22=17

Home: negative limit switch

Deceleration point: negative limit switch



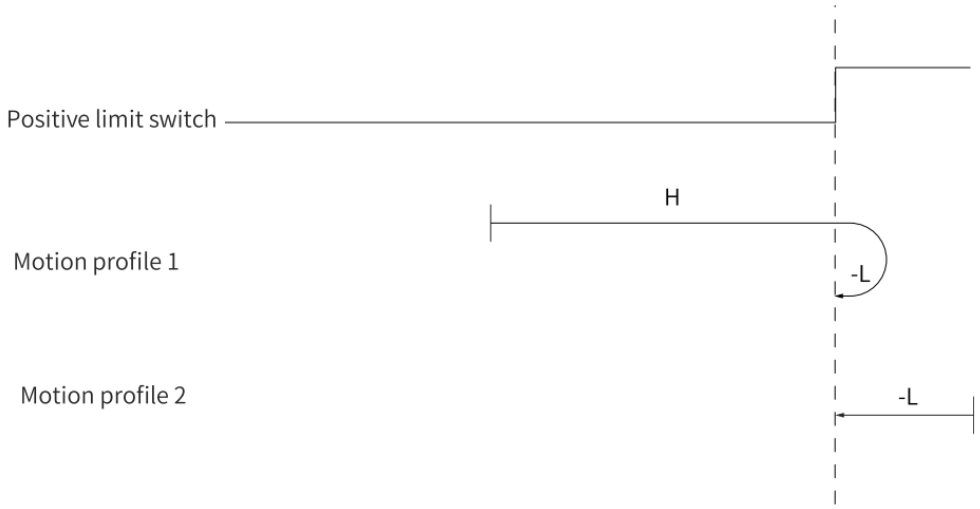
- Motion profile 1: deceleration point signal inactive at start.
- Motion profile 2: deceleration point signal active at start.

NOTE: "H" in the figure represents high-speed H25.23, "L" represents low-speed H25.25, and "-" represents reverse operation.

H25.22=18

Home: positive limit switch

Deceleration point: positive limit switch



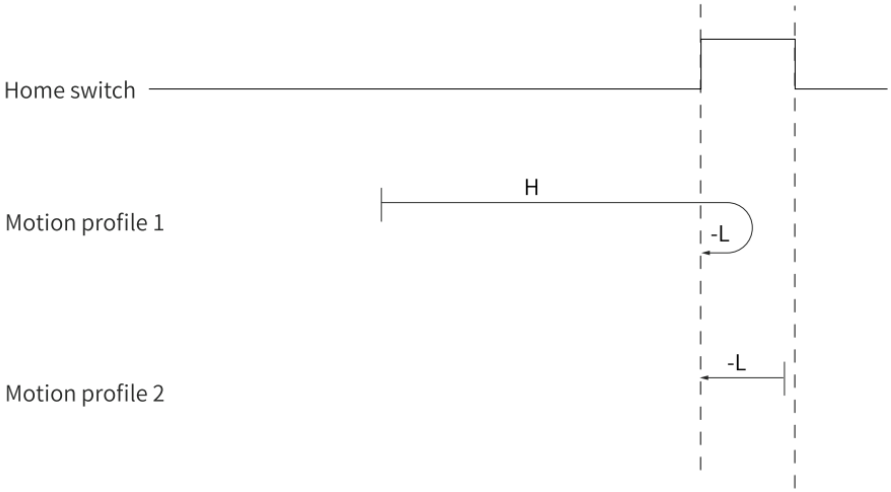
- Motion profile 1: deceleration point signal inactive at start.
- Motion profile 2: deceleration point signal active at start.

NOTE: "H" in the figure represents high-speed H25.23, "L" represents low-speed H25.25, and "-" represents reverse operation.

H25.22=19

Home: home switch (HW)

Deceleration point: home switch (HW)



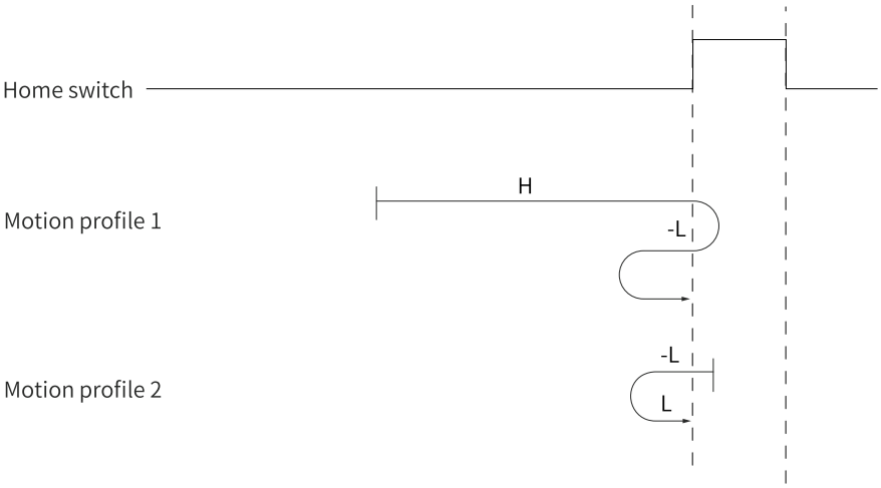
- Motion profile 1: deceleration point signal inactive at start.
- Motion profile 2: deceleration point signal active at start.

NOTE: "H" in the figure represents high-speed H25.23, "L" represents low-speed H25.25, and "-" represents reverse operation.

H25.22=20

Home: home switch (HW)

Deceleration point: home switch (HW)



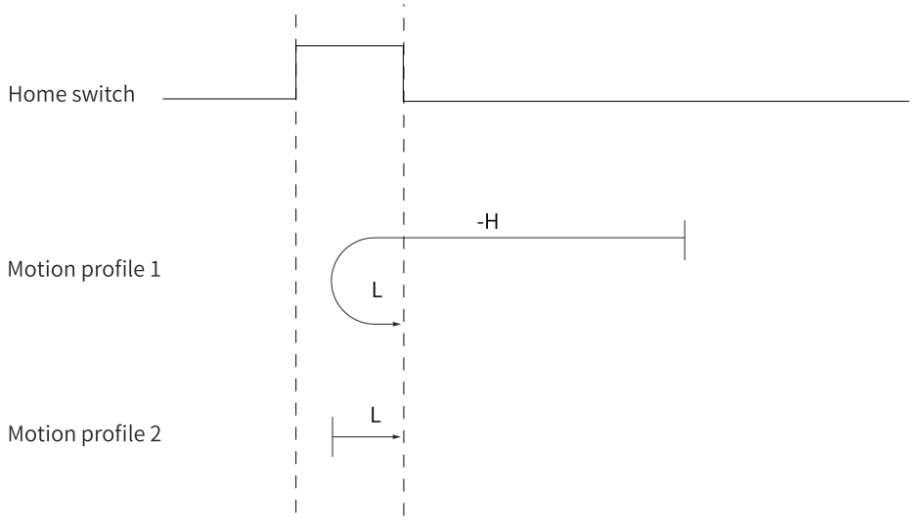
- Motion profile 1: deceleration point signal inactive at start.
- Motion profile 2: deceleration point signal active at start.

NOTE: "H" in the figure represents high-speed H25.23, "L" represents low-speed H25.25, and "-" represents reverse operation.

H25.22=21

Home: home switch (HW)

Deceleration point: home switch (HW)



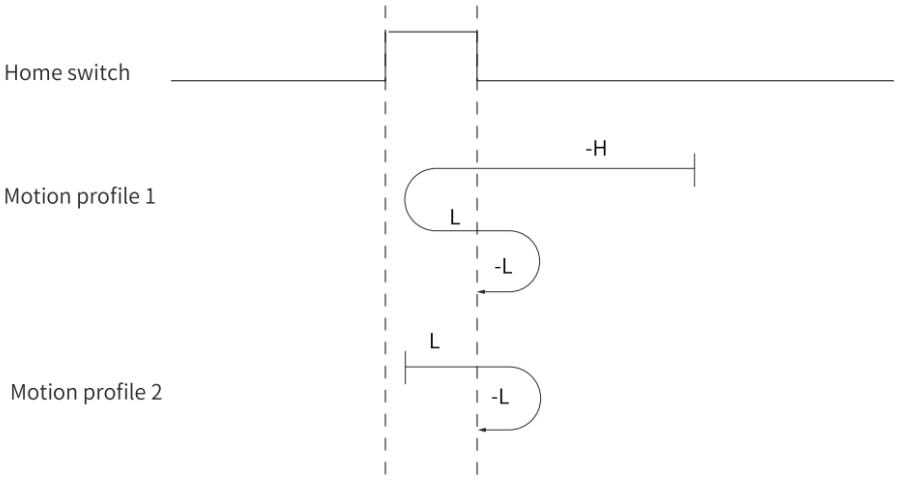
- Motion profile 1: deceleration point signal inactive at start.
- Motion profile 2: deceleration point signal active at start.

NOTE: "H" in the figure represents high-speed H25.23, "L" represents low-speed H25.25, and "-" represents reverse operation.

H25.22=22

Home: home switch (HW)

Deceleration point: home switch (HW)



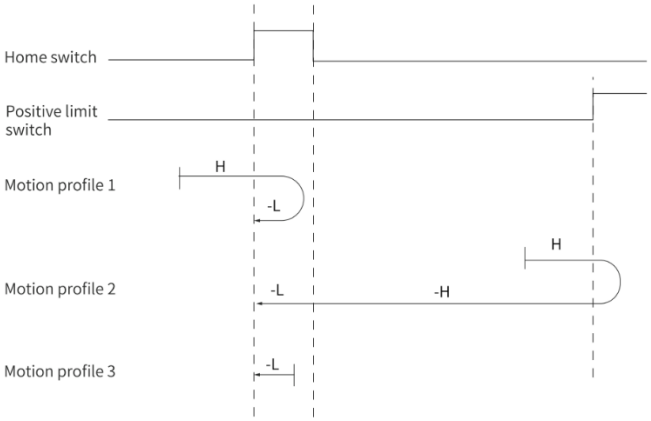
- Motion profile 1: deceleration point signal inactive at start.
- Motion profile 2: deceleration point signal active at start.

NOTE: "H" in the figure represents high-speed H25.23, "L" represents low-speed H25.25, and "-" represents reverse operation.

H25.22=23

Home: home switch (HW)

Deceleration point: home switch (HW)



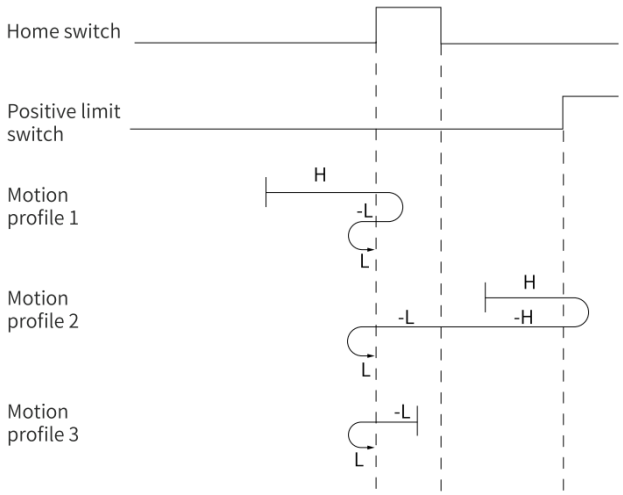
- Motion profile 1: deceleration point signal inactive at start, not hitting the positive limit switch.
- Motion profile 2: deceleration point signal inactive at start, hitting the positive limit switch.
- Motion profile 3: deceleration point signal active at start.

NOTE: "H" in the figure represents high-speed H25.23, "L" represents low-speed H25.25, and "-" represents reverse operation.

H25.22=24

Home: home switch (HW)

Deceleration point: home switch (HW)



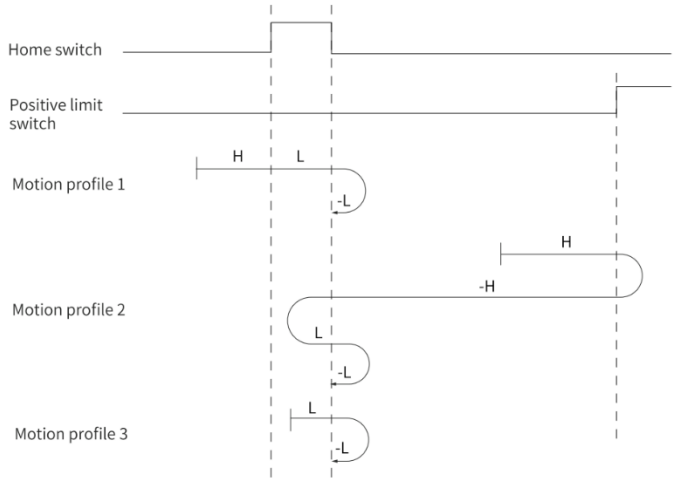
- Motion profile 1: deceleration point signal inactive at start, not hitting the positive limit switch.
- Motion profile 2: deceleration point signal inactive at start, hitting the positive limit switch.
- Motion profile 3: deceleration point signal active at start.

NOTE: "H" in the figure represents high-speed H25.23, "L" represents low-speed H25.25, and "-" represents reverse operation.

H25.22=25

Home: home switch (HW)

Deceleration point: home switch (HW)



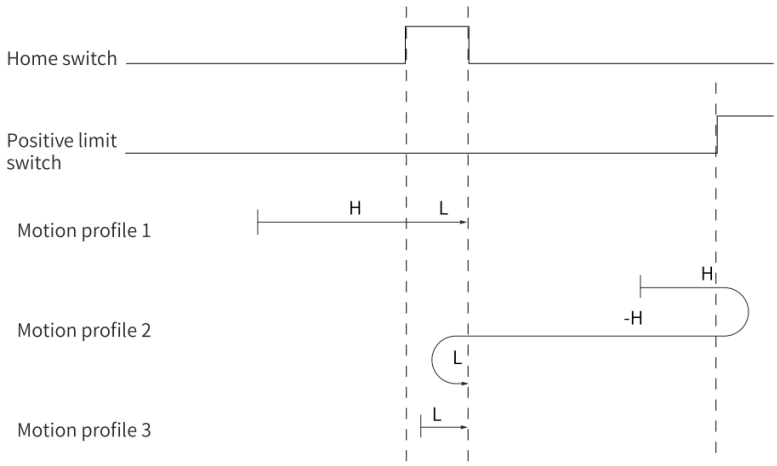
- Motion profile 1: deceleration point signal inactive at start, not hitting the positive limit switch.
- Motion profile 2: deceleration point signal inactive at start, hitting the positive limit switch.
- Motion profile 3: deceleration point signal active at start.

NOTE: "H" in the figure represents high-speed H25.23, "L" represents low-speed H25.25, and "-" represents reverse operation.

H25.22=26

Home: home switch (HW)

Deceleration point: home switch (HW)



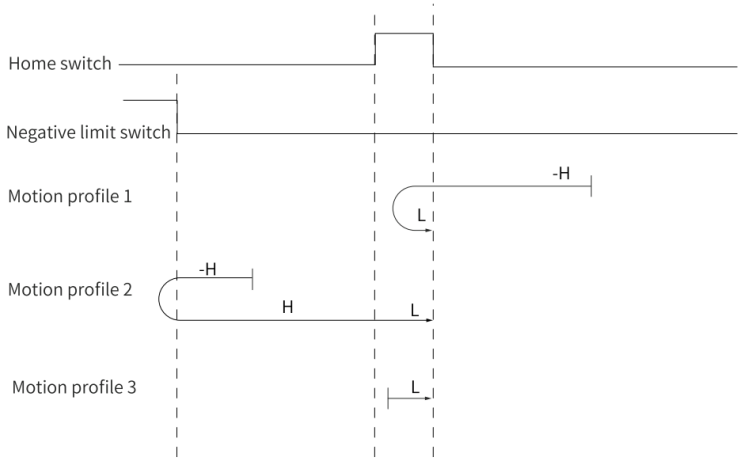
- Motion profile 1: deceleration point signal inactive at start, not hitting the positive limit switch.
- Motion profile 2: deceleration point signal inactive at start, hitting the positive limit switch.
- Motion profile 3: deceleration point signal active at start.

NOTE: "H" in the figure represents high-speed H25.23, "L" represents low-speed H25.25, and "-" represents reverse operation.

H25.22=27

Home: home switch (HW)

Deceleration point: home switch (HW)



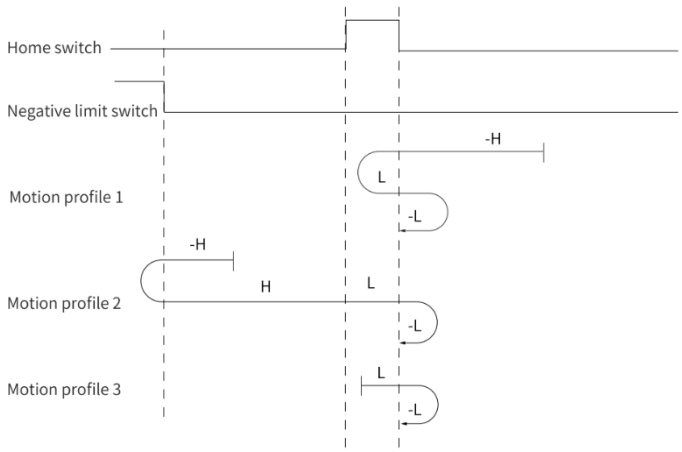
- Motion profile 1: deceleration point signal inactive at start, not hitting the negative limit switch.
- Motion profile 2: deceleration point signal inactive at start, hitting the negative limit switch.
- Motion profile 3: deceleration point signal active at start.

NOTE: "H" in the figure represents high-speed H25.23, "L" represents low-speed H25.25, and "-" represents reverse operation.

H25.22=28

Home: home switch (HW)

Deceleration point: home switch (HW)



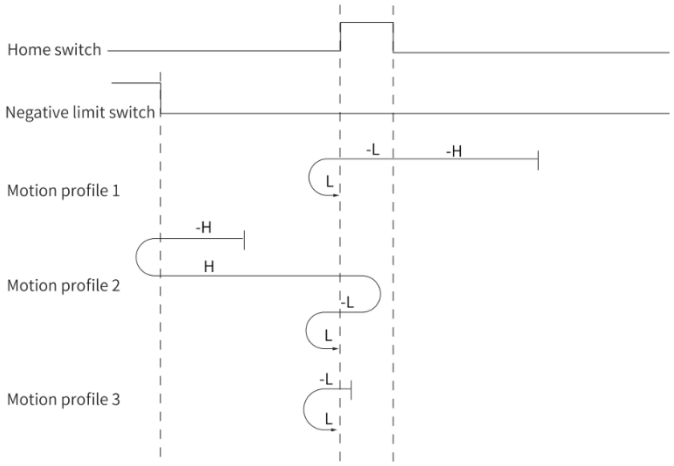
- Motion profile 1: deceleration point signal inactive at start, not hitting the negative limit switch.
- Motion profile 2: deceleration point signal inactive at start, hitting the positive limit switch.
- Motion profile 3: deceleration point signal active at start.

NOTE: "H" in the figure represents high-speed H25.23, "L" represents low-speed H25.25, and "-" represents reverse operation.

H25.22=29

Home: home switch (HW)

Deceleration point: home switch (HW)



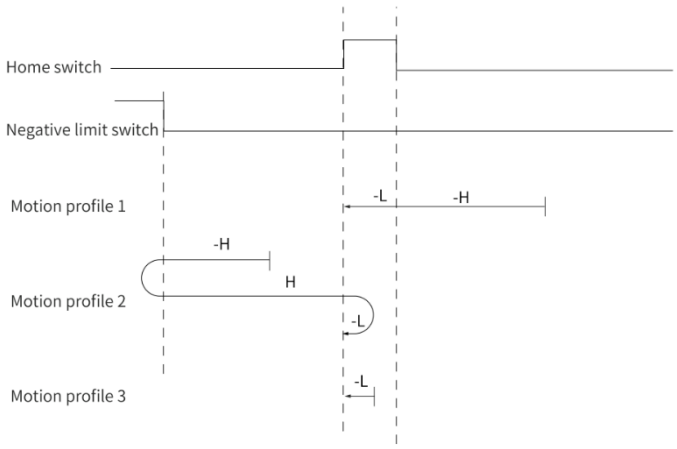
- Motion profile 1: deceleration point signal inactive at start, not hitting the negative limit switch.
- Motion profile 2: deceleration point signal inactive at start, hitting the negative limit switch.
- Motion profile 3: deceleration point signal active at start.

NOTE: "H" in the figure represents high-speed H25.23, "L" represents low-speed H25.25, and "-" represents reverse operation.

H25.22=30

Home: home switch (HW)

Deceleration point: home switch (HW)



- Motion profile 1: deceleration point signal inactive at start, not hitting the negative limit switch.
- Motion profile 2: deceleration point signal inactive at start, hitting the negative limit switch.
- Motion profile 3: deceleration point signal active at start.

NOTE: "H" in the figure represents high-speed H25.23, "L" represents low-speed H25.25, and "-" represents reverse operation.

H25.22=31 and 32

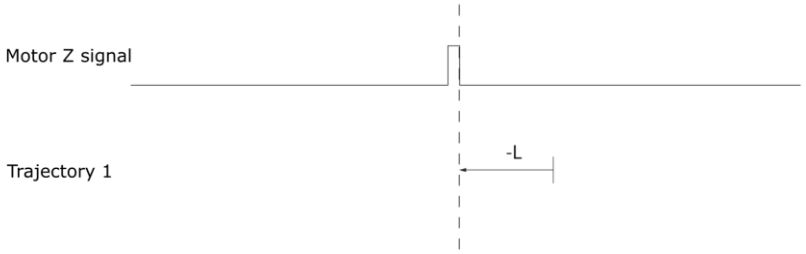
Return to zero mode is not defined.

H25.22=33 and 34

Origin: Z signal

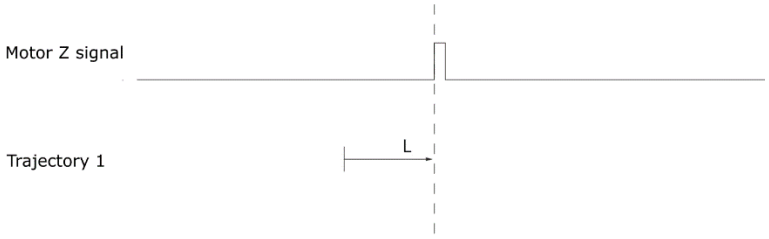
Deceleration point: none

Mode 33:



Motion profile 1: The motor runs in the reverse direction at low speed and stops at the first Z signal.

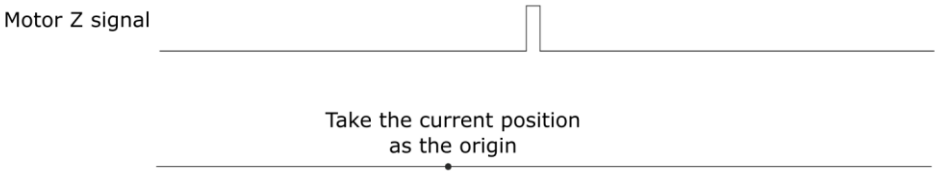
Mode 34:



Motion profile 1: The motor runs in the forward direction at low speed and stops at the first Z signal

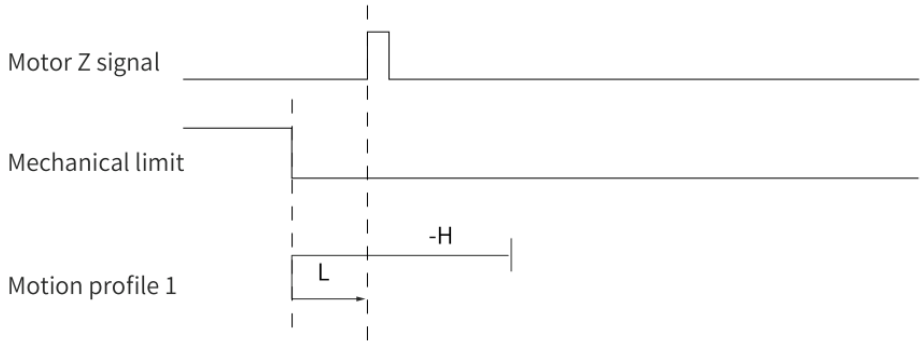
H25.22=35

Return to zero mode 35, take the current position as the mechanical origin, and trigger the origin return to zero.



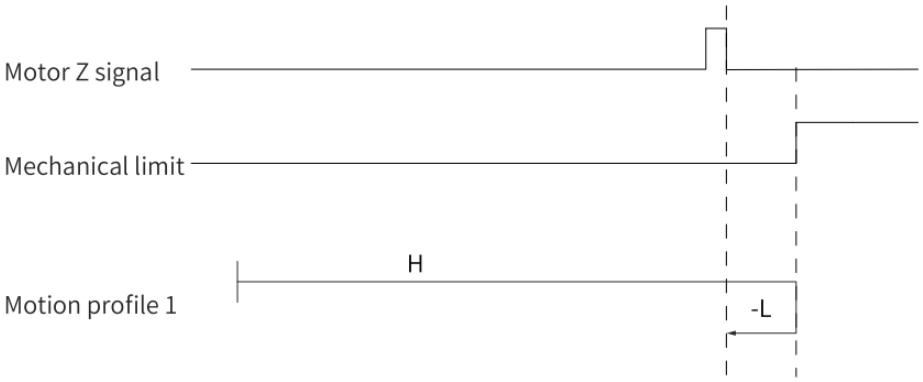
H25.22= -1

The motor runs in the reverse direction at high speed first. If the status where the torque reaches the limit and the speed is near zero after the axis hits the mechanical limit persists, it indicates the axis has reached the mechanical limit position. In this case, the motor runs in the forward direction at low speed and stops after reaching the rising edge of the Z signal for the first time.



H25.22= -2

The servo motor runs in the forward direction at high speed first. If the torque reaches the limit and the speed is near zero when the motor hits the mechanical limit, and such status persists, it indicates the motor reaches the mechanical limit position. In this case, the motor runs in the reverse direction at low speed and stops at the first Z signal after reaching the rising edge.



8.2.2.5 ELECTRONIC GEAR RATIO SETTING

The electronic gear ratio must be within the following range:

$$\frac{0.001 \times \text{Encoder resolution}}{10000} < B/A < \frac{4000 \times \text{Encoder resolution}}{10000}$$

- If the electronic gear ratio exceeds the allowable range, the error EB03 (Electronic gear ratio setting error) occurs.
- If the electronic gear ratio is set incorrectly, the servo drive runs incorrectly. In this case, reset the electronic gear ratio after the servo drive stops.

Overview

In position control mode, the input position reference (reference unit) sets the load displacement, and the motor position reference (encoder unit) sets the motor displacement to specify the ratio of motor position reference to input position ratio so as to introduce the electronic gear ratio function.

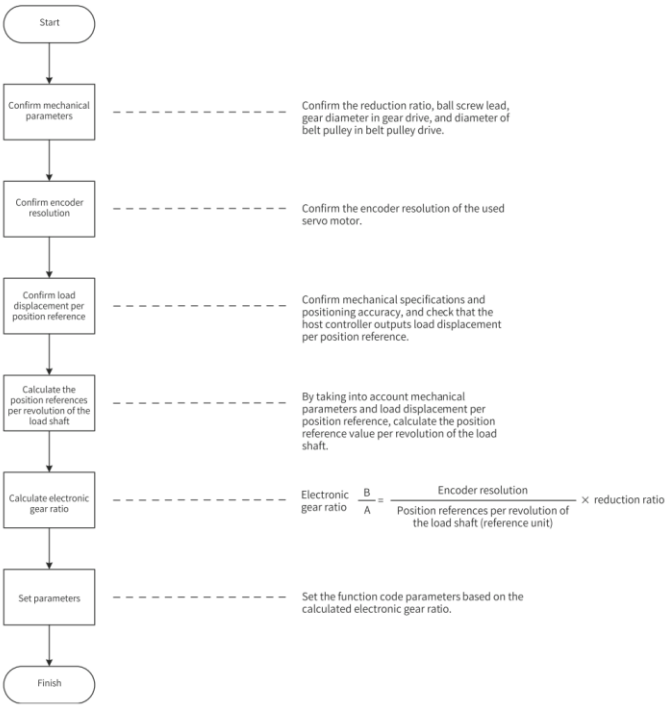
Through frequency division (electronic gear ratio smaller than 1) or multiplication (electronic gear ratio greater than 1) of electronic gear ratio, you can set the actual displacement of motor rotation or moving when the input position reference is one reference unit or increase the frequency of the position reference when the speed set in the relevant parameter cannot reach the speed required by the motor.

Terms:

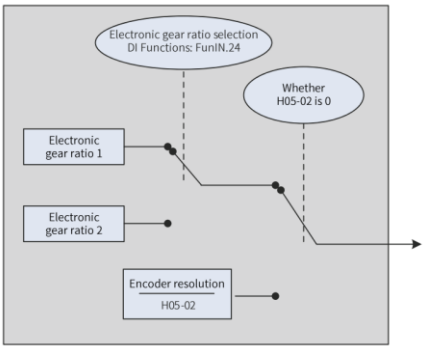
- The reference unit means the distinguishable minimum value input from the host controller to the servo drive.
- The encoder unit means the value obtained after the input reference is processed by electronic gear ratio.

Procedure

The electronic gear ratio varies with the mechanical structure. Set the electronic gear ratio as follows:



The parameter setting procedure is as follows:



When H05-02 (Pulses per revolution) is set to a non-zero value:

$$\text{Electronic gear ratio}\quad \frac{B}{A} = \frac{\text{Encoder resolution}}{\text{H05-02}}$$

In this case, the electronic gear ratio 1 and electronic gear ratio 2 are invalid.

Related parameters

Setting electronic gear ratio parameters

Related parameters:

Parameter	Name	Range	Function Description	Setting Condition	Effective Time	Default
H05-02	Pulses per revolution	0 to 1048576	Sets the number of position references when the motor rotates one revolution.	Immediately	Next Power on	0
H05-07	Electronic gear ratio 1 (numerator)	1 to 1072741824	Sets the numerator of the first electronic gear ratio.	During running	Immediately	8388608
H05-09	Electronic gear ratio 1 (denominator)	1 to 1073741824	Sets the denominator of the first electronic gear ratio.	During running	Immediately	10000
H05-11	Electronic gear ratio 2 (numerator)	1 to 1073741824	Sets the numerator of the second electronic gear ratio.	During running	Immediately	8388608
H05-13	Electronic gear ratio 2 (denominator)	1 to 1073741824	Sets the denominator of the second electronic gear ratio.	During running	Immediately	10000

The electronic gear ratio switchover function can be used when H05-02 is set to 0.

- Determine whether to switch between gear ratio 1 and gear ratio 2 based on the servo drive running condition and set the electronic gear ratio switchover condition. Only one electronic gear ratio is active at any time.
- Allocate function 24 (FunIN.24: GEAR_SEL, electronic gear ratio selection) to one DI terminal of the servo drive and ensure that the logic of the DI terminal is valid.

Related parameters:

Code	Name	Function	Function Description
FunIN.24	GEAR_SEL	Electronic gear ratio selection	Invalid. In position control mode, the first electronic gear ratio is used. Valid. In position control mode, the second electronic gear ratio is used.

The following table lists the electronic gear ratio used by the servo drive under different conditions:

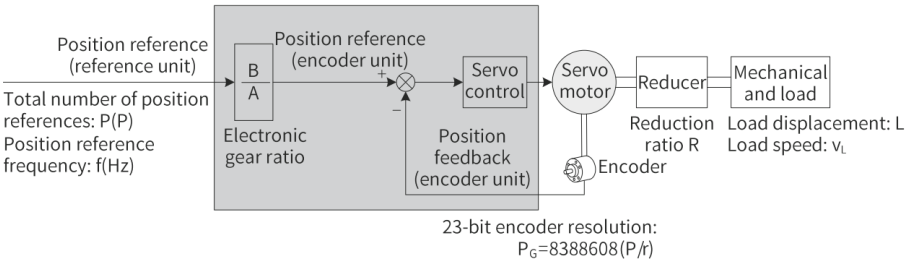
H05-02	DI Level Corresponding to FunIN.24	Electronic Gear Ratio
0	Invalid	H05-07/H05-09
	Valid	H05-11/H05-13
1 to 1048576		

For serial encoders, the motor resolution is 2^n (P/r), where n indicates the number of serial encoder bits.

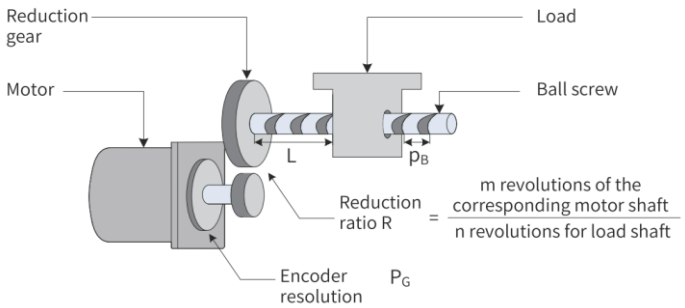
For example, for a 23-bit serial encoder of Inovance, its resolution is 2^{23} (P/r), that is 8388608(P/r).

Calculation Method

The following figure shows the relationship among the position reference (reference unit), load displacement, and electronic gear ratio:



Taking rectilinear motion load ball screw as an example. Assume that the lead is p_B (mm), the encoder resolution is P_G , and the reducer reduction ratio is R.



- With the given load displacement ΔL (mm) when one pulse is input to the servo drive.

When the mechanical displacement is ΔL, the load axis rotates $\frac{\Delta L}{p_B}$ revolutions while the motor shaft rotates $\frac{\Delta L}{p_B} \times R$ revolutions. Then:

$$1 \times \frac{B}{A} = \frac{\Delta L}{p_B} \times R \times P_G$$

Therefore, the electronic gear ratio is:

$$\frac{B}{A} = \frac{\Delta L}{p_B} \times R \times P_G$$

- With the given load displacement L (mm) and total number of positions references P (P)

When the mechanical displacement is L, the load axis rotates $\frac{L}{p_B}$ revolutions while the motor shaft rotates $\frac{L}{p_B} \times R$ revolutions. Then:

$$P \times \frac{B}{A} = \frac{L}{p_B} \times R \times P_G$$

Therefore, the electronic gear ratio is:

$$\frac{B}{A} = \frac{L}{p_B} \times R \times P_G \times \frac{1}{P}$$

With the given load moving speed vL (mm/s) and position reference frequency f(Hz)

The load axis speed is $\frac{v_L}{p_B}$ (r/s).

The motor speed is $v_M = \frac{v_L}{p_B} \times R$ (r/s).

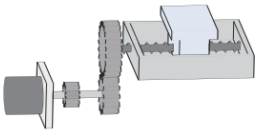
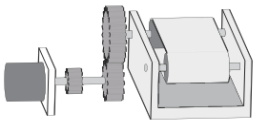
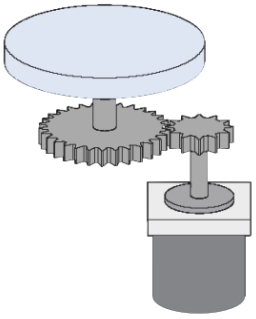
The relationship among the position reference frequency, electronic gear ratio, and motor speed is:

$$f \times \frac{B}{A} = v_M \times P_G$$

Therefore, the electronic gear ratio is:

$$\frac{B}{A} = \frac{v_M \times P_G}{f}$$

Setting Example

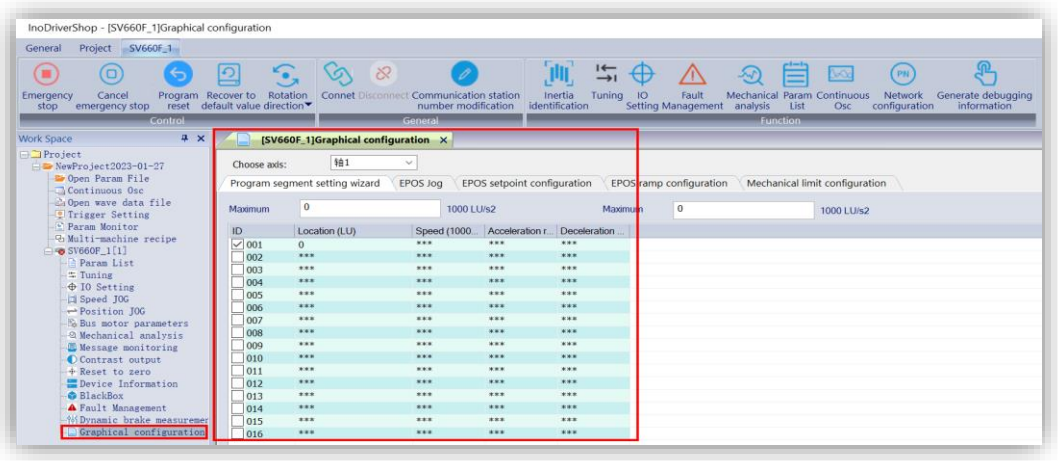
Step	Name	Mechanical Structure		
		Ball screw drive	Belt pulley drive	Rotate load
	-			
1	Mechanical parameter	Reduction ratio R: 1:1 Screw pitch: 0.01 m	Reduction ratio R: 5:1 Belt pulley diameter: 0.2 m (Belt pulley circumstance: 0.628 m)	Reduction ratio R: 10:1 Load rotation angle when the load axis rotates one revolution: 360°
2	Encoder resolution	23 bit = 8388608 P/r	23 bit = 8388608 P/r	23 bit = 8388608 P/r
3	Load displacement corresponding to one position reference (reference unit)	0.0001 m	0.000005 m	0.01°
4	Position reference (reference unit) value required for the load axis to rotate one revolution	$\frac{0.01}{0.0001} = 100$	$\frac{0.628}{0.000005} = 125600$	$\frac{360}{0.01} = 36000$
5	Calculation	$\frac{B}{A} = \frac{8388608}{100} \times \frac{1}{1}$	$\frac{B}{A} = \frac{8388608}{125600} \times \frac{5}{1}$	$\frac{B}{A} = \frac{8388608}{36000} \times \frac{10}{1}$
6	Setting	H05-07 = 8388608 H05-09 = 100	H05-07 = 4194304 H05-09 = 12560	H05-07 = 8388608 H05-09 = 3600

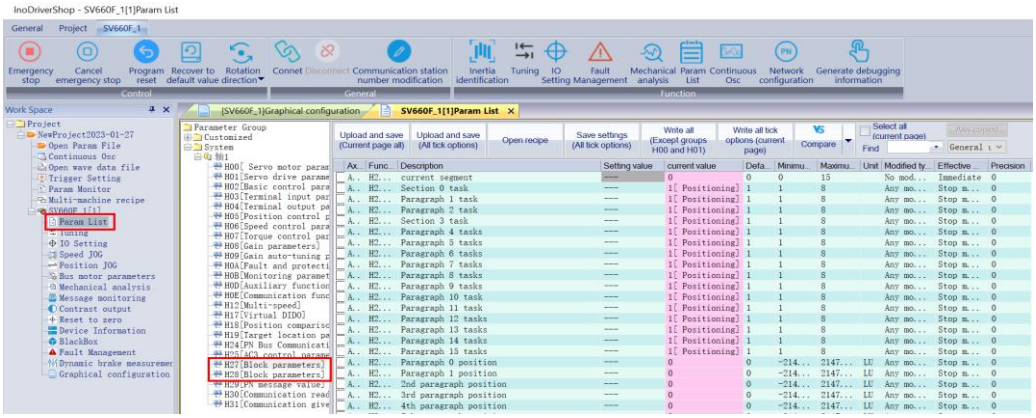
8.2.2.6 PROGRAM SEGMENTS

Up to 16 different running tasks can be saved in the drive system, which can be called by the controller when controlling the servo running.

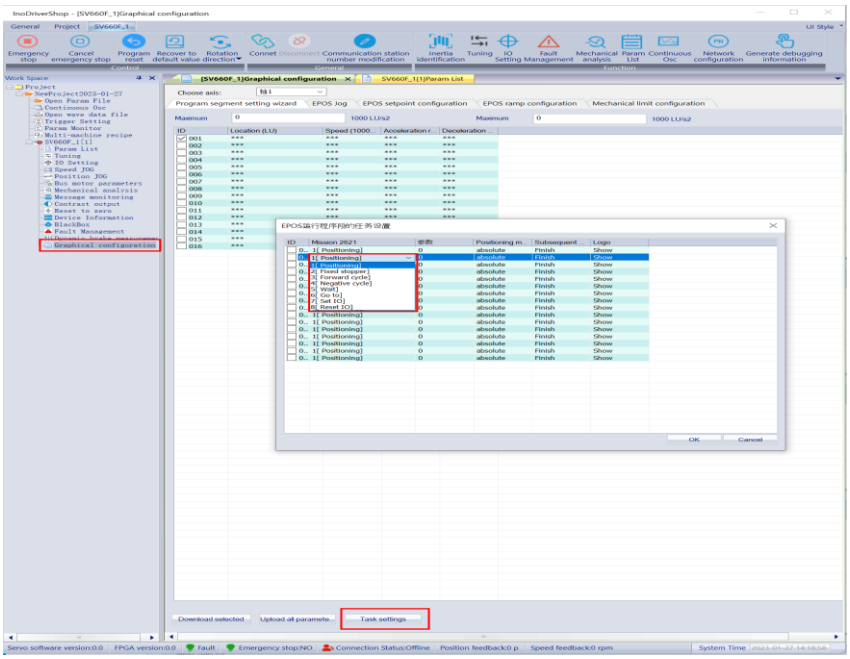
Configuration method

You can select the graphical configuration on the left side of the driver background software to enter the program segment parameter setting, or you can set the program segment according to the function codes H27 and H28 parameters.





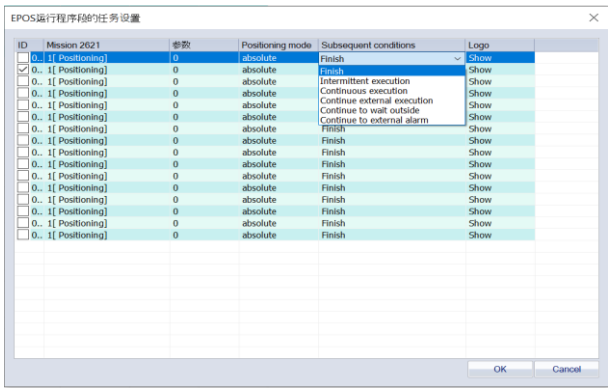
Open the graphical configuration interface, click the task setting to select the task mode, as shown in the below image. Task modes include positioning, fixed stop, positive cycle, negative cycle, wait, go to, set IO, reset IO.



Each task mode is described as follows:

- **Positioning**: positioning mode.
- **Fixed stop**: Make the axis run to the stop when the torque is reached.
- **Forward cycle**: rotate in the positive direction.
- **Negative cycle**: rotate in negative direction.
- **Waiting**: You can set the waiting time before executing the next task.
- **Go to**: Go to the specified block and determine the number of blocks to go to according to the parameters.
- **Set IO**: set the input port or output port to 1.
- **Reset IO**: set the input port or output port to 0.

Subsequent conditions include finish, intermittent execution, continuous execution, continue of external execution, continue to wait, and continue of external alarm:



- **Finish**: stop after this block runs.
- **Intermittent execution**: Execute the next program segment after executing this program segment.
- **Continuous execution**: run the next block directly without deceleration after executing this block.
- **Continue external execution**: Determine the source of the signal to continue external execution according to the H28_68 parameter. If the signal is not triggered, the next program will be executed continuously part. Runs the next block ahead of time if the signal triggers.

- **Continue to wait externally**: wait for the execution signal after executing this program segment, the source of the signal is determined by H28.68, when the signal is 1, execute the next program part.
- **Continue to external alarm**: wait for the execution signal after executing this program segment, the source of the signal is determined by H28.68, when the signal is 1, execute the next program part. Alarm EE550.2 during the waiting process.

8.2.2.7 MODULE AXIS

The module axis function resets the position signal to 0 after running a certain distance. If it is applied to a rotary axis, it can be set so that the angle signal returns to zero every certain angle. If it is applied to a linear axis, it can be set so that the position signal returns to zero every certain distance.

When using the modal axis function, set function code H02-05 = 2 or 5.

- When H02.01 = 2, the absolute position command can be greater than the modulus in this mode. If it is greater than N times the modulus, the movement distance will exceed N modulus circles.
- When H02.01 = 5, in this mode, if the absolute position command first takes the modulus of the position command number, and then sends the modulus into the position loop as a new command, that is

The movement distance is always less than 1 modulo turn.

The modulus is set according to function codes H29.71 (lower 32 bits) and H29.73 (higher 32 bits).

When setting H02.01 = 5, the movement direction of absolute positioning can be selected through control words POS_STW1.bit9 and POS_STW1.bit10.

- Only when POS_STW1.bit9 is 1 is positive direction movement.
- Only when POS_STW1.bit10 is 1 is negative direction movement.
- When both POS_STW1.bit9 and POS_STW1.bit10 are 1 or 0, the axis will run in the direction with the smallest travel distance.

8.2.2.8 SUPPLEMENTARY TELEGRAM 750

With Telegram 750 it is possible to limit the torque of the drive while it is performing movements with the SinaPos block.

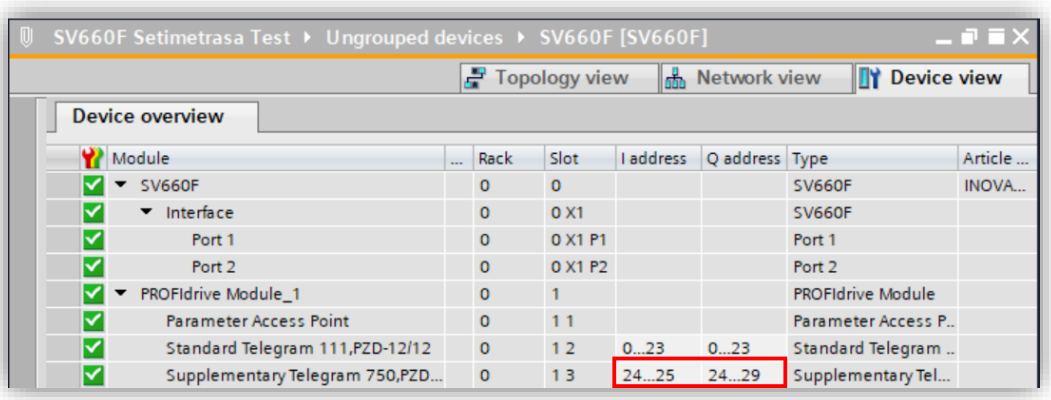
NOTE To enable the torque limits through the PLC it is necessary to enable the parameter **H07.07**=5

Telegram 750				
Register	Description	Receive/Transmit word	Type of data	Drive parameter
M_ADD1	Additional torque	Receiving word	Int16	H29.23
M_LIMIT_POS	Positive torque limit	Receiving word	UInt16	H29.24
M_LIMIT_NEG	Negative torque limit	Receiving word	UInt16	H29.25
M_ACT	Actual torque	Sending word	UInt16	H29.67

Related parameters:

Parameter	Name	Range	Default
H07.07	Torque limit source	0: Positive and negative internal torque limit 5: PROFINET torque limit	0
H29.23	Additional torque	-32768..32767	0
H29.24	Torque upper limit	-32768..32767	16384
H29.25	Torque lower limit	-32768..32767	-16384

To be able to use the torque limits from the PLC it is necessary to add telegram 750 in the SV660F configuration. As can be seen in the image below, the 750 telegram has registers 24..25 as input addresses and output registers are 24..29. The following table shows how each record would be assigned



Register	Description	Register address
M_ADD1	Additional torque	%QW24
M_LIMIT_POS	Positive torque limit	%QW26
M_LIMIT_NEG	Negative torque limit	%QW28
M_ACT	Actual torque	%IW24

The value of torque limit (H29.24 and H29.25) is calculated with the formula below, taking into account that the maximum torque is 300%:

$$Torque\ limit\ value = \frac{16384}{300\%} \cdot Toque\ limit\ (\%)$$

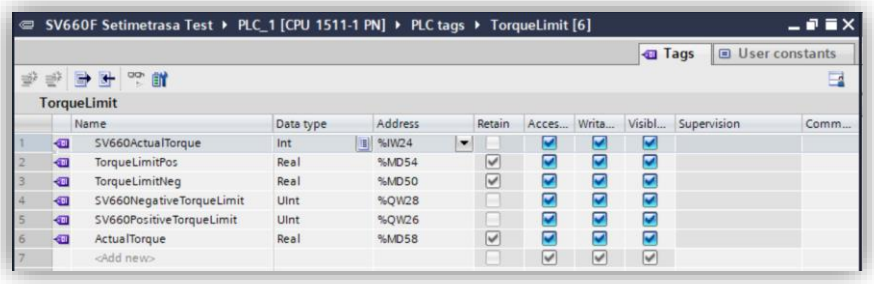
For example, if it is necessary to limit the torque of the drive to 10%, the value that must be assigned to the M_LIMIT_POS/ M_LIMIT_NEG registers is 546:

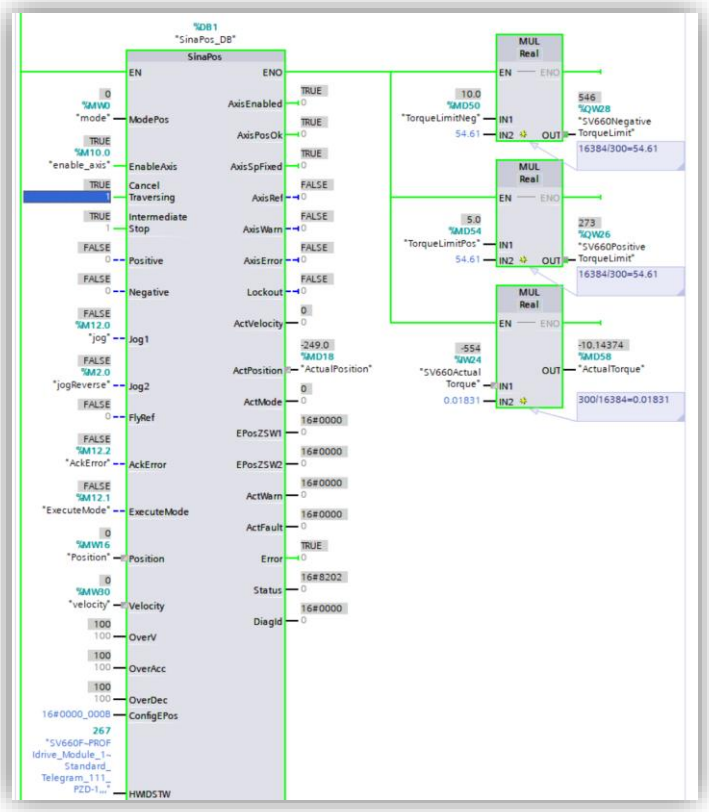
$$Torque\ limit\ value = \frac{16384}{300\%} \cdot 10\% = 546.13$$

The same calculation should be applied to extract the current torque % from the drive:

$$Actual\ torque\ (\%) = \frac{300\%}{16384} \cdot \mathrm{M\_ACT}$$

The images below show an example of how to use the torque limits from the plc together with the SinaPos block. As you can see the negative limit is set to 10% and the current torque value is ≈-10%. The values are scaled according to the formulas described above:





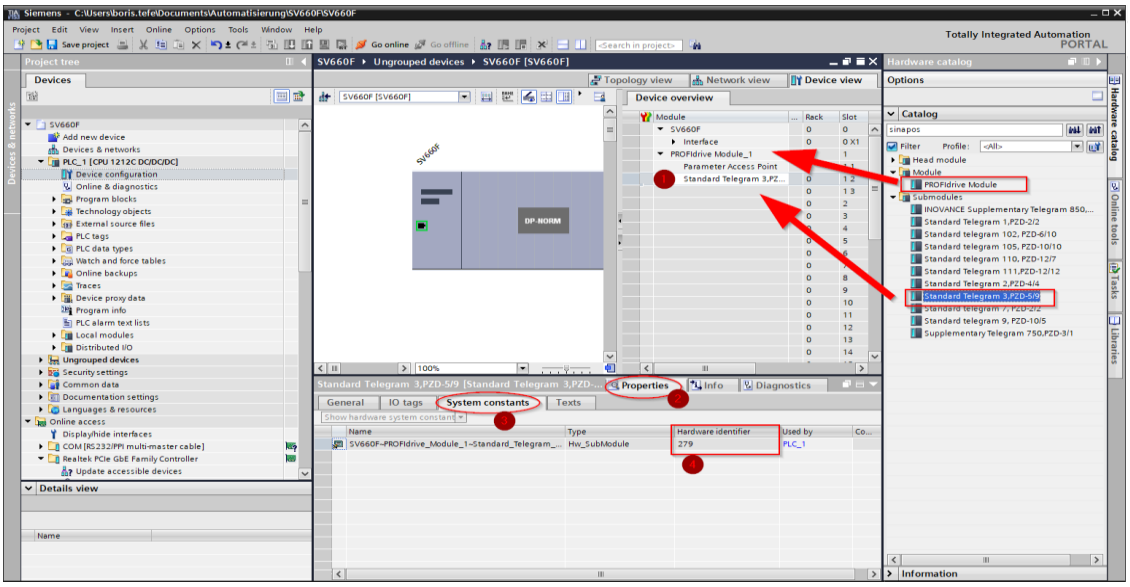
8.2.3 AC4 MODE

8.2.3.1 OVERVIEW

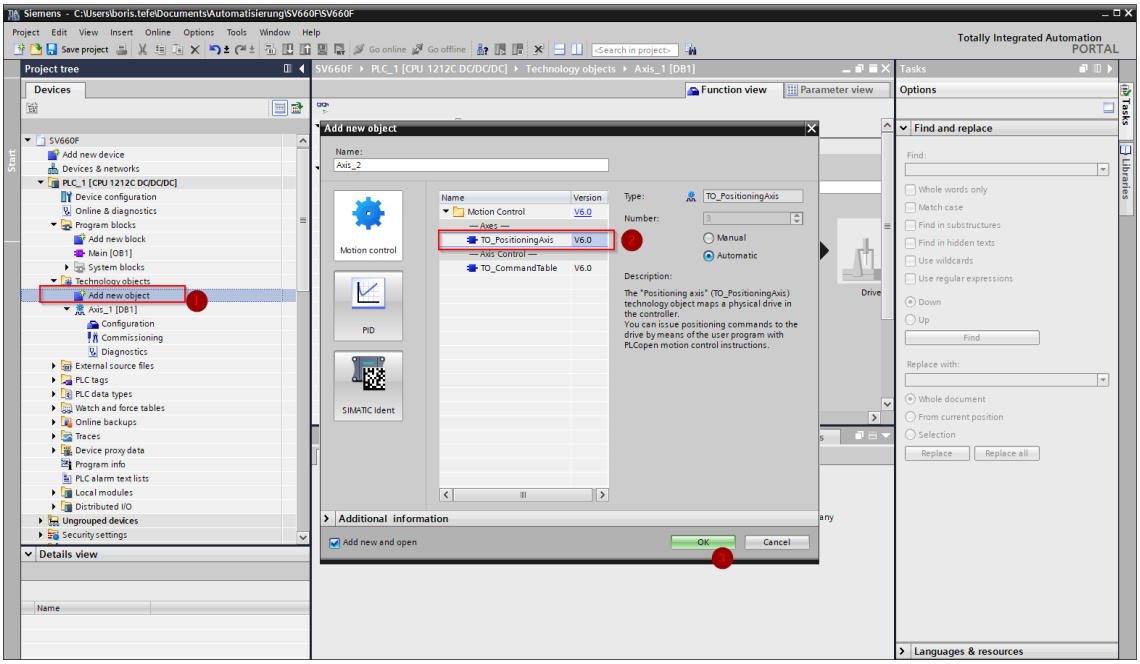
To configure the axis technology object in PLC, SV660F uses standard **telegram 3**, **102** or **105**, through **MC_Power**, **MC_MoveAbsolute** and other PLC Open standard program blocks are used for control. The following uses **S7-1212C** PLC configuration and telegram 3 as an example for positioning axis.

8.2.3.2 CONFIGURATION STEPS

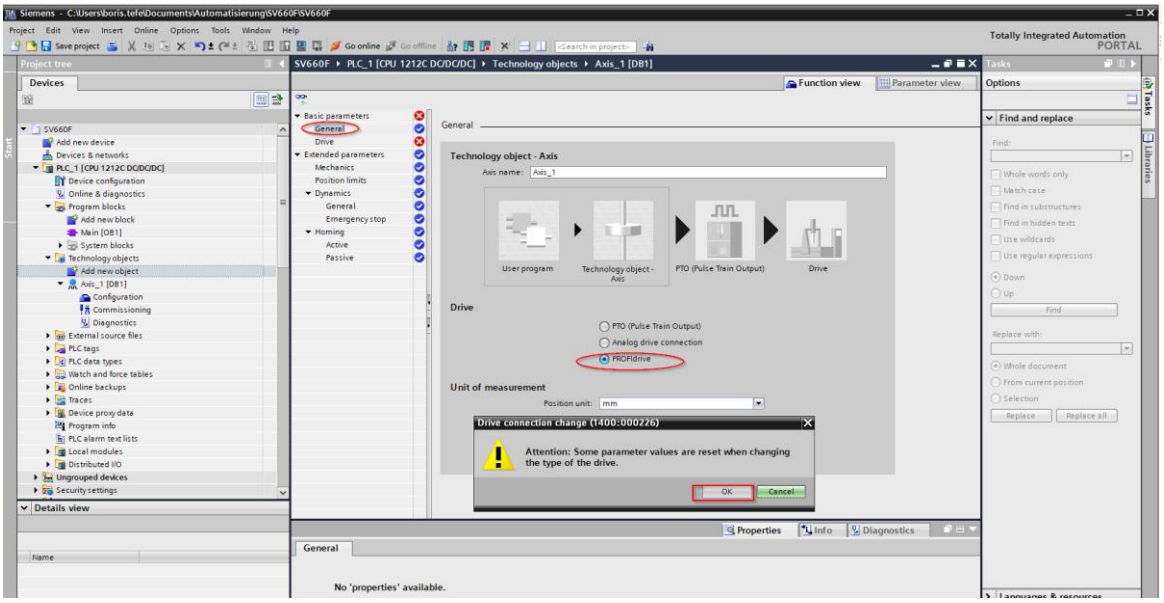
Same as in the previous section we need to select the right telegram as shown in the image below to use the PLC Open function blocks. In this case we use the **telegram 3**



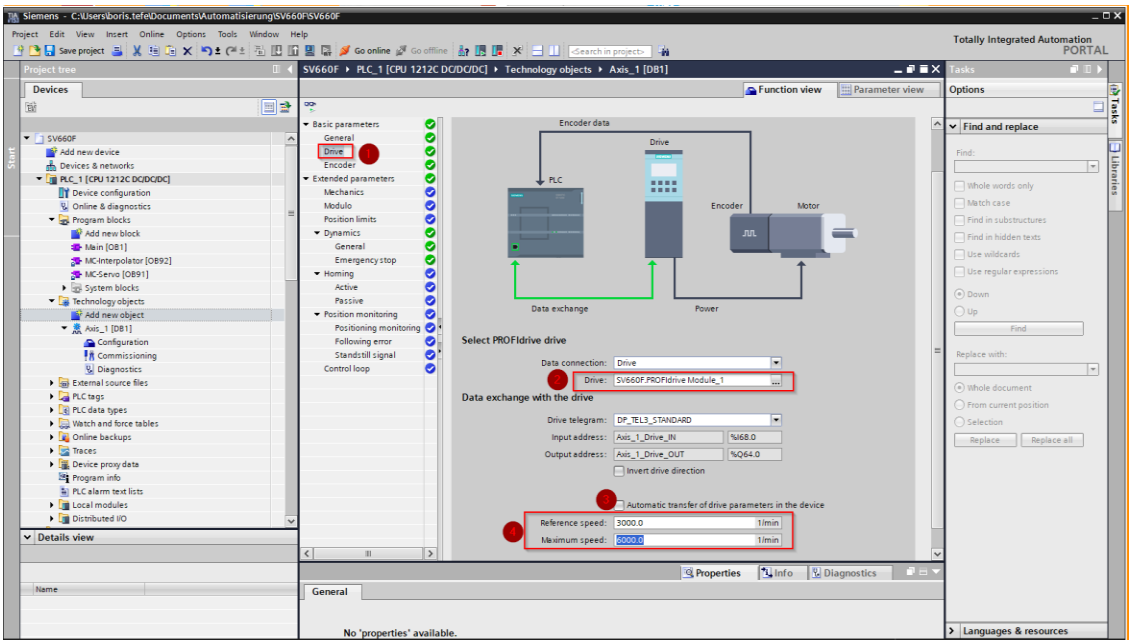
1.Add a new technology object.



2. Select "**Profidrive**" and "**Standard telegram 3**" in the configuration

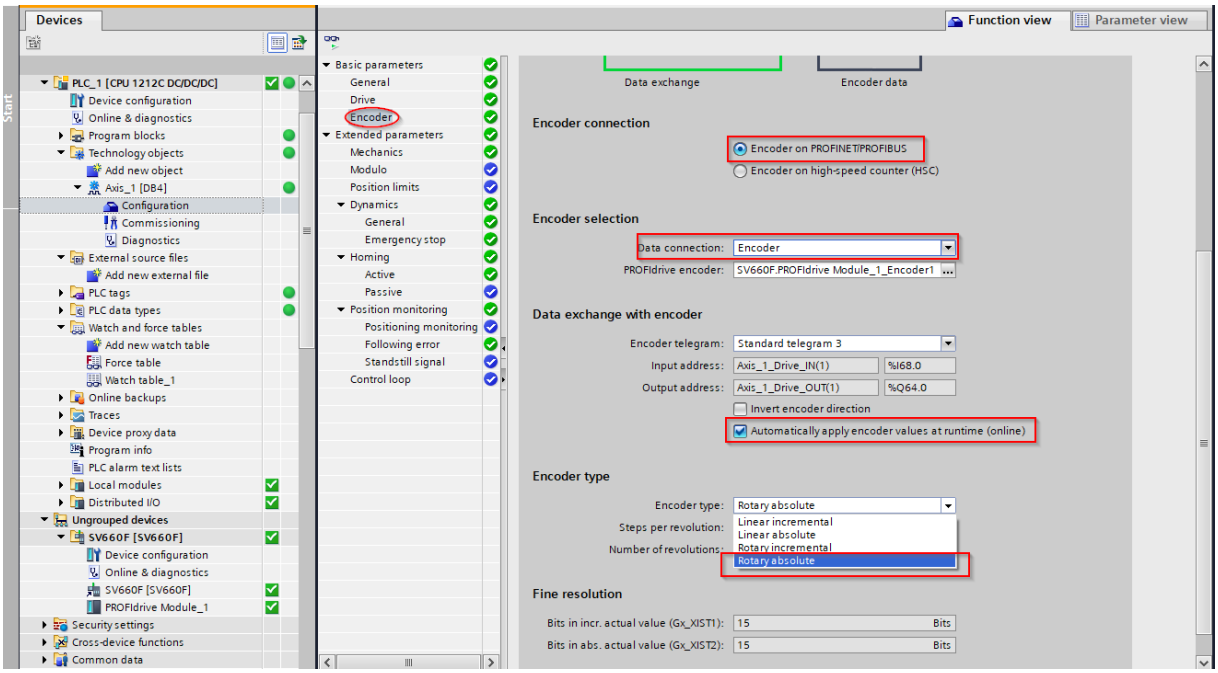


3. Set Reference and maximum speed value



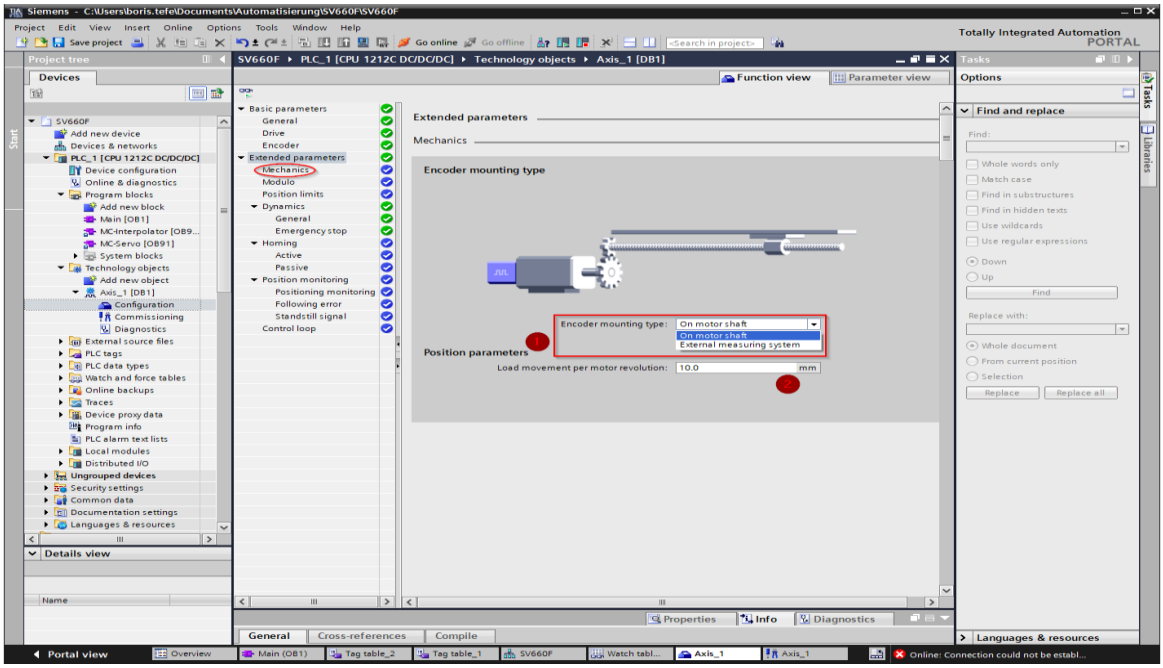
If the reference speed, maximum speed, and reference torque of the motor cannot be checked "Automatically apply drive value when running", it needs to be rooted. Manually set according to drive parameters. The reference speed is the rated speed of the motor, corresponding to the servo parameter H00.14. Maximum speed, corresponding to servo parameter H00.15.

4. Configure the encoder according to the encoder type. For more details. Check the parameter H02.01.



NOTE Select the Options “Automatically apply encoder values at runtime.” To get the best settings of the encoder from InodriverShop.

5. Expand parameter settings, select "on the motor shaft" for the encoder installation type, and set the position parameters.



8.2.3.3 SUPPLEMENTARY TELEGRAM 750

With Telegram 750 it is possible to limit the torque of the drive while it is performing movements with the motion FBs.

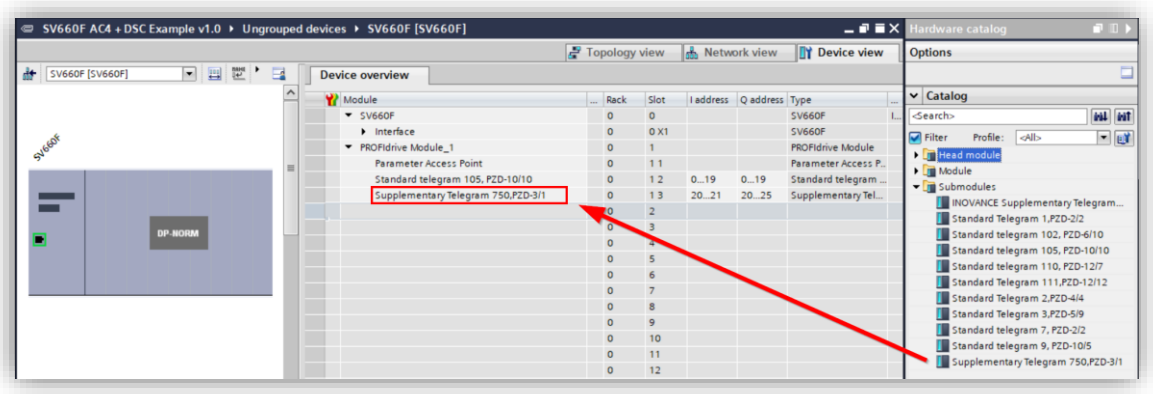
NOTE To enable the torque limits through the PLC it is necessary to enable the parameter **H07.07**=5

Telegram 750				
Register	Description	Receive/Transmit word	Type of data	Drive parameter
M_ADD1	Additional torque	Receiving word	Int16	H29.23
M_LIMIT_POS	Positive torque limit	Receiving word	UInt16	H29.24
M_LIMIT_NEG	Negative torque limit	Receiving word	UInt16	H29.25
M_ACT	Actual torque	Sending word	UInt16	H29.67

Related parameters:

Parameter	Name	Range	Default
H07.07	Torque limit source	0: Positive and negative internal torque limit 5: PROFINET torque limit	0
H29.23	Additional torque	-32768..32767	0
H29.24	Torque upper limit	-32768..32767	16384
H29.25	Torque lower limit	-32768..32767	-16384

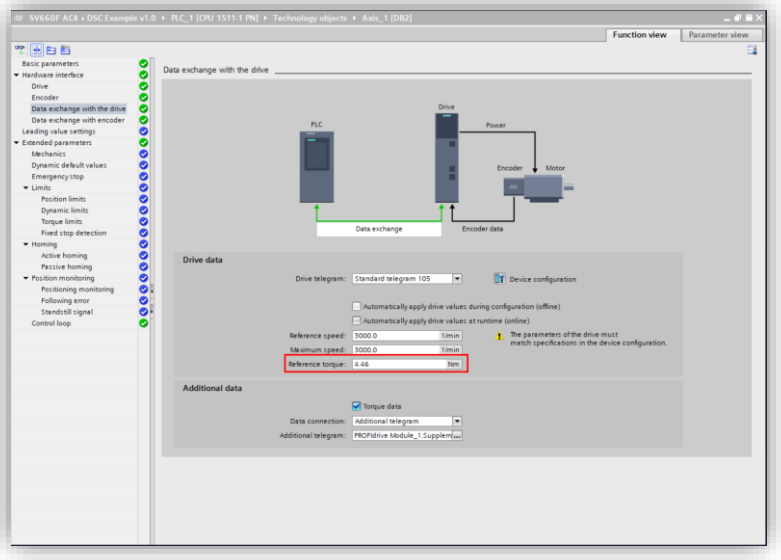
To be able to use the torque limits from the PLC it is necessary to add telegram 750 in the SV660F configuration.



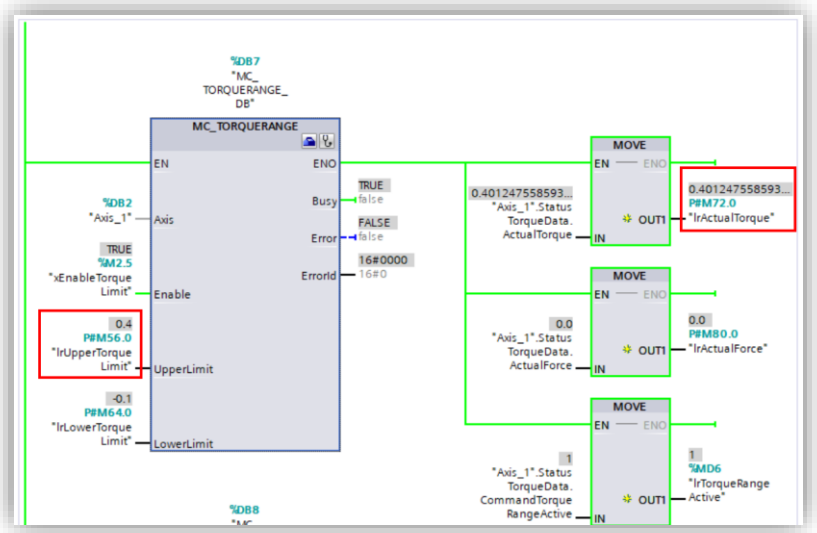
To limit the torque of the drive, the FB *MC_TorqueRange* is used. The units used by this block are in Nm. In order for the drive to limit the torque correctly, it is necessary to configure the peak torque of the motor in the configuration of the technology object.

In the image below you can see how the setting “Reference torque” is adjusted to 4.46Nm for the MS1H1-40B30CB motor. The maximum torque value can be obtained from the parameter H00-13.

Model	Frame Size (mm)	Rated Output (kW)[1]	Rated Torque (N·m)	Maximum Torque (N·m)	Rated Current (Arms)	Maximum Current (Arms)
MS1H1-05B30CB	40	0.05	0.16	0.56	1.3	4.70
MS1H1-10B30CB	40	0.1	0.32	1.12	1.3	4.70
MS1H1-20B30CB	60	0.2	0.64	2.24	1.5	5.80
MS1H1-40B30CB	60	0.4	1.27	4.46	2.8	10.10
MS1H1-55B30CB	80	0.55	1.75	6.13	3.8	15.00

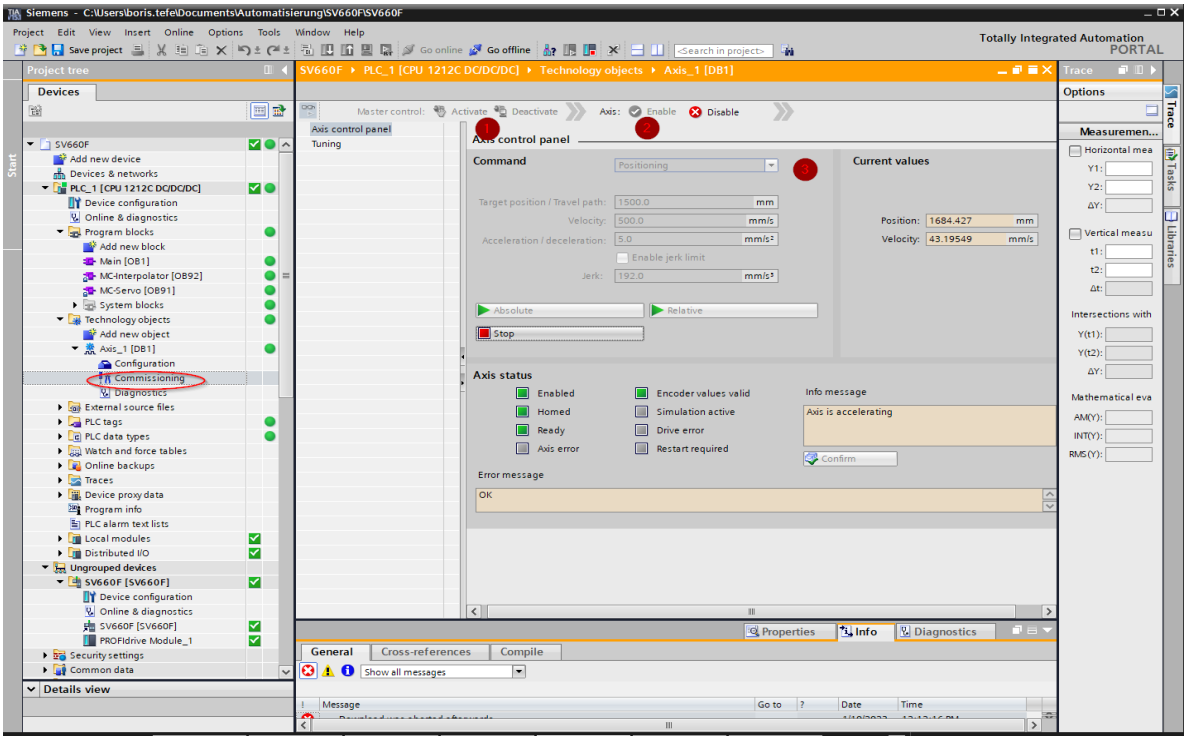


The images below show an example of how to use the torque limits from the plc with the MC_TorqueRange. As you can see the positive limit is set to 0.4Nm and the current torque value is ≈0.4Nm. The rated torque of the motor is 1.27 Nm, so 0.4 Nm is 31.49% of the rated torque.



Axis Id	Function c...	Description	Setting value	current value	Defa...	Minimu...	Maximu...	Unit
Axis1	H29.24	Torque upper limit (UpperLimit)	---	1469	0	-32768	32767	
Axis1	H29.25	Torque lower limit limit (LowerLimit)	---	-368	0	-32768	32767	
Axis1	H0b.02	Internal torque command	---	31.4	0.0	-500.0	500.0	%

8.2.3.4 CONFIGURATION TEST



8.3 PROFINET IRT

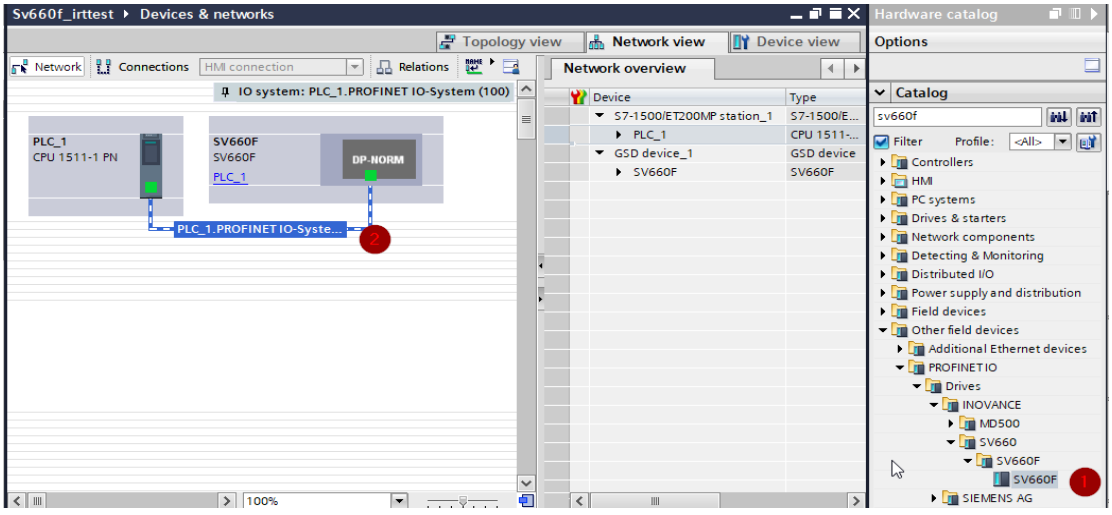
8.3.1 AC4 MODE

To configure the axis technology object in PLC, SV660F uses standard **telegram 3**, **102** or **105**, through **MC_Power**, **MC_MoveAbsolute** and other PLC Open standard program blocks are used for control. The following uses **S7-1511-1** PLC configuration and **telegram 3** as an example for positioning axis.

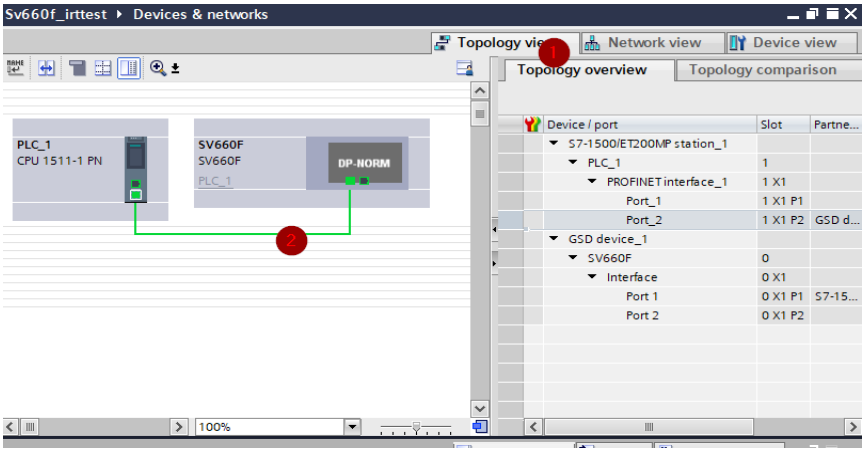
8.3.1.1 CONFIGURATION POINTS

This section describes how to configure the SV660F drive to use the IRT Mode. For basic configurations as assigning “device name ” or “ IP addresses” please refer to section **7.1.1.**

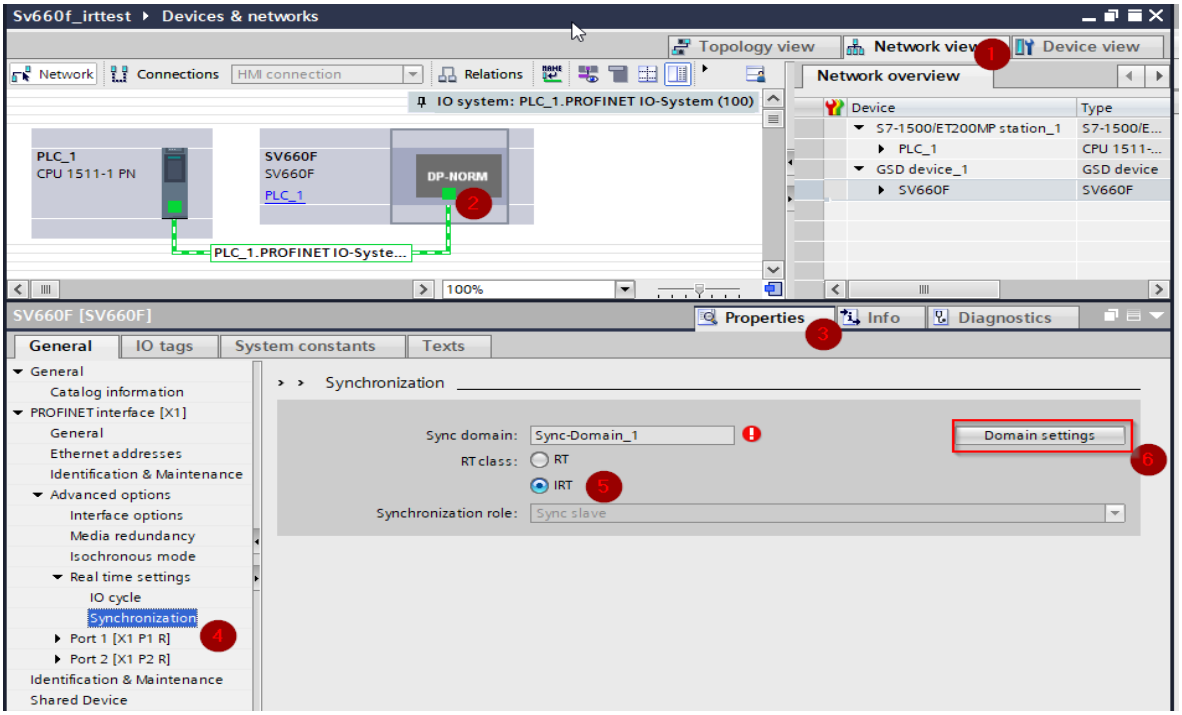
1. Add SV660F and in the “Network view” section connect the PLC to SV660F.



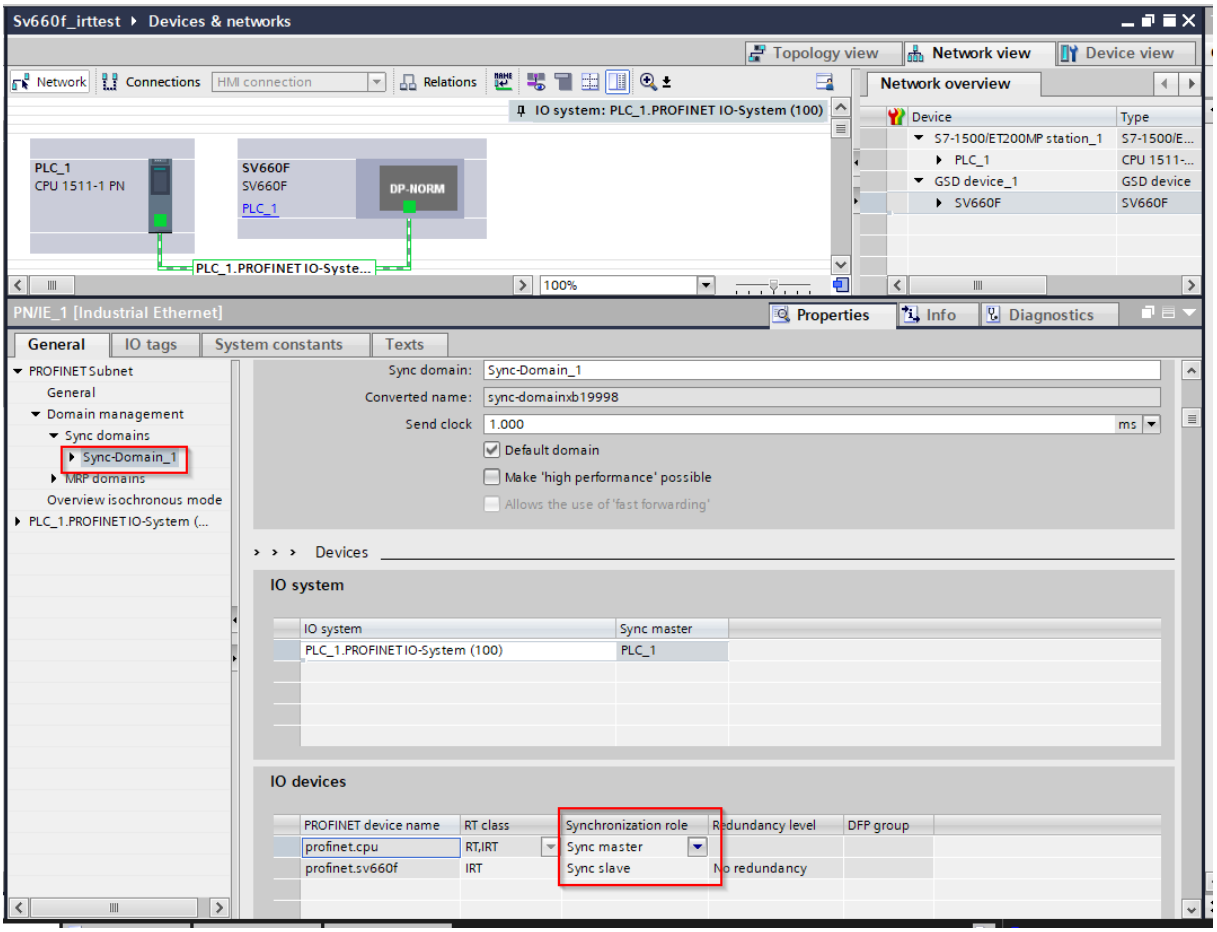
2. To enable IRT communication between PLC and IS660F, connect them to each other in the “Topology view” section and connect physical devices according to the topology view. For RT communication (default), connection is not required in the Topology View section.



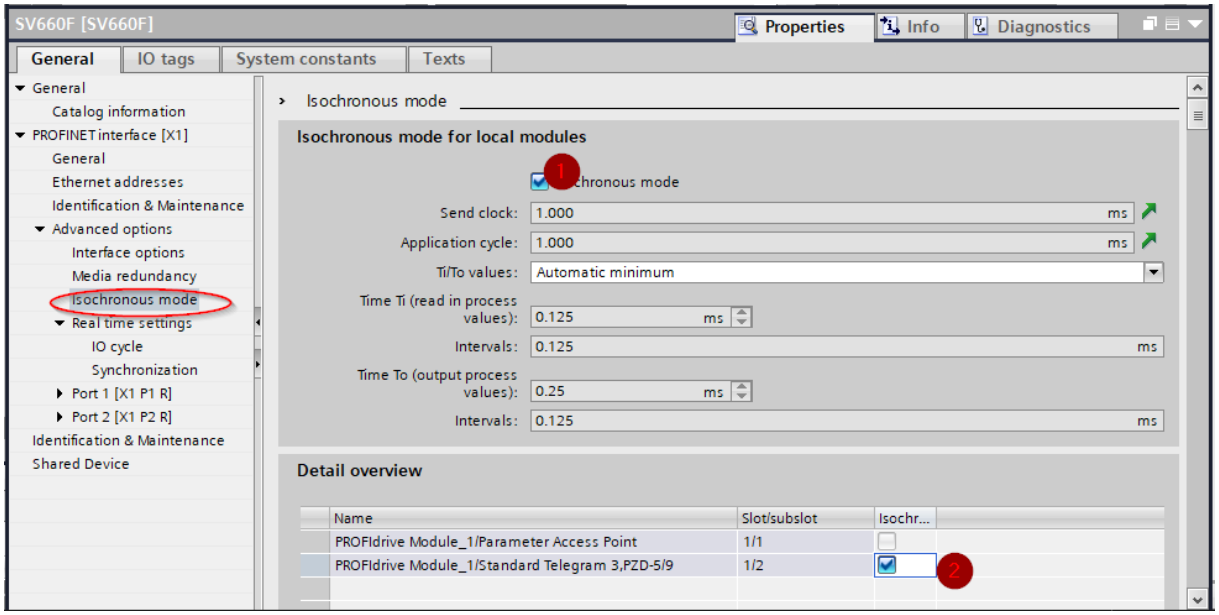
3. Switch to “Network view” section, go to the properties of the SV660F and choose IRT mode for the synchronization .



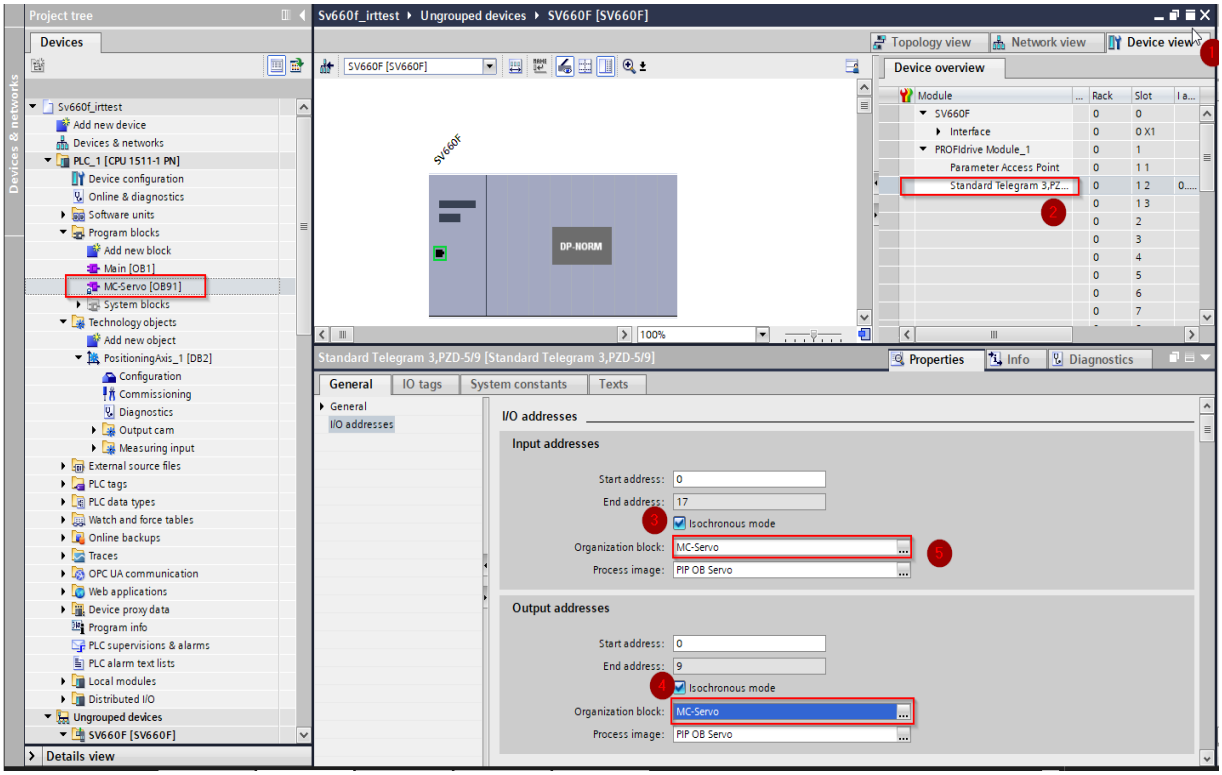
4. Under the “Domain settings” section set the PLC as **sync master** and the drive as **sync slave**



5. Enable the synchronous mode and select the telegram type we want to use.

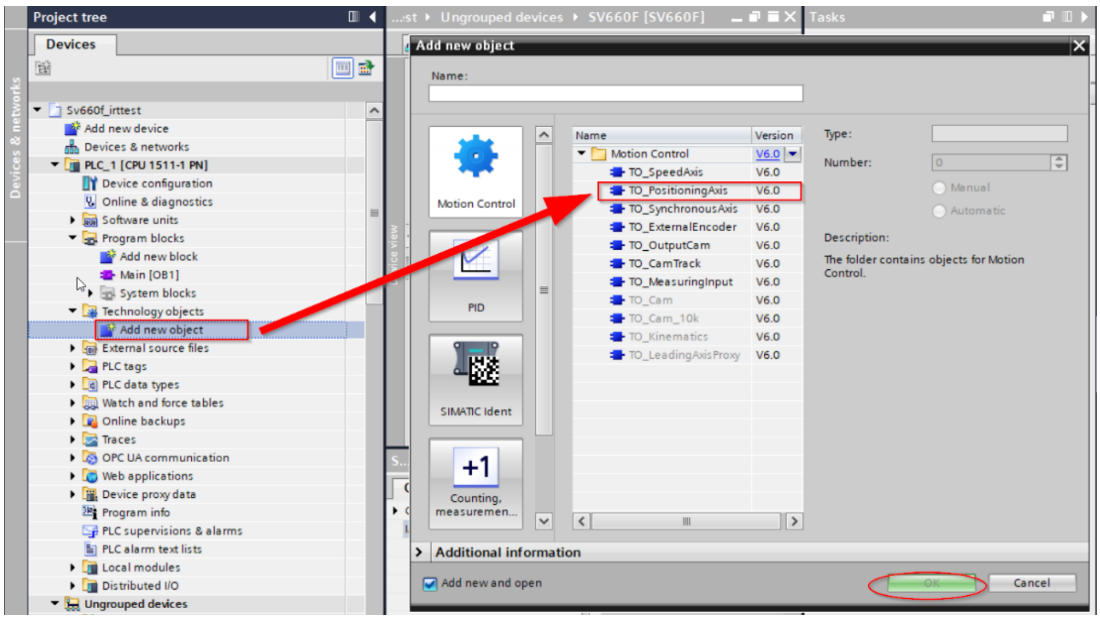


6. For the isochronous mode is always a specific **organization block (MC-Servo)** required to manage the communication time.

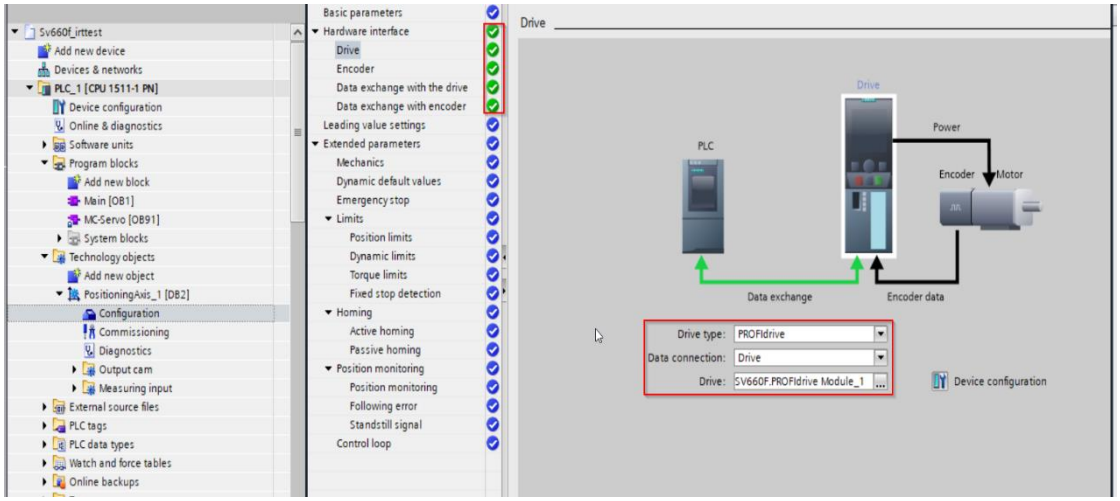


NOTE: The "**MC-Servo**" organization block appears in the project tree only when a technology object exists.

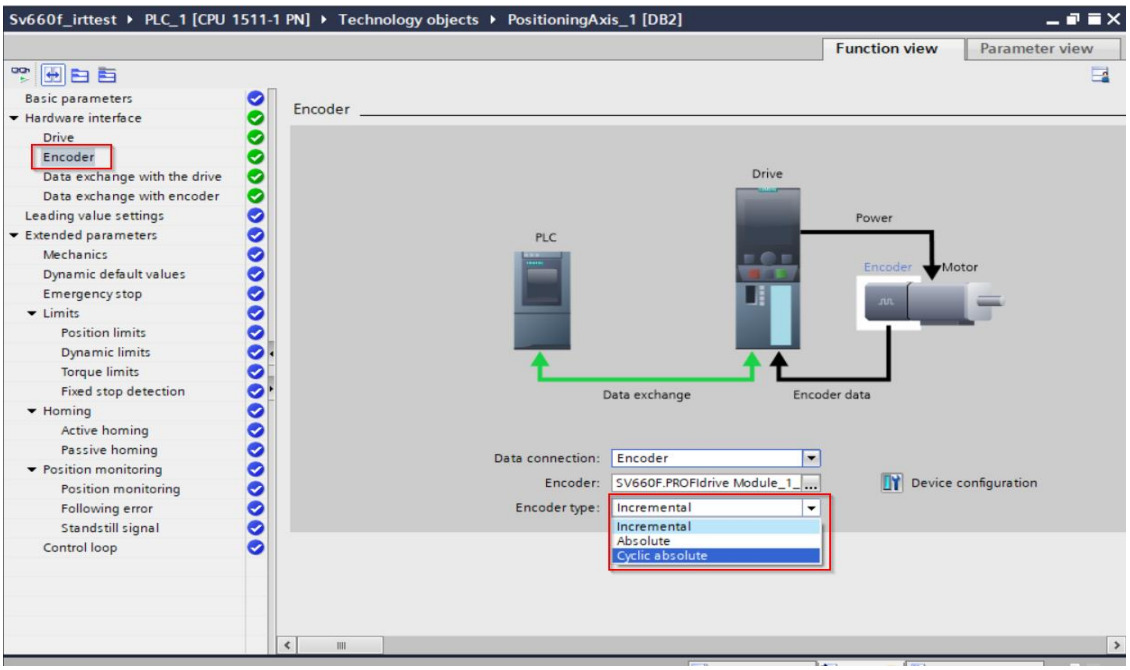
7. Add technology object.



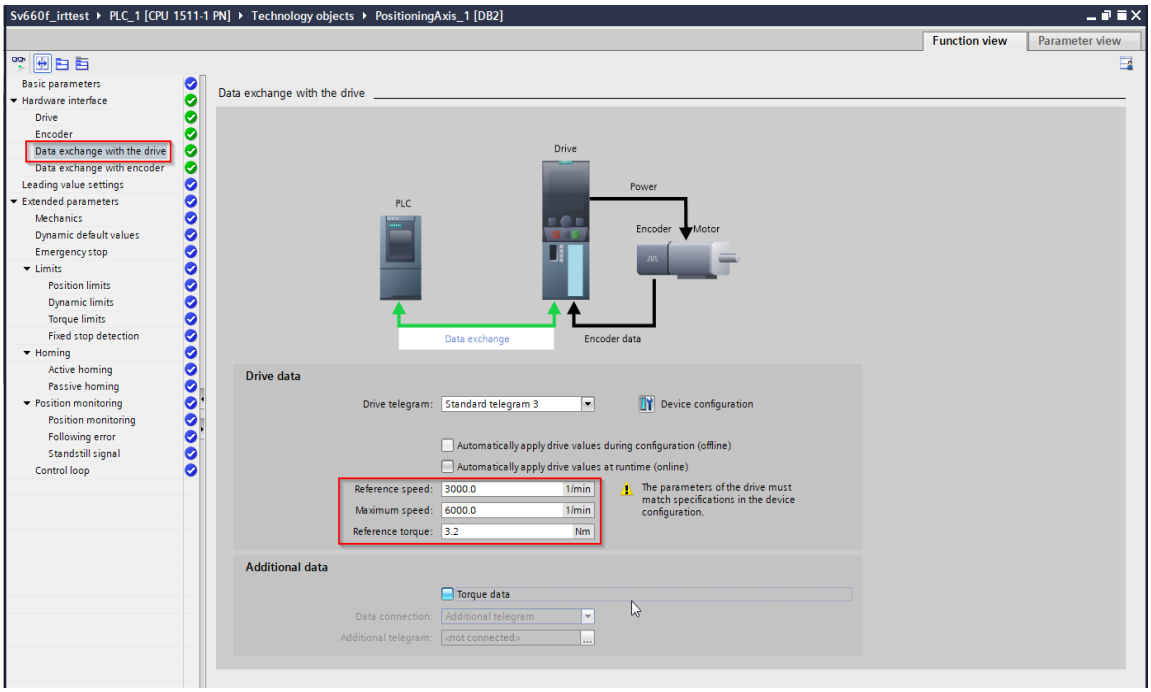
8. From networking configuration, select **PROFIdrive** and Standard telegram 3.



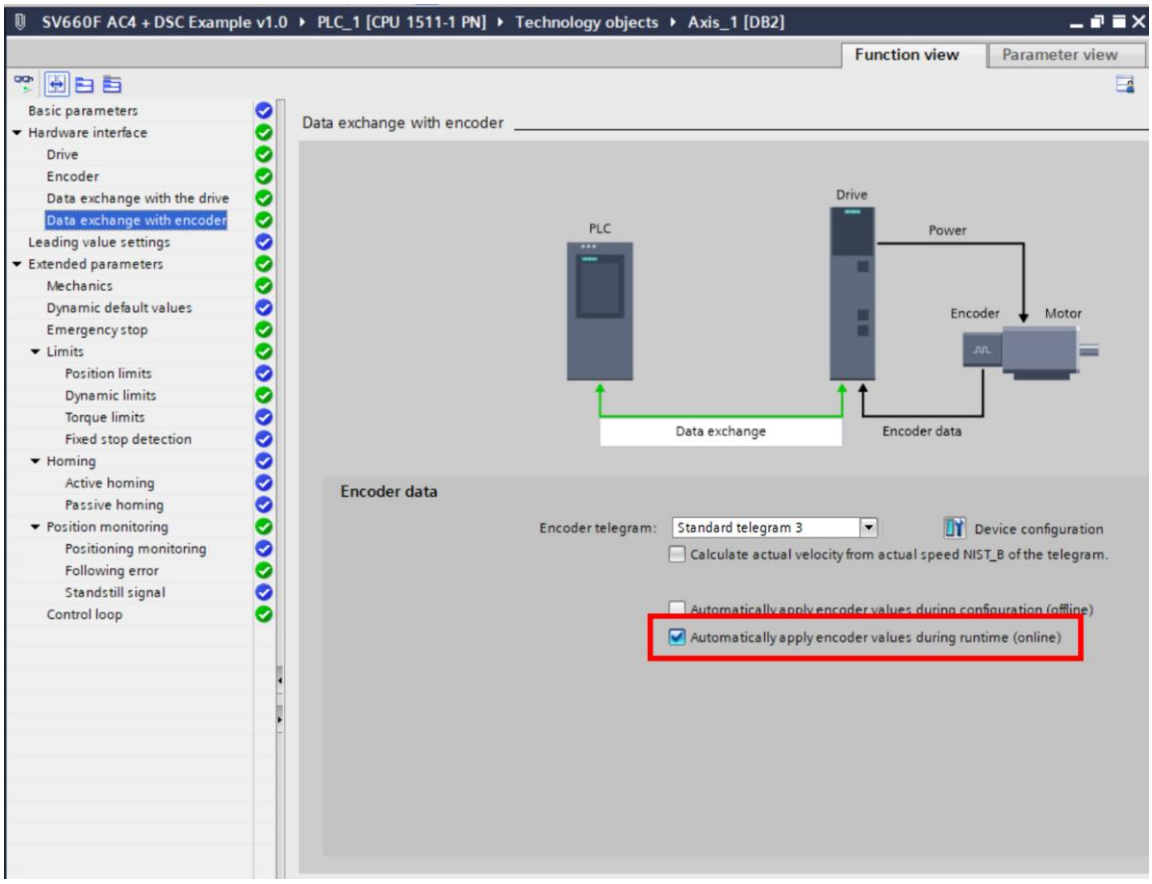
9. If H02-01 is set to 0 (Incremental position mode), select "Incremental" from the drop-down list of "Encoder type". If H02-01 is set to 1 (Absolute position linear mode), select “Cyclic absolute” from the drop-down list of “Encoder type”.



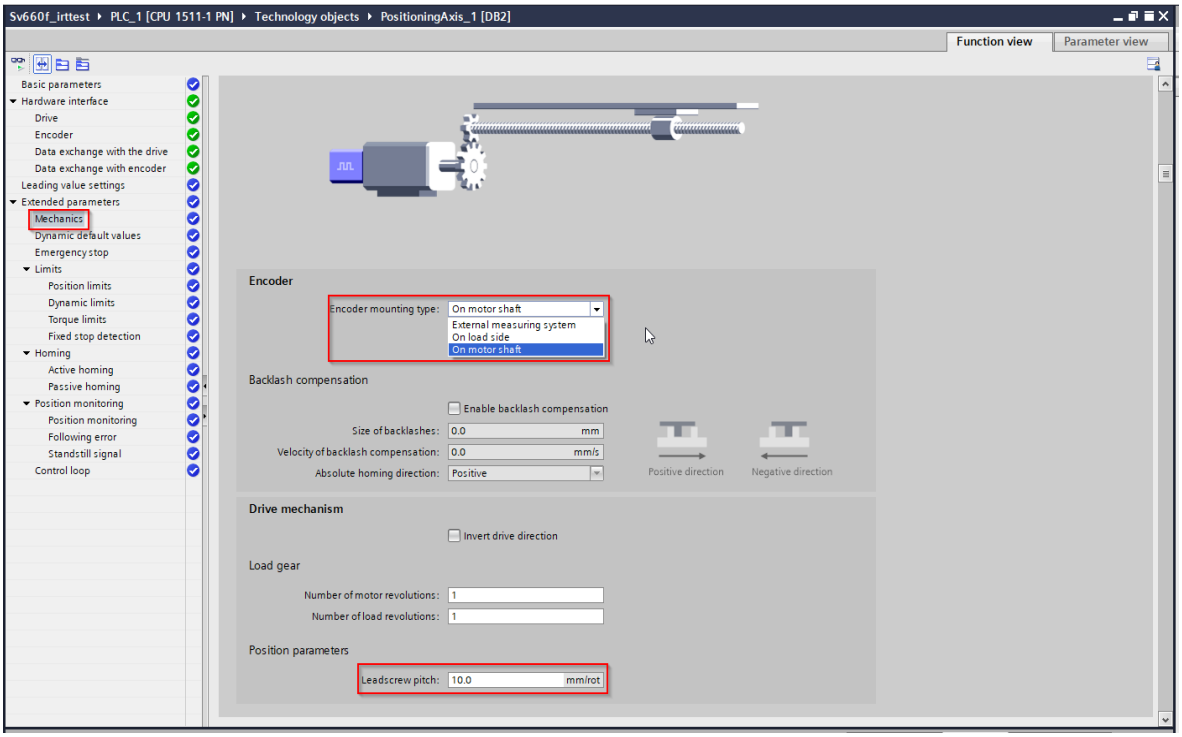
10. If “Automatically apply drive values at runtime” cannot be selected for reference speed, maximum speed, and base torque of the motor, manually set them according to the drive parameters. The reference speed is the rated motor speed, corresponding to the servo parameter H00-14. The maximum speed corresponds to the servo parameter H00-15. And reference torque corresponds to parameter H00-13.



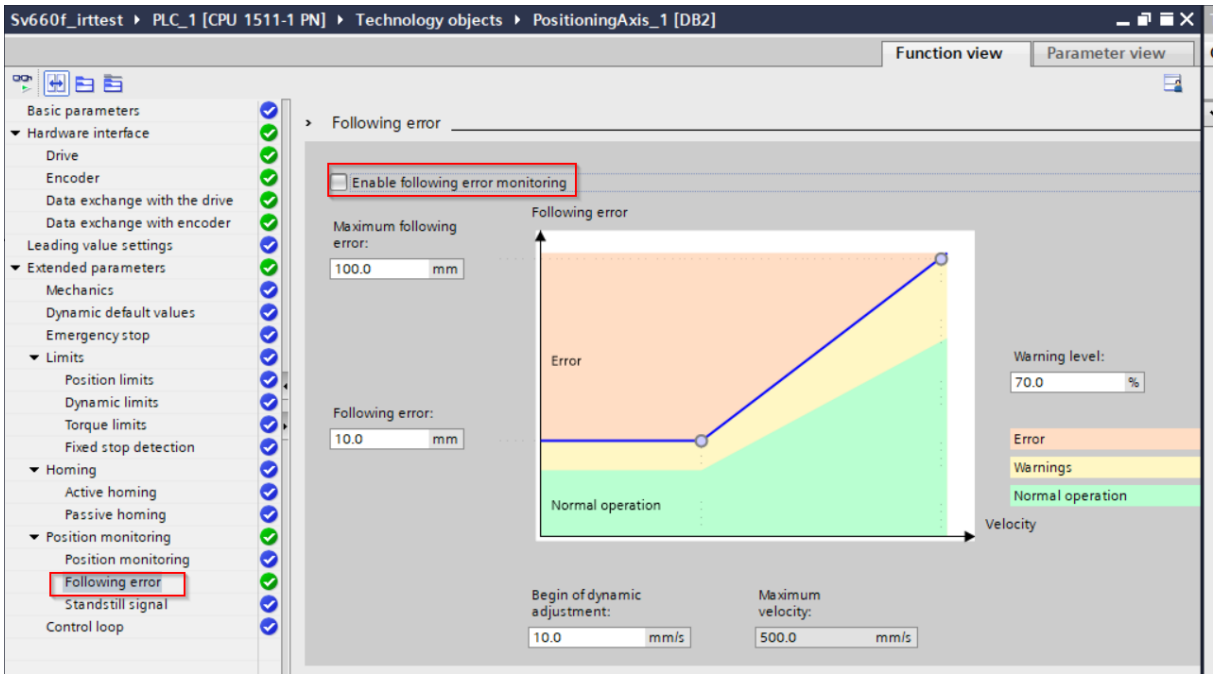
11. In the "Data exchange with encoder" section, select "Automatically apply encoder values during runtime". If you do not want to select this item:



12. In the “Extended parameters” section, select “On motor shaft” from the drop-down list of “Encoder mounting type”, and set the position.



13. You can deselect the “Enable following error monitoring”. If this item is selected and a small following error is set, the host controller reports an error when the motor runs.



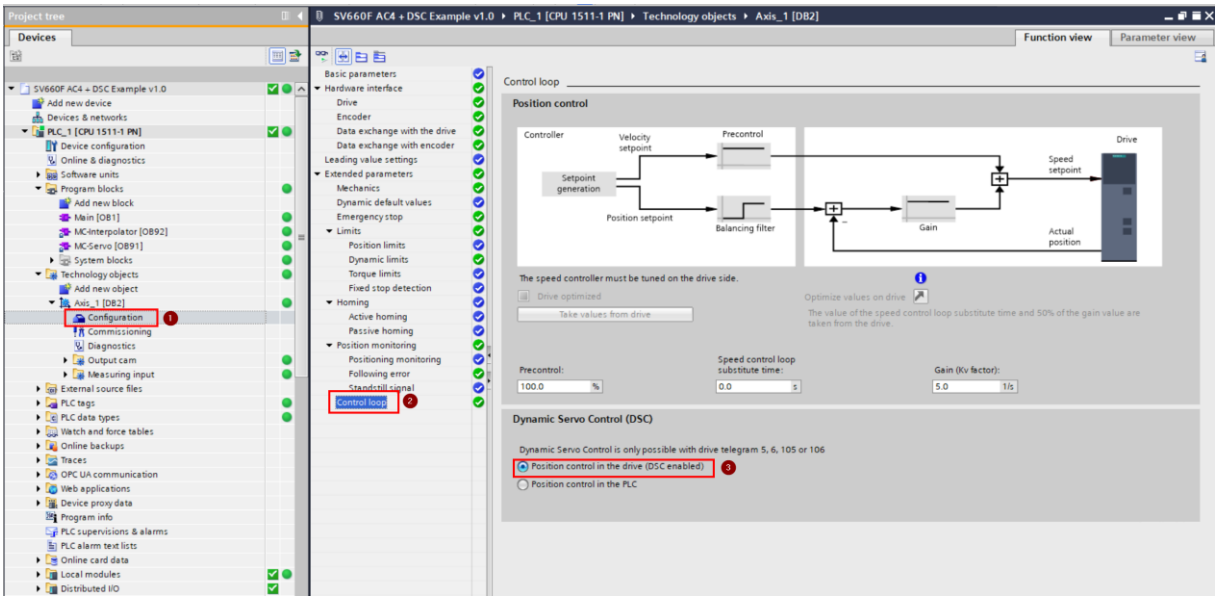
8.3.2 DCS MODE

DSC (Dynamic Servo Control) is to move the position loop calculation and interpolation to the controller through a specific message (Telegram 105) and use the fast calculated speed of the controller to control and improve the positioning accuracy and performance. This function is suitable for highly dynamic and complex movements. If there is no DSC function, the longer position loop control period will cause a step change in the speed reference value, resulting in a larger ripple in torque or current. If the DSC function is activated, the position loop calculates the movement in the drive. Its calculation cycle is shortened considerably, and the current torque or ripple becomes smaller.

NOTE SV660F H01.00=802.8 and above support DSC function.

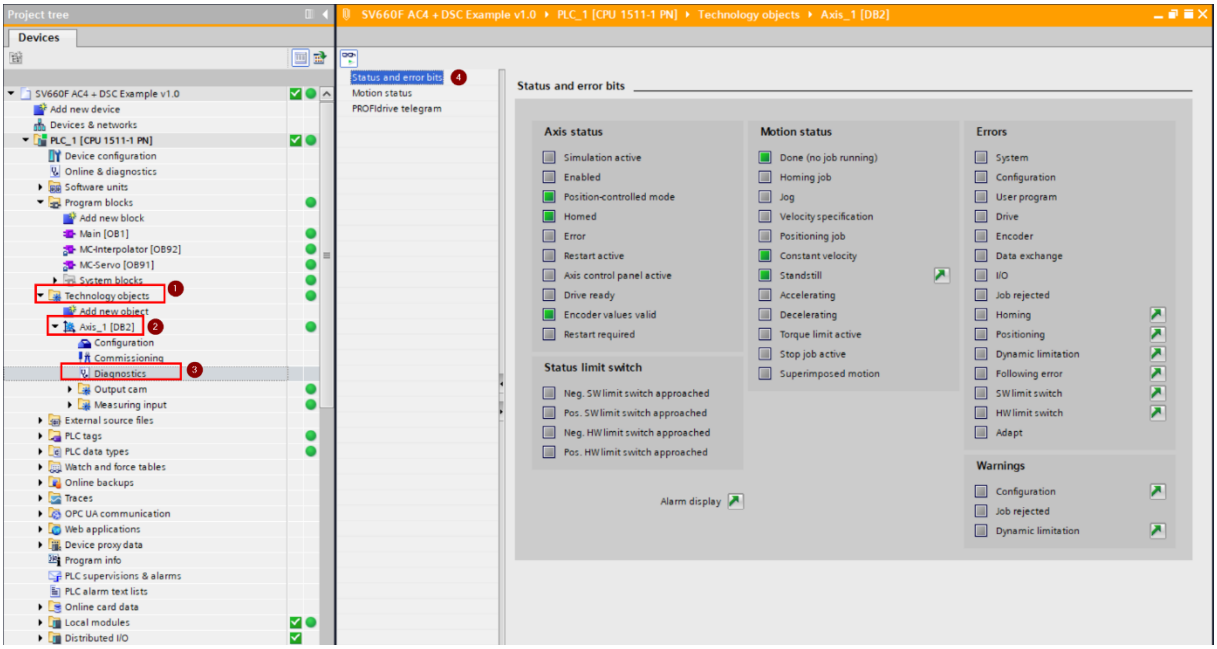
DSC function configuration

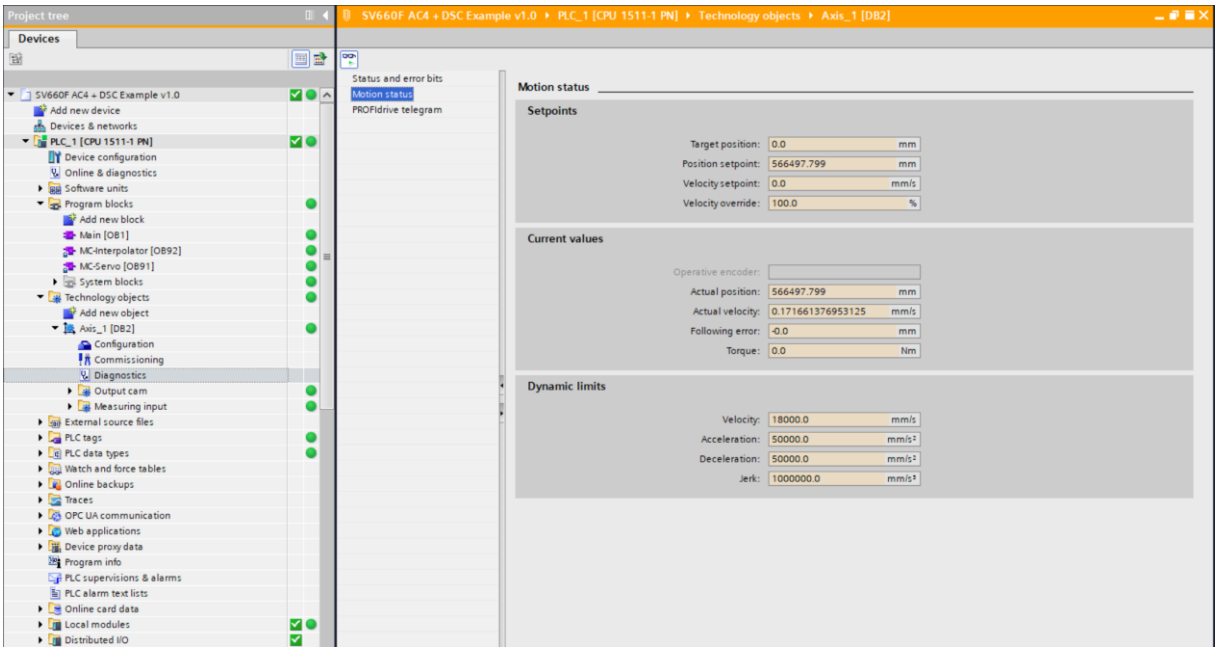
In DSC mode, the servo receives the position loop gain **KPC**, position deviation **XERR** and speed from the main host controller via the telegram 105.

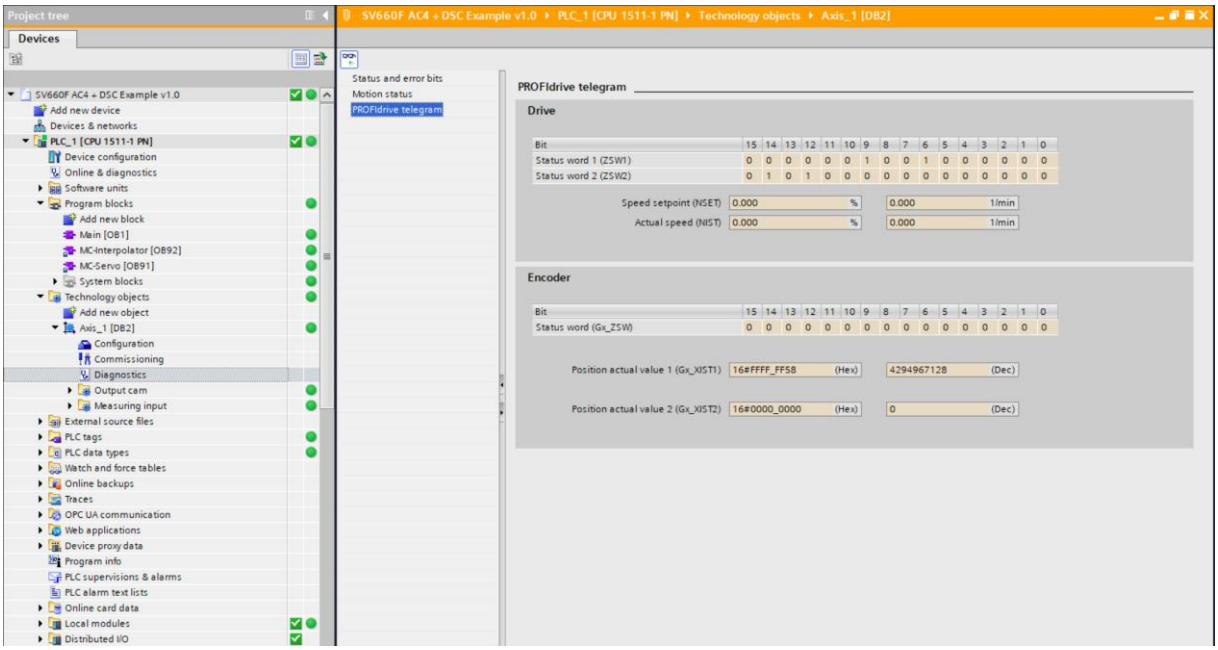


Parameter	Name	Range	Default
H24.32	DSC position loop gain selection	0: Local position loop gain (DSC disabled) 1: PLC position loop gain 3: DSC manual adjustment	0
H24.48	DSC position loop gain	1..31	10

8.3.3 AXIS DIAGNOSTICS



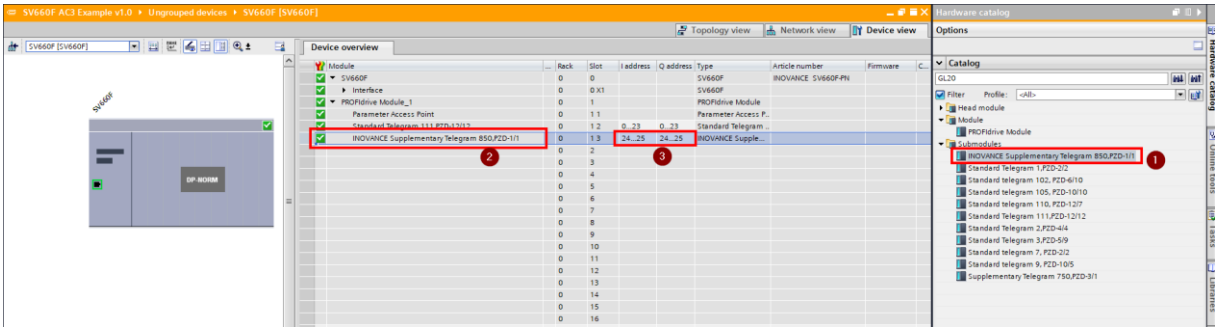



Project tree
Devices
SV660F AC4 + DSC Example v1.0
Add new device
Devices & networks
PLC_1 [CPU 1511-1 PN]
Device configuration
Online & diagnostics
Software units
Program blocks
Add new block
Main [OB1]
MC-Interpolator [OB92]
MC-Servo [OB91]
System blocks
Technology objects
Add new object
Axis_1 [DB2]
Configuration
Commissioning
Diagnostics
Output cam
Measuring input
External source files
PLC tags
PLC data types
Watch and force tables
Online backups
Traces
OPC UA communication
Web applications
Device proxy data
Program info
PLC supervisions & alarms
PLC alarm text lists
Online card data
Local modules
Distributed I/O
SV660F AC4 + DSC Example v1.0 ▸ PLC_1 [CPU 1511-1 PN] ▸ Technology objects ▸ Axis_1 [DB2]
Status and error bits
Motion status
PROFIdrive telegram
PROFIdrive telegram
Drive
Bit 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0
Status word 1 (ZSW1) 0 0 0 0 0 0 1 0 0 1 0 0 0 0 0 0
Status word 2 (ZSW2) 0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0
Speed setpoint (NSET) 0.000 % 0.000 1/min
Actual speed (NIST) 0.000 % 0.000 1/min
Encoder
Bit 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0
Status word (Gx_ZSW) 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Position actual value 1 (Gx_XIST1) 16#FFFF_FF58 (Hex) 4294967128 (Dec)
Position actual value 2 (Gx_XIST2) 16#0000_0000 (Hex) 0 (Dec)

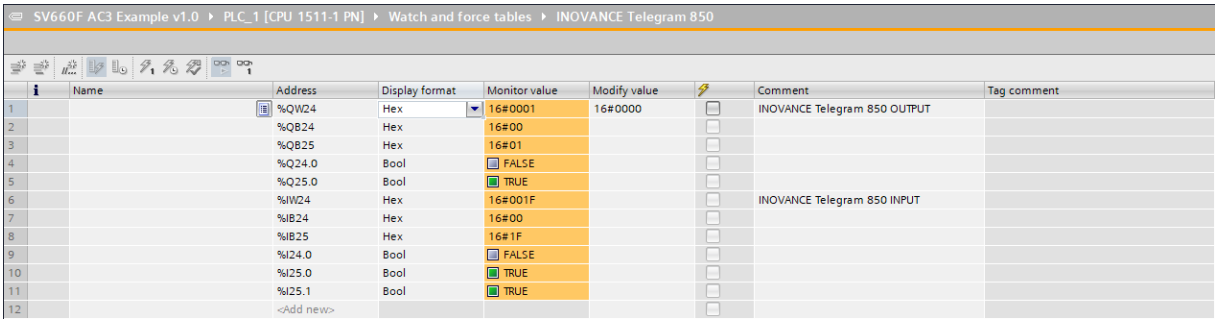
8.4 INOVANCE SUPPLEMENTARY TELEGRAM 850

This telegram allows you to control or monitor extra drive functions such as virtual inputs/outputs that allow you to activate the drive's inputs/outputs through PROFINET communications.

In order to control the extra functions of the drive it is necessary to add this telegram in the hardware configuration of the SV660F. As can be seen in the image, when adding the telegram, the input and output (in this case 24-25) addresses are obtained.



Siemens PLC uses Big Endian byte order. The byte order must be swapped in order to obtain the correct value of the drive functions.



	Name	Address	Display format	Monitor value	Modify value	Comment	Tag comment
1		%QW24	Hex	16#0001	16#0000	INOVANCE Telegram 850 OUTPUT	
2		%QB24	Hex	16#00			
3		%QB25	Hex	16#01			
4		%Q24.0	Bool	FALSE			
5		%Q25.0	Bool	TRUE			
6		%IW24	Hex	16#001F		INOVANCE Telegram 850 INPUT	
7		%IB24	Hex	16#00			
8		%IB25	Hex	16#1F			
9		%I24.0	Bool	FALSE			
10		%I25.0	Bool	TRUE			
11		%I25.1	Bool	TRUE			
12		<Add new>					

Related parameters:

Parameter	Name	Range	Default
Setup			
H24-35	Telegram 850 send data	0: No definition 1: VDO 2: External DI status	0
H24-36	Telegram 850 receive data	0: No definition 1: VDI 2: External DO status	0
Monitoring			
H31-00	Communication VDI value		
H31-00	Communication DO status		

8.5 ACYCLIC COMMMUNICATION

The FB SinaParaS allows you to read/write drive parameter non-cyclically. This block only allows reading/writing one parameter. If it is necessary to read more than one parameter, more than one SinaParaS block must be used.

The reading or the writing of the parameters is initiated by the edge-triggerd “start” input.

The “Parameter” value is calculated in the below way:

10000 + Parameter Group (HEX) + Parameter Number (DEC)

Ex: If we want to read/write the parameter H17-63 the “Parameter” input should be 12363 (10000 + 0x23 (17) + 63)