

SV660F Startup procedure



PROFIdrive



2023

INOVANCE TECHNOLOGY EUROPE

V1.1

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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	1.1 27 July 23 RSR		Add ActWarn and ActFault extra information

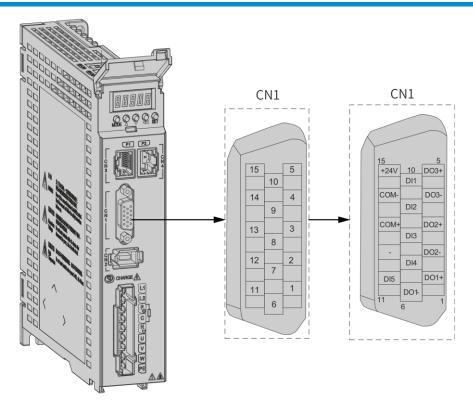
4 **PROFINET SPECIFICATIONS**

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

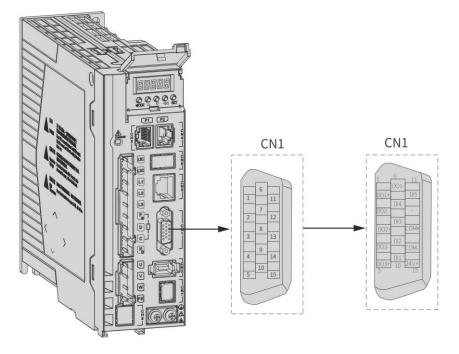
5 ELECTRICAL INSTALLATION

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)



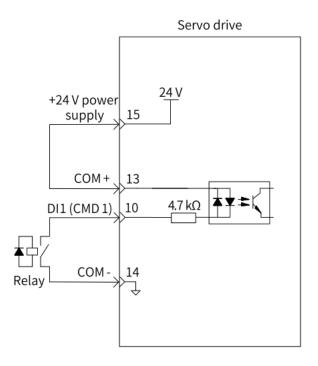
Control terminals of servo drive (SIZE C & SIZE D & SIZE E)

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
COM-		14	28 V, maximum output current: 200 mA
COM+		13	Power input terminal (12 V to 24 V)
DO1+	S-RDY+	1	Comus reach.
D01-	S-RDY-	6	Servo ready
DO2+	ALM+	3	Fault
D02-	ALM-	2	Fault
DO3+	BK+	5	Direka
D03-	BK-	4	Brake

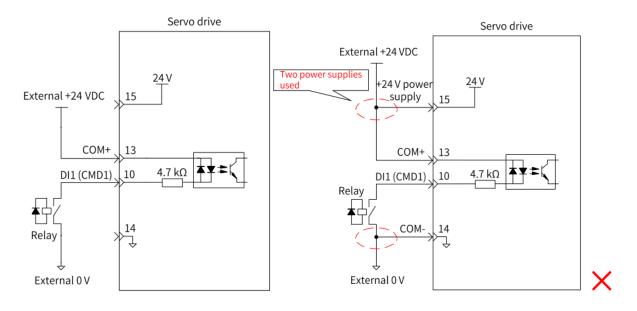
1 DI circuit.

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

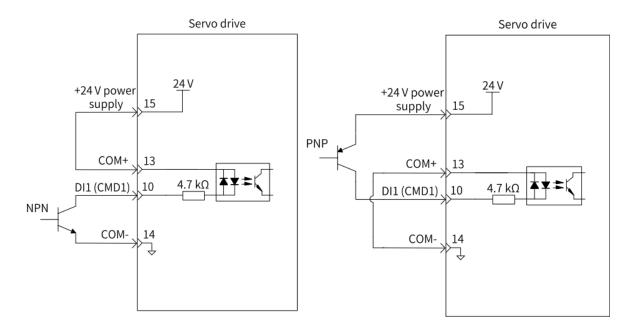
- 1) The host controller provides relay output.
- When using the internal 24 V power supply of the servo drive



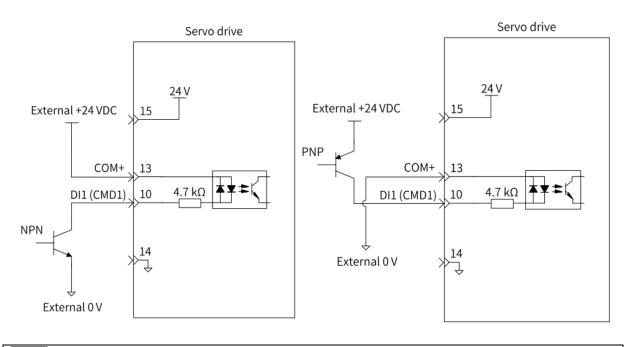
■ When using an external power supply



- 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

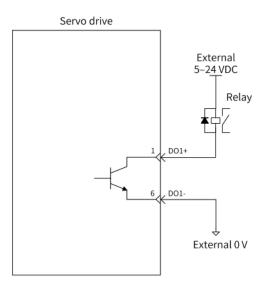


NOTE: PNP and NPN inputs cannot be mixed in the same servo drive.

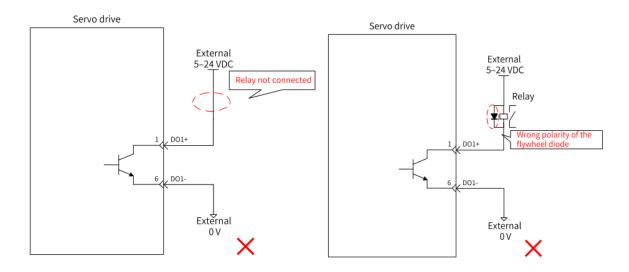
2 DO circuit.

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

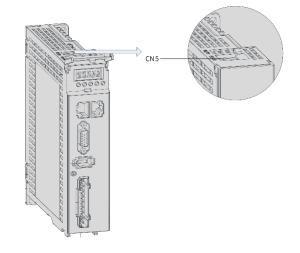
6 PC TOOL INODRIVERSHOP

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.



Device Be sca	egin		Slave	ld 1		-	15		common
	Object name		Slave Id	Baud rag	e Ve	rsion			
⊻ 01	SV660F	SV660F	1	115200	13	283.43.0			
Projec	t Online: :t dir :t name:	1 NewProject20	Scan fini 23-05-05	shed.					
Storage path:		C:\Inovance\I		EN\Servo					

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. 📜 | 🛃 📜 🔻 | Serve Home Sh ? → 👻 ↑ 📜 « Windows (C:) Inovance > InoDriverShop_EN > Servo Date modified Туре ^ 📌 Quick access S WinlgH_Lib.dll 26-Aug-22 16:17 Application extension 10 KB Desktop * WinIgH_Module.dll 26-Aug-22 16:17 Application extension 165 KB WinPcap_4_1_3 Downloads * 30-Sep-22 9:31 Application 894 KB Documents * nel.dll 28-Feb-23 9:04 Application extension 366 KB Nictures WorkSpacePanel.dll 26-Mar-23 15:42 365 KB Application extension EE 📼 288 items

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.

Project Guide						
Stop scanning		tomatically Allocal assign IP segme		2.168.0.0		INOVANCE
Ro Object type	Object name	IP Address	Subnet mask	Gateway	MAC Address	
	profinet.sv660f	192.168.0.60	255.255.255.0	192.168.0.60	70-08-40-14-60-98	
	profinet.cpu	192.168.0.50	255.255.255.0	192.168.0.50	8049-09-09-09-40-68	
			Pre Page	Next page		

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

		Stop scanning	Slave	ld 1		- 15				common problem
	Object name					MAC Address	Version			
	profinet.s	SV660F				70-CA-4D-1				
02	profinet.cpu		192.168	255.255	192.168	8C-F3-19-C8	1.0.0.0			
Object	Online:	2								
Project	dir ——									
Project	name:	NewProject20	23-05-05							
Storage path C:\Inovance\InoDriverShop_EN\Servo										
Storage path: C:\Inovance\InoDriverShop_EN\Servo										

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.

stop emergency stop reset default Control	er to Rotation value direction	number modificat		I↓ Tuning IO n Setting M	Fault Mech anagement ana	anical Para lysis List Function			Generate debra		UI	I Style
Work Space 4 × Project NewProject2023-05-05 Open Param File Gontinuous Osc	Profinet.sv660f[1]Param L Parameter Group Customized System Axisl	Upload and save (Current page all)	Upload and save (All tick options)	Open recipe	Save settings (All tick options)	Write (Except H00 an	groups	Write all tick options (current page)	VS Compare	Select all (current page)	Axis	s copie
Open wave data file Triager Setting Prama Monitor Monitor Monitor Monitor Monitor Monitor Monitor Toring Ore Setting Ore Setting Speed J06 Position J06 Position J06 Position J06 Position J06 Position J06 Position J07 Position J07	<pre># H00 Motor parameters] # H01 Envice parameters] # H02 Envice normal setup # H03 Envice normal setup # H04 Environment output par # H06 Envice control par # H06 Envice control para # H06 Envice Control parameter # H07 Environment output # H08 Monitoring paramet # H0</pre>	A. H0 Sc A. H0 ST A. H0 MC A. H0 DT A. H0 DT A. H0 MC A. H0 CC A. H0 CC A. H0 A.	tor code stomized No. coder version frial-type 0 version frial encod U software GA softwar GA softwar He sories -AC voltag ted power X. output X. output bus overv	410 0,00 2312 0,00 1140 4300 4300 4300 65 220 1,00 1,00 1,00 2,00 420 455 655 	0,00 0,7 0,0 0,0 0,0 0,0 0,0 0,0	0 0.00 0.0 0 0 0.00	65535 4294 6553.5 65535 655.35 6553.5 6553.5 65535 65535 65535 65535 65535 1073 1073 1073	No mod No mod No mod No mod No mod No mod Downti No mod No mod Ww No mod kW No mod kW No mod A No mod No mod No mod Downti Downti Downti Downti	Power on Power on Immediate Immediate Power on	0		
	< >> If you need to operate, please (function code)	A HO St	op mode at		Stop 2 Stop 1 Different from current value	-5	3 7 Update 1		Immediate Immediate ferent with fault value			

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

	- 0 ×
General Project profinet.sv660	UI Style 👻
间 💿 😏 🖳 🕄 🗞 🕺 🖉 🛄 🖫 🕁 🖉 🗒 🔤	(PN) (P)
Emergency Cancel Program Recover to Rotation Connet Disconnect Communication station Inertia Tuning IO Fault Mechanical Param Continuo	us Network Generate debugging
stop emergency stop reset default value direction number modification identification Setting Management analysis List Osc	configuration information
Control General Function	
Work Space 4 × C_ (profinet.sv660f)Graphical configuration ×	•
Der De Server de la constante	<u>^</u>
© Open Param File Program segment setting wizard EPOS Jog EPOS setpoint configuration EPOS ramp configuration Mechanical limit cor	nfiguration
Open wave data file	
Trigger Setting EPUS speed log Dram Monitor	
-Ob Multi-machine recipe JOG1 speed -300 1000LU/min	
Param List	
- ∓ Tuning JOG2 speed 300 1000LU/min - ⊕ IO Setting	
-[] Speed J0G → Position J0G	
- Bo Motor parameters	
- © Mechanical analysis - B Message monitoring EPOS position jog	*
Contrast output	
+ Reset to zero EPOS_JOG1 position 1000 LU	
EPOS JOG2 position EPOS JOG2 position LU	
-15 Dynamic brake measurement increment.	
Graphical configuration	
Writing Upload Parameters parameters	
Paralineters paralineters	
	▼
Servo software version:4301.0 FPGA version:4301.0 💡 Fault 🌻 Emergency stop:NO 🏖 Connection Status:Online Speed feedback:0 rpm Position feedback:-4 p Torque r	reference:0.0 % System Time 2023-05-05:09:26:56

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.

eneral Project profinet_sv660f Program Recoverset default Control	r to Rotation alue direction Connet Disconnect Communication station number modification General	UI Styl
rk Space 🛛 🕂 🗙	[profinet.sv660f]Message monitoring ×	
Project ⇒ NewProject2023-05-05 ⇒ NewProject2023-05-05 ⇒ Open Param File → Continuous 0sc → Open wave data file → Dirigger Setting → Param Monitor → Multi-machine recipe ⇒ Opfinet.sv000[192.108.0.00] → DiParam List	Current message: 1	PZD Structure and value
- Param List - Tuning	Receive direction	Transmit direction
- IO Setting	Control word 1 (STW1)	✓ Status word 1 (ZSW1)
☐ Speed JOG ← Position JOG ← Motor parameters ← Motor parameters ← Message monitoring ← Positions - object ← Positions - object ← Blackbox ← Blackbox ← Blackbox ← Graphical configuration	Message Message Description Message Value H29.00 Control word 1 (STU1) OH bit0 1 = Pulse enable allowed 0 0 bit1 1 = Without OFF2 (pulse enable allowed): 0 0 bit1 1 = Without OFF2 (pulse enable allowed): 0 0 bit3 1 = allow operation 0 = disable operation 0 bit4 1 = Ramp function generator available 0 0 bit5 1 = Ramp function generator available 0 0 bit6 1 = Setpoint enabled 0 0 bit7 Rising edge-triggered, response fault 0 0 bit9 Reserved 0 0 0 bit10 1 = Controlled by PLC 0 0 0 bit11 Reserved 0 0 0 0 bit12 Reserved 0 0 0 0	Message Message Message Description H29.50 Status word 1 (2SH) bit0 1 = Ready to switch on, control bit1 1 = Ready to run, main circuit bit2 1 = Enable bit3 1 = Fault bit4 1 = Coast to stop invalid (OFF3 bit5 1 = Quick stop invalid (OFF3 bit6 1 = Switch-on prohibit bit7 1 = Marning occurred bit8 1 = Speed deviation within t bit01 1 = meet or exceed the comparison bit1 1 = Limit of I. M or P rea bit2 1=Open motor holding br bit3 1 = No motor over temperatur

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

Fu	nction	IO-Controller			
Co	ontroller	NRT	RT	IRT	
	S7-1500	✓	✓	✓	
	S7-1200	<	<	×	
<u> </u>	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

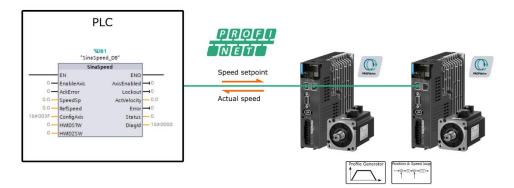
How drives are integrated into automation solutions largely depends on the application. There is an extremely wide range of drive applications in automation solutions. SV660F can cover three classes of applications, depending on the market segment and device implementation. The application classes supported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



PROFIdrive application classes (AC1, AC3, AC4)						
AC	AC Applications					
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	Single-axis positioning	YES				
(AC 4)	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.

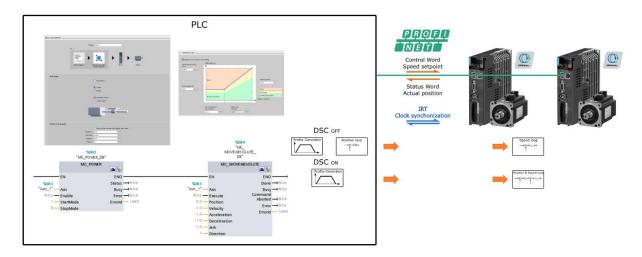
PLC %D *SinaPc EN	B1 os_DB*	PROFI NET		
0 → ModePos 0 ← EnableAis Cancel 1 → Traversing 1 → Stop 0 → Positive 1 → Stop 0 → Positive 1 → Jog1 0 → Jog1 0 → Jog1 0 → AckEror 0 → AckEror 0 → AckEror 0 → ExecuteMode 0 → Position 0 → Velocity 100 → OverAcc 100 → OverDec 169000_0000 ← ConfigEps	AvisEnabled 0 AvisPocDk 0 AvisPocDk 0 AvisPocDk 0 AvisPot 0 AvisPo	Positioning commands Control Word Positioning status Status Word	The second secon	Particle A Speed to: Particle A Speed to:

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.

Margare	Maximum number of PZDs (one PZD = one word)				
Message	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	10	2	10)5
Application Mode	AC	21	AC	1	A	04	AC	4	AC	64
PZD1	STW1	ZSW1	STW1	ZSW1	STW1	ZSW1	STW1	ZSW1	STW1	ZSW1
PZD2	NSOLL_A	NIST_A								
PZD3			NSOLL_B	NIST_B	NSOLL_B	NIST_B	NSOLL_B	NIST_B	NSOLL_B	NIST_B
PZD4			STW2	ZSW2	ZSW2	STW2	ZSW2	STW2	ZSW2	STW2
PZD5					G1_STW	G1_ZSW	MOMRED	MELDW	MOMRED	MELDW
PZD6							G1_STW	G1_ZSW	G1_STW	G1_ZSW
PZD7						G1_XIST1			VEDD	
PZD8						G1_XIST2		G1_XIST1	XERR	G1_XIST1

PZD9					KDC	C1 VICT2
PZD10				G1_XIST2	КРС	G1_XIST2

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					
PZD7	MDI_TARPOS	XIST_A			

PZD8	MDI_VELOCITY		
PZD9		NIST_B	
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	116	4000H≒Rated speed
NSOLL_B	Set speed B value	Receiving word	132	40000000H≒Amount constant speed
NIST_A	Current speed A value	Sending word	116	4000H≒Rated speed
NIST_B	Current Speed B value	Sending word	132	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	116	4000H≒Maximum torque moment
MELDW	message	Sending word	<u>U</u> 16	
MDI_TARPOS	MDI position	Receiving word	132	1H≒1 LU
MDI_VELOCITY	MDI speed	Receiving word	132	1H≒1000 LU/ min
MDI_ACC	MDI acceleration multiplier	Receiving word	116	4000H≒100%
MDI_DEC	MDI deceleration multiplier	Receiving word	116	4000H≒100%



XIST_A	Position A actual value	Sending word	132	1H≒1 LU
OVERRIDE	Position speed multiplier	Receiving word	116	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	116	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	116	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 generator0 = 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)

Signal		Descr	iption	
G1_STW.0	When G1_STW.7 = 0, search for reference point 1 When G1_STW.7 = 1, the rising edge of probe 1			
G1_STW.1	When set to 1: When G1_STW.7 = 0, search for reference point 2 When G1_STW.7 = 1, probe 1 falling edge			
G1_STW.2	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			
G1_STW.3	When set to 1: When G1_STW.7 = 0, search for reference point 4 When G1_STW.7 = 1, the falling edge of probe			
G1_STW.4	G1_STW.4	G1_STW.5	G1_STW.6	Definition
	0	0	0	No activation
G1_STW.5	0	0	1	Activate the selected function
				Selected function
	0	1	0	read value
G1_STW.6	0	1	0	
G1_STW.6 G1_STW.7		1 nent	-	read value
	0 1 = real-time measurer	1 nent	-	read value
G1_STW.7	0 1 = real-time measurer 0 = search for referenc	1 nent e point	-	read value



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 on0 = Ready not switched on
ZSW1.1	1 = ready for operation, main circuit powered0 = 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 active0 = Inhibit on Disabled
ZSW1.7	1 = Warning present 0 = no warning
ZSW1.8	1 = Speed error is within tolerance0 = 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 tolerance0 = 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	$1 = Motor rotates forward (n_act \ge 0)$ 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 tolerance0 = 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

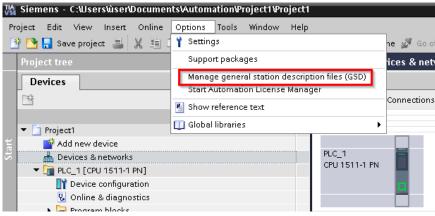
POS_ZSW2.6 -POS_ZSW2.7	reserved
POS_ZSW2.8	1 = absolute positioning 0 = relative positioning
POS_ZSW2.9	1 = run in positive direction
POS_ZSW2.10	1 = run in negative direction
POS_ZSW2.11	reserved
POS_ZSW2.12	 1 = continuous transmission 0 = MDI block change is activated with a rising edge on the traversing 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

Manage general station of	lescription files			×				
Installed GSDs GSDs in the project								
Source path: C:\Progra	m Files\Siemens\Automat	tion\Portal V14\Bi	in	[]				
Content of imported path								
File	Version	Language	Status	Info				
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			Delete	Install Cancel				
Manage general station o		_	_	×				
	Ds in the project	=		×				
		=	×	X				
Installed GSDs GSI Source path: C:\Progre	Ds in the project	-	×					
Installed GSDs GSI Source path: C:\Progre Content of imported pa	Ds in the project	-	×					
Installed GSDs GSI Source path: C:\Progre	Ds in the project Browse For Folder		×					
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3. Select the file and click on the "Install" button



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Installed GSDs	Installed GSDs GSDs in the project					
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GSDML-V2.4-In	iovance-SV660F-20	V2.4	English, Chi	Not yet installed	SV660F	
<						>
				Delete Install	Cance	el 🔤

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

	Installatio	on				
			Installation of GSD files			
		The insta	allation may take some time.			
				Ren	naining time in seconds: 7	
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Man	age general	station d	escription files			×
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Ľ	motanatio	n was com	preced successionly.			
	Save	log	Install additional fil	es	Close	

8.2 PROFINET RT

8.2.1 AC1 MODE

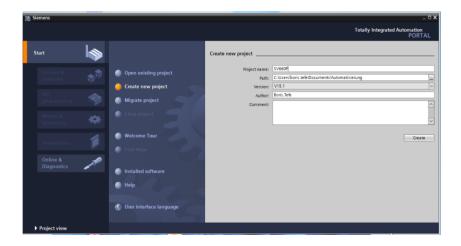
8.2.1.1 OVERVIEW

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.

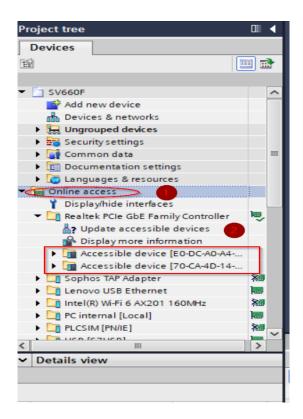
8.2.1.2 CONFIGURATION POINTS

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.

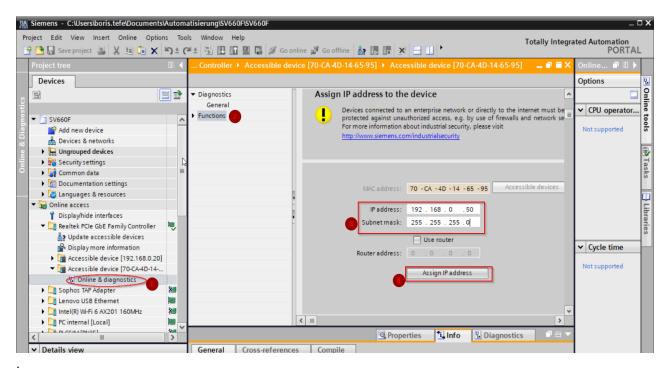


3. Install GSD file. On Tia portal \rightarrow Options \rightarrow Manage General Station Description File. Choose the Path where the GSD file is stored and install.

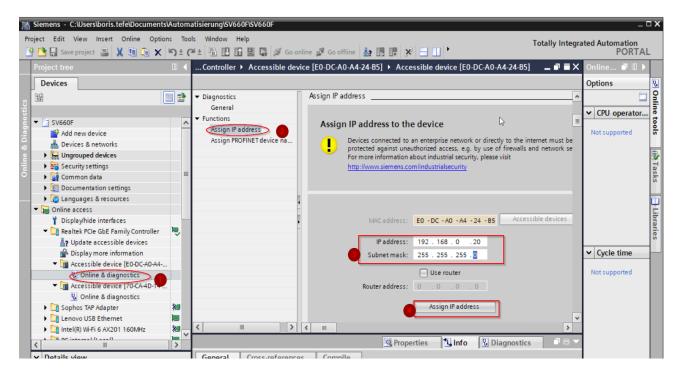
ľ	danag <mark>k</mark> genera	al stat	tion description	files			×	
	Installed GSE	Ds	GSDs in the p	oroject				
	Source path:	C:\U	sers\boris.tefe\INC	OVANCE TECHN	OLOGY EUROPE	GMBH\Motion Solutions (Sroup - [] []	
	Content of im	porte	d path					
	File			Version	Language	Status	Info	
	GSDML-V2.4	-Inova	nce-SV660F-20	V2.4	English, Chi	Already installed	SV660F	
	<							
	Delete Cancel							

4. Assign IP address to our physical devices

IP address Servo drive

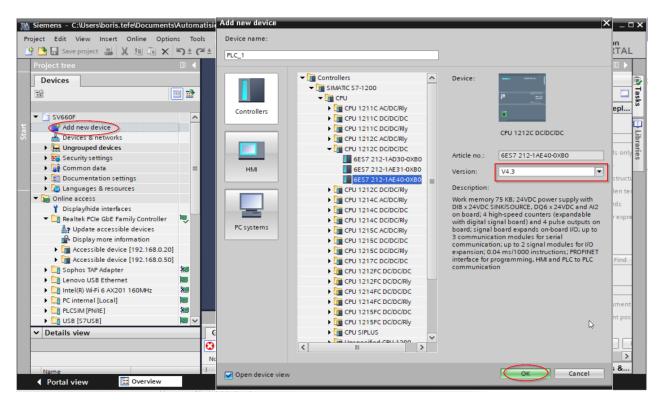


IP address PLC

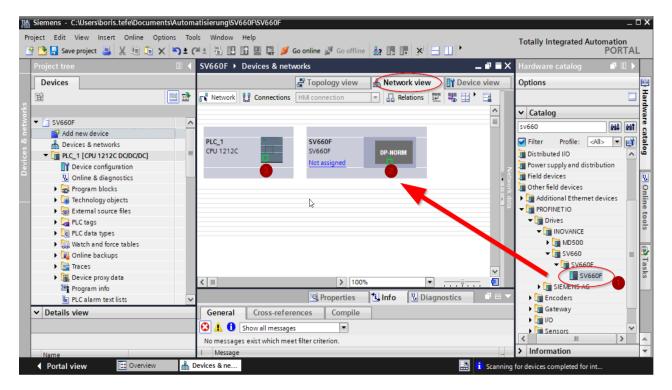


5. Add our devices to the project.

Add a PLC



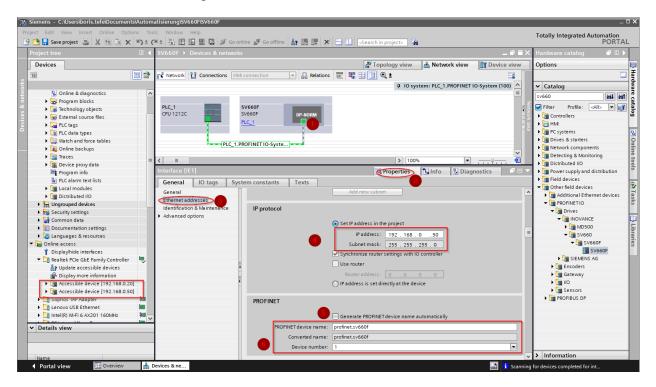
Add the Servo drive: Switch to network view and find the Servo drive in the list and double click and establish a connection with the PLC.



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

渦	Siemens - C:\Users\boris.tefe\Documents\Auton	mati	sierung\SV660F\SV660F						_ 🗆 X
Pro	oject Edit View Insert Online Options To	pols	Window Help						
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rks							Online access		
ž.	External source files	~					Type of the PG/PC interface:	PN/IE	
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	C PLC data types Watch and force tables			SV660F DP-NORM			PG/PC interface:	Realtek PCIe GbE Famil	y Controller 🔹 👻 🔯
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	En Documentation settings	ь	PROFINET interface [X1]						
	Languages & resources		Identification & Maintenance	Plant designation:					
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	 Display more information Improfinet.cpu [192.168.0.20] 								6
	Accessible device [192.168.0.20]								•
	Sophos TAP Adapter		-	-					
	Lenovo USB Ethernet			•	Online status information				
	Intel(R) Wi-Fi 6 AX201 160MHz			-	Search completed	l. 1 of 2 devices we	re found.		
	PC internal [Local]								
	PLCSIM (PN/IE)	Ŀ.							
	USB [S7USB]				<				>
		×							
	✓ Details view								Close

For the PLC

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

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		O IP address is set directly at the device	
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		PROFINET device name is set directly at the device	
		PROFINET device name: profinet.cpu Converted name: profinet.cpu	
		Device number: 0	< III >
			> Information
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• Assign a device name.

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. 🛍 📃 🖻	R Network Connections HM	connection 💌 🔒 Relations 🕎			Dev	vice type:	CPU 1212C DC/DC/DC		
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Device proxy data	< III				Only show	devices wit	hout names		
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Local modules				IP address	MAC address	Device	PROFINET device nar		
Distributed I/O	General Hardware identifier	Hardware identifier		192.168.0.20	E0-DC-A0-A4-24-B5	S7-1200	profinet.cpu	💙 ок	
Ungrouped devices	Overview of addresses								
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🕨 🙀 Common data		Hardware identifier 269							
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Display/hide interfaces Sealtek PCIe GbE Family Controller								Update list	Assign name
Realtek PCIe GbE Family Controller									
Display more information	-								
Accessible device [192.168.0.20]			Online status information						
Accessible device [192.168.0.50]	-		6 Search completed	1 of 2 devices we	re found				
Sophos TAP Adapter						assigned to	MAC address *E0-DC+/	0-A4-24-B5".	
Enovo USB Ethernet			-						
▶ 🛄 Intel(R) Wi-Fi 6 AX201 160MHz 🛛 👹			<						>
✓ Details view									
▼ Details view									
									Close
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 $1 \rightarrow$ right-click properties \rightarrow system constants \rightarrow hardware identifier

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2		✓ Catalog					
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▼ PLC 1 [CPU 1212C DC/DC/DC]	Port 1 0 0	▼ Thead module					
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Program blocks	Parameter Access Point 0	Module 0					
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External source files	13						
PLC tags	2	INOVANCE Supplementary Tele					
PLC data types	0	Standard Telegram 1,PZD-2/2					
Watch and force tables	0 4	Standard telegram 102, PZD 2					
Online backups	0 5	Standard telegram 105, PZD Standard telegram 110, PZD Standard telegram 111, PZD					
Traces	v 0 6	Standard telegram 110, PZD					
Device proxy data		Standard Telegram 111,PZD					
Program info	Standard Telegram 1,PZD-2/ 🔯 Properties 🚺 Info 😨 Diagnostics 💷 🗖 🗖	Standard Telegram 2,PZD-4/4					
PLC alarm text lists		🚺 Standard Telegram 3,PZD-5/9 🛄					
Local modules	General IO tags System constants Texts	Standard telegram 7, PZD-2/2					
Distributed I/O	Show hardware system constant 👻	Standard telegram 9, PZD-10/5					
▼ Hand Ungrouped devices	Name Type Hardware ide	Standard telegram 7, PZD-2/2 Standard telegram 9, PZD-10/5 Supplementary Telegram 75					
✓ Details view	SV660F~PROFIdrive_Module_1~Standard_Telegram Hw_SubModule 279						
Module		1					
	• • • • • • • • • • • • • • • • • • •						
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Portal view Dverview SV660F	🔝 🗸 Conn	ection to PLC_1 terminated.					

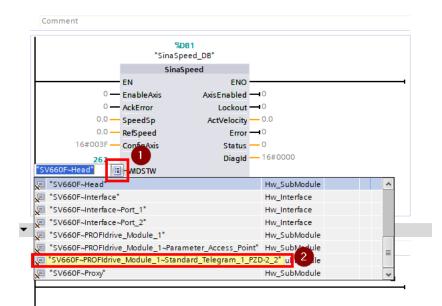
9.Drag and drop the SINA_Speed (FB285) (to find in the Sinamics library) function block into the programming network in OB1.

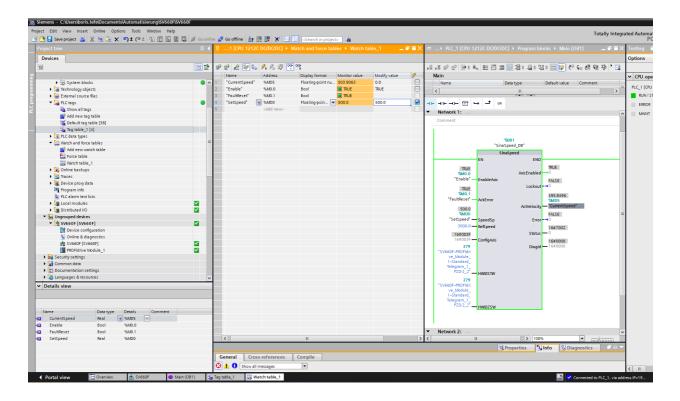
V660F AC3 Example → PLC_1 [CPU 1511-1 PN] → Program blocks → Main [OB1]	_ # =×	Instructions 🛛 🗊 🗊
		Options
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	1	✓ Basic instructions
		Name
Block title: "Main Program Sweep (Cycle)"		🕨 🛅 General 🖉
Comment		General General General Generations
Nature 1		 Timer operations
Network 1:		End Counter operations
Comment		Comparator operations
		Math functions
%DB1 "SinaSpeed DB"		
SinaSpeed		Extended instructions Name
EN ENO		Date and time-of-day
0 — EnableAxis AxisEnabled →0		String + Char
		Process image
0.0 — SpeedSp ActVelocity — 0.0		Distributed I/O
0.0 RefSpeed Error		PROFlenergy
16#003F ConfigAxis Status 0		Module parameter assig.
0 HWIDSTW Diagld - 16#0000		<
0 — HWIDZSW		> Technology
	•	> Communication
		 Optional packages
Network 2:		Name
Comment		SIMATIC Ident
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		SinaInfeed
		Energy Suite extensions
100%	• <u> </u>	

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.









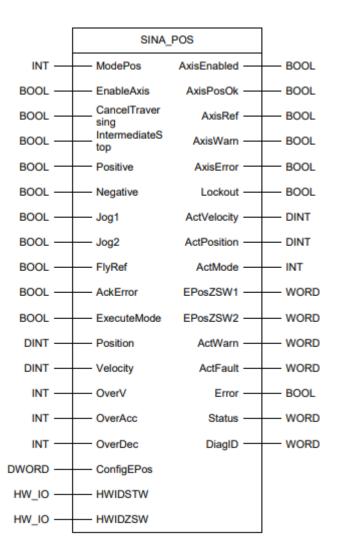
8.2.2 AC3 MODE

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	Туре	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#0000003	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

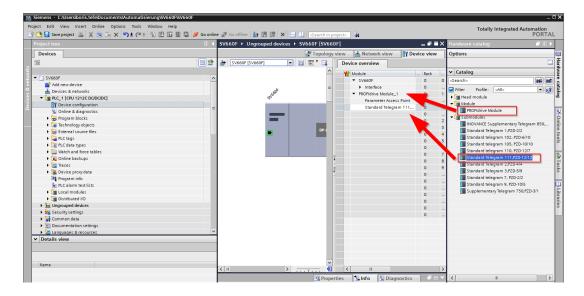
Output parameters								
Name	Туре	Start Value	Function					
Status	WORD	0	Display of status values: 16#7002: no fault 16#8401: Fault in the drive 16#8402: On-inhibit 16#8403: Homing on the fly could not be initiated 16#8600: DPRD_DAT error 16#8601: DPWR_DAT error 16#8202: incorrect mode selected 16#8203: 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 <i>E952.0: Reverse overtravel warning</i> is shown as COO 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 E S O O 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** \rightarrow right-click properties \rightarrow system constant



8.2.2.3 CALL FB300 FUNCTION BLOCK (SINA_POS) AND TEST

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👻 🖝 🖸 SV660F			Data type	Default value	Comment	1	"Actualposition"	%MD18	DEC+/-	-828928	mouny value	0	✓ CPU operato
Add new device				Derault value		2	"enable_axis"	SM10.0	Bool	TRUE			PLC_1 (CPU 121)
Authewidevice Authewidevice Authewidevice Authewidevice	<		-		>	4	"ExecuteMode"	%M12.1	Bool	FALSE			RUN / STOP
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Add new tag table	1	9	AxisRef			E							
Solution tag table [38]	TRUE	internediateSt		FALSE		E .							
Tag table_1 [4]	1.	ab	AxisWem			E							
Sa Tag table_2 (8)	FALSE			FALSE									
See The Second Seco	•	Pasitive	AxisEma										
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	"jog" -	Jog1		-828667		E							
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✓ Details view	FALSE		EPes25W	16#0400		E .							
	· · ·	AckError	EPos2SW1	-0		E .							
	FALSE M12.1		EPISESWO	16#0020		E .							
	"Execute/foold"	ExecuteNode	EPOSED NE	16#0000		E .							
Name Data type Details Comment			ActVen	0		E .							
Actualposition DInt 1 %MD18 .	NARW16			16#0000		E .							
configEpos DWord %MD12		- Rasision	Act suit			E .							
enable_axis Bool %At10.0	256			FALSE		E .							
ExecuteMode Bool %M12.1	%MW12		Error	-0		E .							
ig Bool %M12.0	"velocity" -	-Welocity		16#7002									
a mode Int %MMO	100	0 wW	Status										
Position Int %AW/16		Overv	Diagld	16#0000									
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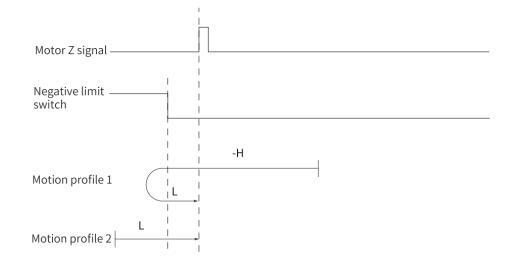
8.2.2.4 MESSAGE 111 RETURN TO ZERO MODE

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.

H25.22=2

Home: motor Z signal

Deceleration point: positive limit switch

Motor Z signal	
Positive limitswitch	
Motion profile 1	
Motion profile 2	

- 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



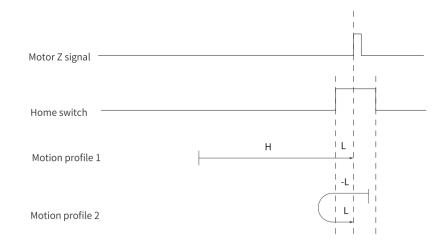
Motor Z signal ————————————————————————————————————	
Home switch	
Motion profile 1	
Motion profile 2	

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

H25.22=4

Home: Z signal

Deceleration point: home switch (HW)



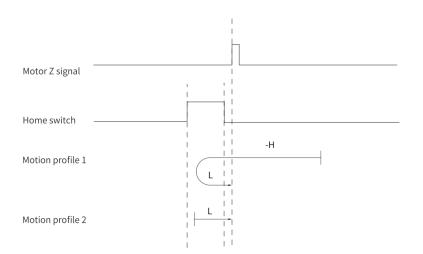
- Motion profile 1: deceleration point signal inactive at start
- Motion profile 2: deceleration point signal active at start.

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



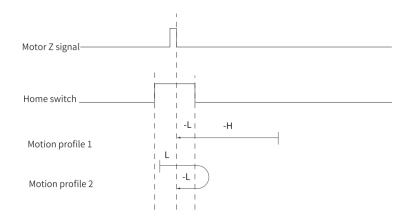


- Motion profile 1: deceleration point signal inactive at start
- Motion profile 2: deceleration point signal active at start.

H25.22=6

Home: Z signal

Deceleration point: home switch (HW)



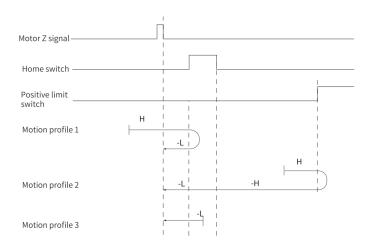
- Motion profile 1: deceleration point signal inactive at start
- Motion profile 2: deceleration point signal active at start.

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



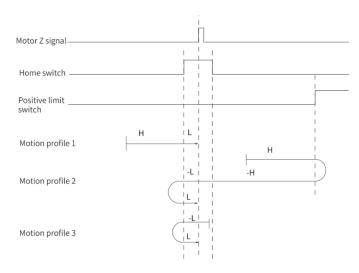


- Motion profile 1: deceleration point signal inactive at start, not hitting the positive limit switch.
- Motion profile 2: deceleration point signal inactive at start, hitting the positive limit switch.
- Motion profile 3: deceleration point signal active at start.

H25.22=8

Home: Z signal

Deceleration point: home switch (HW)



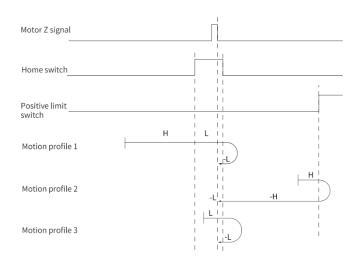
- Motion profile 1: deceleration point signal inactive at start, not hitting the positive limit switch.
- Motion profile 2: deceleration point signal inactive at start, hitting the positive limit switch.
- Motion profile 3: deceleration point signal active at start.

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



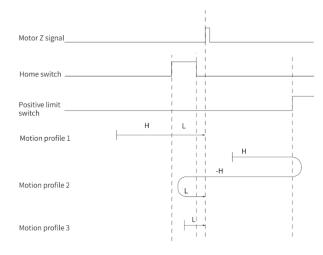


- Motion profile 1: deceleration point signal inactive at start, not hitting the positive limit switch.
- Motion profile 2: deceleration point signal inactive at start, hitting the positive limit switch.
- Motion profile 3: deceleration point signal active at start.

H25.22=10

Home: Z signal

Deceleration point: home switch (HW)



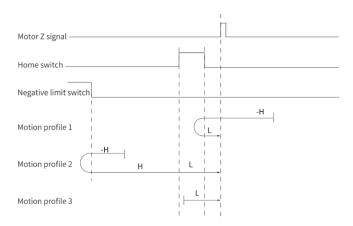
- Motion profile 1: deceleration point signal inactive at start, not hitting the positive limit switch.
- Motion profile 2: deceleration point signal inactive at start, hitting the positive limit switch.
- Motion profile 3: deceleration point signal active at start.

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



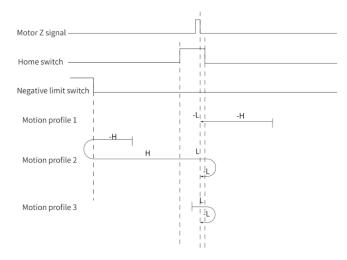


- Motion profile 1: deceleration point signal inactive at start, not hitting the positive limit switch.
- Motion profile 2: deceleration point signal inactive at start, hitting the positive limit switch.
- Motion profile 3: deceleration point signal active at start.

H25.22=12

Home: Z signal

Deceleration point: home switch (HW)



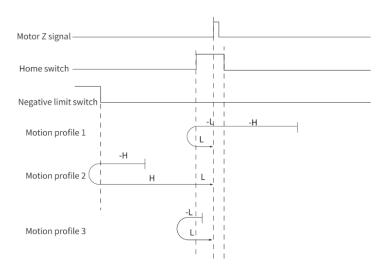
- Motion profile 1: deceleration point signal inactive at start, not hitting the positive limit switch.
- Motion profile 2: deceleration point signal inactive at start, hitting the positive limit switch.
- Motion profile 3: deceleration point signal active at start.

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



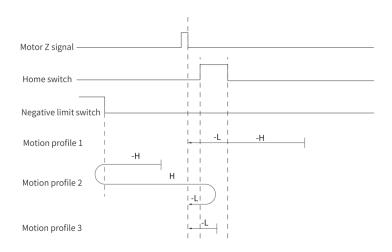


- Motion profile 1: deceleration point signal inactive at start, not hitting the positive limit switch.
- Motion profile 2: deceleration point signal inactive at start, hitting the positive limit switch.
- Motion profile 3: deceleration point signal active at start.

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.

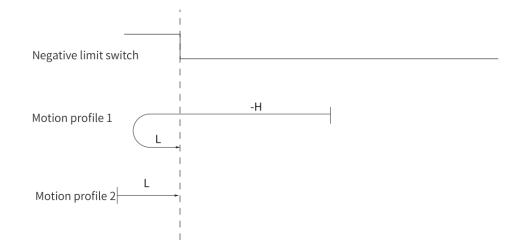
NOTE: "H" in the figure represents high-speed H25.23, "L" represents low-speed H25.25, and "-" represents reverse operation.

H25.22=17

Home: negative limit switch

Deceleration point: negative limit switch



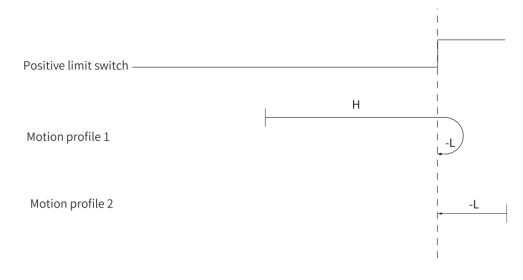


- Motion profile 1: deceleration point signal inactive at start.
- Motion profile 2: deceleration point signal active at start.

H25.22=18

Home: positive limit switch

Deceleration point: positive limit switch



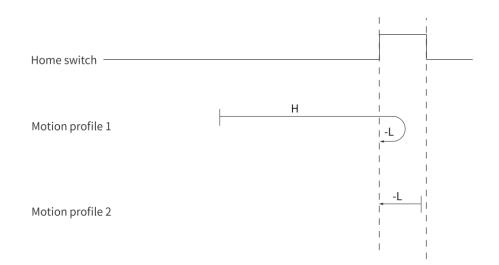
- Motion profile 1: deceleration point signal inactive at start.
- Motion profile 2: deceleration point signal active at start.

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)



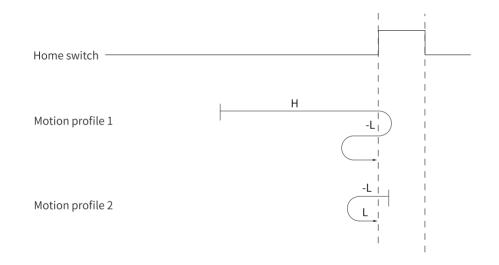


- Motion profile 1: deceleration point signal inactive at start.
- Motion profile 2: deceleration point signal active at start.

H25.22=20

Home: home switch (HW)

Deceleration point: home switch (HW)



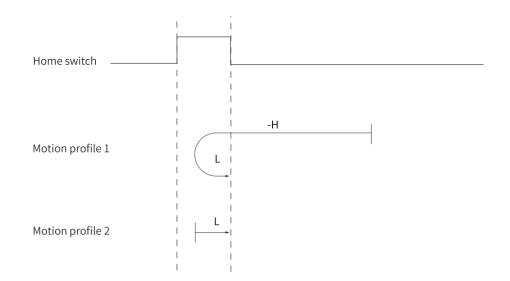
- Motion profile 1: deceleration point signal inactive at start.
- Motion profile 2: deceleration point signal active at start.

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)



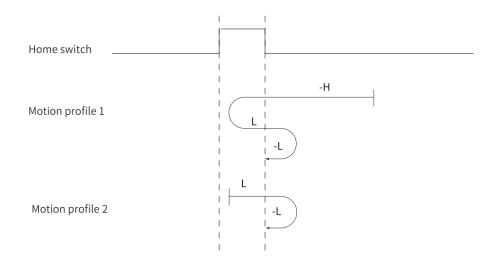


- Motion profile 1: deceleration point signal inactive at start.
- Motion profile 2: deceleration point signal active at start.

H25.22=22

Home: home switch (HW)

Deceleration point: home switch (HW)



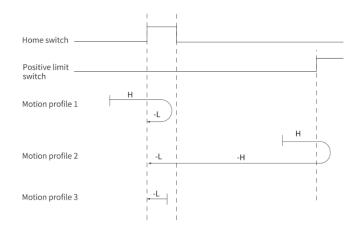
- Motion profile 1: deceleration point signal inactive at start.
- Motion profile 2: deceleration point signal active at start.

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)



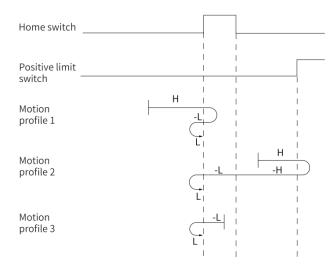


- Motion profile 1: deceleration point signal inactive at start, not hitting the positive limit switch.
- Motion profile 2: deceleration point signal inactive at start, hitting the positive limit switch.
- Motion profile 3: deceleration point signal active at start.

H25.22=24

Home: home switch (HW)

Deceleration point: home switch (HW)



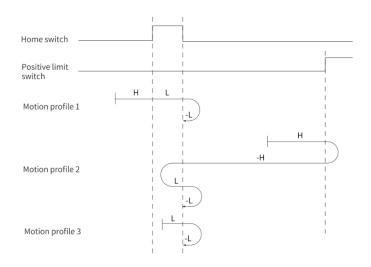
- Motion profile 1: deceleration point signal inactive at start, not hitting the positive limit switch.
- Motion profile 2: deceleration point signal inactive at start, hitting the positive limit switch.
- Motion profile 3: deceleration point signal active at start.

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)



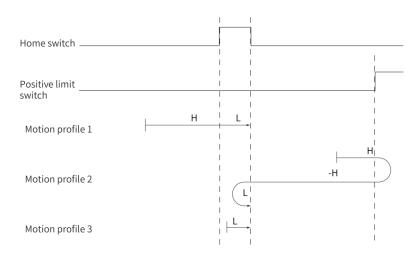


- Motion profile 1: deceleration point signal inactive at start, not hitting the positive limit switch.
- Motion profile 2: deceleration point signal inactive at start, hitting the positive limit switch.
- Motion profile 3: deceleration point signal active at start.

H25.22=26

Home: home switch (HW)

Deceleration point: home switch (HW)



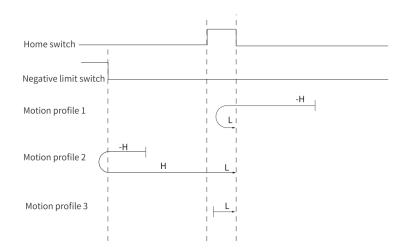
- Motion profile 1: deceleration point signal inactive at start, not hitting the positive limit switch.
- Motion profile 2: deceleration point signal inactive at start, hitting the positive limit switch.
- Motion profile 3: deceleration point signal active at start.

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)



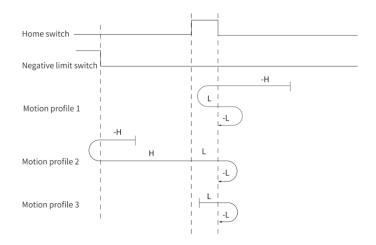


- Motion profile 1: deceleration point signal inactive at start, not hitting the negative limit switch.
- Motion profile 2: deceleration point signal inactive at start, hitting the negative limit switch.
- Motion profile 3: deceleration point signal active at start.

H25.22=28

Home: home switch (HW)

Deceleration point: home switch (HW)



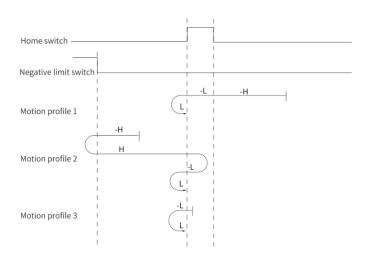
- Motion profile 1: deceleration point signal inactive at start, not hitting the negative limit switch.
- Motion profile 2: deceleration point signal inactive at start, hitting the positive limit switch.
- Motion profile 3: deceleration point signal active at start.

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)



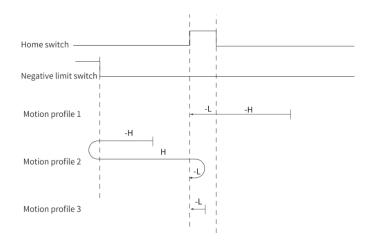


- Motion profile 1: deceleration point signal inactive at start, not hitting the negative limit switch.
- Motion profile 2: deceleration point signal inactive at start, hitting the negative limit switch.
- Motion profile 3: deceleration point signal active at start.

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.

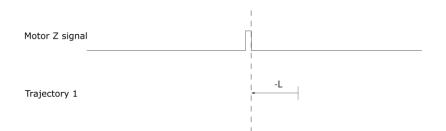
H25.22=33 and 34



Origin: Z signal

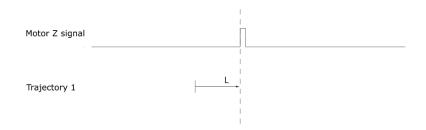
Deceleration point: none

<u>Mode 33:</u>



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.

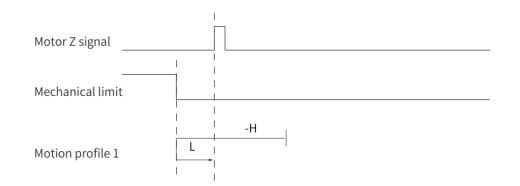
Motor Z signal		
		_
	Take the current position	

ake the current positior as the origin

H25.22= -1

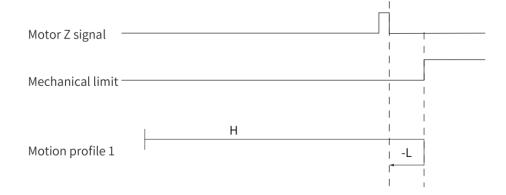
The motor runs in the reverse direction at high speed first. If the status where the torque reaches the limit and the speed is near zero after the axis hits the mechanical limit persists, it indicates the axis has reached the mechanical limit position. In this case, the motor runs in the forward direction 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:

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

- 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.

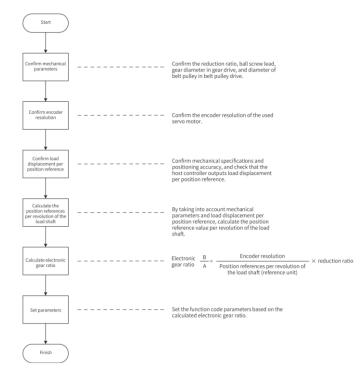
Through frequency division (electronic gear ratio smaller than 1) or multiplication (electronic gear ratio greater than 1) of electronic gear ratio, you can set the actual displacement of motor rotation or moving when the input position reference is one reference unit or increase the frequency of the 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.

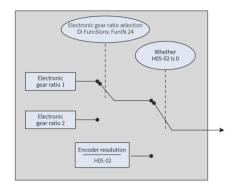
Procedure

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:

		Encoder
Electronic	В	resolution
gear ratio	A	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:

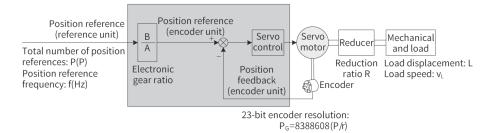
H05-02	DI Level Corresponding to FunIN.24	Electronic Gear Ratio
0	Invalid	H05-07/H05-09
0	Valid	H05-11/H05-13
1 to 1048576		

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

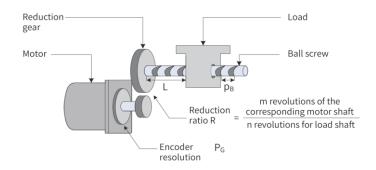
For example, for a 23-bit serial encoder of Inovance, its resolution is 2²³ (P/r), that is 8388608(P/r).

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:

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

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 $~^{V_{M}=}\frac{~V_{L}}{~p_{B}}~x\,R$ (r/s).

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

$$fx - \frac{B}{A} = v_M x P_G$$

Therefore, the electronic gear ratio is:

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

Setting Example

Step	Name		Mechanical Structure	2
	1	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.

General Project SV660F_1							
mergency Cancel Program Reset de Control	-	ation tion	enect Communication number moo General		tia Tuning IO		Param Continuous Network Generate debugg Ust Osc configuration information
ork Space 🗸 🗸	SV6	60F_1]Graphical confi	iguration ×				
Project www.project2023-01-27	Choose axis	9自1	~				
Open Param File Continuous Osc	Program se	gment setting wizard	EPOS Jog EP	DS setpoint configu	ration EPOS ram	p configuration Mechar	ical limit configuration
-Ca Open wave data file - Trigger Setting	Maximum	0	1000 L	U/s2	Maximum	0	1000 LU/s2
- Param Monitor	ID	Location (LU)	Speed (1000.	Acceleration r (Deceleration		
- So Multi-machine recipe	001	0	***		***		
⊖ 😎 SV660F_1[1]	002	***	***	***	***		
- Paran List	003	***	***	***			
Tuning 	004	***	***	*** 2	***		
- J Speed JOG	005	***	***	***			
Position IOG	006	***	***	***	***		
- S Bus motor parameters	007	***	***	***	***		
A Mechanical analysis	008	***	***	***			
- Message monitoring	009	***	***	***	***		
Contrast output	010	***	***				
+ Reset to zero	011	***	***		***		
- Device Information	012	***	***				
- 🌍 BlackBox	013	***	***		***		
-A Fault Management	014	***					
-% Dynamic brake measuremer	015	222	222	***			

InoDriverShop - SV660F_1[1]Param List									
General Project SV660F_1									
emergency Cancel Program R stop emergency stop	ecover to Rotation fault value direction	Communication station Inertia Tuning IO	Fault Mecha	anical Param Continu	ious Netw	ork Generate	e debugging		
Control	and value difection	General	ig management and	Function	connigui		manon		
lork Space 4 ×									
Project		uration SV660F_1[1]Param List ×							
NewProject2023-01-27	Parameter Group	Upload and save (Current page all) Upload and save (All tick options) Open recipe			nte all tick ons (current page)	VS Compare	Current page) Find	• General 1	
- Open wave data file	HOO[Servo notor param	Ax. Func. Description	Setting value	current value	Deta Min	mu Maximu.	Unit Modified ty.	Effective P	Precisio
Trisger Setting	H01[Servo drive parame			0	0 0	15	No mod	Innediate 0	0
- Param Monitor	HO2[Basic control para			1[Positioning]	1 1	8	Any mo	Stop m 0	0
- Shulti-machine recipe	HO3[Terminal input par			1[Positioning]		8	Any mo	Stop m 0	0
- SV660F 1[1]	H04[Terminal output pa H05[Position control p			1[Positioning]		8	Any mo	Stop m 0	0
Paran List	HOS[POSITION CONTROL p HOS[Speed control para	A. HL. Section 5 task		1[Positioning]		8	Any mo	Stop m 0	0
- Juning	# H07[Torque control para	A., H2 Paragraph 4 tasks		1[Positioning]		8		Stop m 0	
⊕ IO Setting	-* HO8[Gain parameters]	A., H2 Paragraph 5 tasks		I[Positioning]	1 1	8	Any mo	Stop m 0	0
-CI Speed JOG	HO9[Gain auto-tuning p	A., H2 Paragraph 6 tasks		1[Positioning]	1 1	8	Any mo	Stop m 0	0
- Position JOG	# HOA Fault and protecti	A., H2 Paragraph 7 tasks		1[Positioning]	1 1	8	Any mo	Stop m 0	0
- Bus motor parameters	HOB Monitoring paramet	A. H2 Paragraph 8 tasks		1[Positioning]		8	Any mo	Stop m 0	0
- @ Mechanical analysis	HOD[Auxiliary function	A., H2 Paragraph 9 tasks		1[Positioning]	1 1	S	Any mo	Stop m 0	0
A Message monitoring	HOE[Communication func	A., H2 Paragraph 10 task		1[Positioning]	1 1	8	Any mo	Stop m 0	0
Contrast output	H12[Multi-speed]	A., H2 Paragraph 11 task		1[Positioning]	1 1	8	Any mo	Stop m 0	0
+ Reset to zero	H17[Virtual DID0]	A., H2 Paragraph 12 tasks		1[Positioning]	1 1	8	Any mo	Stop m 0	0
- Device Information	H18[Position compariso			1[Positioning]	1 1	8	Any mo	Stop m 0	0
BlackBox	H19[Target location pa H24[PN Bus Communicati	A., H2 Paragraph 14 tasks		1[Positioning]	1 1	8	Any mo	Stop m 0	0
A Fault Management	H24 PN Bus Communicati			1[Positioning]		8		Stop m 0	
14 Dynamic brake measuremer	#H27[Block parameters]			0	0 -21	4 2147	LU Any mo	Stop m 0	0
Graphical configuration	H28[Block parameters]	A., H2 Paragraph 1 position		0		4 2147		Stop m 0	
	THEY HAVE PN message value	A., H2 2nd paragraph position		0			LU Any mo		
	H30[Communication read			0			LU Any mo		
		A., H2 4th paragraph position		0			LU Any mo		
				1			and it is the set		7

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.

											U
ngency Cancel Program R			t Disconnect Communi-					Iechanical Param	Continuour h	etwork Generati	B
top emergency stop reset de Control	ecover to Ro fault value dire	ction	number i General	nodification i	Inertia dentification	Setting N	Fault M danagement	analysis List Function	Osc con	letwork Generati figuration info	rmation
Space 4 × Project	Isve	60F_1]Graphi	al configuration 🗙 🍊	SV660F_1[1]Param List	-					
NewProject2023-01-27	Choose axi										
Continuous Osc		sgment setting			onfiguration			Mechanical lin	nit configuration		
Trigger Setting	Maximum	0		00 LU/92		Maximum	0		1000 LU/52		
- D Paran Monitor - D Multi-machine recipe - SV060F_1[1]	ID 001 002	Location (Lt		00Accelerate		ration					
Paras List	002										
	002 003 004 005										
Position JOG	006										
- Co Bus motor parameters - O Mechanical analysis	008										
	008										
+ Reset to zero	012										
 BlackBox Fault Management 	013		EPOS進行程序與的任	务设置						×	
Graphical configuration	015		ID Mission 2621 0 1[Positioning		0100x	Positioning m absolute	Subsequent	Logo	1		
			0. 1(Positioning	~)	absolute	Finish	Show			
			0. 11 Dealthoning 0. 21 Fixed stopp	e1.)	absolute	Finish	Show			
			04 Porward cys	ile]		absolute absolute	Finish	Show			
			0. 3 Forward cy 4 Negative cy 0. 5 Wait] 0. 6 Go to] 0. 7 Set IO])	absolute absolute	Finish Finish	Show			
			0 8[Reset IO] 0 1[Positioning			absolute	Finish	Show			
			0 1[Positioning 0 1[Positioning			absolute	Finish Finish	Show			
			0. 1[Positioning 0. 1[Positioning 0. 1[Positioning			absolute	Finish	Show			
)	absolute	Finish	Show			
			0 1[Positioning)	absolute	Finish	Show			
									OK	Cancel	
	Download	selected Up	oad all paramete	Task settings							

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:

Mission 2621	参数	Positioning mode	Subsequent conditions	Logo	
0 1[Positioning]	0	absolute	Finish	✓ Show	
0., 1[Positioning]	0	absolute	Finish	Show	
0., 1[Positioning]	0	absolute	Intermittent execution	Show	
0., 1[Positioning]	0	absolute	Continuous execution	Show	
0 1[Positioning]	0	absolute	Continue external execution Continue to wait outside	Show	
0 1[Positioning]	0	absolute	Continue to external alarm	Show	
0 1[Positioning]	0	absolute	Finish	Show	
0 1[Positioning]	0	absolute	Finish	Show	
0 1[Positioning]	0	absolute	Finish	Show	
0 1[Positioning]	0	absolute	Finish	Show	
0 1[Positioning]	0	absolute	Finish	Show	
0 1[Positioning]	0	absolute	Finish	Show	
0 1[Positioning]	0	absolute	Finish	Show	
0 1[Positioning]	0	absolute	Finish	Show	
0 1[Positioning]	0	absolute	Finish	Show	
0 1[Positioning]	0	absolute	Finish	Show	

- **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	-3276832767	0
H29.24	Torque upper limit	-3276832767	16384
H29.25	Torque lower limit	-3276832767	-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

	5	루 Тор	ology vie	w 🖁	Network v	iew 📑 Device	view
Device overview							
Y Module		Rack	Slot	I address	Q address	Туре	Article
✓ ▼ SV660F		0	0			SV660F	INOVA.
 Interface 		0	0 X1			SV660F	
Port 1		0	0 X1 P1			Port 1	
Port 2		0	0 X1 P2			Port 2	
PROFIdrive Module_1		0	1			PROFIdrive Module	
 Parameter Access Point 		0	11			Parameter Access P	
Standard Telegram 111,PZD-12/12		0	12	023	023	Standard Telegram	
Supplementary Telegram 750,PZD		0	13	2425	2429	Supplementary Tel	

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 =
$$\frac{16384}{300\%}$$
 · 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:

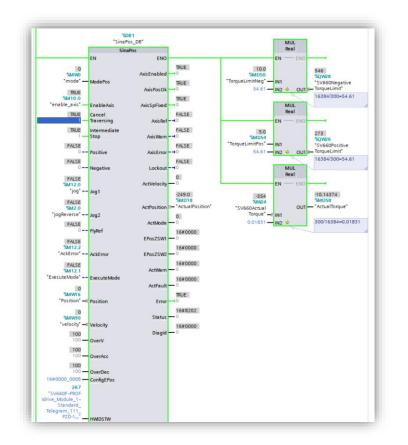
Torque limit value $= \frac{16384}{300\%} \cdot 10\% = 546.13$

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

Actual torque (%) =
$$\frac{300\%}{16384} \cdot M_{ACT}$$

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 \approx -10%. The values are scaled according to the formulas described above:

								- T 🗗	ags 🔳 User	constants
ý,) 🕾 🐨 🛍								
9	Torque	Limit								
	N	lame	Data type	Address	Retain	Acces	Writa	Visibl	Supervision	Comm
	-0	SV660ActualTorque	Int	%IW24	-					
2	-	TorqueLimitPos	Real	%MD54	Image: A start and a start					
	-	TorqueLimitNeg	Real	%MD50	Image: A start and a start					
ł.	-00	SV660NegativeTorqueLimit	UInt	%QW28						
5	-	SV660PositiveTorqueLimit	UInt	%QW26						
5	-00	ActualTorque	Real	%MD58						
7		<add new=""></add>								





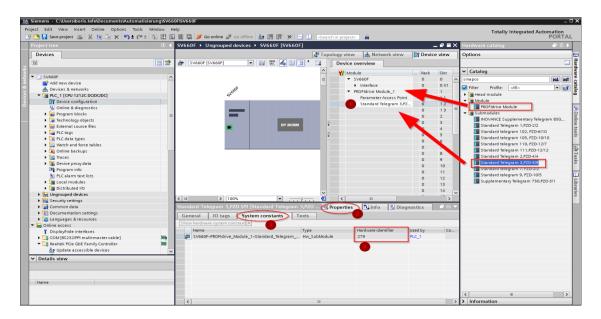
8.2.3 AC4 MODE

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**

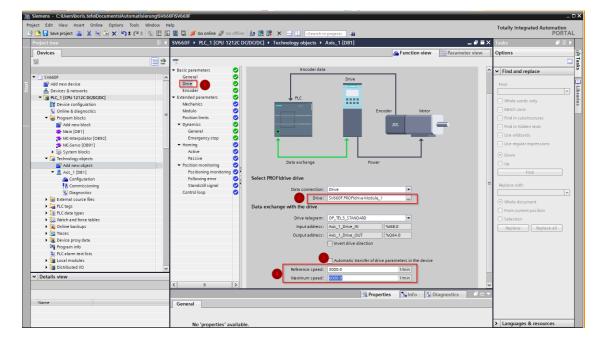


1.Add a new technology object.

Siemens - C:\Users\boris.tefe\Documents\Automatisierung\SV66	\\$V660F	_ ¤ ×
Project Edit View Insert Online Options Tools Window H		Totally Integrated Automation
	🖳 🙀 🕼 Go online 🖉 Go offline 🛔 🖪 🖪 🛠 🚍 🛄 🤇earch in project>	PORTAL
Project tree 🔲 🖣	SV660F → PLC_1 [CPU 1212C DC/DC/DC] → Technology objects → Axis_1 [DB1]	Tasks 🔊 🗊 🗊 🕨
Devices	Se Function view	Options
🖬 📰 📰	30 ∿ ⊳	
	Add new object	v Find and replace
▼ SV660F		m
Add new device	Name: Axis_2	Find:
S Bevices & networks	N05_2	v ibra
PLC_1 [CPU 1212C DC/DC/DC] Device configuration	Name Version Type: 🎊 TO_PositioningAvis	Whole words only
Online & diagnostics		Match case
Program blocks	- Aves - Number: 3	Find in substructures
Add new block	TO_PositioningAvis V6.0 Manual	Find in hidden texts
Main (OB1)	Motion control — Avis Control — Avis Control — Avis Control —	
System blocks	TO CommandTable V60	Use wildcards
 Technology objects 	Description:	Use regular expressions
Add new object	The "Positioning axis" (TO_PositioningAxis) Drive technology object maps a physical drive in	Down
▼ 🦹 Axis_1 [DB1]	the controller.	Oup
Configuration	PID You can issue positioning commands to the drive by means of the user program with	
R Commissioning	PLCoper motion control instructions.	Find
Diagnostics External source files		Replace with:
Letternal source nies La PLC tags		vepiace with:
PLC data types	- <u>BCC</u>	
Watch and force tables	SIMATIC Ident	Whole document
Online backups	Showing defit	 From current position
Traces		O Selection
Device proxy data		Replace Replace all
Program info		
PLC alarm text lists		
Local modules	< m >	
Distributed I/O	> Additional information	
Europed devices Security settings	· Additional information	
	Add new and open OK Cancel	
✓ Details view		
Name		
		> Languages & resources

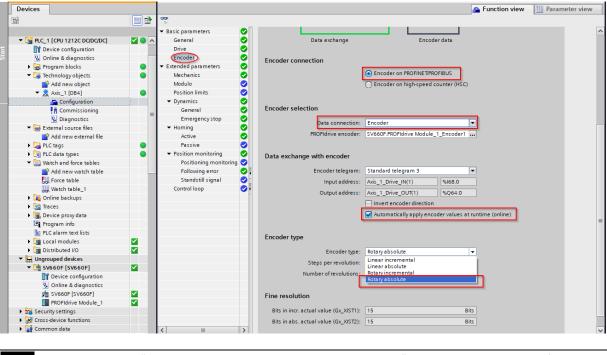
- ens C:\Users\boris.tefe\Documents\Automatisierung\S TA Siem ect Edit View Insert Online Options Tools Window Help C Sweproject S X 1:0 → X S ± (A ± 7½) [[] S 2 → Ø Go Totally Integrated Automation Ar 10 10 SV660F + PLC_1 [CPU 1212C DC/DC/DC] + Technology objects + Axis_1 [DB1] _ # = X Devices Find and replace General General tended parame Mechanic Add new device Devices & networks PLC_1 (CPU 1212C DC) Device configuration Configuration Configuration Technology object - Axis Axis name: Axis 1 Nechanics Position lim Dynamics General Emerger Homing J.L. i., -rt. . * 1 Active Passiv 110 Drive agnostics Analog drive cor PLC tags A PROEIdraw Watch and wrong Online backups Unit of 推 tion change (1400:0 PLC alarm text Attention: Some part the type of the drive. uped devi E Ur Details view Linfo Diagnostics Properties No 'properties' available
- 2. Select "Profidrive" and "Standard telegram 3" in the configuration

3. Set Reference and maximum speed value



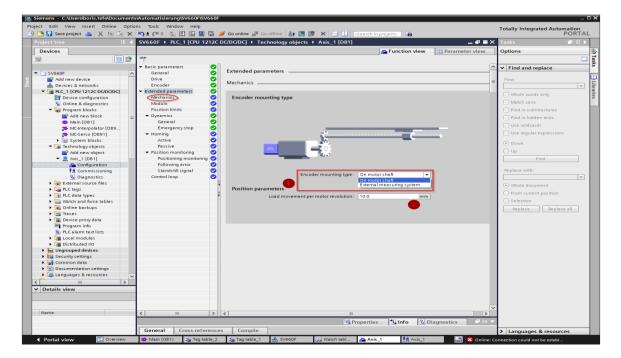
If the reference speed, maximum speed, and reference torque of the motor cannot be checked "Automatically apply drive value when running", it needs to be rooted. Manually set according to drive parameters. The reference speed is the rated speed of the motor, corresponding to the servo parameter H00.14. 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	0
HU7.07	Torque innit source	5: PROFINET torque limit	0
H29.23	Additional torque	-3276832767	0
H29.24	Torque upper limit	-3276832767	16384
H29.25	Torque lower limit	-3276832767	-16384

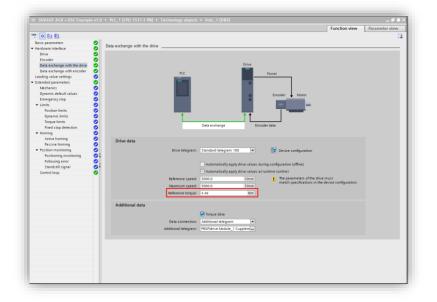
To be able to use the torque limits from the PLC it is necessary to add telegram 750 in the SV660F configuration.

SV660F AC4 + DSC	Example v1.0 → Ungroupe	ed devices 🕨 SV660F [SV660F]					_ • •	ХН	lardware catalog 🛛 🗖 🛙
			🛃 Topology	y view	🔥 Netw	ork view	Device view	0	ptions
SV660F [SV660F]	💌 🖽 🔛 🎽	Device overview							
	^	Module	Rack	Slot	l address	Q address	Туре	~	Catalog
		 SV660F 	0	0			SV660F	I <	Search>
		Interface	0	0 X1			SV660F		Filter Profile: All>
SV660F		 PROFIdrive Module_1 	0	1			PROFIdrive Module		Head module
5		Parameter Access Point	0	11			Parameter Access P.,		Module
		Standard telegram 105, PZD-10/10	0	12	019	019	Standard telegram		Submodules
_		Supplementary Telegram 750,PZD-3/	1 0	13	2021	2025	Supplementary Tel	1	INOVANCE Supplementary Telegram
_			10	2					Standard Telegram 1,PZD-2/2
	DP-NORM		0	3					Standard telegram 102, PZD-6/10
	DI- MONUM		0	4					Standard telegram 102, F2D-010
			0	5					Standard telegram 105, F20-1010
			0	6					Standard Telegram 111,PZD-12/12
			0	7					Standard Telegram 2,PZD-4/4
			0	8					Standard Telegram 3,PZD-5/9
			0	9					Standard telegram 7, PZD-2/2
			0	10					Standard telegram 9, PZD-10/5
			0	11					Supplementary Telegram 750,PZD-3
			0	12					Supplementary lelegram 750,P2D-3

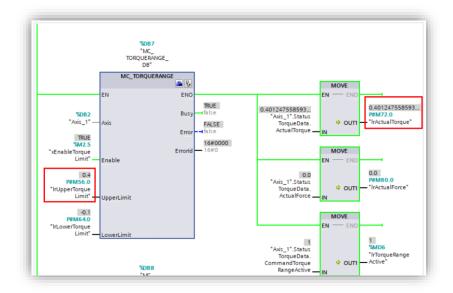
To limit the torque of the drive, the FB *MC_TorqueRange* is used. The units used by this block are in Nm. In order for the drive to limit the torque correctly, it is necessary to configure the peak torque of the motor in the configuration of the technology object.

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 \approx 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

渦	Siemens - C:\Users\boris.tefe\Documents\Automatisi	rrungISV660FISV660F	_ 🗆 X
Pr	oject Edit View Insert Online Options Tools	Mindow Help Totally Integra	ited Automation
2	i 📑 🔚 Save project 🚊 🐰 🏦 🗊 🗙 🏷 ± (🖛 ±	🖥 🗓 🖆 🚆 🖓 🖓 Go online 🖉 Go offline 🏭 🖪 🖪 🛠 🚍 🛄 <search in="" projects="" td="" 🖓<=""><td>PORTAL</td></search>	PORTAL
	Project tree 🔲 🖣	SV660F → PLC_1 [CPU 1212C DC/DC/DC] → Technology objects → Axis_1 [DB1] 🖬 🗮 🗙	Trace 🗊 🗉 🕨
	Devices		Options -
	11 II I	🗠 Master control: 🧐 Activate 💁 Deactivate 🌺 Axis: 🥥 Enable 🔇 Disable	Trace
		Axis control panel	Measuremen
	👻 🗋 SV660F 🛛 🗹 🔵 🔿	Tuning Aus control panel	Horizontal mea
Ħ	Add new device	Command Positioning Current values	
S,	Devices & networks	romoning	Y1: Tasks
	▼ 0 PLC_1 [CPU 1212C DC/DC/DC]		Y2:
	Device configuration	Target position / Travel path: 1500.0 mm	ΔΥ:
	U Online & diagnostics	Velocity: 500.0 mm/s Position: 1684.427 mm	
	Program blocks Add new block	Acceleration / deceleration: 5.0 mm/s ² Velocity: 43.19549 mm/s	Vertical measu
	Main [OB1]	Enable jerk limit	Vertical measu
	MC-Interpolator [OB92]	Jerk: 192.0 mm/s*	t2: 0
	MC-Servo [OB91]		∆t:
	System blocks	Absolute Relative	
	🔻 🙀 Technology objects 🛛 🔵		Intersections with
	Add new object	Stop	Y(t1):
	▼ 🕺 Axis_1 [DB1]		Y(t2):
	Configuration	Axis status	AY:
	T Commissioning		
	Diagnostics External source files	- Enabled Encoder values valid Info message	Mathematical eva
	External source files	Homed Simulation active Axis is accelerating	AM(Y):
	C C C C C C C C C C C C C C C C C	Ready Drive error	INT(Y):
	Watch and force tables	Axis error Restart required	RMS(Y):
	Online backups	Confirm	······
	Traces	Error message	
	Device proxy data	ОК	
	Program info		
	PLC alarm text lists		
	Im Local modules Im Distributed I/O		
	Ungrouped devices		
	▼ H SV660F [SV660F]		
	Device configuration		
	Online & diagnostics	()	
	📩 SV660F [SV660F]	🔍 Properties 🔭 Info 🖏 Diagnostics 🔍 🖃 🗨	
	PROFIdrive Module_1		
	Security settings	General Cross-references Compile	
	🕨 🙀 Common data 🛛 🗸	Show all messages	
	✓ Details view		
		I Message Go to ? Date Time	

8.3 PROFINET IRT

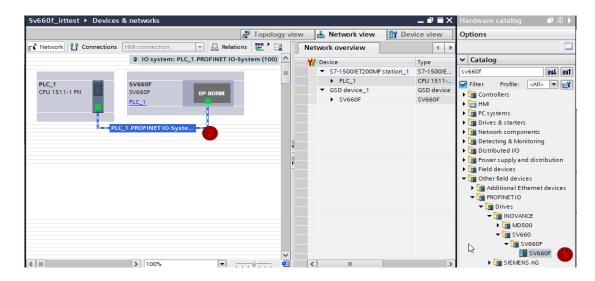
8.3.1 AC4 MODE

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.

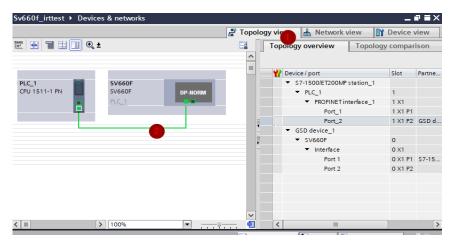
8.3.1.1 CONFIGURATION POINTS

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**.

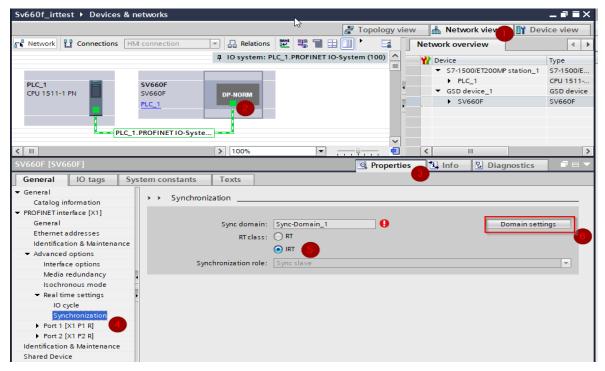
1. Add SV660F and in the "Network view" section connect the PLC to SV660F.



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

Sv660f_irttest > Devices & netw	vorks				_∎∎×
			📲 Topology view	🚠 Network view 🛛 🛐 Dev	vice view
Network Connections HMI cor	nnection 💌 🖪 Relations 🗱	5 🖬 🖽 🛄 🍳 ±	Net	work overview	
		IO system: PLC_1.PROFINET IC		Device	
		, -		 S7-1500/ET200MP station 1 	Type \$7-1500/E
			-	▶ PLC_1	CPU 1511
	660F DP-NORM			 GSD device_1 	GSD device
PLC	Di Horan		•	SV660F	SV660F
PLC_1.PRC	DFINET IO-Syste	100%		III	5
PN/IE 1 [Industrial Ethernet]		10010			
			Properties	Info Diagnostics	
	n constants Texts				
▼ PROFINET Subnet		omain_1			^
General Domain management	Converted name: sync-do	omainxb19998			
Sync domains	Send clock 1.000				ms 🔻 🗏
Sync-Domain_1	🗹 Defa	ault domain			
MRP domains	Ma k	e 'high performance' possible			
Overview isochronous mode	Allo	ws the use of 'fast forwarding'			
PLC_1.PROFINETIO-System (_
	>> Devices				
	IO system				
	io system				
•	IO system	Sync master			
	PLC_1.PROFINETIO-System (100)	PLC_1			
-					
	IO devices				
	PROFINET device name RT class		dundancy level DFP group		
	profinet.cpu RT,IRT	 Sync master 			
	profinet.sv660f IRT	Sync slave No	redundancy		
<					
					×

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

SV660F [SV660F]			Q Properties	🚺 Info	Diagnostics		
General IO tags Sys	tem constants Texts						
✓ General Catalog information	Isochronous mode						*
▼ PROFINET interface [X1]	Isochronous mode for local r	nodules					
General Ethernet addresses		hronous mode					
Identification & Maintenance	Send clock:	1.000				ms 🖊	
 Advanced options 	Application cycle:	1.000				ms 🖊	
Interface options Media redundancy	Ti/To values:	Automatic minimum					
Isochronous mode	Time Ti (read in process values):	0.125 ms					
IO cycle	Intervals:	0.125				ms	
Synchronization Port 1 [X1 P1 R]	Time To (output process values):	0.25 ms	4				
Port 2 [X1 P2 R]	Intervals:	0.125				ms	
Identification & Maintenance							- 11
Shared Device	Detail overview						
	Name		Slot/subslot	Isochr			
	PROFIdrive Module_1/Parame		1/1				
	PROFIdrive Module_1/Standa	rd Telegram 3,PZD-5/9	1/2		2		
							~

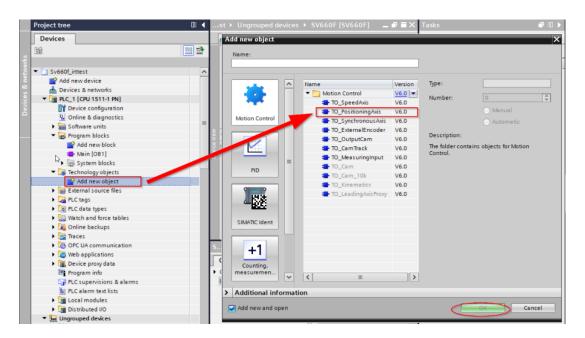
6. For the isochronous mode is always a specific **organization block (MC-Servo)** required to manage the communication time.



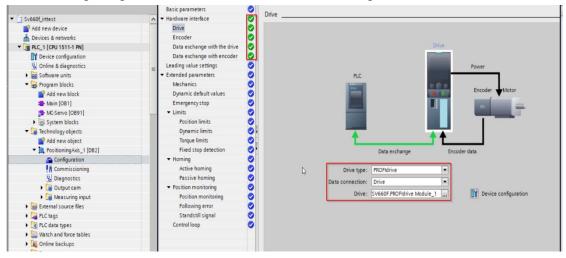
Project tree	Sv660f_irttest > Ungrouped devices > SV660F [SV660F]	∎×
Devices	🖉 Topology view 🔒 Network view 🕅 Device vie	ews
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		
Sv660f_irttest	Module Rack Slot I	a
Sv660f_irttest	= ▼ SV660F 0 0	^
Add new device	X Interface 0 0 X1	
om Devices & networks ▼ m PLC_1 [CPU 1511-1 PN]	view > Interface 0 0 X1 PROFIGURE Module_1 0 1 1	=
Device configuration	Talameter Access rome of Th	
Online & diagnostics		0
Software units		
Program blocks		
Add new block	DP-NORM 0 3	
Main [OB1]		
MC-Servo [OB91]	0 5	
System blocks	0 6	
 Technology objects 		~
Add new object	(III) 100%	>
PositioningAxis_1 [DB2]	Standard Telegram 3,PZD-5/9 [Standard Telegram 3,PZD-5/9]	\exists \checkmark
Configuration	General IO tags System constants Texts	
🕂 Commissioning		
堤 Diagnostics	General VO addresses	^
🕨 🚂 Output cam	I/O addresses	=
🕨 🚂 Measuring input	Input addresses	
External source files		
PLC tags	Start address: 0	
PLC data types	End address: 17	
Watch and force tables	🖌 🖂 🖌 🖌 Schronous mode	
Online backups	Organization block: MC-Servo	
Traces	Process image: PIP OB Servo	
OPC UA communication	ribessimage: ribbservo	
Web applications	, Output addresses	
Device proxy data	- Output addresses	
Program info	Start address: 0	
PLC alarm text lists		
 PLC alarm text lists Image: Local modules 	End address: 9	
Distributed I/O	✓ Isochronous mode	
Light Distributed inco Light Distributed inco	Organization block: MC-Servo	
▼ 💾 SV660F [SV660F]	Process image: PIP OB Servo	
> Details view		•

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

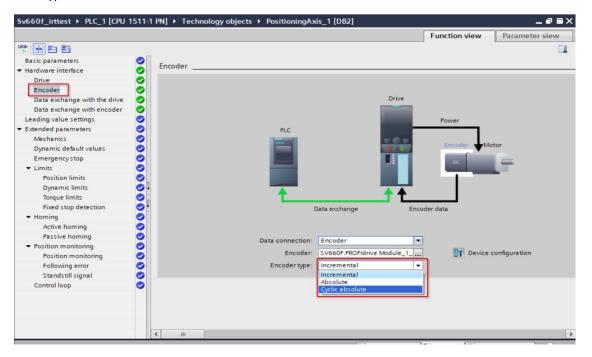
7. Add technology object.



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.

Sv660f_irttest > PLC_1 [CPU 15	1-1 PN] • Technology objects	PositioningA	Axis_1 [DB2]			_ - = ×
					Function view	Parameter view
😤 🖶 🖻						-
Basic parameters						
✓ Hardware interface	Data exchange with the driv	/e				
Drive	Data exchange with the driv					
Encoder						
Data exchange with the drive			Drive			
Data exchange with encoder						
Leading value settings				Power		
 Extended parameters 		PLC				
Mechanics						
Dynamic default values				Encoder Motor		
Emergency stop						
Position limits						
Dynamic limits						
Torque limits		т <u> т</u>	T T			
Fixed stop detection			Data exchange Enc	oder data		
✓ Homing	Drive data					
Active homing	Drive data					
Passive homing						
 Position monitoring 		Drive telegram:	Standard telegram 3	Device configuration		
Position monitoring						
Following error	24		Automatically apply drive values	during configuration (offline)		
Standstill signal						
Control loop			Automatically apply drive values			
		Reference speed:	3000.0 1/min	1 The parameters of the drive must		
		Maximum speed:	6000.0 1/min	match specifications in the device configuration.		
		Reference torque:		conigerotion		
		velerence torque:	3.2 Nm	l .		
	Additional data					
			Torque data			
				6		
		Data connection:	Additional telegram	W		
	Ado	litional telegram:	<not connected=""></not>			

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

SV660F AC4 + DSC Example v	1.0 → PLC_1 [CPU 1511-1 PN] →	Technology objects	 Axis_1 [DB2] 		_ # # ×
				Function view	Parameter view
* # 8 5					
Basic parameters					
	Data exchange with encoder				
Drive					
Encoder					
Data exchange with the drive	5			Drive	
Data exchange with encoder	5				
Leading value settings		PLC		Power	
Extended parameters		-			
Mechanics					
Dynamic default values				Enc.	oder Motor
Emergency stop				Enco	oder 🔶 Motor
✓ Limits	5	_			ML =
Position limits					
 Hardware interface Drive Encoder Data exchange with the drive Data exchange with encoder Leading value settings Extended parameters Mechanics Dynamic default values Emergency stop Limits Position limits Dynamic limits Fixed stop detection Homing Active homing Position monitoring Following error Standstill signal Control loop 		+		<u>†</u> †	
Torque limits					J
Fixed stop detection			Data exchange	Encoder data	
✓ Homing					
Active homing	Encoder data				
Passive homing	Encoder data				
 Position monitoring 		Encoder telegram:	Standard telegram 3	- II	Device configuration
Positioning monitoring			Calculate actual vel	locity from actual speed N	
Following error				ioni pecon	o _o or the telegroun.
Standstill signal 🔍					
Control loop			Automatically apply	encoder values during co	nfiguration (offline)
			Automatically apply	encoder values during ru	ntime (online)
	•				
	•				

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

Sv660f_irttest + PLC_1 [CPU	1511-1 PN] → Technology objects → PositioningAxis_1 [DB2]		_₽∎×
		Function view	Parameter view
😤 🖶 🖻 🖻			
Basic parameters			^
✓ Hardware interface	•		
Drive			
Encoder			
Data exchange with the drive			
Data exchange with encoder			=
Leading value settings			
 Extended parameters 			
Mechanics	Encoder Encoder Encoder Commotor shaft Esternal mesuring system Commotor shaft Esternal mesternal mesuring system Commotor		
Dynamic default values			
Emergencystop			
	Encoder		
Position limits			
Dynamic limits	Encoder mounting type: On motor shaft 👻		
Torque limits	External measuring system		
Fixed stop detection	On load side On motor shaft		
✓ Homing			
Active homing Passive homing	Backlash compensation		
Position monitoring			
Position monitoring Position monitoring	Enable backlash compensation		
Following error	Size of backlashes: 0.0 mm		
Standstill signal	Velocity of backlash compensation: 0.0 mm/s		
Control loop			
Control loop	Absolute homing direction: Positive Vositive Positive direction Negative direction		
	Drive mechanism		
	Invert drive direction		
	Load gear		
	Number of motor revolutions: 1		
	Number of load revolutions: 1		
	Position parameters		
	Leadscrew pitch: 10.0 mm/rot		
	Leadscrew pitch: 10.0 mm/rot		
			*

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.

Sv660f_irttest > PLC_1 [CPU	1511-1 P	N] • Technolo	ogy objects 🕨	PositioningAxis_1 [DB2			_∎≡×
						Function view	Parameter view
* H E E							
Basic parameters	0	F _1					
 Hardware interface 	I	 Following er 	ror				
Drive	0						
Encoder		Enable foll	owing error mor	nitoring			
Data exchange with the drive	0						
Data exchange with encoder	000	Maximum follo	owing	Following error			
Leading value settings	0	error:	, in the second se	1			
 Extended parameters 	0	100.0	mm				
Mechanics	0						
Dynamic default values	0						
Emergencystop	0						
▼ Limits	0			Error		W	arning level:
Position limits	⊘.					; 70	0.0 %
Dynamic limits	O	Following erro					
Torque limits							
Fixed stop detection	0	10.0	mm	O		E	ror
✓ Homing	0					: w	arnings
Active homing	0					N	ormal operation
Passive homing	0			Normal operation		Veloci	
 Position monitoring 	0						ty.
Position monitoring	0						
Following error	0			Product data and a			
Standstill signal	0000000			Begin of dynamic adjustment:	Maximum velocity:		
Control loop	0			10.0 mm/s		nm/s	
				10.0 111115	300.0		

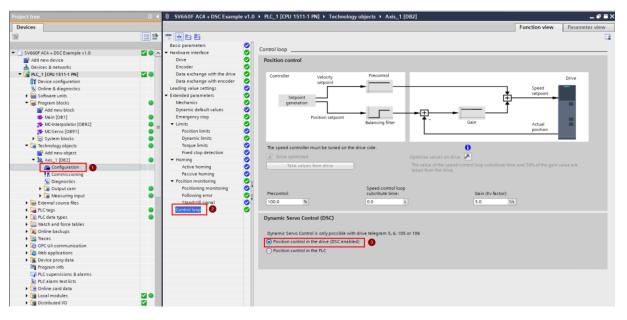
8.3.2 DCS MODE

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.

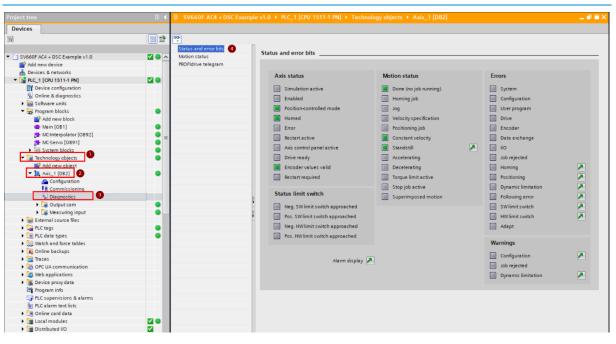
DSC function configuration

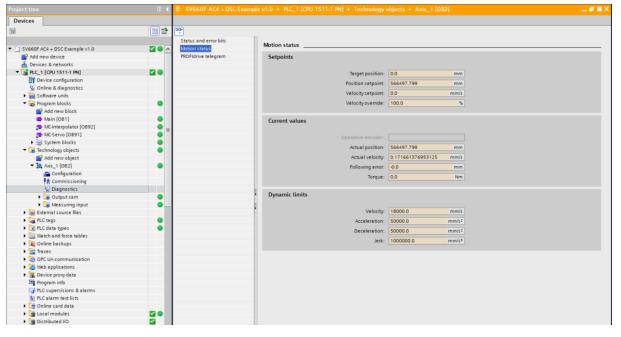
In DSC mode, the servo receives the position loop gain **KPC**, position deviation **XERR** and speed from the main host controller via the telegram 105.



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	131	10

8.3.3 AXIS DIAGNOSTICS



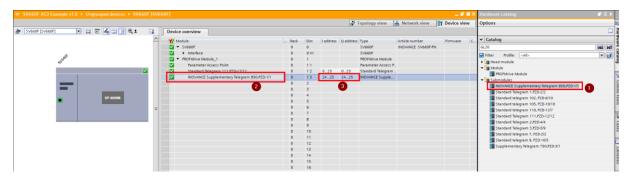


		SV660F AC4 + DSC Exam						_ # = X
Devices								
窗		001						
		Status and error bits	Π					
 SV660F AC4 + DSC Example v1.0 	2 O A	Motion status	PROFIdrive telegram					
Add new device		PROFIdrive telegram	Drive					
📥 Devices & networks		and a second						
PLC_1 [CPU 1511-1 PN]			Bit	15 14 13 12	11 10 9	8 7 6 5	4 3 2 1 0	
Device configuration			Status word 1 (ZSW1)	0 0 0 0		0 0 1 0		
Q Online & diagnostics			Status word 2 (ZSW2)	0 1 0 1			0 0 0 0 0	
Software units								
Program blocks	•		Speed setpoint (NSET)	0.000	%	0.000	1/min	
Add new block			Actual speed (NIST)	0.000	%	0.000	1/min	
🖀 Main [OB1]								
MC-Interpolator [OB92]	•							
MC-Servo [OB91]	• 1							
System blocks	•		Encoder					
 Technology objects 	•							
📑 Add new object			Bit	15 14 13 12	11 10 9	8 7 6 5	4 3 2 1 0	
Axis_1 [DB2]	•		Status word (Gx_ZSW)	0 0 0 0	0 0 0	0 0 0 0	0 0 0 0	
Configuration								
R Commissioning								
Se Diagnostics			Position actual value 1 (Gx_XIST1)	16#FFFF_FF58	(Hex)	4294967128	(Dec)	
Output cam	•		1					
Measuring input	•		Position actual value 2 (Gx_XIST2)	16#0000 0000	(Hex)	0	(Dec)	
External source files								
PLC tags	•							
Eg PLC data types	•							
Watch and force tables								
Image: Contine backups								
🕨 📴 Traces								
OPC UA communication								
Web applications								
Device proxy data								
Program info								
PLC supervisions & alarms								
PLC alarm text lists								
Online card data								
Local modules	2 •							
Distributed I/O								

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.

@ \$	SV660F AC3 Example v1.0 + PLC_1 [CPU 1511-1 PN] + Watch and force tables + INOVANCE Telegram 850									
<u>⊒</u> ≱ =	e 🟥 🕼 Lo 🕫 70 2									
i	Name	Address	Display form	nat	Monitor value	Modify value	1	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		%124.0	Bool		FALSE					
10		%125.0	Bool		TRUE					
11		%I25.1	Bool		TRUE					
12		<add new=""></add>								

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)

