

Connection Guide

IF2030/PNET

Interface module





1 General

This document describes how to connect IF2030/PNET to SIMATIC S7 controllers. IF2030/PNET is an interface module to connect Micro-Epsilon sensors (controller) equipped with either an RS422 or RS485 interface to PROFINET. This is how these devices can be integrated into Siemens PLC environments. This guide refers to the STEP 7 V.14 programming software which is part of the TIA Portal framework. Other versions may differ in the design of the graphical user interface and their range of features.

2 System design

Please prepare the following equipment to connect an IF2030/PNET-compatible sensor (controller) with a Siemens PLC environment:

- CPU module of the Siemens SIMATIC S7 series
- Micro-Epsilon sensor (controller) with RS422 or RS485 interface, incl. corresponding connection cable
- IF2030/PNET interface module, incl. GSDML file (download from the Micro-Epsilon website or data storage device included in the scope of supply)
- Computer with installed STEP 7 software (TIA Portal)
- 2x Ethernet cables
- Power supply PS2020 (optional)

Please note that the connectable Micro-Epsilon sensors (controllers) are stored in the IF2030/PNET firmware. The figure below schematically shows you how to connect the previously mentioned components.



3 Basic settings and configuration

3.1 Importing IF2030/PNET into the software

1. Start the TIA (Totally Integrated Automation) Portal. Therefore, either double-click the TIA Portal icon on your desktop or call up the framework via the Start Menu.

2. Click the button Create new project which is at the top left of the Start portal view. Enter a project name and confirm by clicking the Create button.

👫 Siemens					
Start			Create new project		
United the set of the		Open existing project	Project name: Path:	Project1 C:\Users\11000516\Documents\Au	
		Create new project	Version:	V14 SP1	
PLC	- 🦘 💽	Migrate project	Author: Comment:	11000516	
Mattern S. Nachowlesar					
Weinallization	Create new project				
	Project na	ime: if2030demo			
Online &	Pi	Path: C:\Users\11000516\Documents\Automatisie	rung		
Diagnostics	Vers	ther 11000516			
	Comm	ient:			<u></u>
					~
					Create

3. Switch to the Devices & networks portal.

art		First steps			
Devices & 👘	🗊 💮 Open existing project	Project: "If 20:	30demo" was open	ed successfu	illy. Please select the next step
PLC programming	Create new project	Start		5	
Motion & 🗧	Close project	l la	Principal and a	_	
Visualization			netva 🕁 s	n n	Configure a device
Online & Diagnostics	•	→ 		Ŷ	Write PLC program
					Configure

4. Click Add new device. Select the S7 CPU series you are using in the device list and click the Add button. Make sure that the checkbox Open device view on the bottom left of the window is activated.

<u>Hint</u>: Identify your CPU module based on the order number on the S7 device, its packaging, or the delivery note. Also select the correct firmware Version.



<u>Note</u>: Here, you can also change the default Device name PLC_1. However, this is not mandatory.

5. The software switches automatically to the Project view and displays the Working window (center of screen) in the Device view. Below, you can find the Inspector window which shows the parameterization options of the selected PLC in the Properties register.

Note: The TIA Portal automatically assigns the IP address and subnet mask. You can manually adjust these data here (General \rightarrow PROFINET interface \rightarrow Ethernet addresses) if necessary and save them by clicking the Save project button Save project (top left corner in the Toolbar).



6. Import the GSDML file. In general, it contains information about a PROFINET device (properties such as supported sensors and parameters of IF2030/PNET) and is provided by Micro-Epsilon. This file is necessary for the PROFINET controller and must be integrated into the corresponding configuration software.

Navigate in the Main menu to Options \rightarrow Manage general station description files (GSD).

roject Edit View Insert Online	Options Tools Window Help
😚 🎦 🔚 Save project 🛛 🔒 🐰 🧾	Y Settings
Project tree	Support packages
Devices	Manage general station description files (GSD) Start Automation License Manager
<u> </u>	Show reference text
- Ta itagadama	🛄 Global libraries

7. Select the path for the file *"GSDML-Vx-MICRO-EPSILON-IF2030.xml*" in the open Dialog box and click the Install button.

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Manage general station descriptio	n files		3	
Installed GSDs GSDs in the	project		-0	
Source path: C:\Users\11000516\D	Documents\A	utomatisierung\if.	2030-demo\AdditionalFi	es\GSD
Content of imported path				
File	Version	Language	Status	Info
GSDML-V2.33-MICRO-EPSILON-IF2	V2.33	English, Ger	Not yet installed	PROFINET I
<		111		>
			Delete	Cancel

8. After successful installation, switch to the Project view again by clicking Devices & networks in the Project tree on the left side of the screen.

Proje	ect tree	[
De	vices	
1		
• 15	if2030demo	
	Add new device	
	Devices & netwo	orks

9. Make sure that IF2030/PNET has been integrated correctly. Use the Hardware catalog (within the Task window) next to the Working window for this purpose. The catalog shows all hardware components which can be configured with the current STEP 7 version.

Follow this path: Other field devices \rightarrow PROFINET IO \rightarrow I/O \rightarrow MICRO-EPSILON MESSTECHNIK GmbH \rightarrow PNS \rightarrow IF2030/PNET.



3.2 Unique integration of IF2030/PNET into the PROFINET network

10. Switch to the Network view of the Working window and add IF2030/PNET from the Hardware catalog by drag and drop.

if2030demo 🕨 Devices	& networks		_ # = ×	Hardware catalog 🛛 🗐 🗎 🕨
	🖉 Topology view	📥 Network view	Device view	Options
Network Connectio	ns HM connection 💌 🕎 🤀 💷 🛄 🍳 🛨	=	Network overvie 4	
		^	Y Device	✓ Catalog
PLC_1 CPU 1212C	H2030pnet H2030pnet Not ssighed		 \$7-120 tatio PLC_1 GS0 device_1 #2030pnet 	Centro-
K M GSD device_1 [Device]	> 100% • •	Info 1 Dia	gnostics) [m] Encoders) [m] Gateway ↓ [m] I/O) [m] Hilscher Gesellsch
General IO tags	System constants Texts General			MICRO-EPSILON

11. Connect the green Ethernet socket of IF2030/PNET with the one of the PLC by clicking one of the green boxes with the left mouse button. Hold the button and draw the resulting line to the other green box in order to create a PROFINET subsystem.

Network	Connections	HMI connection	* 1014	11 @ ±	
PLC_1 CPU 1212C			₹J	lf2030pnet IF2030/PNET <u>PLC_1</u>	

12. Switch to Device view, double-click your IF2030/PNET and assign a (device) Name in the Inspector window (tab Properties \rightarrow General). This name is used for identification in the PROFINET network and as address. Therefore, it must be <u>unique</u> throughout the system!

Note: This is one of several possibilities to change the device name.



13. The change of name has to be communicated to the PROFINET network. Right-click IF2030/PNET to reach the function Assign device name in the displayed Shortcut menu.

2030/PNET]		Go to topology view Go to network view Compile Download to device	
		Copy Paste X Delete	Ctrl+C Ctrl+V Del
•		Change device Write IO-Device name to Micro Start device tool	o Memory Card

14. Click the Update list button in the open Dialog box in order to display all possible devices in the PROFINET network corresponding to the profile. Select the line containing the IF2030/PNET, which should be given a new name, in the appearing list (Status "Device name is different"). Finally, click the Assign name button.

<u>Hint</u>: If you activate the Flash LED checkbox in the orange highlighted area you can verify which device you are currently addressing. This is especially helpful in larger networks.

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		Configured Pf	ROFINET devi	ce		111.04F	
		PROFINET de	vice name:	myif2030pnet			
\rightarrow		c	Device type:	IF2030/PNET			
		Online access					
		Type of the PG/F	C interface:	PN/IE		•	
		PG/F	C interface:	ASIX AX88179 USB 3.0	to Gigabit Ethernet	A 💌 😨 💁	
طي		Device filter					
		🛃 Only she	ow devices of the	e same type			
		Only she	ow devices with	bad parameter settings			
		Only she	ow devices with	out names			
	Arcessible devi	ices in the network:					
	IP address	MAC address	Device	PROFINET device name	Status		
Flash LED							
-11 MEM	2						
				Up	date list	Assign name	
	L	1	Accessible	levices in the network			
			IP address	MAC address	Device	PROFINET device name	Status
line status information:			192.168.0.	1 00-0C-12-02-13-	08 MICRO-EP	myif2030	Device name is different
		1999 C					
	E Flas	sh LED					
			1			100	· · · · · · · · · · · · · · · · · · ·

3.3 Defining inputs and outputs of IF2030/PNET

15. Add modules to IF2030/PNET. In the Hardware catalog on the right-hand side, first select the appropriate input module for the payload. Drag it to the first free Slot in the Device overview. Then select the output module "*Basic configuration*" and place it in the next free spot.

<u>Note</u>: IF2030/PNET determines the amount of cyclic data to be transmitted itself and selects a suitable module. The module must match the one selected in TIA. The determination results from the logic described below.

<u>15.1</u> Determination of payload data: If a value != 0 is entered in the Datasize object (hex address 0x2022), this value is used as data quantity per sensor for selecting the module. Otherwise the following applies for (\triangleright Operating Instructions **4.2.2**)

- **ME Bus** / **RS485** sensors: IF2030/PNET asks the first sensor at boot time for the amount of payload data and multiplies it by the number of sensors.
- **MEO** / **RS422** device: IF2030/PNET cannot determine the amount of data, which is why the 128 Bytes input module is selected by default.

<u>15.2</u> Debug header: If the Cyclic Status Information is activated in the settings at boot time, additional 8 Bytes are added to the determined demand. The debug header can be addressed directly via the hex address 0x2028.

<u>15.3</u> Module selection: From the number of available modules (16, 32, 48, 80, 128, 208, 336, 544, 880, 1424 Bytes) the smallest possible one is selected, which can fulfill the demand. To give you some examples:

- RS422 sensor → 128 Bytes Input
- RS422 sensor, DebugHeader (0x2028) active → 208 Bytes Input
- RS422 sensor, Datasize (0x2022) = 42 → 48 Bytes Input
- RS485 sensor with frame length 66 Bytes → 80 Bytes Input
- 4x RS485 sensors with frame length 23 Bytes → 128 Bytes Input



3.4 Loading the configuration into the PLC

16. Click the Download to device symbol button in the Toolbar. Alternatively, rightclick the image of your S7 in the Network view and select the function in the Shortcut menu. 17. In the open Dialog box, select the option "*PN/IE_1*" (the previously created PROFINET subsystem) in Connection to interface/subnet. Click the Start search button afterwards. Next, select your target PLC in the displayed list. Clicking the Load button transfers the hardware configuration.

	Configured access no	des of "PLC_1"						
	Device	Device type	Slot	Туре	Address	Subnet		
	PLC_1	CPU 1212C ACID	1 X1	PNAE	192.168.0.10	PN/IE_1		
		Type of the PG/PC inte	erface:	PN/IE		•		
		PG/PC inte	erface:	ASIX AX88179	USB 3.0 to Gigabit Eth	iernet A 💌 🐨 🔯		
	Conr	nection to interface/s	ubnet:	Please select		- 🐨		
		î st ga	te way:	Please select Direct stelot '1 X	1	1		
	Select target device:		Ľ		Show devices with the	same address 💌		
	Device	Device type	Interfa	ace type Add	ess	Target device	1	
	and the second s							
1147					· · · · · · · · · · · · · · · · · · ·		E .	
					\sim			
	-				\sim			
Flash LED							-	
Flash LED						Ľ		
Flash LED						لم (Start search		
Flash LED	12	Select targ	get device			Show all compat	i li lible devices	
Flash LED	12	Select targ	get device	:: Device type	Interface type	Start search Show all compat	i lible devices Target devi	ce
Flash LED): 	Select targ Device plc_1	get device	: Device type \$7-1200	Interface type PN/IE	Show all compatients Address 192.168.0.10	ible devices Target devi	ce
Flesh LED		Select targ Device plc_1	get device	:: Device type \$7-1200 	Interface type PN/IE PN/IE	Start search Show all compati Address 192,168,0,10 Access address	ible devices	ce
Flash LED		Select targ Device plc_1	get device	:: Device type \$7-1200 	Interface type PN/IE PN/IE PN/IE	Start search Show all compati Address 192,168,0,10 Access address	ible devices	ce
Flash LED		Select targ Device plc_1	get device	:: Device type \$7-1200 	Interface type PN/IE PN/IE	Start search Show all compat Address 192,168.0.10 Access address	ible devices	ce
Flash LED	r: I I I I I I I I I I I I I I I I I I I	Select targ Device plc_1	get device	:: Device type \$7-1200 	Interface type PN/IE PN/IE	Start search Show all compat Address 192.168.0.10 Access address	ible devices Target devi —	ce
Flash LED	n: In Flash LED	Select targ Device pic_1	get device	:: Device type \$7-1200 -	Interface type PN/IE PN/IE	Start search Show all compat Address 192.168.0.10 Access address	ible devices Target devi — — —	ce
Flash LED	n: Flash LED	Select targ	get device	:: Device type \$7-1200 -	Interface type PN/IE PN/IE	Start search Show all compat Address 192.168.0.10 Access address	ible devices Target devi — — — —	ce
Plash LED	12 International International	Select targ	get device	:: Device type \$7-1200 -	Interface type PN/IE PN/IE	Stort search Show all compate Address 192.168.0.10 Access address	ible devices	ce
Flach LED	n: Flash LED Online status in	Select targ	get device	Device type S7-1200 -	Interface type PN/IE PN/IE	Stort search Show all compate Address 192, 168,0, 10 Access address	ible devices Target devi — — — — — — — — — — — — — — — — — — —	ce
Plash LED	n: Flash LED Online status in Found acce	Select targ	get device 80pnet [15	:: Device type \$7-1200 - 92.168.0.1]	Interface type PN/IE PN/IE	Start search Show all compate Address 192.168.0.10 Access address	ible devices Target devi — — — — — — — — — — — — — — — — — — —	ce search
Flexh LED	n: Flash LED Online status in Found acce Scan comp	Select targ	get device 30pnet [15 evices of 2	:: Device type \$7-1200 - 92.168.0.1] 2 accessible device:	Interface type PN/IE PN/IE s found.	Start search Show all compate Address 192.168.0.10 Access address	ible devices Target devi — — — — — — — — — — — — — — — — — — —	search
Flexh LED	Deline status in Flash LED Online status in Found acce Scan comp	Select targ	get device 30pnet [15 evices of : ral comple	2.168.0.1] 2 accessible device: eted. 1 problem four	Interface type PN/IE PN/IE s found.	Start search Show all compate Address 192.168.0.10 Access address	ible devices Target devi — — — — — — — — — — — — — — — — — — —	ce search

18. The "Load preview" Dialog box opens. Select the "Stop all" option in Stop modules. The device configuration can only be loaded when the CPU is in the operating state "STOP"!

4	Stop modules	The modules are stopped for downloading to device.	No action 👻
0	Device configura	ti Delete and replace system data in target	Strp all
0	Software	Download software to device	Consistent download
-		· · · · · · · · · · · ·	
			Refresh

<u>Note:</u> Depending on whether you created a new project or opened an existing one, it might be necessary to overwrite the so-called additional information. The latter is recommended to ensure an up-to-date data pool. This can be done by scrolling downwards within the same dialog and checking the Overwrite all box at Additional information.

Click the Load button. The PLC is thereby introduced to its environment for the first time. The loading process is indicated visually by a red flashing LED of the S7 device.

19. The results of the loading process are displayed in the following Dialog box. If the process was completed successful, start your S7. Activate the Start all checkbox, if necessary, and click the Finish button.

Load re	sults			×
3	Status	and actions after downloa	iding to device	
Status	1	Target	Message	Action
+1	A	▼ PLC_1	Downloading to device completed without error.	
	4	Start modules	Start modules after downloading to device.	Start all
<			111	>
			Filigh	Load Cancel

If no error occurs, the S7 changes to the operating state "*RUN*" which is indicated by the green RUN-LED.

4 Accessing input and output data

1. Switch to the Device view and take a look at the Device overview of IF2030/PNET. Memorize the start address of the input module as an example.

5	Topolog	y view	đ	Netwo	rk view	Devic	e view	
	Device	overvi	ew					
· -			Rack	Slot	I address	Q address	Туре	le
1			0	0			IF203	1
			0	0 X1			if203	
			0	1	68275		208 B	
	n_1		0	2	R		Basic	

Depending on the module, the address space (memory

address bytes) is visible in the I address or the Q address columns. These addresses are automatically assigned to the respective module depending on the slot.

2. Go to the Project tree. Follow this path in your PLC: PLC tags → Default tag table. The latter opens in the Working window by double-clicking.



3. You can now define variables in the Tag register to read out the desired memory locations. Each PLC tag is assigned a name, a data type, and an address.

Proceed as follows to read out the content of the input module at its start address:

3.1 Assign a (tag) Name and select the Data type "DWord".

if20)30 de	mo → PLC_1 [CPU 12	212C AC/DC/Riy] + PLC	tags ► De	efault	tag tab	ole [38]			
1	💉 🖥	🕈 🗄 🤷 🕅 It tag table			_					
	N	ame	Data type	Address	-	Retain	Acces	Writa	Visibl	C
1	-	value01	DWord	%10.0						
2		<add new=""></add>					~	V		

<u>3.2</u> Open the extended view of the address definition. This facilitates the correct specification of operand and memory space. Enter the start address from <u>point 1</u> and confirm the entry by clicking the symbol button with the green check mark.

	1	lame	Data type	Address		Retain	Acces	Writa	Visibl	Comment
1	-	value01	DWord	%10.0						
2		<add new=""></add>			Opera	nd iden	tifier: 1			
					c	perand	type: D			-
						Add	iress: 68	3		
									\rightarrow	X

4. You can monitor the values of the PLC tags in online mode directly via the Default tag table. Click either the Monitor all symbol button in the Toolbar or select this function by right-clicking within the tag table.



This leads to the online mode and the column Monitor value is displayed in the table. Clicking the symbol button once again quits the monitor mode.

if 20)30der	mo → PLC_1 (CPU 12	12C AC/DC/Riy] 🕨	PLC t	ags ≀ De	fauit	tag tab	ie (38)			
9	🛃 🔄 Defaul	→ 📴 🐨 🖬 t tag table									
	N	ame	Data type		Address		Retain	Acces	Writa	Visibl	Monitor value
1	-00	value01	DWord		%ID68	-					16#7638_1000
2		<add new=""></add>						~			

Below is an example to help you interpret the values correctly. One RS422 device outputs two values. Depending on whether the debug header was activated in your IF2030/PNET, the value of the corresponding PLC variable is composed as follows:



For further examples and information on the interpretation and conversion of sensor values, please refer to ► Operating Instructions A 4.

5 Using the output module "Basic configuration"

A special output module is available for making basic settings via the TIA portal interface. Proceed as follows to configure IF2030/PNET using a few basic parameters.

1. Select the output module "*Basic configuration*" and place it in the next free Slot in the Device overview – cf. basic settings (section 3).



<u>Note</u>: The "*Basic configuration*" module must always be located one slot below the input module!

2. Double-click the module in the Device view. Switch to the Inspector window and navigate to tab Properties → General → Module parameters.

3. Make all desired settings ("*Baud rate*" to "*Status information*") and finally activate the "*Initial configuration*" (seventh configuration option). Ensure that you specify the sensor interfaces correctly (▶Operating Instructions **4.2.2**):

- ME-Bus + RS485
- MEO-ASCII + RS422

Basic Configuration_1 [Basic Co	nfiguration]
General IO tags Syst	em constants Texts
General Module parameters	Module parameters1
Hardware identifier	Baudrate Wandler
	Setzt die Baudrate des Schnittstellenwandlers - Neus 4 MBaud
	Minimum Cycle Time
	Minimum Number of MS one sensor cycle will take: 0
	Preferred Sensor Data Size
	Preferred number of bytes per sensor frame: 0
•	Sensor Interface
•	Sensor Interface: MEO-ASCII + RS422
	HTTL Sync
	HTTL sync mode: Disabled
	Cyclic Status Info
	include cyclic status information: Enabled
	DISABLE Init CFG
	Disables initial configuration sequence: Disabled

4. Save your changes by clicking the Save project button Save project. Now you can load the settings into the CPU. If this is not the case, select your S7 device in the working window, and click the Download to device symbol button in the Toolbar.

5. The loading procedure is described in section 3 of this document. Return to the Module parameters view of the Inspector window after this process. Deactivate the "*Initial configuration*" there, save and reload afterwards.

Restart the IF2030/PNET for the changes to take effect!

<u>Note</u>: This step is required due to the selected/used mechanism to establish a GUI for parameterizing IF2030/PNET while preventing the configuration from being sent again (repeatedly) to the CPU in the further course.

6 Configuring IF2030/PNET via function blocks

You can also configure your IF2030/PNET via S7 with some function blocks. These cover core functions (extended scope compared to the output module from section 5) that can be used for all compatible Micro-Epsilon sensors.

These blocks are unencrypted so that you can view the code ("*Structured Control Language*") and use it as template for your own programs. The function



blocks are provided together with the GSDML file. Below, you will find an overview of the configuration examples including the register addresses in Hex format. The corresponding object directory can be found in ► Operating Instructions **5.4**.

- *IF2030_BaudrateInterface*: R/W Sensor interface (0x2023) and baud rate (0x2020)
- IF2030_CycletimeDatasize: R/W Cycle time (0x2021) and data size (0x2022)
- *IF2030_HTTL-Debug*: R/W Switching between HTL/TTL (0x2027) and activation of the debug header (0x2028)
- IF2030_MEB_floatparam: R/W Sensor parameters of type Float (0x2510)
- IF2030_MEB_intparam: R/W Sensor parameters of type Int (0x2530)
- IF2030_MEB_uintparam: R/W Sensor parameters of type UInt (0x2530)
- *IF2030_Reset*: W Delete IF2030/PNET configuration (0x2024) or sensor configuration (0x2025) and restart (0x2026)
- *IF2030_SelectSensor*: R/W Sensor selection (0x2000) and R Sensor list (0x2001)

<u>Note</u>: The device_id of the connected device (Micro-Epsilon sensor or controller) must be passed to each function block. A *trigger* on TRUE for a program cycle triggers the desired *action (read has priority* over write), the *end* of which is signaled by done = TRUE. A status != 0 indicates an *error* while sending or receiving data. If reset_after_write = TRUE, IF2030/PNET is restarted after successful configuration so that the *changes made become effective immediately*.

6.1 Importing function blocks

1. Go to the Project tree. Follow this path in your PLC: External source files \rightarrow Add new external file. Double-click the latter to open a Dialog box.

2. Select the path for the source file "IF2030_FBs.scl" and click the Open button.

📑 Add new device	VM Öffnen						>
Devices & networks	$\leftarrow \rightarrow \checkmark \uparrow $ Admin >	Deskto	p > PN_TIA_FunctionBlocks	ٽ ~	"PN_TIA_Fun	ctionBlocks" dur	, p
Device configuration	Organisieren 🔻 Neuer Ordner						2
Program blocks	IF2030	^	Name	Ān	derungsdatum	Тур	
Technology objects	PN_TIA_FunctionBlocks		152020 EPs sel	20 /	2 2010 14.17	SCI Datai	
✓	OneDrive		statemachine.scl	04.0	04.2019 07:30	SCL-Datei	
PLC data types Watch and force tables	Dieser PC	i.					
Online backups	Bilder .						
Fraces	Deskton						
Device proxy data Program info	Dokumente						
PLC alarm text lists	- Downloads						
Local modules	J Musik						
Distributed I/O	Videos						
 Ungrouped devices Security settings 	Lokaler Datenträger (C:)	~	<			_	
🕨 🙀 Common data	Dateiname:			~	All sources		~
Documentation settings					Ölleren	Abbreak	
Languages & resources					Offnen	Abbreche	an

3. When stored correctly, your source file is available in the External source files folder (Project tree). Now transfer the function blocks from the source file to the Program blocks folder. Therefore, right-click the source file to open the Shortcut menu and select the Generate blocks from source command. Confirm the message which may appear informing that existing blocks will be overwritten.

4. The generated function blocks are now available in the Program blocks folder. You will see the result of the generation in the Inspector window in the Info → Compile tab. Please note that these messages refer to the source file!

Add new block	
Main [OB1]	
Technology objects	
 External source files 	
Add new external file	
IF2030_FBs.scl	0.000
> Contractorys	Open
PLC data types	🗶 Cut Ctrl+X
Watch and force tables	E Copy Ctrl+C
Online backups	Paste Ctri+V
🕨 🔄 Traces	X Delete Del
Device proxy data	Go online Ctrl+K
Program info	So offine Ctrl+M
PLC alarm text lists	
Local modules	Start simulation Ctrl+Shift+X
Distributed I/O	Search in project Ctrl+F
🕨 🔙 Ungrouped devices	Generate blocks from source
Security settings	
Common data	Cross-reterences F11



6.2 Executing function blocks

5. Select the Program blocks folder of your CPU in the Project tree and then click Add new block to create a global data block.

Select the Data block option in the following Dialog box and change the block name, if necessary. Select "Global-DB" as type. Activate the checkbox Add new and open, if this is not the case automatically. Now confirm by clicking the OK button.



6. The data block is displayed automatically. Now create the necessary variables, depending on the function module. The start value is the value with which the data block is loaded in the main memory of the CPU. Then click the Save project button (top left corner in the Toolbar).

	Ve	rtrie	ebT	raining1 PLC_1 [CPU	1212C AC/DC/Rly	 Program blo 	ocks ► IF2	030_gDB [D8	37]	í í		_ • •	Ξ×
ł			6	🔩 🛃 🔛 🖏 Keep act	tual values 🛛 🔒 Sn	apshot 🔤 🖳	Copysnapsh	iots to start val	ues 🖳	🖳 Load	start values a	is actual values 🕨	-
		IF2	03	0_gDB									
			Nar	ne	Data type	Start value	Retain	Accessible f	Writa	Visible in	Setpoint	Comment	
^	1	-	•	Static									
	2	-	•	ILD1420_Modul_id	HW_IO	273			~				
	3	-	•	ILD1420_Interface	Byte	16#2			~				
	4		•	ILD1420_Baudrate	DInt	921600			~				
	5		•	ILD1420_Baudrate_st	Bool	false							
	6	-	•	ILD1420_Baudrate_wr	Bool	false							
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-	8		•	ILD1420_Baudrate_d	Bool	false							

<u>Note</u>: Make sure you use the correct data types! You have to link the global variables correctly with those of the function blocks.

7. To allow for a function block to be processed, it must be called in the program. Open the organization block "*Main [OB1]*" with a double click. Now mark your function block and drag it into the program of the previously opened organization block.

<u>Note</u>: The call does not necessarily have to be made via the main program OB1, which is always processed by the CPU by default.

8. Now interconnect your data and function block. Drag and drop the required variables from your data block to the connections of the function block to be called using the mouse. Alternatively, you can also enter the variables manually.



<u>Hint</u>: You can display the data block and the organization block "*Main [OB1]*" next to each other by clicking the Split editor space vertically symbol button III in the Toolbar.

9. Save your project as usual. To compile all blocks, click the Program blocks folder in the Project tree and select the Compile symbol button in the Toolbar.

<u>Note</u>: The Inspector window (\rightarrow Info \rightarrow Compile) then displays which blocks were successfully compiled.

After successful compilation, the entire control can be loaded with the created program including the hardware configuration, as already described, via the Load to device symbol button.

7 Appendix

7.1 Portal view

In general, a portal provides all functions and tools required for the respective task range in the corresponding Portal view. After the start-up, STEP 7 displays the **Start portal**. Starting from here, you can reach the following portals:

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		Create new project Migrate project	Start	
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	4		Devices 4 6 0 Configure a device	
			PLC programming 🖉	
		 Welcome Tour First steps Installed software 	Motion & configure technology objects Visualization Configure an HM screen	
		Help		
			Project view Open the project view	
		🕲 User Interface language		
Project view		Opened project: C:\Users\1100051	161Documents/Automatisierunglif2030demolif2030demo	

- Devices & networks: for configuring the hardware of the programmable controller (incl. selection, positioning, and property assignment of hardware components) and defining connections to network multiple devices
- PLC programming: for generating the PLC station's user program with different tools
- Motion & technology: for creating technology objects
- Visualization: for generating operator controls and monitoring interfaces for HMI stations
- Online & diagnostics: for testing programs and detecting faults in the automation system

Moreover, you can Create a new project, Open an existing one, or perform a Migration via the Start portal. For an introduction to STEP 7, carefully read the Welcome Tour and First steps. Navigate to Installed software to get an overview of further SIMATIC applications that are currently available on the programming device. You can call Help in every portal. Use the User interface language function to change the operating language of STEP 7.

5.2 Project view and associated windows

The **Project view** (in portal Devices & networks) consists of various processing windows that show all elements of a project in a structured manner. Different window contents are displayed depending on the currently used editor.

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Main menu, Toolbar, and Shortcut menu

The Main menu with all menu commands is beneath the title bar. The currently marked object determines the commands which can be selected (non-selectable ones are greyed out). The same functionality is available via the Shortcut menu: By right clicking an object, a window with the currently selectable menu commands opens. Underneath the Main menu is the Toolbar that graphically represents the "main functions". Both Main menu and Toolbar are available at all times.

2 Working window

The **Working window**, whose contents depend on the currently used editor, is in the center of the screen. Here you can, for instance, configure the hardware of the automation system. The objects (stations and modules) are both diagrammed and tabulated.

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Inspector window

The Inspector window underneath the working window serves multiple purposes: it shows the properties of an object marked in the Working window, records the sequence of actions, and displays the diagnostics of all connected devices. During configuration you set the object properties (e.g. addresses and symbol names of inputs and outputs, tag data types, or block attributes).



The content of the **Project tree** window remains stable in all editors. It is hierarchically structured and contains the entire project data and required editors: folders for the PLC, HMI, and PC stations included in the project, with further subfolders for, e.g., **PLC tags** or watch tables. Double-click an object with project data to start the associated editor automatically.



Task window

Right next to the Working window is the **Task window** with the so-called task cards and further objects that are intended for processing in the Working window. Again, the window's contents depend on the currently active editor (e.g. the **Hardware catalog** with available components during hardware configuration).



Editor and Status bar

The bottom of the Project view offers different functions. On the left you can change to the Portal view. In the middle you can find the tabs of the open windows. You can quickly switch between different window contents by simply clicking a tab (i.e. they are displayed at the top level of the Working window). The Status bar is on the right and indicates the current status of project execution.

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