Manual IO-Link function blocks

Table of contents

Disclaimer of Warranties

ifm disclaims to the fullest extent authorized by law any and all warranties, whether express or implied, including, without limitation, any implied warranties of title, non-infringement, quiet enjoyment, integration, merchantability or fitness for a particular purpose.
Without limitation of the foregoing, ifm expressly does not warrant that:

a) the software will meet your requirements or expectations;
b) the software or the software content will be free of bugs, errors, viruses or other defects;
c) (c) any results, output, or data provided through or generated by the software will be accurate, up-to-date, complete or reliable;
d) (d) the software will be compatible with third party software;
e) (e) any errors in the software will be corrected

DEMO SOFTWARE AND TEMPLATES

Demo software and templates are provided “as is” and “as available”, without any warranty of any kind, either express or implied.
The User acknowledges and agrees to use the software at User’s own risk.
In no event shall ifm be held liable for any direct, indirect, incidental or consequential damages arising out of the use of or inability to use the software.
User may use the software solely for demonstration purposes and to assess the software functionalities and capabilities.

Software written specifically for Customer

1. The software created and used is put together by ifm specially to the customer using modular software components made by ifm for numerous applications (Standard software modules) and adapted to the contractual service required (customer-specific application program).
2. Upon complete payment of the purchase price for the customer-specific application program, ifm transfers the non-exclusive, locally and temporarily unrestricted usage right thereof to the customer, without the customer acquiring any rights of any kind to the standard software module on which the individual or customer-specific adaptation is based. Notwithstanding these provisions, ifm reserves the right to produce and offer customer specific software solutions of the same kind for other customers based on other terms of reference. In any case ifm retains a simple right of usage of the customer–specific solution for internal purposes.
3. Upon acceptance of the program, User acknowledges and agrees to use the software at User’s own risk. User also acknowledges and agrees upon acceptance of the program that the software meets the requirements of the specifications agreed upon. ifm disclaims any and all warranties, in particular regarding fitness of the software for a particular purpose.

General

To help customers to integrate IO-Link devices in the Siemens automation system ifm electronic provides how-to examples.

Content:

The examples include:

- Devices and Network
- Read/write cyclic process data
- Read/write IO-Link device parameters from a PLC
- Execute IO-Link system commands
- Read IO-Link events

TIA Version:

All examples are developed in TIA-Portal V14.1. Reason for this is that it is possible to upgrade to an higher version but not possible to downgrade.

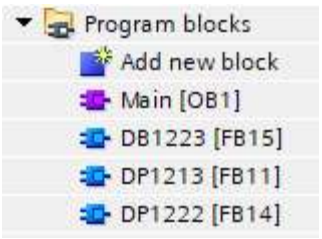
Distribution of the examples

In order to make the examples clear, there is a separate example for each product family.
In the StartUpPackage they can be found here:

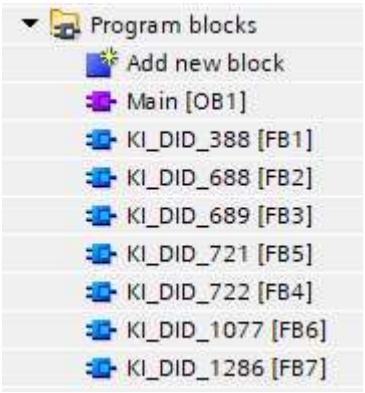
AL StartUpPackage\Startup Package_AL1x0x_PN_PLC Siemens S7 - TIA_27-0-0\2. IO-Link Device - Function Blocks\1. TIA Function Blocks

Naming of the devices in the examples

In this case where the IODDs (IO device descriptions) contains single devices everything in the example is named with the article name as shown below:

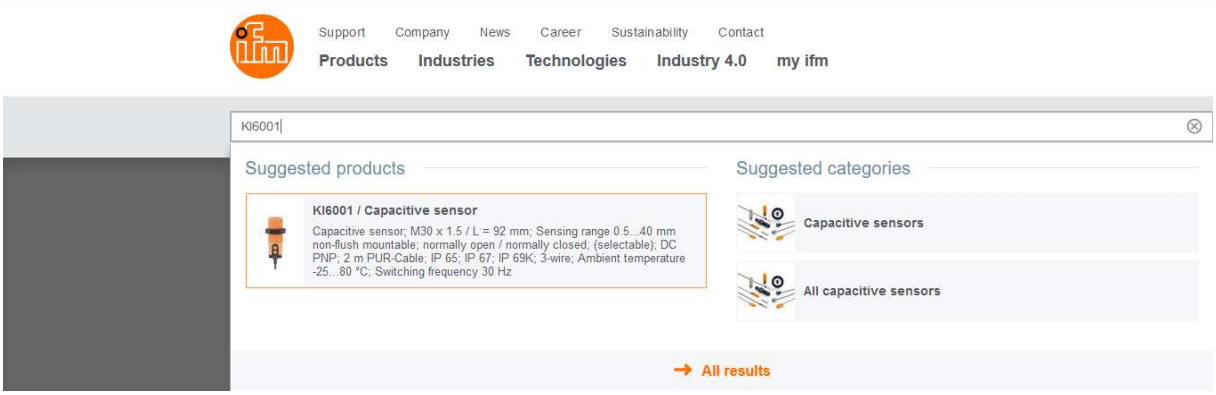


Devices with different housings or process connections that have the same IO-Link interface can be combined under one Device ID.
In this case the Device-ID is taken for naming function blocks and tags inside the examples as shown below.



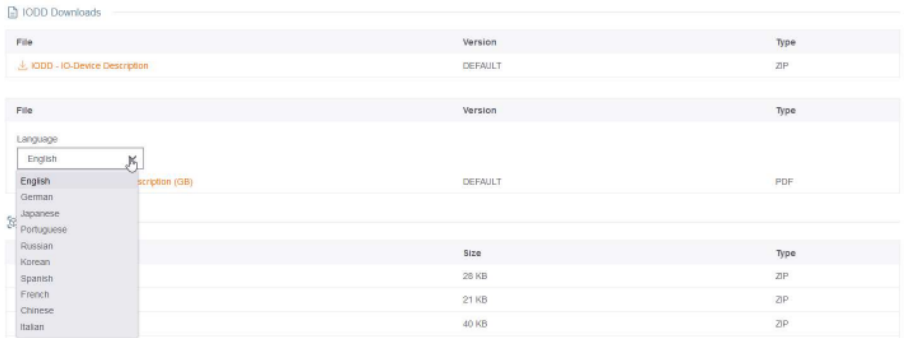
Example: How to find out which is the right function block for the KI-sensor (KI6001):

Go to: www.ifm.com



Enter the article name

Go to downloads



Open the IO-Link interface description in your preferred language.

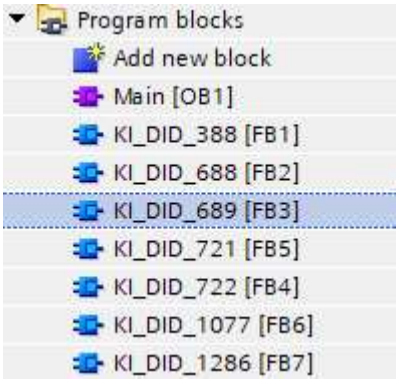
Table of Contents

Go to “2 Communication” and look up the Device-ID.

2 Communication

Vendor ID	310 / Bytes 1-54 (hex: 01-36)
Device ID	689 / Bytes 0-2-177 (hex: 00-02-B1)
Bit rate	COM2
Minimum cycle time	20 ms
SIO mode supported	Yes
Block parameterization	Yes
Data storage	Yes
Supported profiles	Smart Sensor Profil Device Identification Switching Signal Channel Process Data Variable Device Diagnosis

Here is the Device-ID listed.



The correct function block KI_DID_689 (FB3) is highlighted above.

Missing device:

The StartUpPackage is updated twice a year. If a device is available to purchase but is not yet provided in the StartUpPackage please contact ifm support.

Feedback:

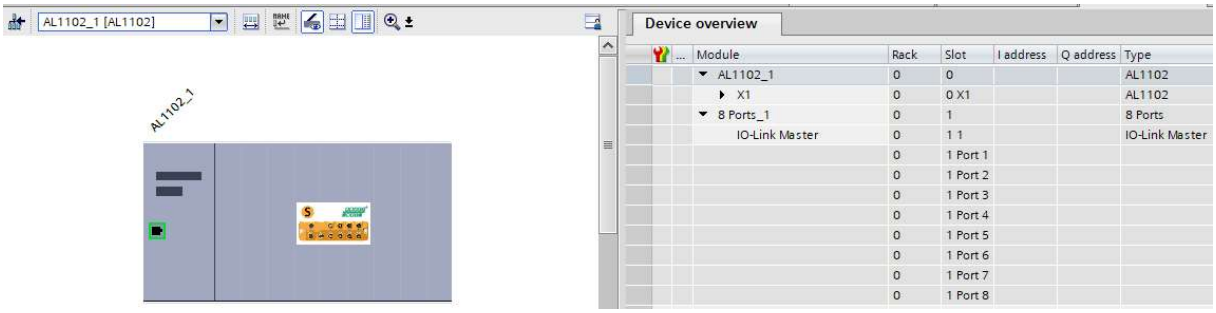
To help us continuously improve our StartUpPackage we would be grateful for any feedback regarding the examples provided

Support

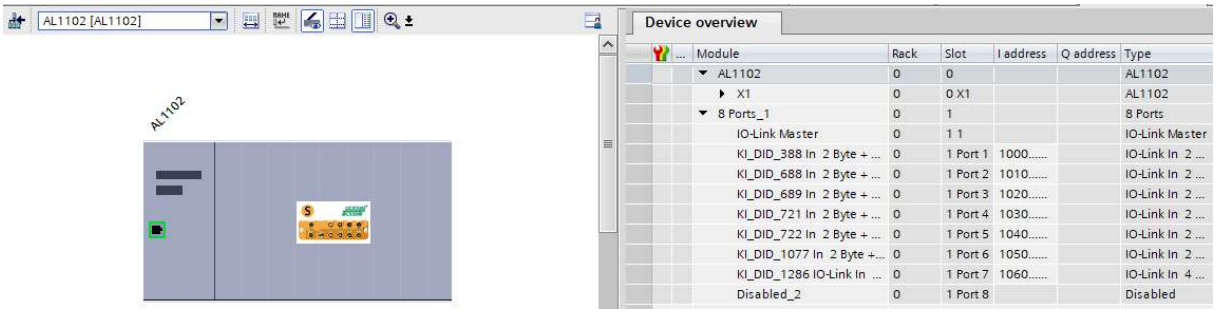
If you have any questions relating to the examples please don’t hesitate to contact ifm electronic:
info@ifm.com

Devices and network

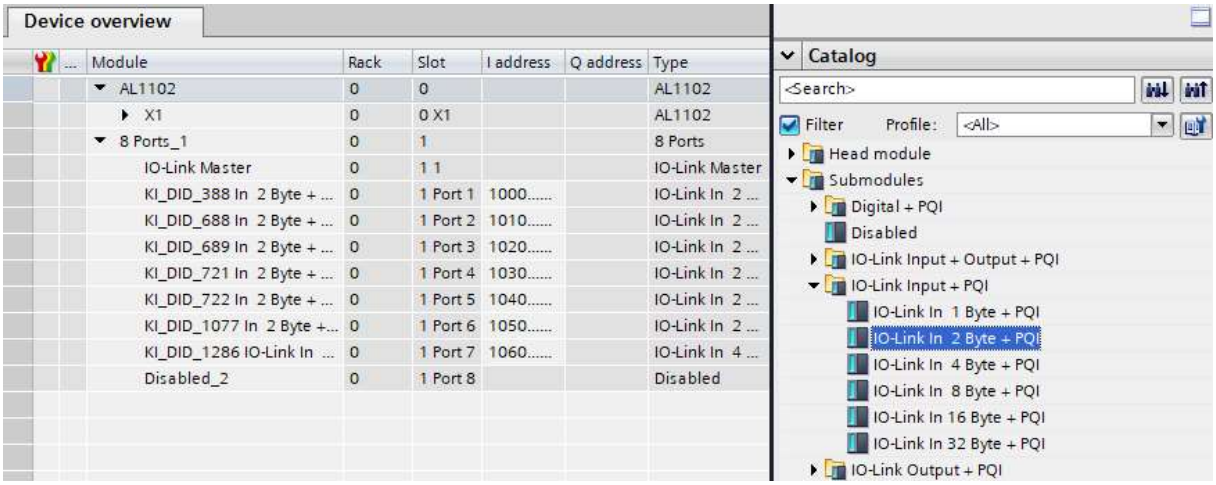
Please select the IO-Link-Master-Gateway currently in use and add it to the PLC's network.
Then go to the device view.



In the first step the slots of the IO-Link Master ports are empty and must be filled with modules from the catalog according to the connected IO-Link device.



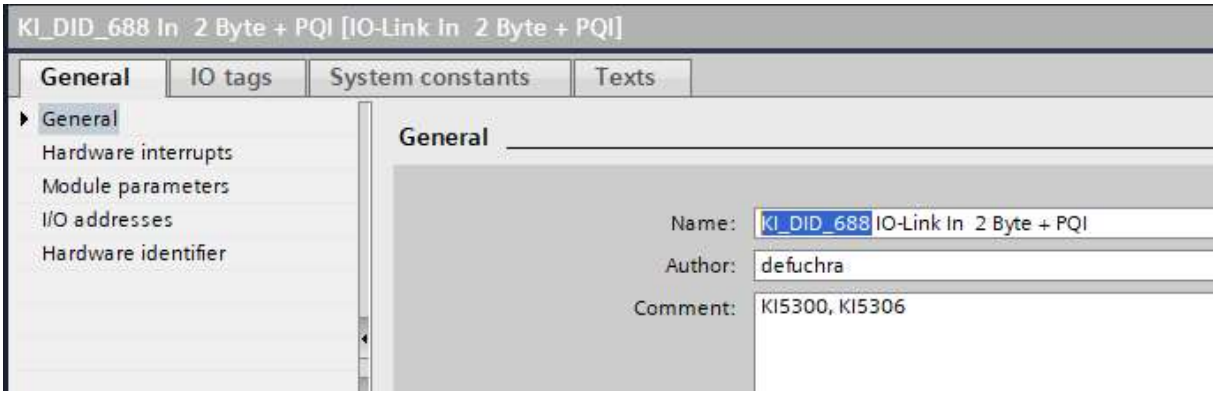
Please take the same modules as in the examples.
These modules have the correct process data range for the connected device which means you don't have to look in the interface description.



The modules in the examples are standard modules taken from the catalog.

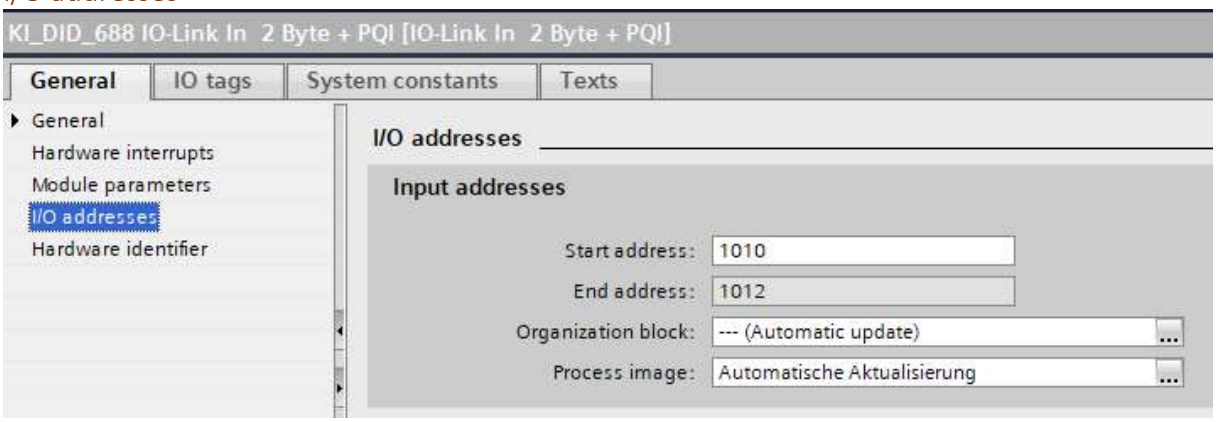
Properties

General



To get the example more readable the device article name ore the device-ID is written in front of the default module name.
The name of the module is optional and the choice of the engineer.

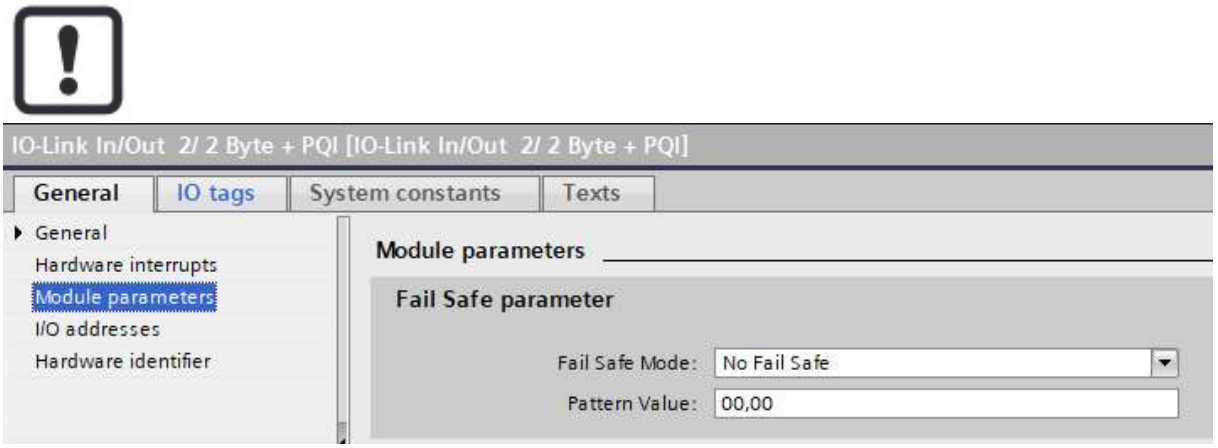
I/O addresses



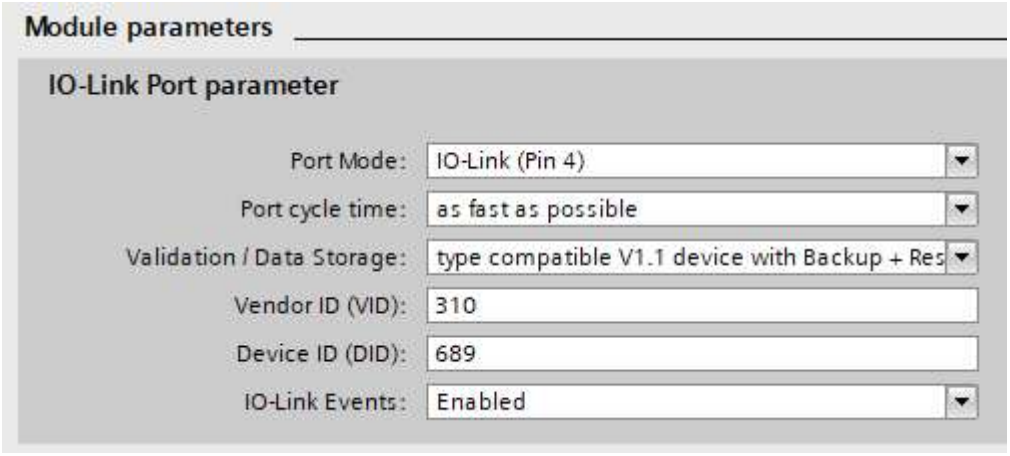
The user decides where the cyclic IO-Link process data should be processed in the PLC.

Module parameter

Fail save parameter



If an IO-Link device also has output from the PLC to the device, please make sure that the fail-safe settings match your application.



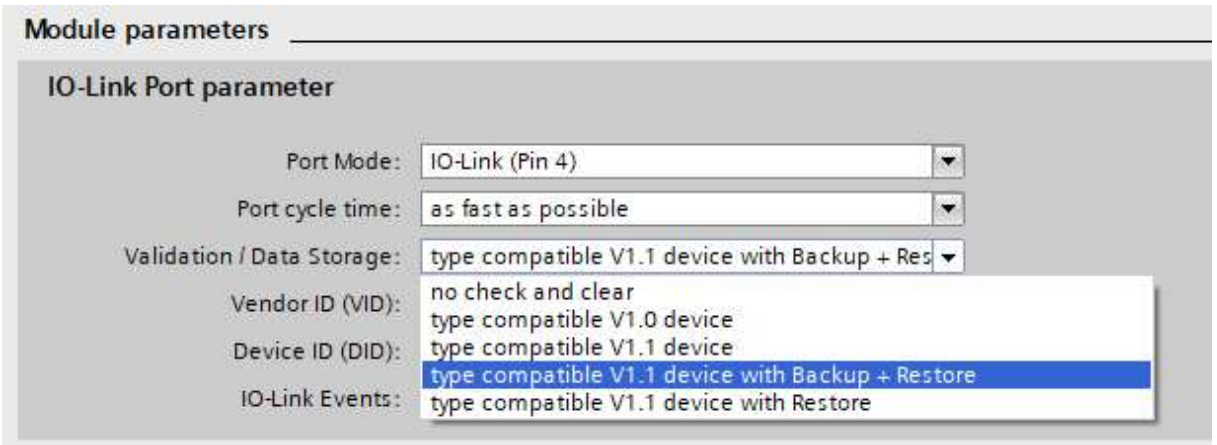
Port mode

Port mode is selected by track and drop the module from the catalog and can't be changed.

Port cycle time

Port cycle time enables the settings of the time intervals at which the IO-Link master should query the cyclic process data from the device.
The limits here are the MinCycleTime (see IODD interface description) and the performance of the IO-Link master.
If a setting that falls below these limits is selected, no communication takes place.
Recommendation: Leave the setting on "as fast as possible", then the IO-Link master automatically determines the fastest possible update rate.

Validation / Data Storage



No check and clear

No check if the device is the right type of device. Every device can be connected if the device's cyclic process date is not greater than the range of the selected module. Saving device parameters in the IO-Link master is disabled.

Type compatible V1.0 / V1.1

If this setting is active the IO-Link Master detects if the right device type is connected. During the startup the master asks the device for Vendor-ID and Device-ID and compares that numbers with the settings which were chosen in the parameters below.
If the numbers matches the communication will start otherwise the communication will not go to operation. The master alerts a mismatch with red flashing LED.
Because the detection of the device has changed from IO-Link Version V1.0 to V1.1 there are two options. Please have a look which IO-Link Version the used device supports and take the setting according to the device.

Type compatible V1.1 device with backup + restore / restore

Remark: The function Datastorage is only available if master and device support IO-Link V1.1

If you need more information about the function data storage please have a look on the home page of ifm electronic or contact one of our IO-Link experts.

IO-Link events

One of the advantages of IO-Link is the detailed device diagnosis. If you don't want the events to come up to your system please change the setting to disabled.

Function blocks

Preamble:

Many different function blocks are used in the examples.

This is due to the fact that there was no standardized transmission of the process data until the SmartSensorProvil V2, which came onto the market in 2017.

In addition, the examples were formally designed for S7 Classic and were migrated from there to TIA. TIA offers functions such as hardware IO that were not yet available in S7 Classic. Since these functions offer real added value, the blocks have been redesigned accordingly.

Due to the available employee capacity, ifm decided not to renew existing examples.
If you have questions regarding to the different versions of the function blocks, please feel free to contact the ifm electronic support.

As written in the disclaimer the function blocks are only examples with known warranty. We do our best to test the function blocks. If you find a mistake we would appreciate any feedback.

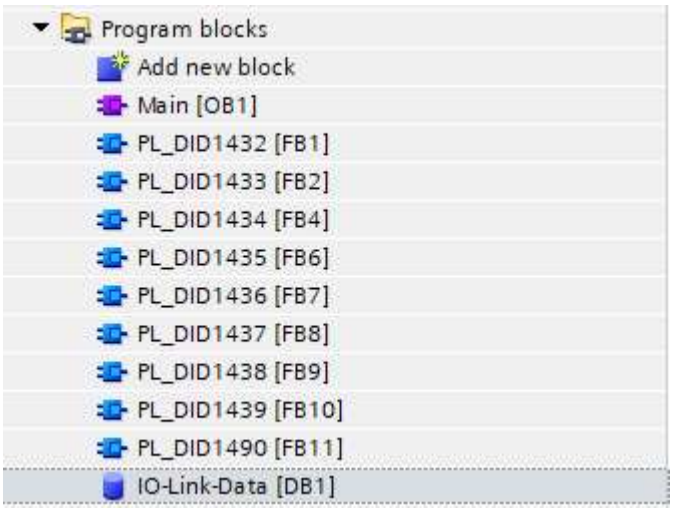
The function blocks are not know-how-protected. If you want to extend or reduce the function please feel free to do that.

The function blocks are described on the following pages. The function blocks suitable each device are already used in the examples.

Data block

IO-Link Data

In every example a data block is added which contains the signals generated by the devices.



IO-Link-Data

	Name	Data type	Offset	Start value	Retain	Accessible f...	Writa...	Visible in ...	Setpoint	Supervision	Comment
1	Static										
2	PL_DID1432	Struct	0.0								
3	ProcessData	Struct	0.0								
4	OP	"OP_Int_V2"	36.0								operating function blocks
5	P-IF	"IF_PL_DID1432"	58.0								parameter interface
6	PQI	"PQI_IF"	2308.0								interface PQI
7	Commando	"Commando_PL"	2310.0								interface system commandos
8	Events	"Event_PL"	2462.0								interface active events
9	PL_DID1433	Struct	2466.0								
10	PL_DID1434	Struct	4932.0								
11	PL_DID1435	Struct	7398.0								
12	PL_DID1436	Struct	9864.0								
13	PL_DID1437	Struct	12330.0								
14	PL_DID1438	Struct	14796.0								
15	PL_DID1439	Struct	17262.0								
16	PL_DID1490	Struct	19728.0								

The data block contains a struct for each device / device-ID.
To save effort, the structure can be copied into your own project.

Process data

IO-Link-Data

	Name	Data type	Offset	Start value	Retain	Accessible f...	Writa...	Visible in ...	Setpoint	Supervision	Comment
1	Static										
2	PL_DID1432	Struct	0.0								
3	ProcessData	Struct	0.0								
4	Pressure	"SmartSensor"	0.0								Pressure [pascal]
5	OR_PS	Real	0.0	0.0							output process value (real)
6	OD_PS	DInt	4.0	0							output process value (dint)
7	OB_Status	Byte	8.0	16#0							device status (see IODD-description)
8	O_SSC_OU1	Bool	9.0	false							switch point 1
9	O_SSC_OU2	Bool	9.1	false							switch point 2
10	O_SSC_OU3	Bool	9.2	false							switch point 3
11	O_SSC_OU4	Bool	9.3	false							switch point 4
12	O_Cr_OL	Bool	9.4	false							process value over critical limit
13	O_OL	Bool	9.5	false							process value over limit
14	O_UL	Bool	9.6	false							process value under limit
15	O_Cr_UL	Bool	9.7	false							process value under critical limit
16	O_NoData	Bool	10.0	false							process value no data

Interface of the process data provided by the device

OP

IO-Link-Data

	Name	Data type	Offset	Start value	Retain	Accessible f...	Write...	Visible in ...	Setpoint	Supervision	Comment
1	Static										
2	PL_DID1432	Struct	0.0								
3	ProcessData	Struct	0.0								
4	OP	"OP_Int_V2"	36.0								operating function blocks
5	_12_IOL_GenX	Struct	36.0								signals for function block read/write parar
6	O_ComActi...	Bool	36.0	false							acyclic communication is active
7	O_Fault	Bool	36.1	false							fault occured during acyclic communicati
8	I_DataStora...	Bool	36.2	false							written parameter shall be stored in the r
9	I_BlockParam	Bool	36.3	false							parameter shall be written with block par
10	IO_ReadReq	Bool	36.4	false							request reading parameter from device
11	IO_WriteReq	Bool	36.5	false							request writing parameter to device
12	IO_ResetReq	Bool	36.6	false							request fault from functionblock
13	ExcecuteCom...	Struct	38.0								signals for function block execute comma
14	ISDU_Event_SCL	Struct	48.0								signals for function block read events

Interface Operation. With these signals the function blocks can be connected to an HMI.

P-IF

P-IF	"IF_PL_DID1432"	58.0								parameter interface
StandardStructure	Struct	58.0								
Header	Struct	58.0								
Paramdownload	Struct	78.0								
DeviceIndentification	Struct	102.0								device indentification p
ApplicationSpecificTag	Struct	758.0								AppliciationSpecificTag
DeviceParameters	Struct	1004.0								Device Parameters

Interface read / write parameter PLC
We at ifm electronic have a converter which generates an UDT out of the device IODD. The UDT suitable for the device is stored in each example.
The UDT contains all parameters of a device and can be used to store settings in the PLC or to bring the parameter-setting to an HMI.
This UDT will be connected to the function block _12_IOL_GenX (see description of the function block.
Important: To work properly the function block needs exactly this structure and pre-defined values (except the parameter values). Please do not make any changes otherwise read / write of parameters won't be work.

Example parameter-setting:

Parameter_32								V_AEP2_PRES_AEP2 _ PRES > AEP2 _ PRES Analogue end point 2
V_AEP2_PRES	4000							
Byte02	BYTE#16#00							
Byte03	BYTE#16#00							
Index	631							parameter index
Subindex	0							parameter subindex
Length	2							parameter length in BYTE for writing
BlockStat	16#0							function block status
IOLStat	16#0							IO-Link Status
RelRead	TRUE							reading release
RelWrite	TRUE							writing release

To set the Analog-End-Point for the analog-output of the device from an HMI set an input-field to this parameter in the data block. The function bloc _12_IOL_GenX will write the input to the device (see also description of the function block).

If you have any questions regarding to this interface please don't hesitate to contact the support of ifm electronic support.

Note: The IODD to UDT converter is an internal tool from ifm electronic and cannot be made available to customers. The software is designed for ifm IO-Link devices. It is not guaranteed that working UDTs can be generated from IODDs of competitor devices.

PQI

PQI	08.0		☐	☑	☑	☑	☐	interface PQI
O_DI4	08.0	false	☐	☑	☑	☑	☐	
O_DI2	08.1	false	☐	☑	☑	☑	☐	
O_DA	08.2	false	☐	☑	☑	☑	☐	
O_DE	08.3	false	☐	☑	☑	☑	☐	
O_PQ	08.4	false	☐	☑	☑	☑	☐	

Interface PQI-Diagnostic. The parameters are described in the description of the function block.

Events

Event	52.0		☐	☑	☑	☑	☐	Interface bit coded events
Event_00	52.0	false	☐	☑	☑	☑	☐	(0x5000) Device hardware fault
Event_01	52.1	false	☐	☑	☑	☑	☐	(0x6320) Parameter error
Event_02	52.2	false	☐	☑	☑	☑	☐	(0x7710) Short circuit
Event_03	52.3	false	☐	☑	☑	☑	☐	not used
Event_04	52.4	false	☐	☑	☑	☑	☐	not used
Event_05	52.5	false	☐	☑	☑	☑	☐	not used
Event_06	52.6	false	☐	☑	☑	☑	☐	not used
Event_07	52.7	false	☐	☑	☑	☑	☐	not used
Event_08	53.0	false	☐	☑	☑	☑	☐	(0x8C10) Process variable range overrun
Event_09	53.1	false	☐	☑	☑	☑	☐	(0x8C30) Process variable range underrun
Event_10	53.2	false	☐	☑	☑	☑	☐	(0x8C20) Measurement range exceeded
Event_11	53.3	false	☐	☑	☑	☑	☐	(0x8CDF) Reserved
Event_12	53.4	false	☐	☑	☑	☑	☐	not used
Event_13	53.5	false	☐	☑	☑	☑	☐	not used
Event_14	53.6	false	☐	☑	☑	☑	☐	(0x4220) Device temperature underrun
Event_15	53.7	false	☐	☑	☑	☑	☐	(0x4210) Device temperature overrun
Event_16	54.0	false	☐	☑	☑	☑	☐	(0x8C01) Simulation active
Event_17	54.1	false	☐	☑	☑	☑	☐	not used
Event_18	54.2	false	☐	☑	☑	☑	☐	not used
Event_19	54.3	false	☐	☑	☑	☑	☐	not used
Event_20	54.4	false	☐	☑	☑	☑	☐	not used

In order to make it easier for users to read out events, the events are mirrored in index 545 for devices from ifm elektronic.
A structure suitable for the devices is stored in each example.
Index 545 can be read out with the ISDU_Event_SCL_Diag function block.
If the status of the corresponding bit is high, the event is pending.

Settings

Settings

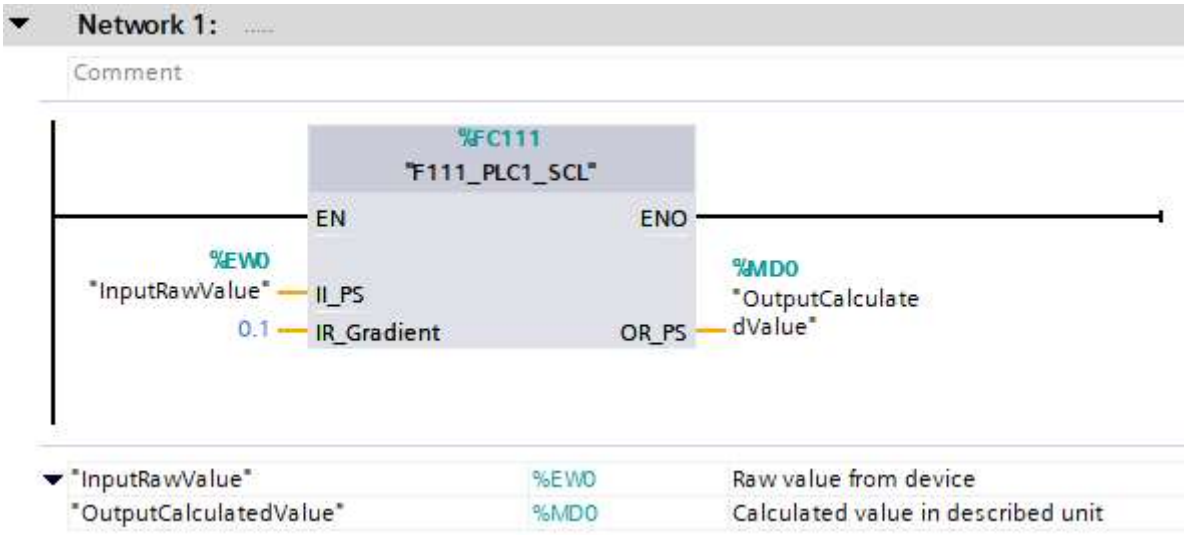
	Name	Data type	Start value	Retain	Accessible f...	Writa...	Visible in ...	Setpoint	Supervision	Comment
1	Static									
2	Port-Number	Struct								
3	PL_DID1432	Int	1							
4	PL_DID1433	Int	2							
5	PL_DID1434	Int	3							
6	PL_DID1435	Int	4							
7	PL_DID1436	Int	5							
8	PL_DID1437	Int	6							
9	PL_DID1438	Int	7							
10	PL_DID1439	Int	8							
11	PL_DID1490	Int	1							

The information showing which port of the IO-Link master the device is connected to is required by all function blocks that use the IO_LINK_DEVICE from Siemens internally.
In order not to have to enter the number in the block each time, it is stored here once and this parameter is then transferred to the block.

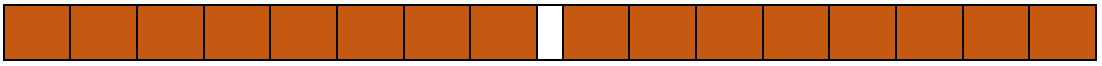
Process data

Non-SmartSensorProfile

F111_PLC1_SCL

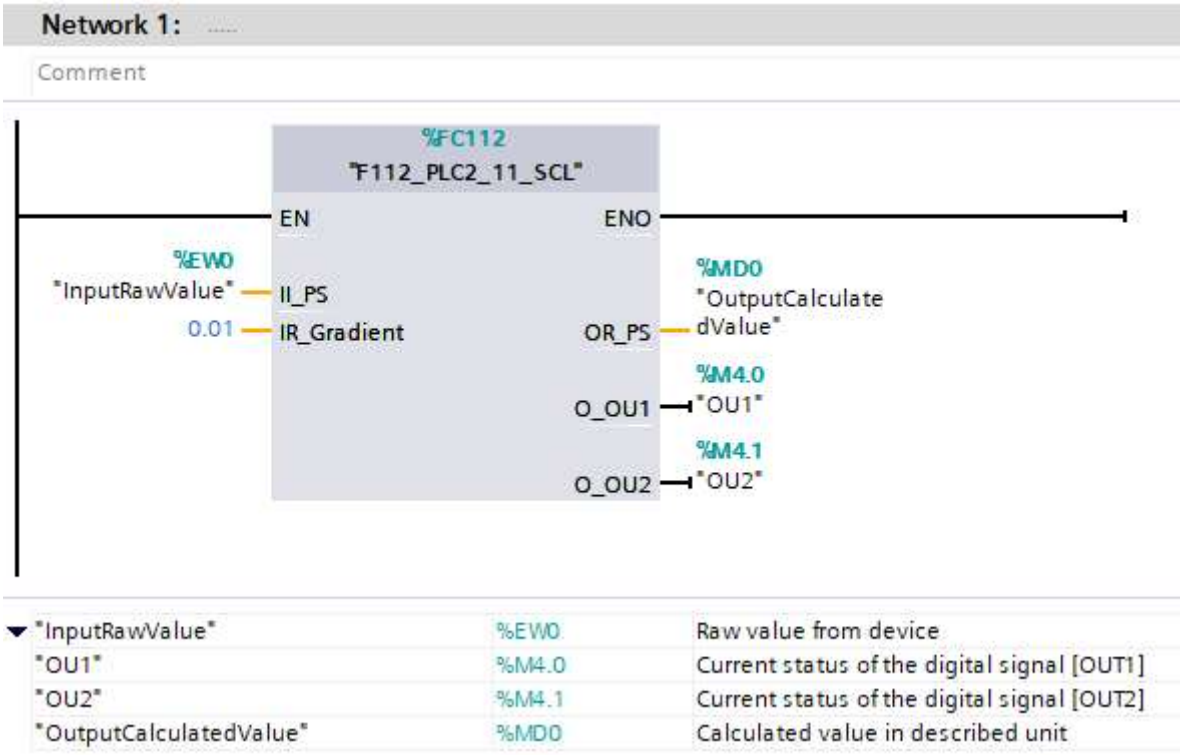


This function block is for a device with two byte process data input and no switch point in the process data stream.

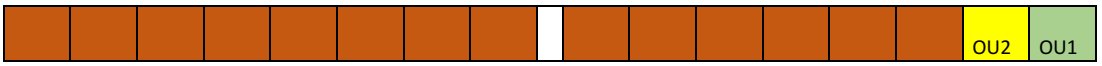


Formal operant	Format	Description
II_PS	INT	Raw value from the device. Global input. See IO-Link Master configuration in Devices and Network.
IR_Gradient	REAL	Gradient to calculate raw value to the described unit. The gradient can be found in the description of the IO-Link interface
OR_PS	REAL	Output value in the specified unit.

F112_PLC2_11_SCL

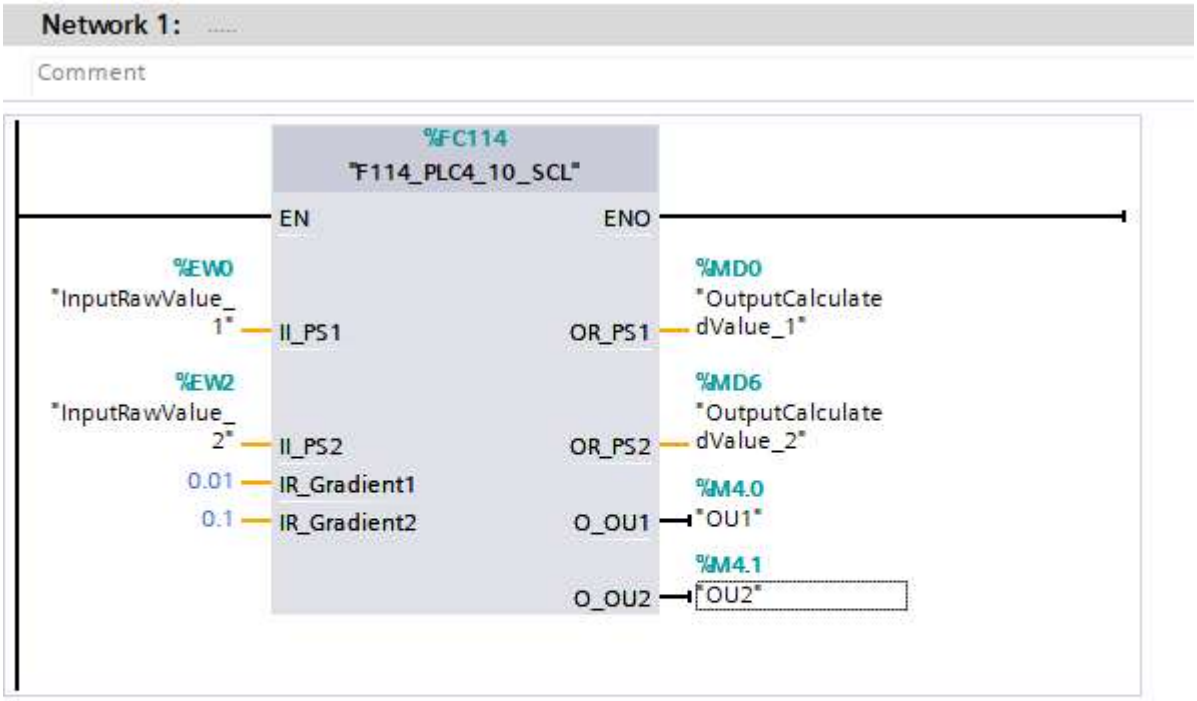


This function block is for a device with two byte process data input and two switch points in the process data stream.



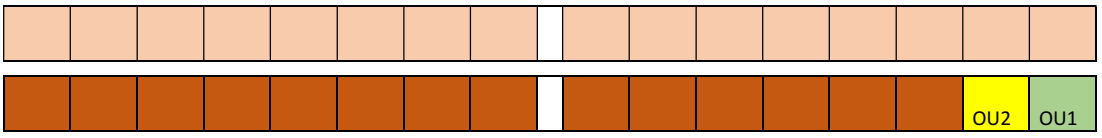
Formal operant	Format	Description
II_PS	INT	Raw value from the device. Global input. See IO-Link Master configuration in Devices and Network.
IR_Gradient	REAL	Gradient to calculate raw value to the described unit. The gradient can be found in the description of the IO-Link interface
OR_PS	REAL	Output value in the specified unit.
O_OU1	BOOL	Current status of the digital signal [OUT1]
O_OU2	BOOL	Current status of the digital signal [OUT2]

F114_PLC4_10_SCL

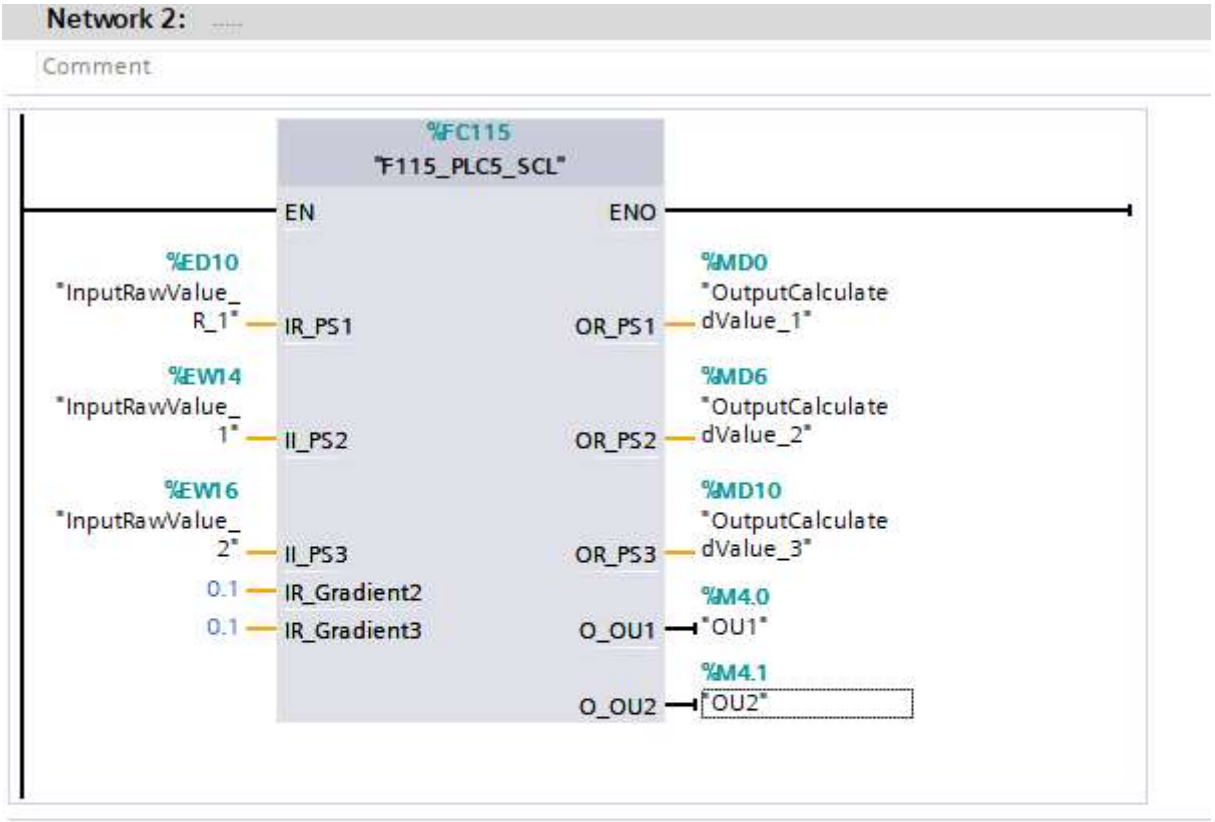


"InputRawValue_1"	%EW0	Raw value from device
"InputRawValue_2"	%EW2	Raw value from device
"OU1"	%M4.0	Current status of the digital signal [OUT1]
"OU2"	%M4.1	Current status of the digital signal [OUT2]
"OutputCalculatedValue_1"	%MD0	Calculated value in described unit
"OutputCalculatedValue_2"	%MD6	Calculated value in described unit

This function block is for a device with four byte process data input, two process values and two switch points in the process data stream.

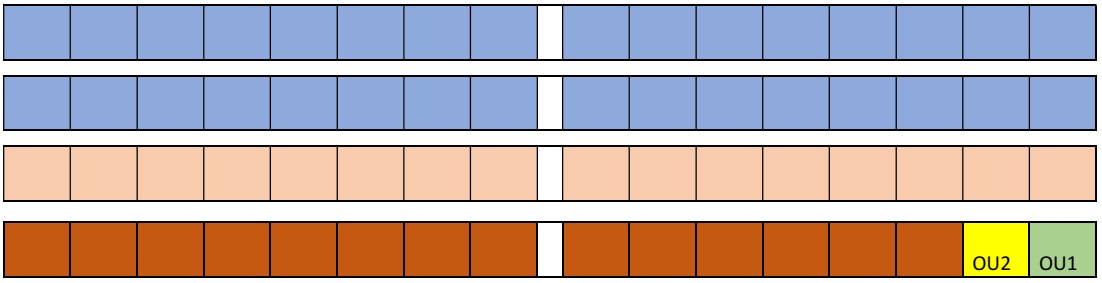


Formal operant	Format	Description
II_PS1	INT	First raw value from the device. Global input. See IO-Link Master configuration in Devices and Network.
II_PS2	INT	Second raw value from the device. Global input. See IO-Link Master configuration in Devices and Network.
IR_Gradient1	REAL	Gradient to calculate first raw value to the described unit. The gradient can be found in the description of the IO-Link interface
IR_Gradient2	REAL	Gradient to calculate second raw value to the described unit. The gradient can be found in the description of the IO-Link interface
OR_PS1	REAL	Output first value in the specified unit.
OR_PS2	REAL	Output second value in the specified unit.
O_OU1	BOOL	Current status of the digital signal [OUT1]
O_OU2	BOOL	Current status of the digital signal [OUT2]

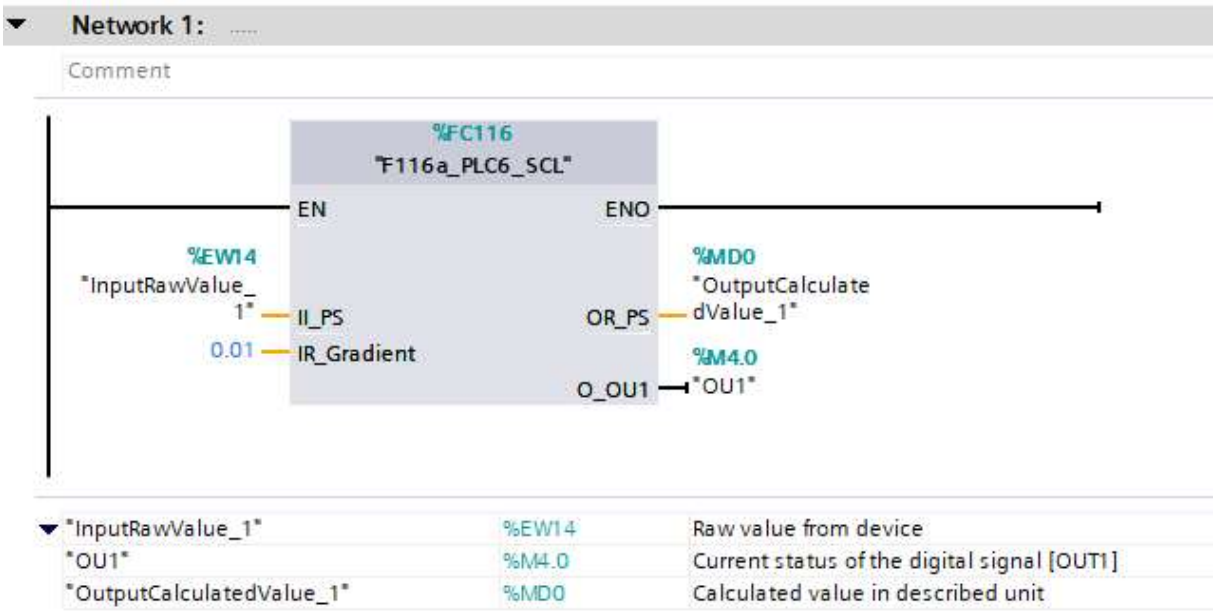


"InputRawValue_1"	%EW14	Raw value from device
"InputRawValue_2"	%EW16	Raw value from device
"InputRawValue_R_1"	%ED10	Raw value from device
"OU1"	%M4.0	Current status of the digital signal [OUT1]
"OU2"	%M4.1	Current status of the digital signal [OUT2]
"OutputCalculatedValue_1"	%MD0	Calculated value in described unit
"OutputCalculatedValue_2"	%MD6	Calculated value in described unit
"OutputCalculatedValue_3"	%MD10	Calculated value in described unit

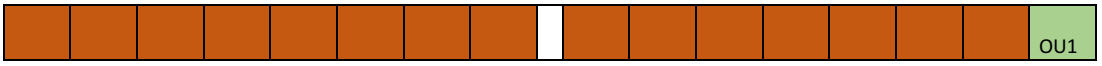
This function is special for flow sensors with totalizer, flow, temperature and two switch points.



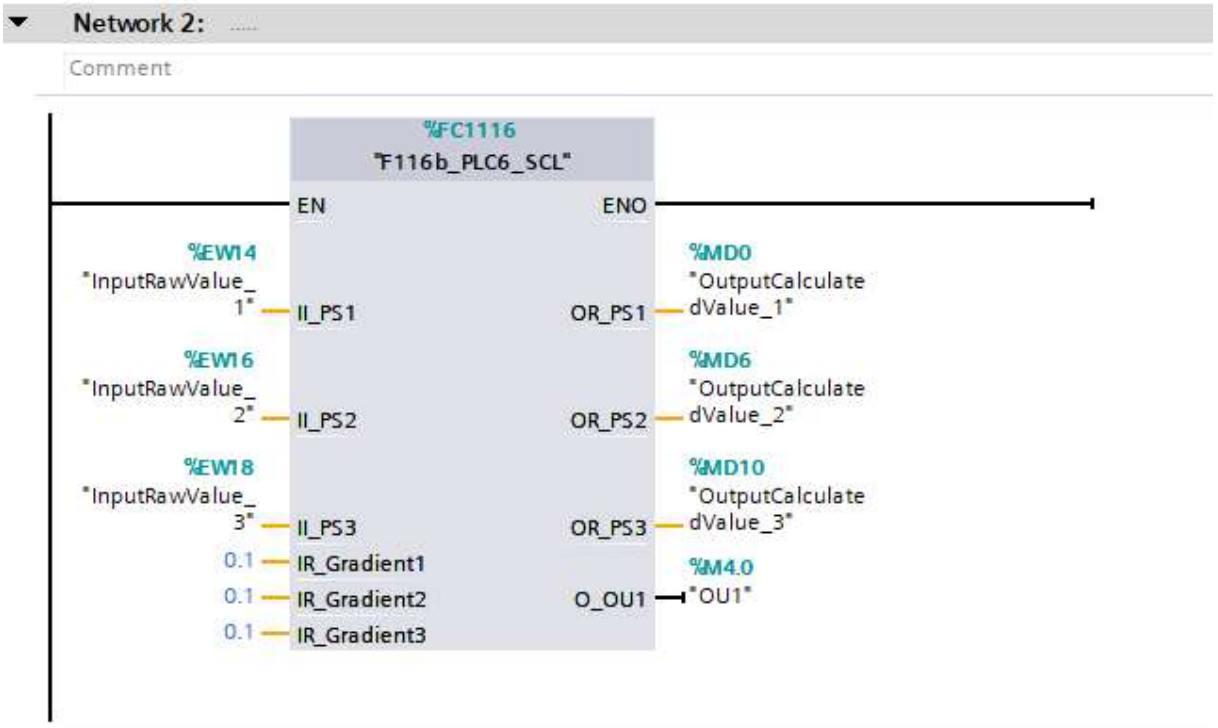
Formal operant	Format	Description
II_PS1	REAL	First raw value from the device. Global input. See IO-Link Master configuration in Devices and Network.
II_PS2	INT	Second raw value from the device. Global input. See IO-Link Master configuration in Devices and Network.
II_PS3	INT	Third raw value from the device. Global input. See IO-Link Master configuration in Devices and Network.
IR_Gradient2	REAL	Gradient to calculate second raw value to the described unit. The gradient can be found in the description of the IO-Link interface
IR_Gradient3	REAL	Gradient to calculate third raw value to the described unit. The gradient can be found in the description of the IO-Link interface
OR_PS1	REAL	Output first value in the specified unit.
OR_PS2	REAL	Output second value in the specified unit.
OR_PS3	REAL	Output third value in the specified unit.
O_OU1	BOOL	Current status of the digital signal [OUT1]
O_OU2	BOOL	Current status of the digital signal [OUT2]



This function block is for a device with two byte process data input and one switch point in the process data stream.

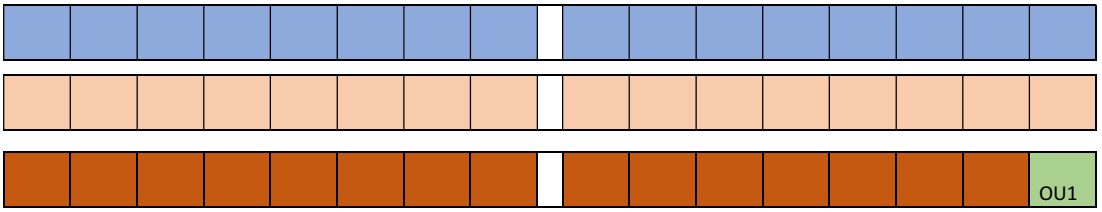


Formal operant	Format	Description
II_PS	INT	Raw value from the device. Global input. See IO-Link Master configuration in Devices and Network.
IR_Gradient	REAL	Gradient to calculate raw value to the described unit. The gradient can be found in the description of the IO-Link interface
OR_PS	REAL	Output value in the specified unit.
O_OU1	BOOL	Current status of the digital signal [OUT1]



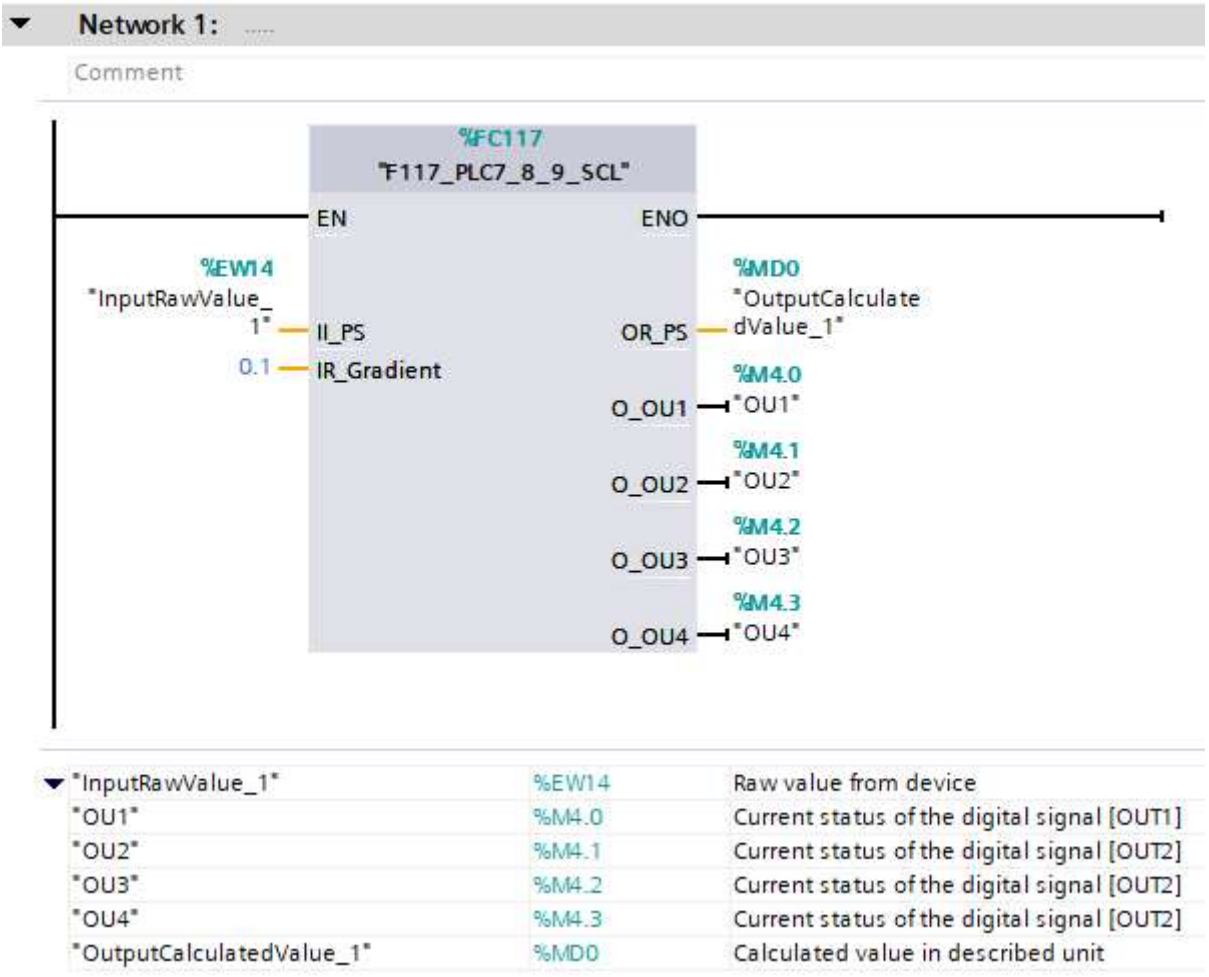
"InputRawValue_1"	%EW14	Raw value from device
"InputRawValue_2"	%EW16	Raw value from device
"InputRawValue_3"	%EW18	Raw value from device
"OU1"	%M4.0	Current status of the digital signal [OUT1]
"OutputCalculatedValue_1"	%MD0	Calculated value in described unit
"OutputCalculatedValue_2"	%MD6	Calculated value in described unit
"OutputCalculatedValue_3"	%MD10	Calculated value in described unit

This function block is for a device with six byte process data input and one switch point in the process data stream.



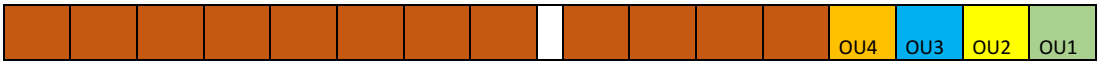
Formal operant	Format	Description
II_PS1	INT	First raw value from the device. Global input. See IO-Link Master configuration in Devices and Network.
II_PS2	INT	Second raw value from the device. Global input. See IO-Link Master configuration in Devices and Network.
II_PS3	INT	Third raw value from the device. Global input. See IO-Link Master configuration in Devices and Network.
IR_Gradient1	REAL	Gradient to calculate first raw value to the described unit. The gradient can be found in the description of the IO-Link interface
IR_Gradient2	REAL	Gradient to calculate second raw value to the described unit. The gradient can be found in the description of the IO-Link interface
IR_Gradient3	REAL	Gradient to calculate third raw value to the described unit. The gradient can be found in the description of the IO-Link interface
OR_PS1	REAL	Output first value in the specified unit.
OR_PS2	REAL	Output second value in the specified unit.
OR_PS3	REAL	Output third value in the specified unit.
O_OU1	BOOL	Current status of the digital signal [OUT1]

F117_PLC7_8_9_SCL

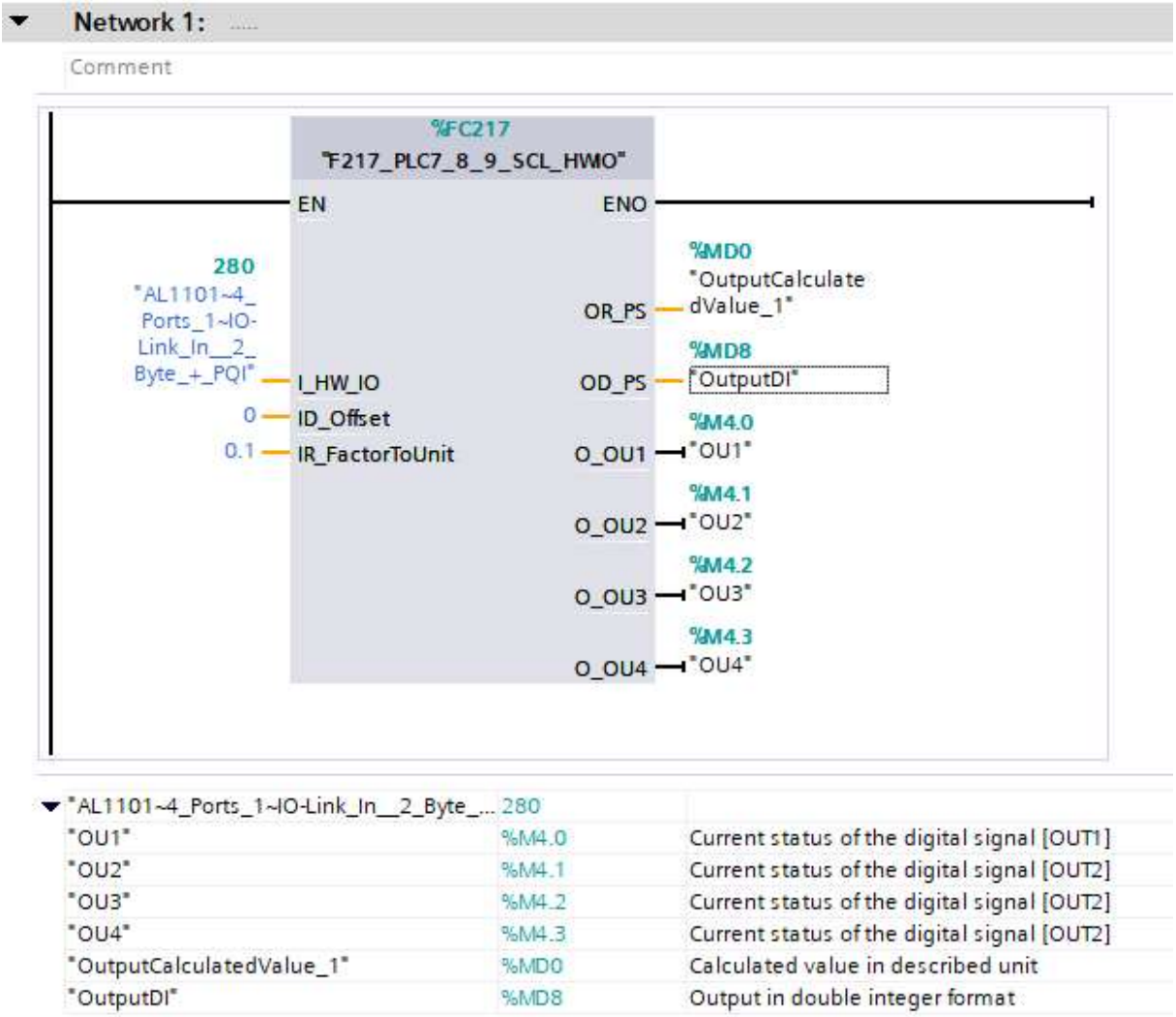


"InputRawValue_1"	%EW14	Raw value from device
"OU1"	%M4.0	Current status of the digital signal [OUT1]
"OU2"	%M4.1	Current status of the digital signal [OUT2]
"OU3"	%M4.2	Current status of the digital signal [OUT2]
"OU4"	%M4.3	Current status of the digital signal [OUT2]
"OutputCalculatedValue_1"	%MD0	Calculated value in described unit

This function block is for a device with two byte process data input and four switch points in the process data stream.

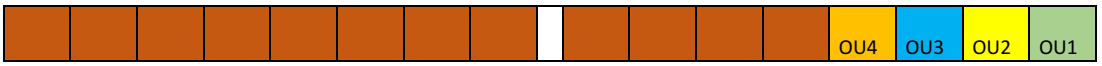


Formal operant	Format	Description
II_PS	INT	Raw value from the device. Global input. See IO-Link Master configuration in Devices and Network.
IR_Gradient	REAL	Gradient to calculate raw value to the described unit. The gradient can be found in the description of the IO-Link interface
OR_PS	REAL	Output value in the specified unit.
O_OU1	BOOL	Current status of the digital signal [OUT1]
O_OU2	BOOL	Current status of the digital signal [OUT2]
O_OU3	BOOL	Current status of the digital signal [OUT3]
O_OU4	BOOL	Current status of the digital signal [OUT4]

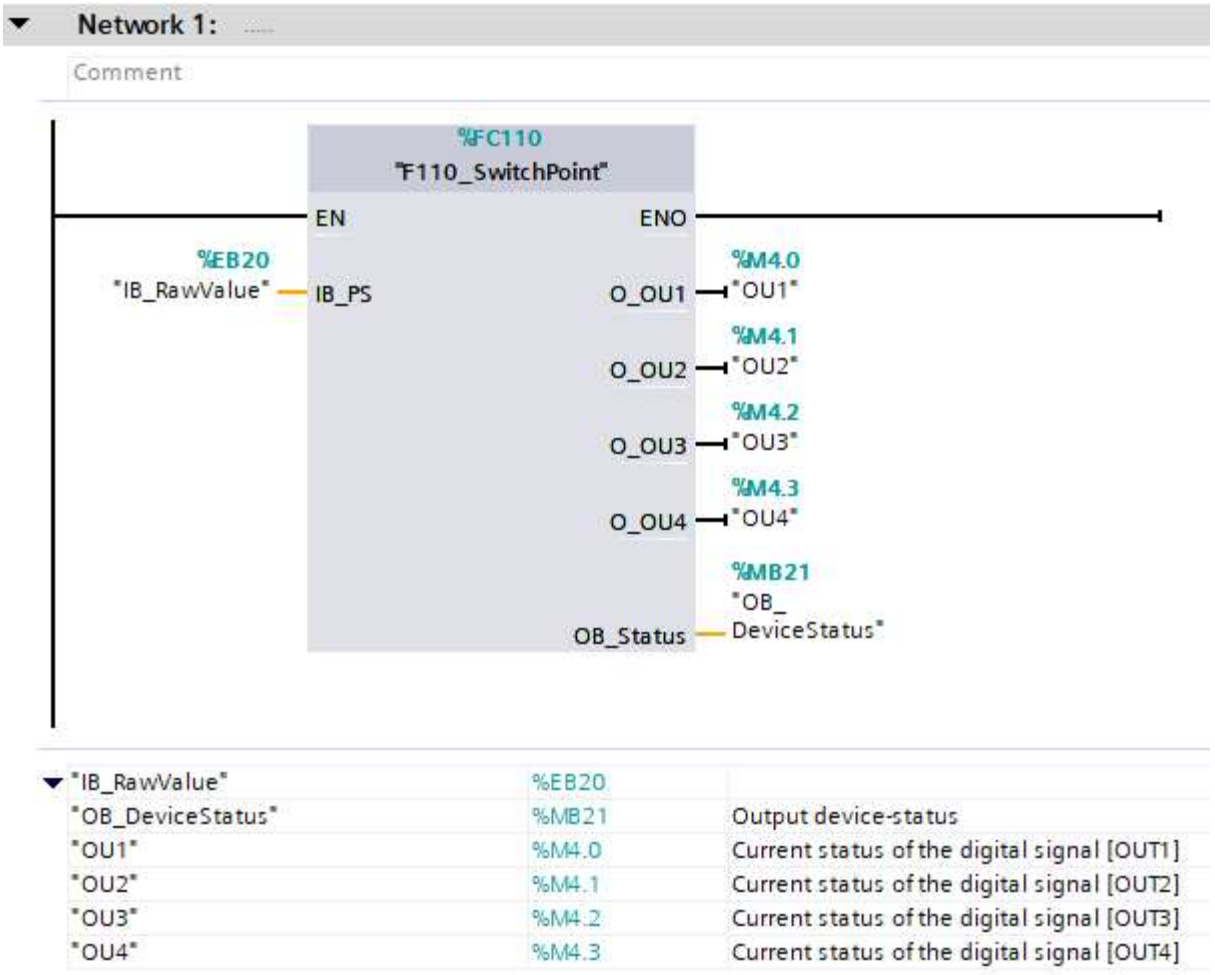


"AL1101~4_Ports_1~IO-Link_In__2_Byte_...	280	
"OU1"	%M4.0	Current status of the digital signal [OUT1]
"OU2"	%M4.1	Current status of the digital signal [OUT2]
"OU3"	%M4.2	Current status of the digital signal [OUT2]
"OU4"	%M4.3	Current status of the digital signal [OUT2]
"OutputCalculatedValue_1"	%MD0	Calculated value in described unit
"OutputDI"	%MD8	Output in double integer format

This function block is for a device with two byte process data input and four switch points in the process data stream. The function is the same as *F117_PLC7_8_9_SCL*. The input is taken from the hardware-ID.



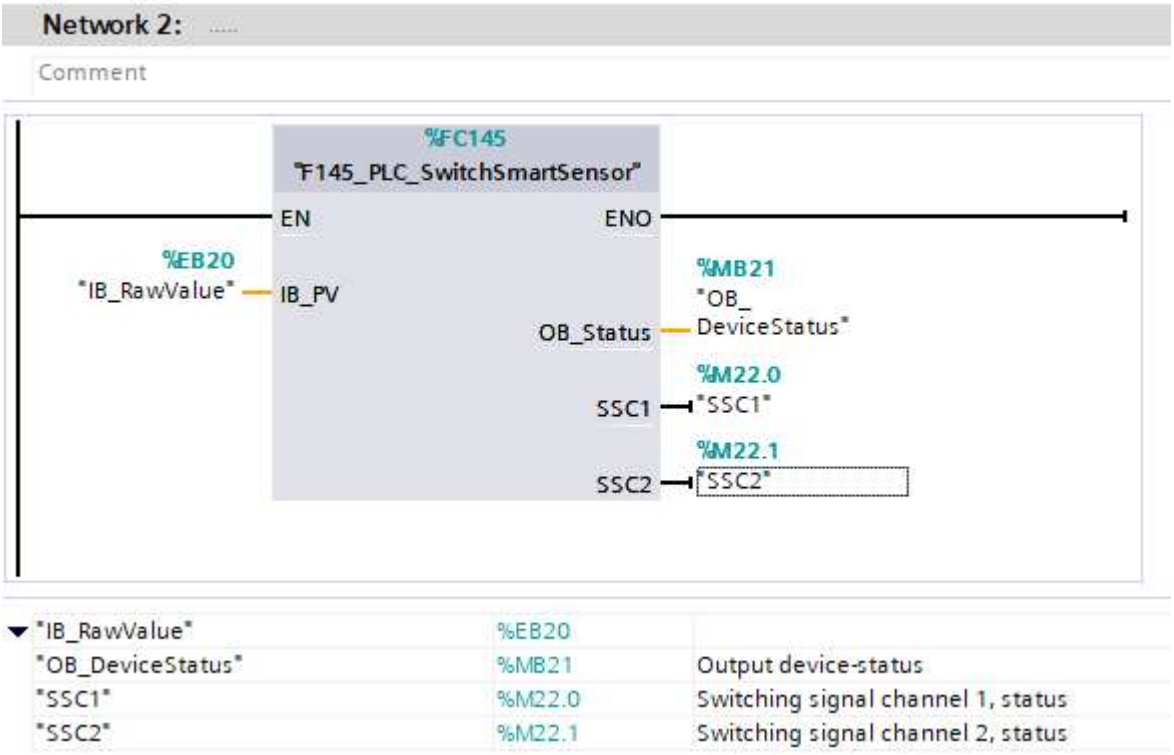
Formal operant	Format	Description
I_HW_IO	INT	Hardware-IO of the module the device is connected to.
ID_Offset	DINT	Offset if a device has more than one value. First Value = Offset 0 Second Value = Offset 2 Third Value = Offset 4
IR_FactorToUnit	REAL	Gradient to calculate raw value to the described unit. The gradient can be found in the description of the IO-Link interface
OR_PS	REAL	Output value in the specified unit.
O_OU1	BOOL	Current status of the digital signal [OUT1]
O_OU2	BOOL	Current status of the digital signal [OUT2]
O_OU3	BOOL	Current status of the digital signal [OUT3]
O_OU4	BOOL	Current status of the digital signal [OUT4]



"IB_RawValue"	%EB20	
"OB_DeviceStatus"	%MB21	Output device-status
"OU1"	%M4.0	Current status of the digital signal [OUT1]
"OU2"	%M4.1	Current status of the digital signal [OUT2]
"OU3"	%M4.2	Current status of the digital signal [OUT3]
"OU4"	%M4.3	Current status of the digital signal [OUT4]

This function block is for a device with one byte process data containing four switch points and device status.

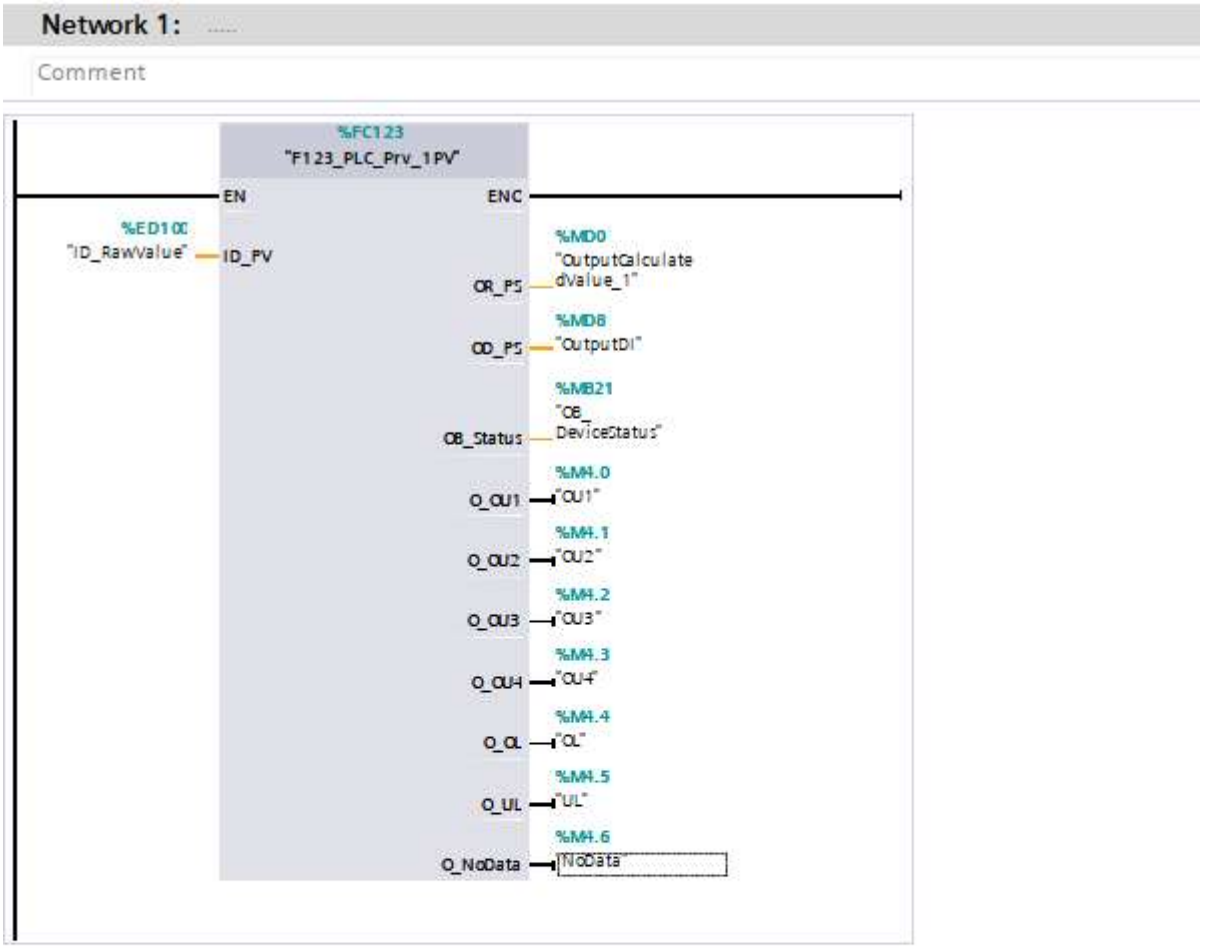
Formal operant	Format	Description
I_PS	Byte	Raw value from the device. Global input. See IO-Link Master configuration in Devices and Network.
O_OU1	BOOL	Current status of the digital signal [OUT1]
O_OU2	BOOL	Current status of the digital signal [OUT2]
O_OU3	BOOL	Current status of the digital signal [OUT3]
O_OU4	BOOL	Current status of the digital signal [OUT4]
OB_Status	BYTE	Act. status of the device: 0 (Device is OK) 1 (Maintenance required) 2 (Out of specification) 3 (Functional check) 4 (Failure)



This function block is for a device with one byte process data containing two smart switching channels and device status.

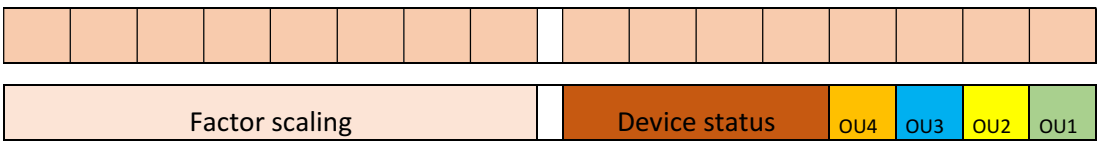
Formal operant	Format	Description
I_PS	Byte	Raw value from the device. Global input. See IO-Link Master configuration in Devices and Network.
OB_Status	BYTE	Act. status of the device: 0 (Device is OK) 1 (Maintenance required) 2 (Out of specification) 3 (Functional check) 4 (Failure)
SSC1	BOOL	Switching signal channel 1, status
SSC2	BOOL	Switching signal channel 2, status

F123_PLC_Prv_1PV



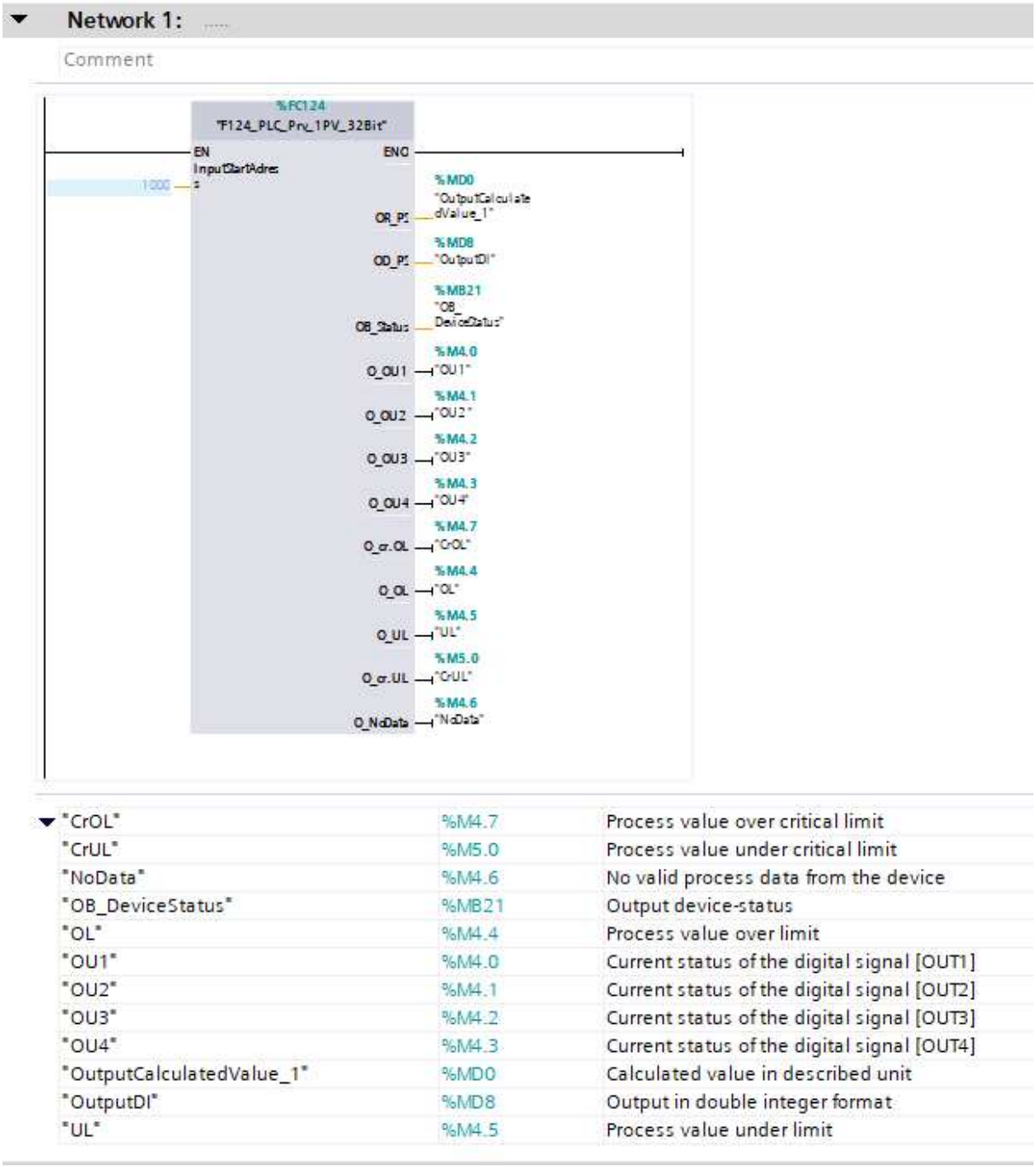
"ID_RawValue"	%ED100	Raw value from device
"NoData"	%M4.6	No valid process data from the device
"OB_DeviceStatus"	%MB21	Output device-status
"OL"	%M4.4	Process value over limit
"OU1"	%M4.0	Current status of the digital signal [OUT1]
"OU2"	%M4.1	Current status of the digital signal [OUT2]
"OU3"	%M4.2	Current status of the digital signal [OUT3]
"OU4"	%M4.3	Current status of the digital signal [OUT4]
"OutputCalculatedValue_1"	%MD0	Calculated value in described unit
"OutputDI"	%MD8	Output in double integer format
"UL"	%M4.5	Process value under limit

Function block for a device with 16-bit SmartSensorProfile.



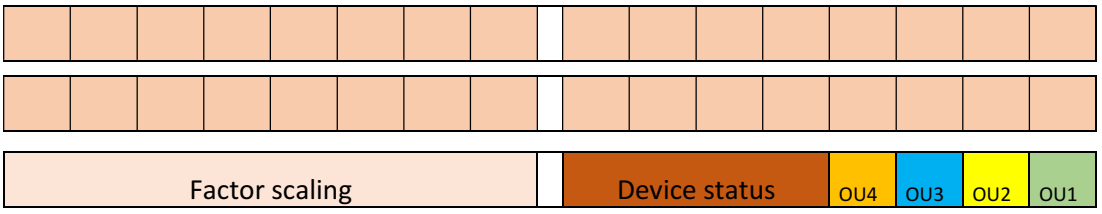
Formal operant	Format	Description
ID_PV	DINT	Raw value from the device. Global input. See IO-Link Master configuration in Devices and Network.
OR_PS	REAL	Output value in the specified unit.
OD_PS	DINT	Raw value without scaling to unit
OB_Status	BYTE	Act. status of the device: 0 (Device is OK) 1 (Maintenance required) 2 (Out of specification) 3 (Functional check) 4 (Failure)
O_OU1	BOOL	Current status of the digital signal [OUT1]
O_OU2	BOOL	Current status of the digital signal [OUT2]
O_OU3	BOOL	Current status of the digital signal [OUT3]
O_OU4	BOOL	Current status of the digital signal [OUT4]
O_OL	BOOL	Act. process value is over the limit of the device.
O_UL	BOOL	Act. process value is under the limit of the device.
O_NoData	BOOL	No valid process data from the device. Please check device and parameter setting.

F124_PLC_Prv_1PV_32Bit



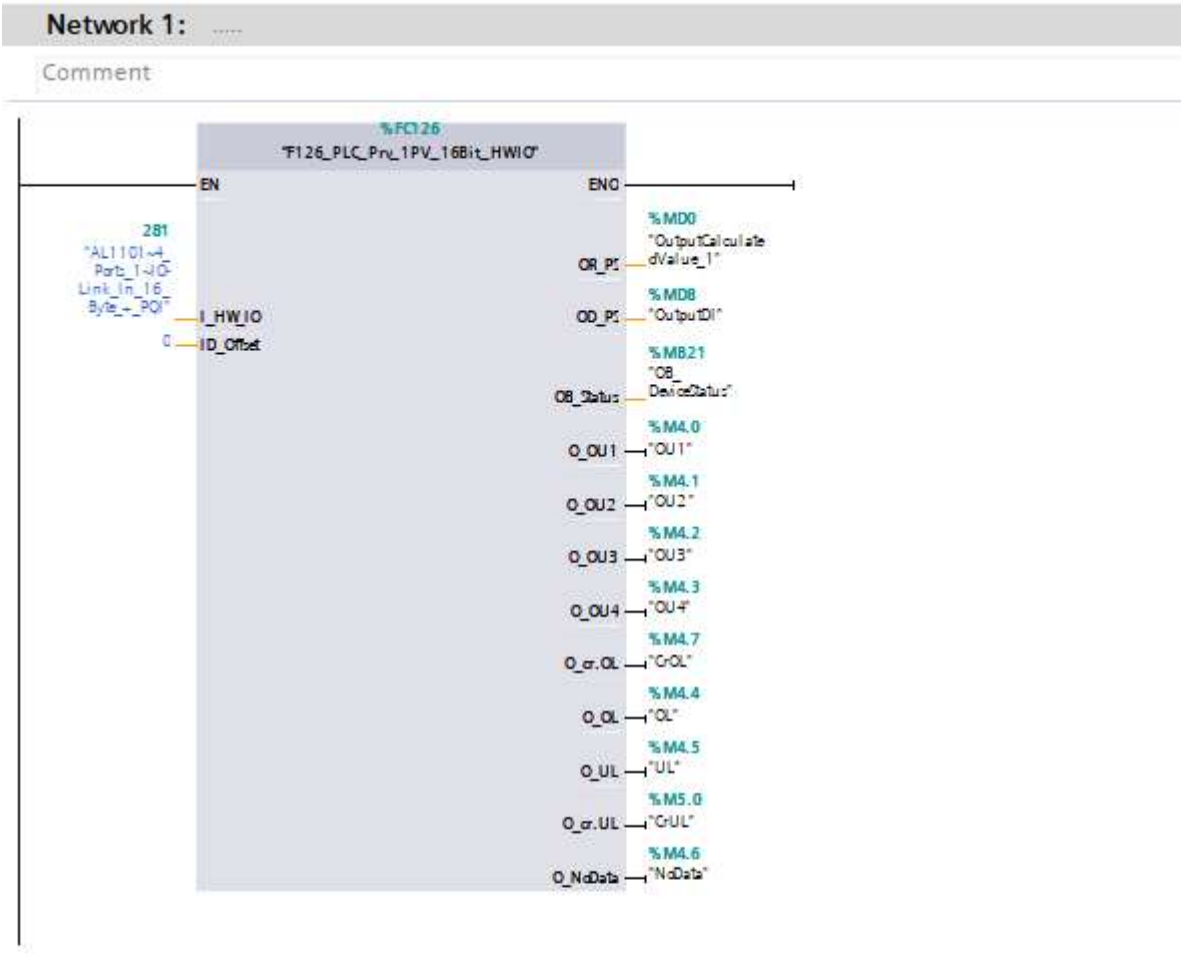
"CrOL"	%M4.7	Process value over critical limit
"CrUL"	%M5.0	Process value under critical limit
"NoData"	%M4.6	No valid process data from the device
"OB_DeviceStatus"	%MB21	Output device-status
"OL"	%M4.4	Process value over limit
"OU1"	%M4.0	Current status of the digital signal [OUT1]
"OU2"	%M4.1	Current status of the digital signal [OUT2]
"OU3"	%M4.2	Current status of the digital signal [OUT3]
"OU4"	%M4.3	Current status of the digital signal [OUT4]
"OutputCalculatedValue_1"	%MD0	Calculated value in described unit
"OutputDI"	%MD8	Output in double integer format
"UL"	%M4.5	Process value under limit

Function block for a device with 32-bit SmartSensorProfile.



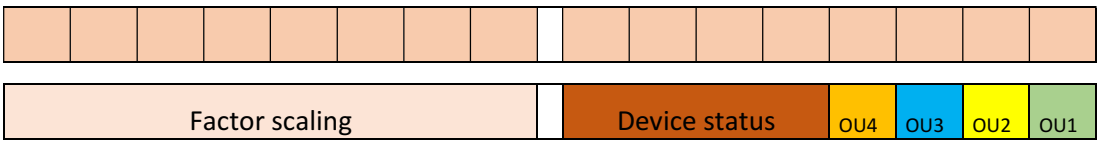
Formal operant	Format	Description
Input_StartAddress	DINT	Start address of the IO-Link Master Module the device is connected to.
OR_PS	REAL	Output value in the specified unit.
OD_PS	DINT	Raw value without scaling to unit
OB_Status	BYTE	Act. status of the device: 0 (Device is OK) 1 (Maintenance required) 2 (Out of specification) 3 (Functional check) 4 (Failure)
O_OU1	BOOL	Current status of the digital signal [OUT1]
O_OU2	BOOL	Current status of the digital signal [OUT2]
O_OU3	BOOL	Current status of the digital signal [OUT3]
O_OU4	BOOL	Current status of the digital signal [OUT4]
O_CrOL	BOOL	Act. process value is over the critical limit of the device.
O_OL	BOOL	Act. process value is over the limit of the device.
O_UL	BOOL	Act. process value is under the limit of the device.
O_CrUL	Bool	Act. process value is under the critical limit of the device.
O_NoData	BOOL	No valid process data from the device. Please check device and parameter setting.

F126_PLC_Prv_1PV_16Bit_HWIO



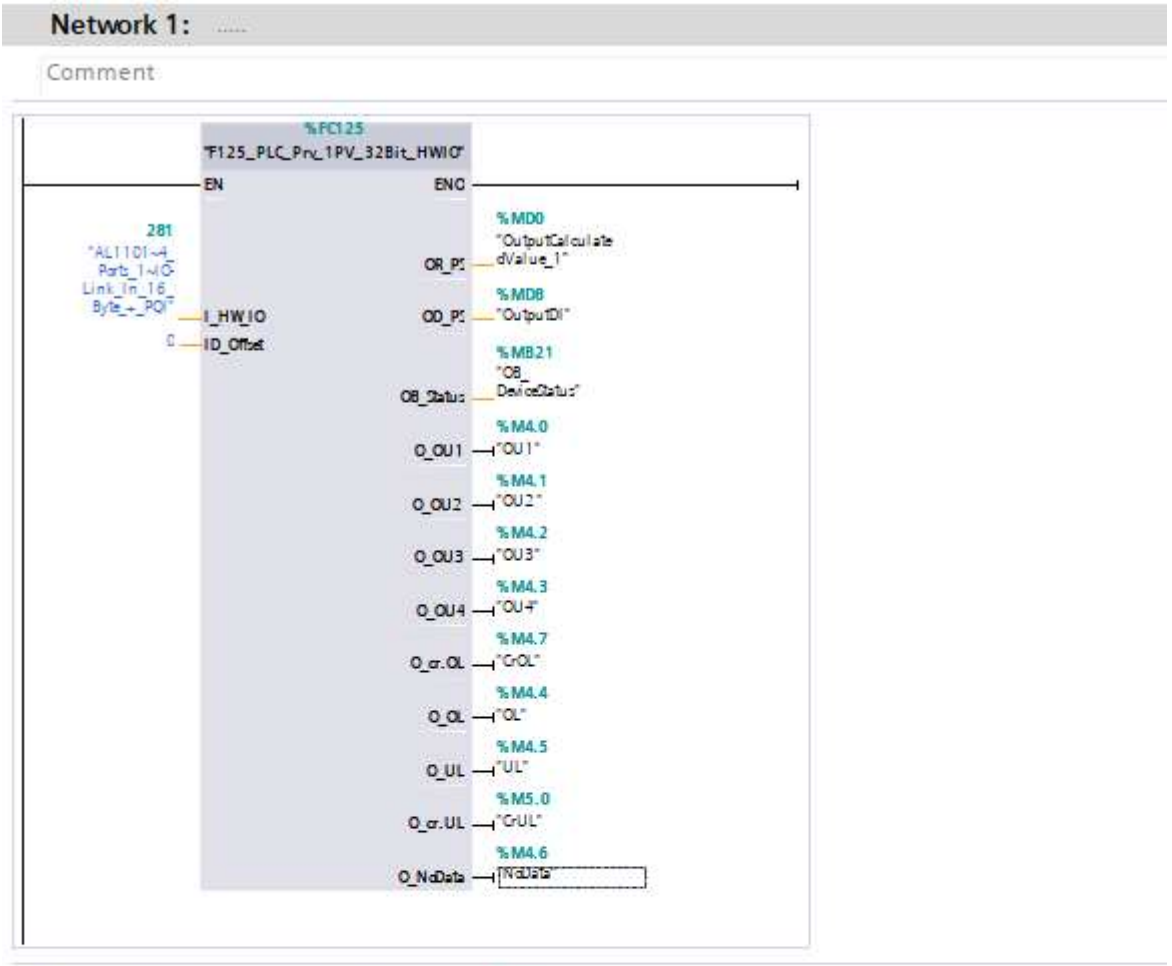
"AL1101~4_Ports_1~IO-Link_In_16_Byte_...	281	
"CrOL"	%M4.7	Process value over critical limit
"CrUL"	%M5.0	Process value under critical limit
"NoData"	%M4.6	No valid process data from the device
"OB_DeviceStatus"	%MB21	Output device-status
"OL"	%M4.4	Process value over limit
"OU1"	%M4.0	Current status of the digital signal [OUT1]
"OU2"	%M4.1	Current status of the digital signal [OUT2]
"OU3"	%M4.2	Current status of the digital signal [OUT3]
"OU4"	%M4.3	Current status of the digital signal [OUT4]
"OutputCalculatedValue_1"	%MD0	Calculated value in described unit
"OutputDI"	%MD8	Output in double integer format
"UL"	%M4.5	Process value under limit

Function block for a device with 16-bit SmartSensorProfile.
The input-address is taken form the hardware-IO.



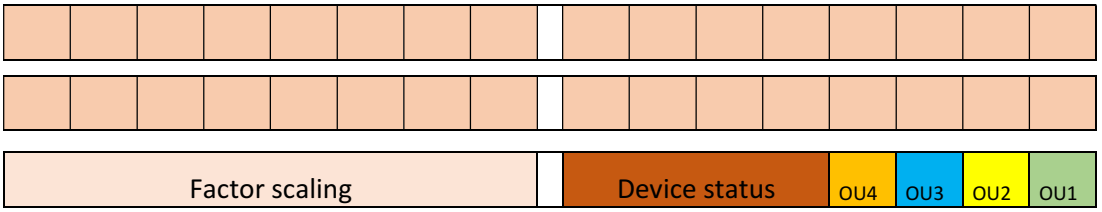
Formal operant	Format	Description
I_HW_IO	HWIO	Hardware-IO of the module the device is connected to.
ID_Offset	DINT	Some devices have more than one value. To read the second value take the same HW-IO and add 4 to the parameter offset.
OR_PS	REAL	Output value in the specified unit.
OD_PS	DINT	Raw value without scaling to unit
OB_Status	BYTE	Act. status of the device: 0 (Device is OK) 1 (Maintenance required) 2 (Out of specification) 3 (Functional check) 4 (Failure)
O_OU1	BOOL	Current status of the digital signal [OUT1]
O_OU2	BOOL	Current status of the digital signal [OUT2]
O_OU3	BOOL	Current status of the digital signal [OUT3]
O_OU4	BOOL	Current status of the digital signal [OUT4]
O_CrOL	BOOL	Act. process value is over the critical limit of the device.
O_OL	BOOL	Act. process value is over the limit of the device.
O_UL	BOOL	Act. process value is under the limit of the device.
O_CrUL	Bool	Act. process value is under the critical limit of the device.
O_NoData	BOOL	No valid process data from the device. Please check device and parameter setting.

F125_PLC_Prv_1PV_32Bit_HWIO



"AL1101~4_Ports_1~IO-Link_In_16_Byte_...	281	
"CrOL"	%M4.7	Process value over critical limit
"CrUL"	%M5.0	Process value under critical limit
"NoData"	%M4.6	No valid process data from the device
"OB_DeviceStatus"	%MB21	Output device-status
"OL"	%M4.4	Process value over limit
"OU1"	%M4.0	Current status of the digital signal [OUT1]
"OU2"	%M4.1	Current status of the digital signal [OUT2]
"OU3"	%M4.2	Current status of the digital signal [OUT3]
"OU4"	%M4.3	Current status of the digital signal [OUT4]
"OutputCalculatedValue_1"	%MD0	Calculated value in described unit
"OutputDI"	%MD8	Output in double integer format
"UL"	%M4.5	Process value under limit

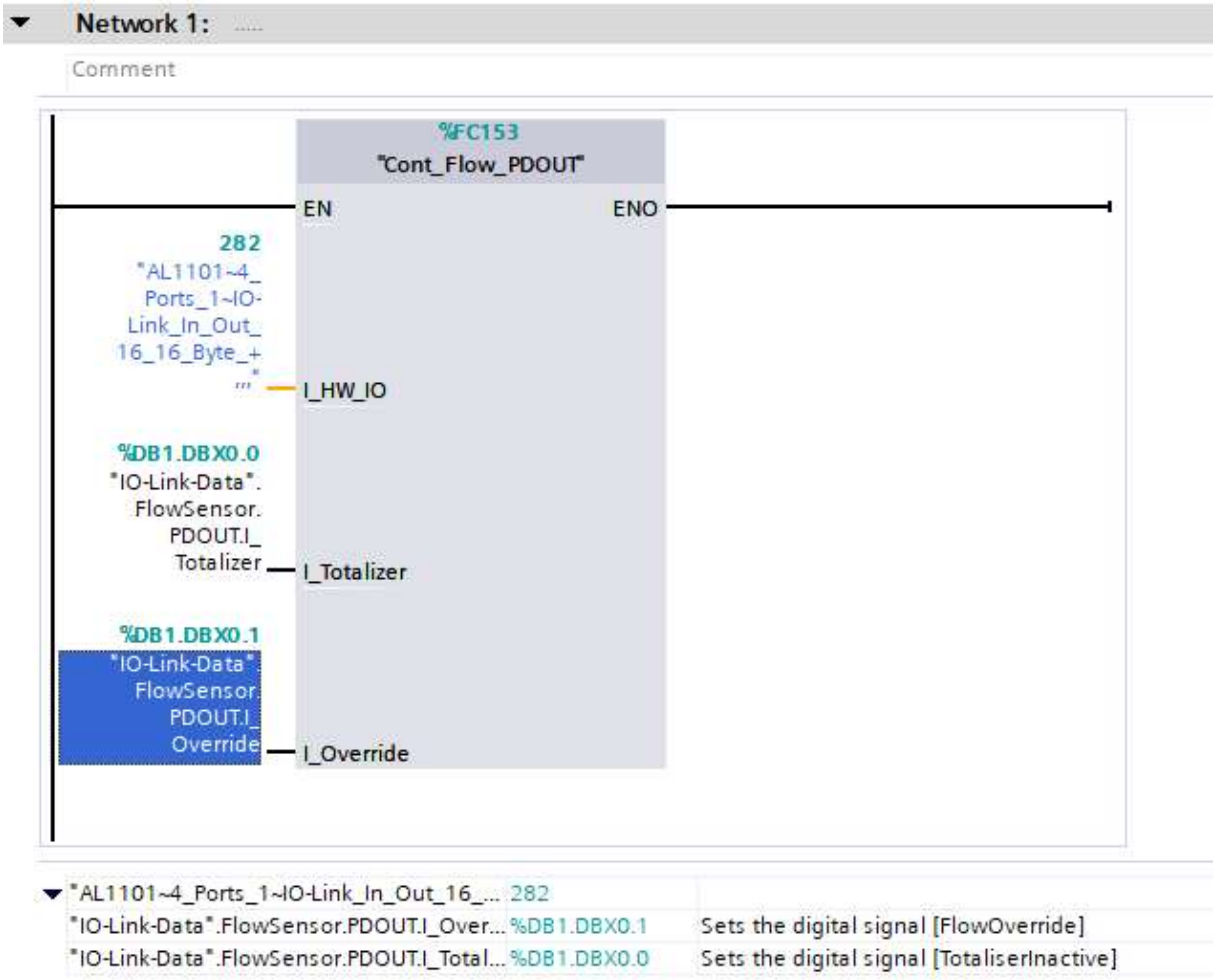
Function block for a device with 32-bit SmartSensorProfile.
The input-address is taken from the hardware-IO.



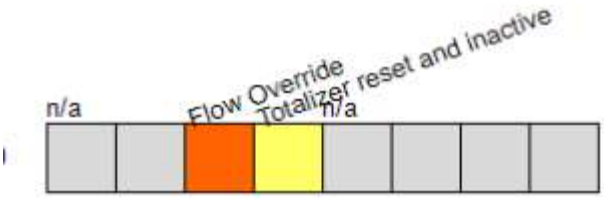
Formal operant	Format	Description
I_HW_IO	HWIO	Hardware-IO of the module the device is connected to.
ID_Offset	DINT	Some devices have more than one value. To read the second value take the same HW-IO and add 6 to the parameter offset.
OR_PS	REAL	Output value in the specified unit.
OD_PS	DINT	Raw value without scaling to unit
OB_Status	BYTE	Act. status of the device: 0 (Device is OK) 1 (Maintenance required) 2 (Out of specification) 3 (Functional check) 4 (Failure)
O_OU1	BOOL	Current status of the digital signal [OUT1]
O_OU2	BOOL	Current status of the digital signal [OUT2]
O_OU3	BOOL	Current status of the digital signal [OUT3]
O_OU4	BOOL	Current status of the digital signal [OUT4]
O_CrOL	BOOL	Act. process value is over the critical limit of the device.
O_OL	BOOL	Act. process value is over the limit of the device.
O_UL	BOOL	Act. process value is under the limit of the device.
O_CrUL	Bool	Act. process value is under the critical limit of the device.
O_NoData	BOOL	No valid process data from the device. Please check device and parameter setting.

Special

Cont_Flow_PDOUT

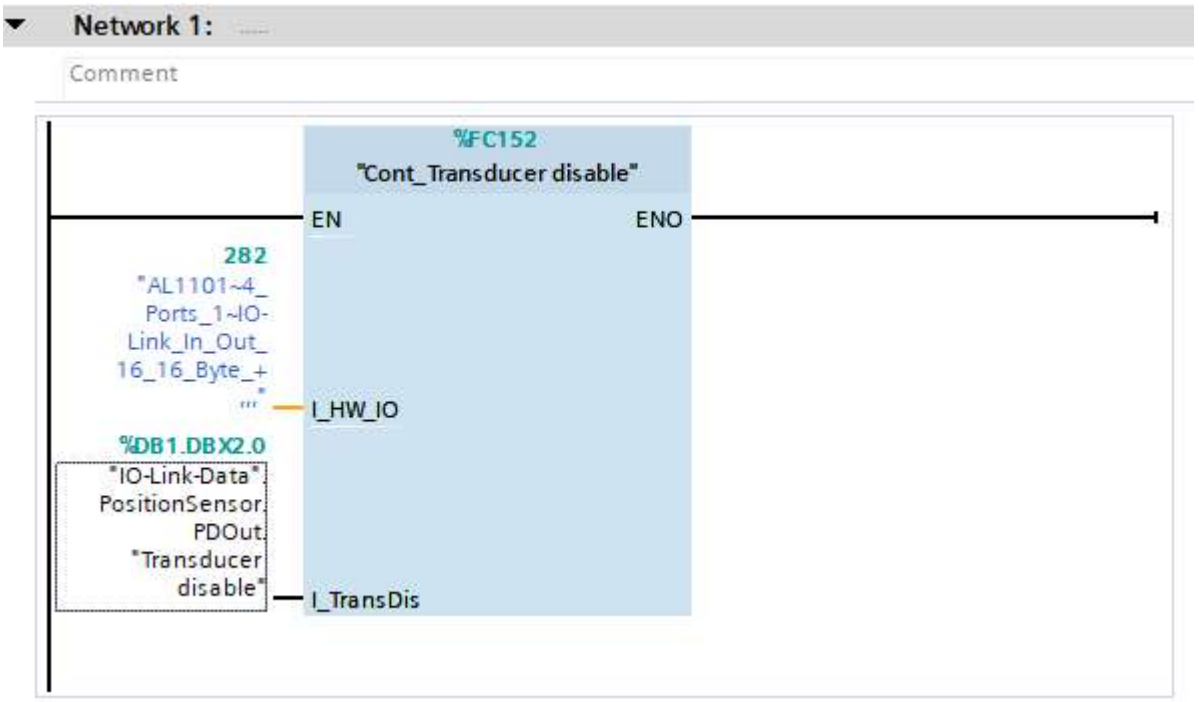


Function block for flow-sensors. Function not available for all devices, please check the description of your flow-sensor.

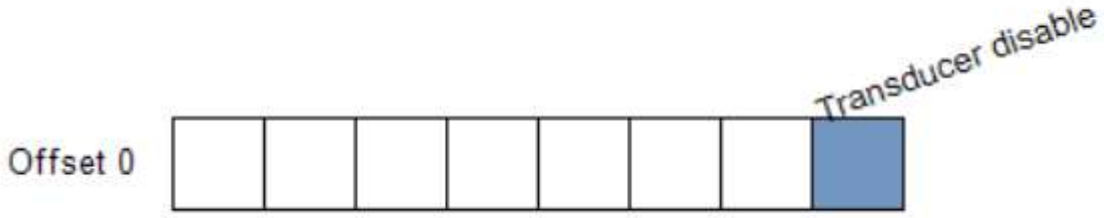


Formal operant	Format	Description
I_HW_IO	INT	Hardware-IO of the module the device is connected to.
I_Totalizer	BOOL	If this input is high the totalizer in the device is set and hold to zero.
I_Override	BOOL	If this input is high the actual flow is set to zero

Cont_Transducer disable

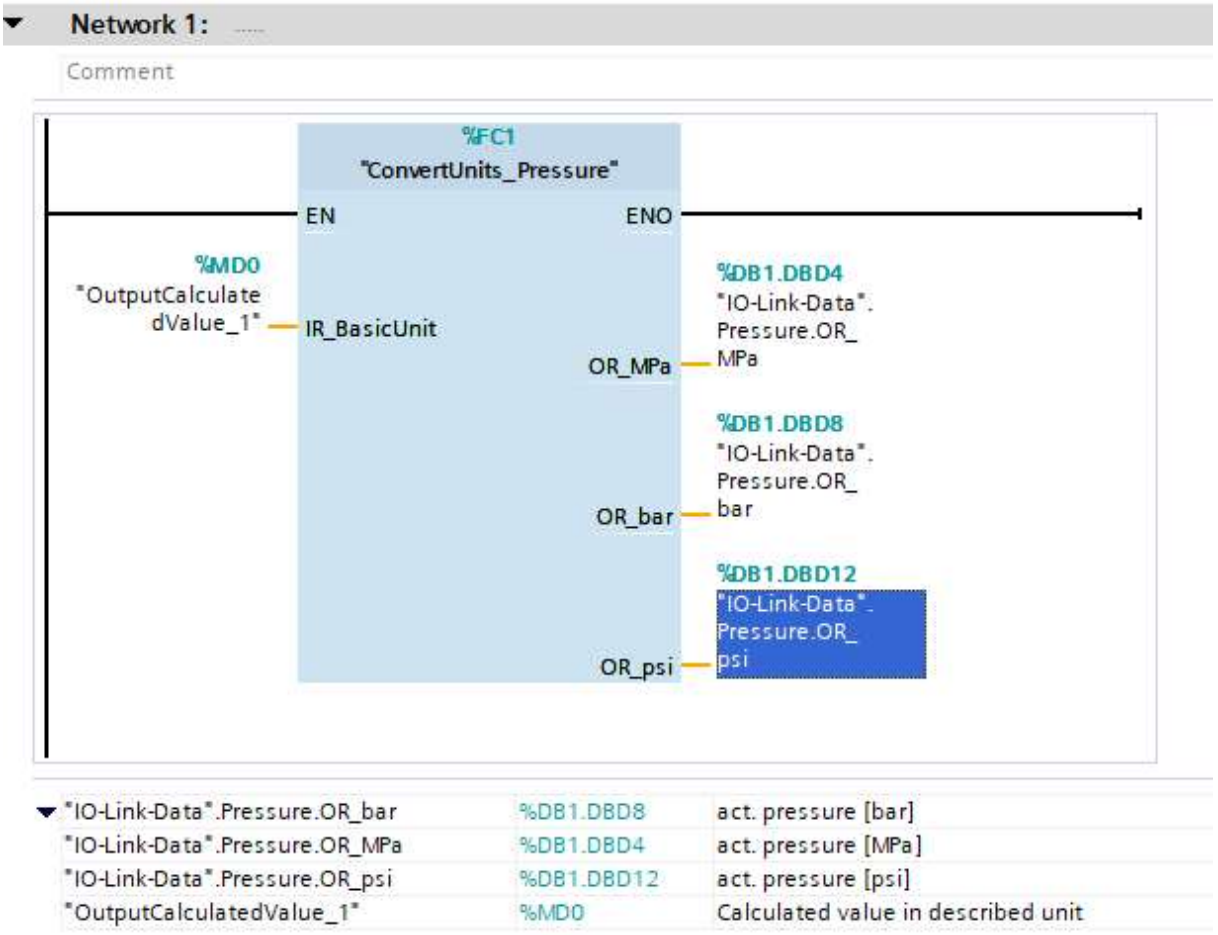


This function block enables / disables the transducer of a position sensor.



Formal operant	Format	Description
I_HW_IO	INT	Hardware-IO of the module the device is connected to.
I_TransDis	BOOL	0 = Transducer enabled 1 = Transducer disabled.

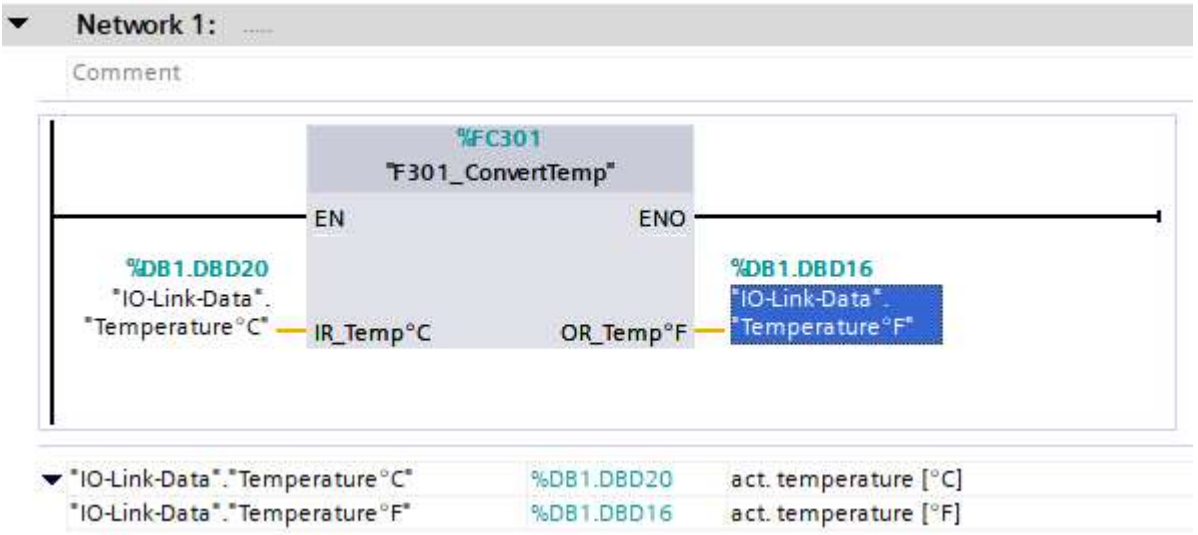
ConvertUnits_Pressure



SmartSensorProfile provides the process value in the SI-unit. This function block converts the SI-Unit [Pascal] in other units for pressure.

Formal operant	Format	Description
IR_BasicUnit	REAL	Process value in the SI-Unit from the function block for SmartSensorProfile
OR_MPa	REAL	Act. pressure in Mega-Pascale
OR_bar	REAL	Act. pressure in bar
OR_psi	REAL	Act. pressure in psi

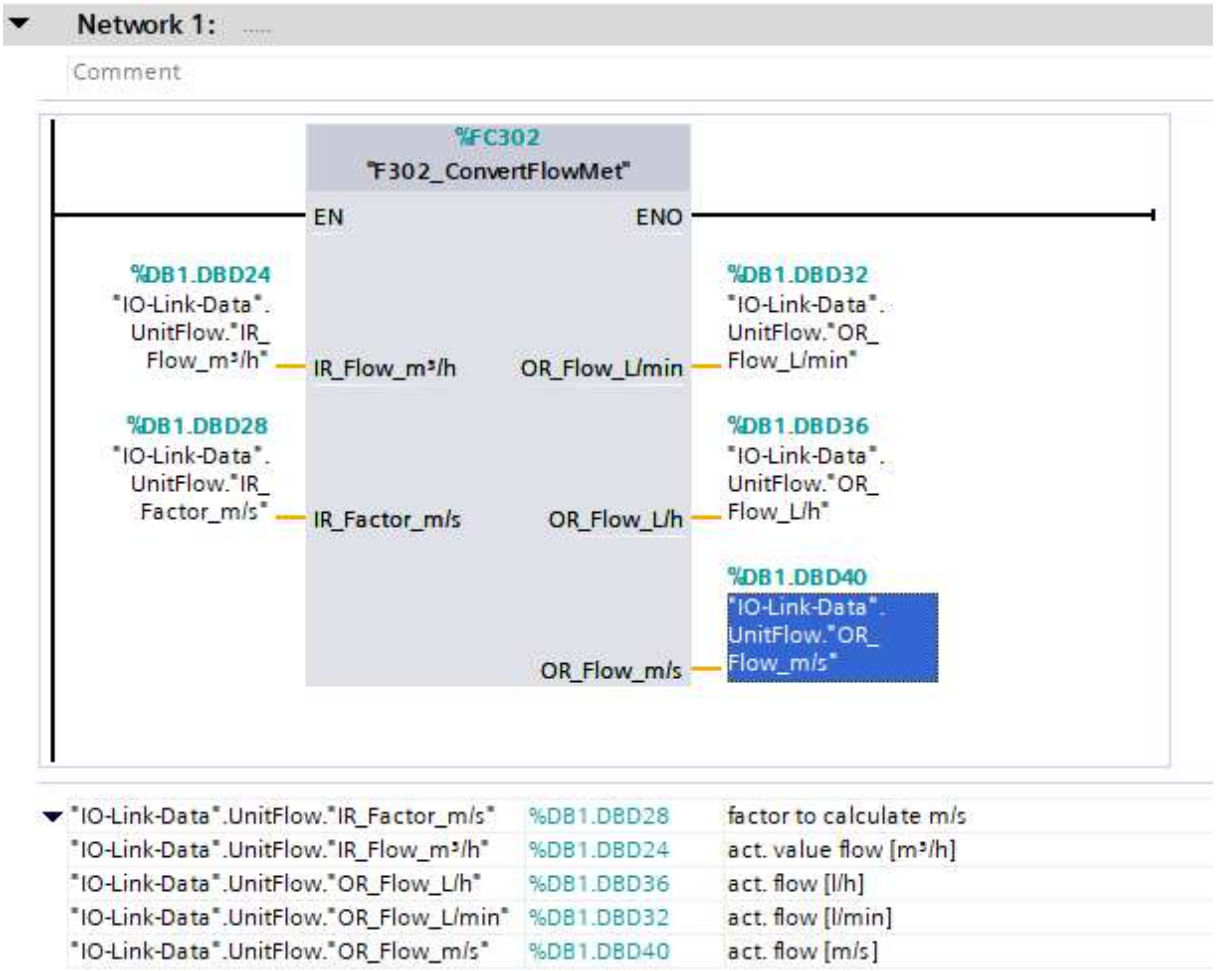
F301_ConvertTemp



In SmartSensorProfile the unit for temperature is °C. This function block converts the temperature from °C to °F.

Formal operant	Format	Description
IR_Temp°C	REAL	Process value in °C from the function block for SmartSensorProfile
OR_Temp°F	REAL	Act. temperature in °F

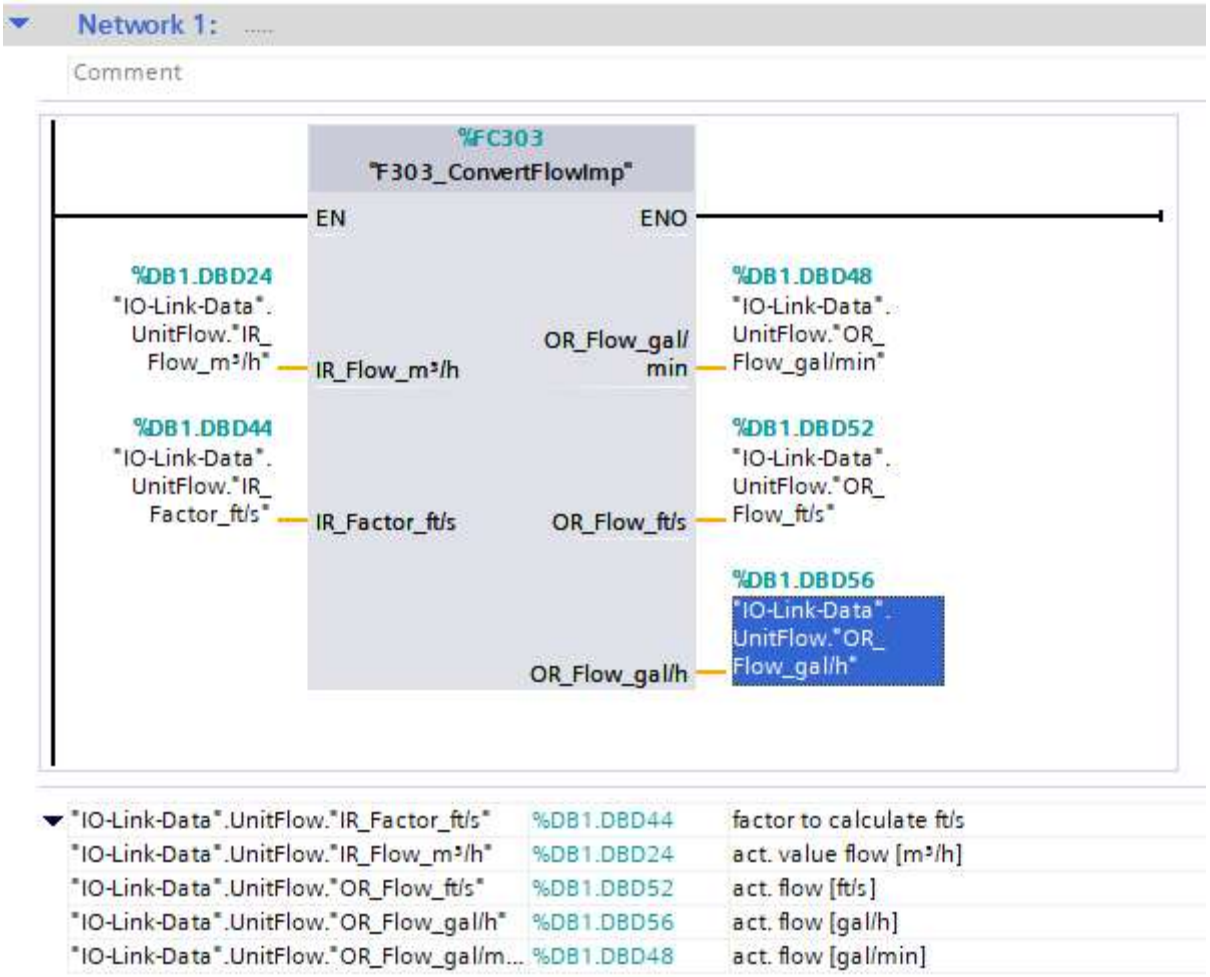
F302_ConvertFlowMet



In SmartSensorProfile the unit for flow is m³/h. This function block converts the flow to other metric units.

Formal operant	Format	Description
IR_Flow_m³/h	REAL	Process value in m³/h from the function block for SmartSensorProfile
IR_Factor_m/s	REAL	Factor to calculate m/s. Please have a look at the manual of the device
OR_Flow_L/min	REAL	Act. flow in L/min
OR_Flow_L/h	REAL	Act. flow in L/h
OR_Flow_m/s	REAL	Act. flow in m/s

F303_ConvertFlowImp



In SmartSensorProfile the unit for flow is m³/h. This function block converts the flow to other imperial units.

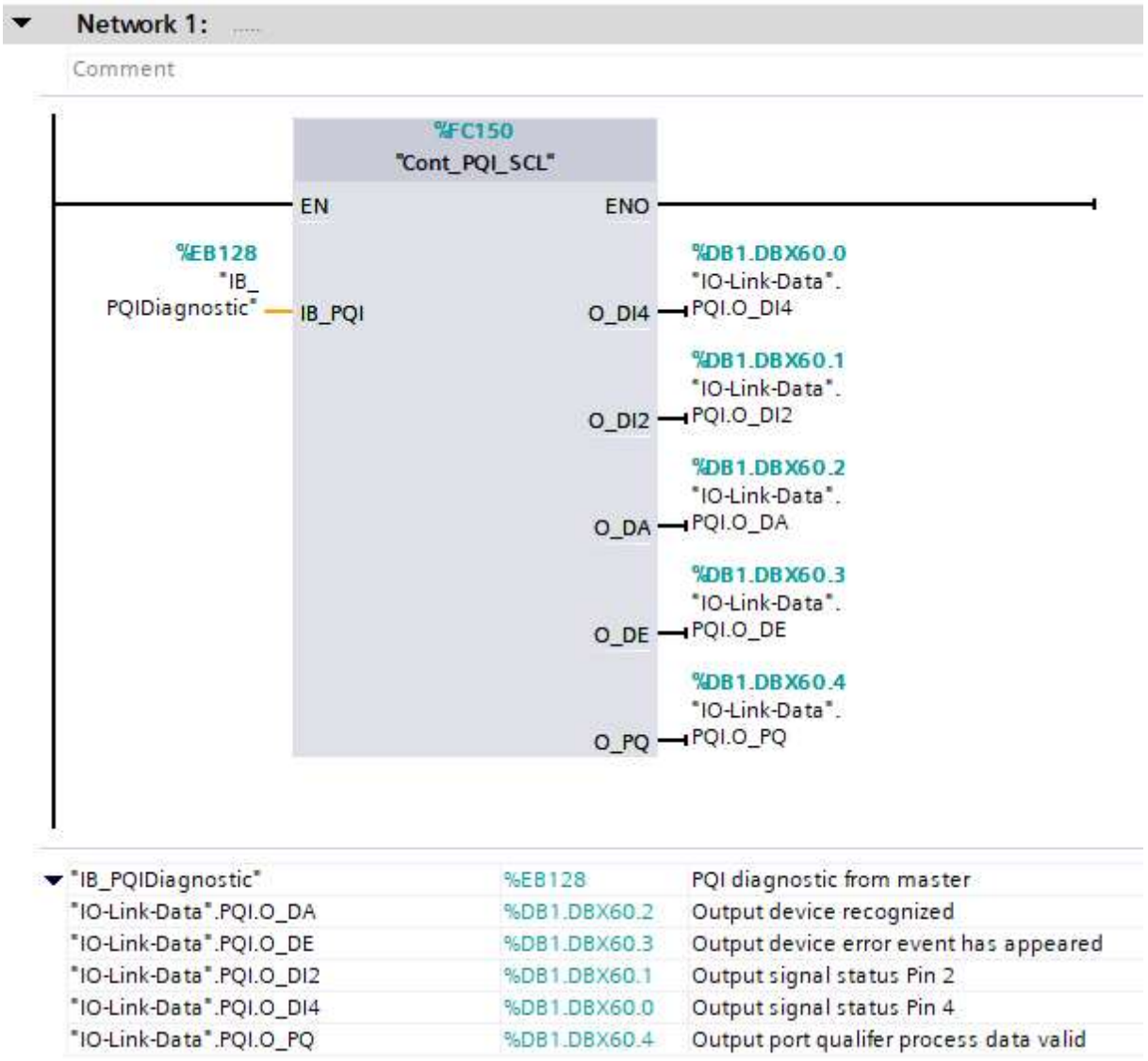
Formal operant	Format	Description
IR_Flow_m³/h	REAL	Process value in m³/h from the function block for SmartSensorProfile
IR_Factor_ft/s	REAL	Factor to calculate ft/s. Please have a look at the manual of the device
OR_Flow_gal/min	REAL	Act. flow in gal/min
OR_Flow_ft/s	REAL	Act. flow in ft/s
OR_Flow_gal/h	REAL	Act. flow in gal/h

PQI

Actually there are two version the specification how to implement IO-Link into fieldbus-world. The PQI diagnostic was changed between the two versions. Please check which one is supported in the manual of the IO-Link Master

Version 1

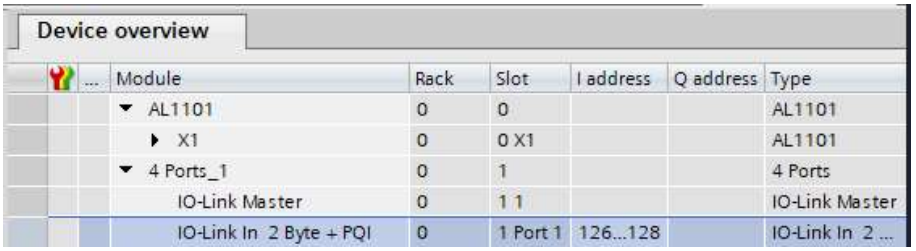
Cont_PQI_SCL



"IB_PQIDiagnostic"	%EB128	PQI diagnostic from master
"IO-Link-Data".PQI.O_DA	%DB1.DBX60.2	Output device recognized
"IO-Link-Data".PQI.O_DE	%DB1.DBX60.3	Output device error event has appeared
"IO-Link-Data".PQI.O_DI2	%DB1.DBX60.1	Output signal status Pin 2
"IO-Link-Data".PQI.O_DI4	%DB1.DBX60.0	Output signal status Pin 4
"IO-Link-Data".PQI.O_PQ	%DB1.DBX60.4	Output port qualifer process data valid

This function block reads PQI byte from the IO-Link-Master and extracts the single information bits.

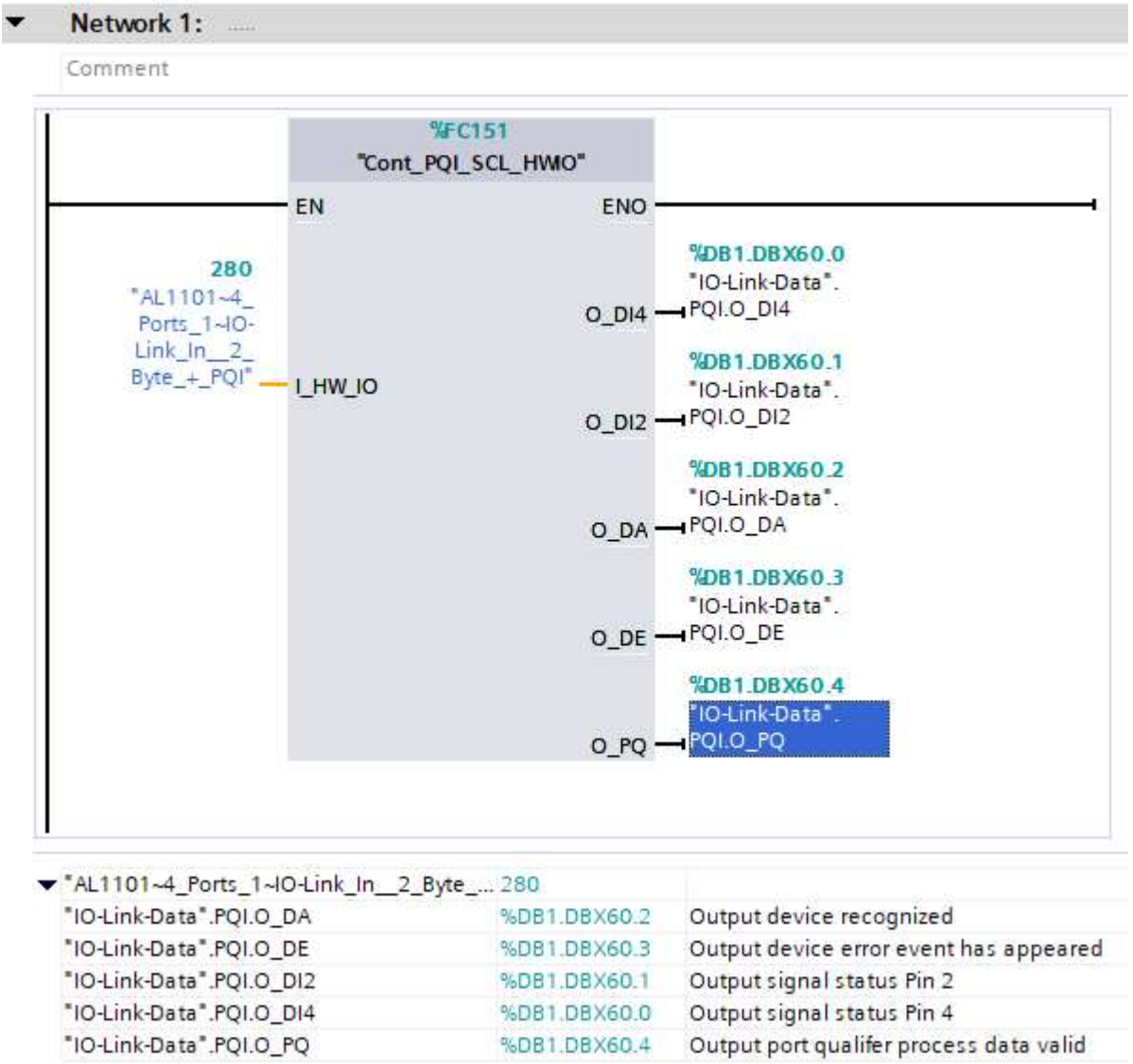
The PQI-byte is always the last byte in the PDIN-Interface:



In this example PQI is on byte 128.

Formal operant	Format	Description
IB_PQI	BYTE	PQI diagnostic byte from IO-Link Master. Always the last byte in PDIN
O_DI4	BOOL	Act. Status of input on pin 4 Only available if device is in SIO-mode. (SIO = standard input/output mode)
O_DI2	BOOL	Act. Status of input on pin 2
O_DA	BOOL	0 = no IO-Link communication active 1 = IO-Link communication active
O_DE	BOOL	0 = no IO-Link event from the device 1 = at least one IO-Link event pending
O_PQ	Bool	0 = process value from the device invalid 1 = Process value from the device valid.

Cont_PQI_SCL_HWIO

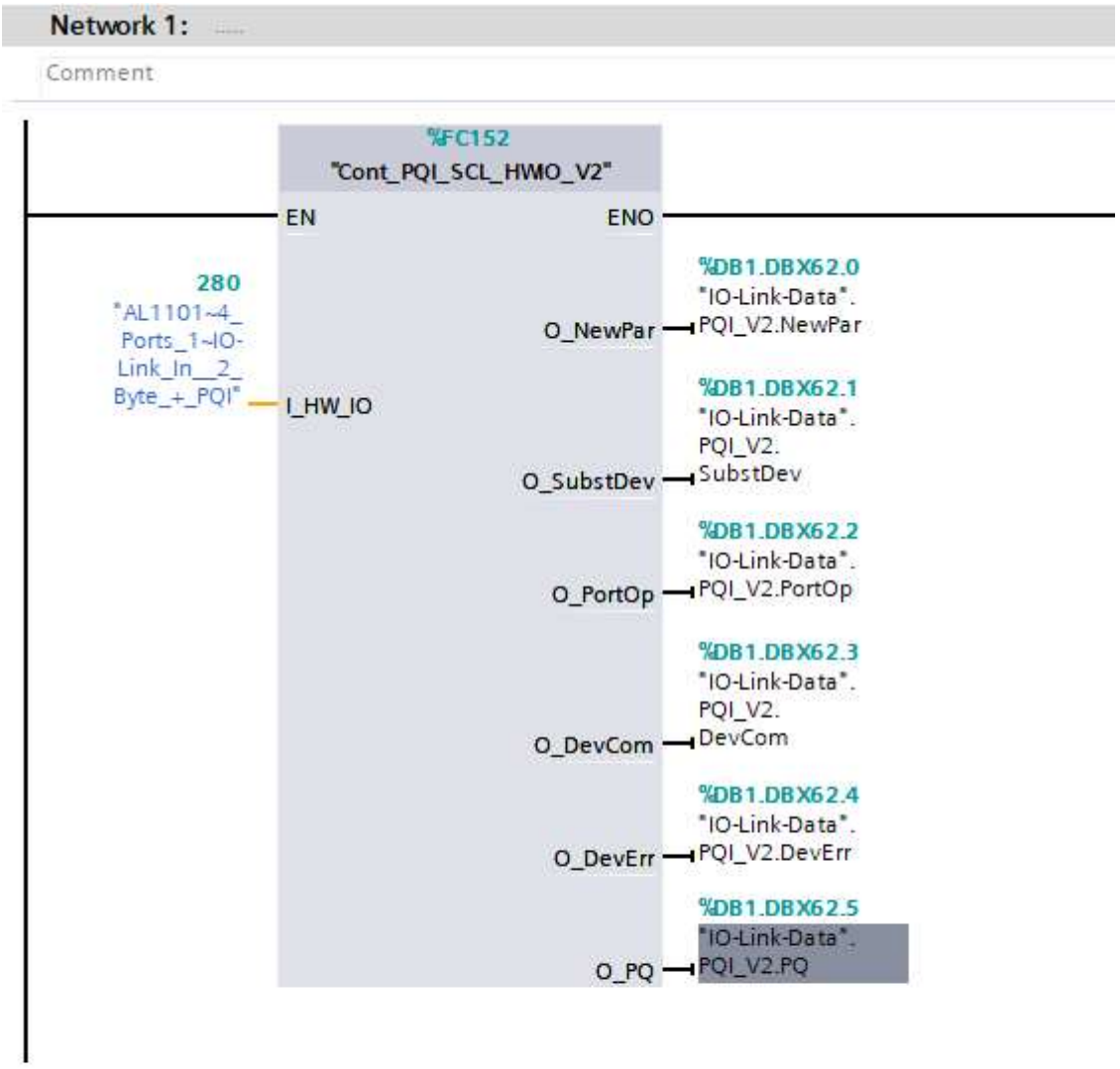


This function block reads PQI byte from the IO-Link-Master and extracts the single information bits.

Formal operant	Format	Description
I_HW_IO	HWIO	Hardware-IO of the module the device is connected to.
O_DI4	BOOL	Act. Status of input on pin 4 Only available if device is in SIO-mode. (SIO = standard input/output mode)
O_DI2	BOOL	Act. Status of input on pin 2
O_DA	BOOL	0 = no IO-Link communication active 1 = IO-Link communication active
O_DE	BOOL	0 = no IO-Link event from the device 1 = at least one IO-Link event pending
O_PQ	Bool	0 = process value from the device invalid 1 = Process value from the device valid.

Version 2

Cont_PQI_SCL_HWIO_V2



"AL1101~4_Ports_1~IO-Link_In__2_Byte_...	280	
"IO-Link-Data".PQI_V2.DevCom	%DB1.DBX62.3	Communication active
"IO-Link-Data".PQI_V2.DevErr	%DB1.DBX62.4	Error / warning occured
"IO-Link-Data".PQI_V2.NewPar	%DB1.DBX62.0	Update device parameter
"IO-Link-Data".PQI_V2.PortOp	%DB1.DBX62.2	Port activated
"IO-Link-Data".PQI_V2.PQ	%DB1.DBX62.5	Valid IO process data from device
"IO-Link-Data".PQI_V2.SubstDev	%DB1.DBX62.1	Subsitude device

This function block reads PQI byte from the IO-Link-Master and extracts the single information bits.

Formal operant	Format	Description
I_HW_IO	HWIO	Hardware-IO of the module the device is connected to.
O_NewPar	BOOL	0 = no update of device parameter detected 1 = Update of device parameter detected. Master performed a data storage upload.
O_SubstDev	BOOL	0 = no substitute device detected / same serial number. 1 = Substitute device detected / different serial number
O_PortOp	BOOL	0 = port deactivated via port function 1 = port activated
O_DevCom	BOOL	0 = no device avalable 1 = device detected and is in pre-operate or operate state
O_DevErr	BOOL	0 = no error / warning occurred 1 = error / warning assigned to device or port
O_PQ	BOOL	0 = process value from the device invalid 1 = Process value from the device valid.

Parameter and system-commands

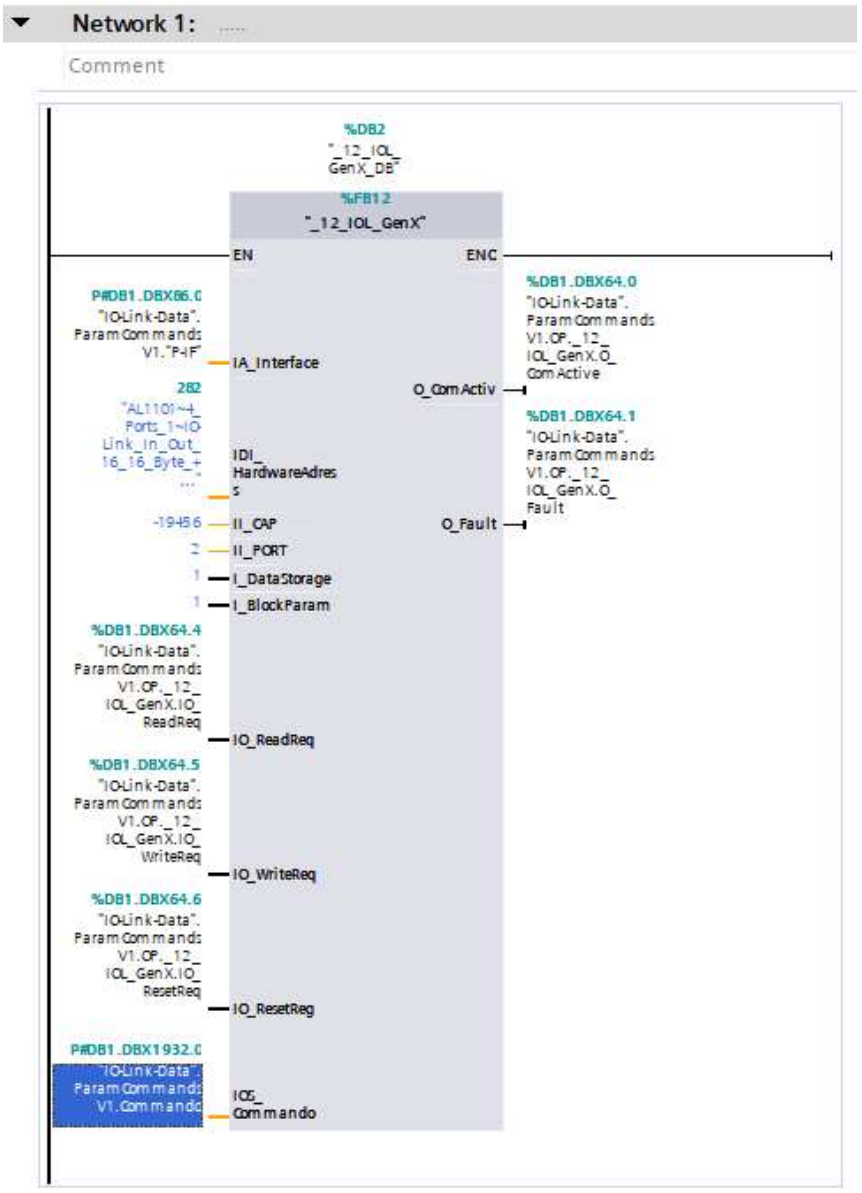
There are two versions of the function block for parameters and system commands.
In the first version, parameters and system commands were combined in one block.
This has proven to be impractical, since a user who only wanted to teach the device using system commands, for example, had to take over the entire parameter handling in this project.
In the second version there are separate blocks for parameters and system commands.

Both versions use the IO_Link_Device function block from Siemens. Please also copy this function block from the library in your project.

The function block _12_IOL_GenX is written in the language AWL. Please check if your PLC supports this language.

Version 1

_12_IOL_GenX



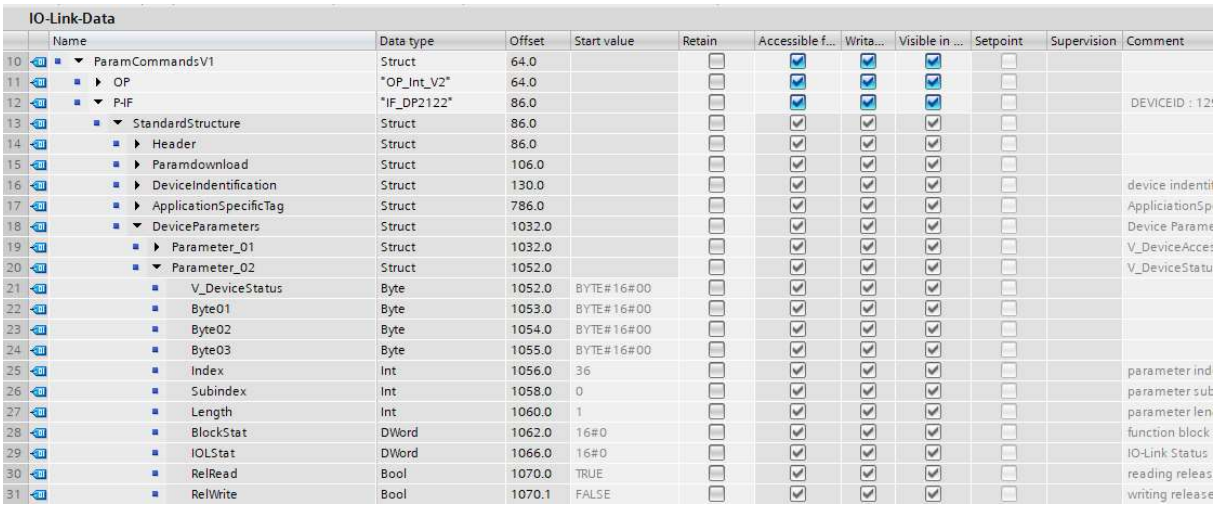
This function block reads / writes device parameter and executes system-commands

Formal operant	Format	Description
IA_Interface	ANY	Pointer to device parameter UDT generated from IODD. Please see also description of the data block in this document.
IDI_HardwareAddress	HWIO	Hardware-IO of the module the device is connected to.
II_CAP	INT	CAP-ID of the IO-Link Master 255 for AL1000 -19456 for all other ifm master
II_Port	INT	Number of the port the device is connected to.
I_DataStorage	BOOL	0 = Settings shall not be stored in the master 1 = Settings shall be stored in the master
I_BlockParam	BOOL	0 = Parameter will be written without block parameter setting 1 = Parameter will be written with block parameter setting
IO_ReadReq	BOOL	Latch this signal to read the parameter set from the device The bit will be unlatched by the function block
IO_WriteReq	BOOL	Latch this signal to write the parameter set to the device The bit will be unlatched by the function block
IO_ResetReq	BOOL	To reset a fault message from the function block latch this bit. The bit will be unlatched by the function block
IOS_Commando	STRUCT	Struct for system commands. See description below
O_ComActive	BOOL	Signal that communication to the device is active. The number of communications that can be started at the same time is dependent on the performance of the PLC. Please check the date sheet of the PLC
O_Fault	BOOL	0 = no fault 1 = Fault occurred during the communication. See description below.

Execute system commands

To execute a system command please latch the bit for the system command in the system command structure. The bit will be unlatched by the function block.

Detailed fault message


IO-Link-Data

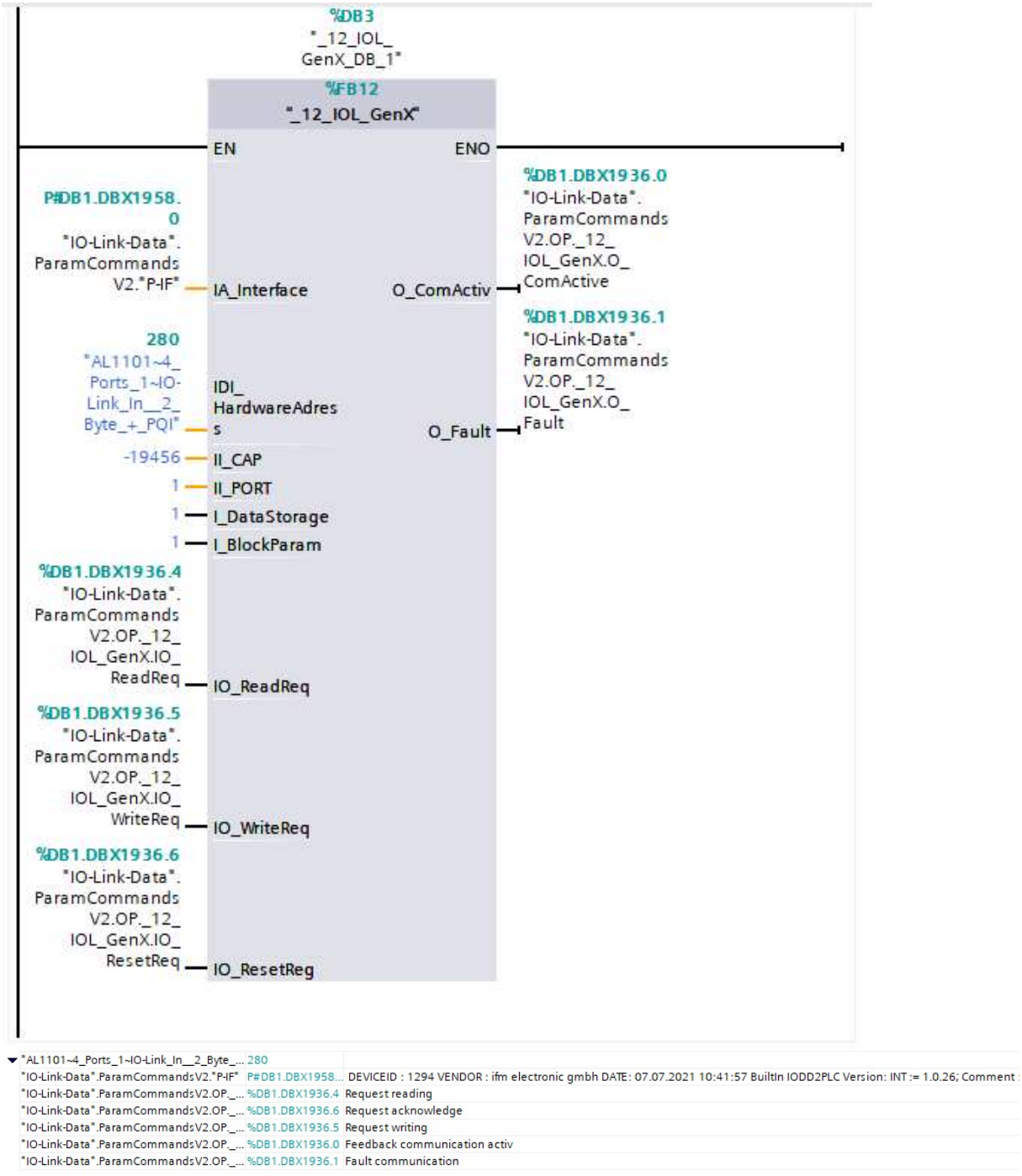
	Name	Data type	Offset	Start value	Retain	Accessible f...	Writa...	Visible in ...	Setpoint	Supervision	Comment
10	ParamCommandsV1	Struct	64.0								
11	OP	"OP_Int_V2"	64.0								
12	P-IF	"IF_DP2122"	86.0								DEVICEID : 12
13	StandardStructure	Struct	86.0								
14	Header	Struct	86.0								
15	Paramdownload	Struct	106.0								
16	DeviceIndentification	Struct	130.0								device indenti
17	ApplicationSpecificTag	Struct	786.0								AppliciationSp
18	DeviceParameters	Struct	1032.0								Device Parame
19	Parameter_01	Struct	1032.0								V_DeviceAcce
20	Parameter_02	Struct	1052.0								V_DeviceStatu
21	V_DeviceStatus	Byte	1052.0	BYTE#16#00							
22	Byte01	Byte	1053.0	BYTE#16#00							
23	Byte02	Byte	1054.0	BYTE#16#00							
24	Byte03	Byte	1055.0	BYTE#16#00							
25	Index	Int	1056.0	36							parameter ind
26	Subindex	Int	1058.0	0							parameter sub
27	Length	Int	1060.0	1							parameter len
28	BlockStat	DWord	1062.0	16#0							function block
29	IOLStat	DWord	1066.0	16#0							IO-Link Status
30	RelRead	Bool	1070.0	TRUE							reading releas
31	RelWrite	Bool	1070.1	FALSE							writing release

If an error occurs during the communication the detailed code for the fault message will be saved in the BlockStat and IOLStat of the parameter which caused the fault.

Detailed information relating to the fault code can be found in the IO-Link-PDF of the device and the manual of the IO-Link-Device function block from Siemens.

Version 2

_12_IOL_GenX



"AL1101~4_Ports_1~IO-Link_In__2_Byte_...	280	
"IO-Link-Data".ParamCommandsV2."P-IF"	P#DB1.DBX1958...	DEVICEID : 1294 VENDOR : ifm electronic gmbh DATE: 07.07.2021 10:41:57 BuiltIn IODD2PLC Version: INT := 1.0.26; Comment :
"IO-Link-Data".ParamCommandsV2.OP._...	%DB1.DBX1936.4	Request reading
"IO-Link-Data".ParamCommandsV2.OP._...	%DB1.DBX1936.6	Request acknowledge
"IO-Link-Data".ParamCommandsV2.OP._...	%DB1.DBX1936.5	Request writing
"IO-Link-Data".ParamCommandsV2.OP._...	%DB1.DBX1936.0	Feedback communication activ
"IO-Link-Data".ParamCommandsV2.OP._...	%DB1.DBX1936.1	Fault communication

This function block reads / writes device parameters

Formal operant	Format	Description
IA_Interface	ANY	Pointer to device parameter UDT generated from IODD. Please see also description of the data block in this document.
IDI_HardwareAddress	HWIO	Hardware-IO of the module the device is connected to.
II_CAP	INT	CAP-ID of the IO-Link Master 255 for AL1000 -19456 for all other ifm masters
II_Port	INT	Number of the port the device is connected to.
I_DataStorage	BOOL	0 = Settings shall not be stored in the master 1 = Settings shall be stored in the master
I_BlockParam	BOOL	0 = Parameter will be written without block parameter setting 1 = Parameter will be written with block parameter setting
IO_ReadReq	BOOL	Latch this signal to read the parameter set from the device The bit will be unlatched by the function block
IO_WriteReq	BOOL	Latch this signal to write the parameter set to the device The bit will be unlatched by the function block
IO_ResetReq	BOOL	To reset a fault message from the function block latch this bit. The bit will be unlatched by the function block
O_ComActive	BOOL	Signal that communication to the device is active. The number of communications that can be started at the same time is dependent on the performance of the PLC. Please check the date sheet of the PLC
O_Fault	BOOL	0 = no fault 1 = Fault occurred during the communication. See description below.

Detailed fault message

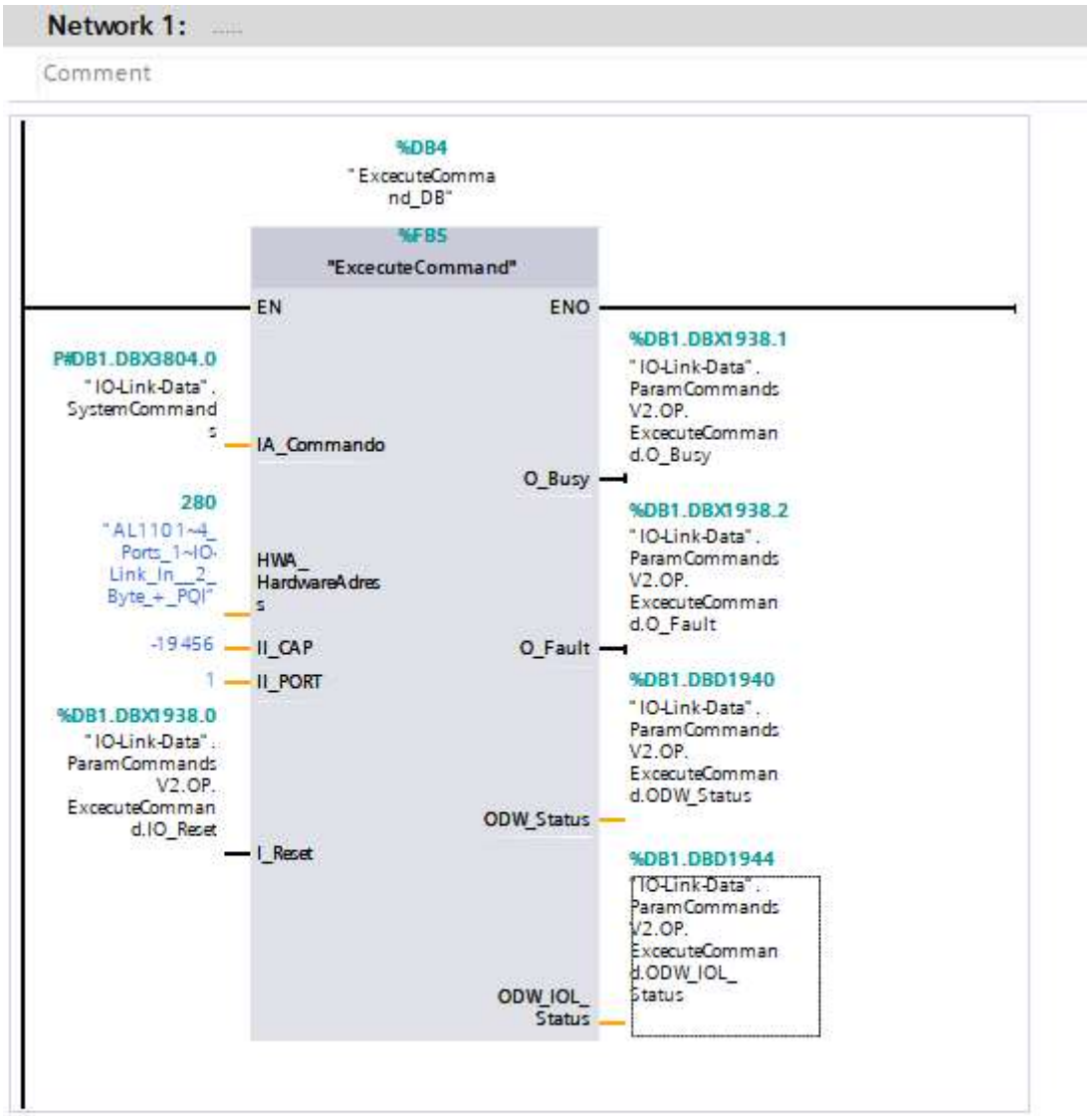
IO-Link-Data

	Name	Data type	Offset	Start value	Retain	Accessible f...	Writa...	Visible in ...	Setpoint	Supervision	Comment
10	ParamCommandsV1	Struct	64.0								
11	OP	"OP_Int_V2"	64.0								
12	P-IF	"IF_DP2122"	86.0								DEVICEID : 12
13	StandardStructure	Struct	86.0								
14	Header	Struct	86.0								
15	Paramdownload	Struct	106.0								
16	DeviceIndentification	Struct	130.0								device indenti
17	ApplicationSpecificTag	Struct	786.0								AppliciationSp
18	DeviceParameters	Struct	1032.0								Device Parame
19	Parameter_01	Struct	1032.0								V_DeviceAcce
20	Parameter_02	Struct	1052.0								V_DeviceStatu
21	V_DeviceStatus	Byte	1052.0	BYTE#16#00							
22	Byte01	Byte	1053.0	BYTE#16#00							
23	Byte02	Byte	1054.0	BYTE#16#00							
24	Byte03	Byte	1055.0	BYTE#16#00							
25	Index	Int	1056.0	36							parameter ind
26	Subindex	Int	1058.0	0							parameter sub
27	Length	Int	1060.0	1							parameter len
28	BlockStat	DWord	1062.0	16#0							function block
29	IOLStat	DWord	1066.0	16#0							IO-Link Status
30	RelRead	Bool	1070.0	TRUE							reading releas
31	RelWrite	Bool	1070.1	FALSE							writing release

If an error occurs during the communication the detailed code for the fault message will be saved in the BlockStat and IOLStat of the parameter which caused the fault.

Detailed information relating to the fault code can be found in the IO-Link-PDF of the device and the manual of the IO-Link-Device function block from Siemens.

ExcecuteCommand



"AL1101~4_Ports_1~IO-Link_In__2_Byte_...	280
"IO-Link-Data".ParamCommandsV2.OP.E...	%DB1.DBX1938.0
"IO-Link-Data".ParamCommandsV2.OP.E...	%DB1.DBX1938.1
"IO-Link-Data".ParamCommandsV2.OP.E...	%DB1.DBX1938.2
"IO-Link-Data".ParamCommandsV2.OP.E...	%DB1.DBD1944
"IO-Link-Data".ParamCommandsV2.OP.E...	%DB1.DBD1940
"IO-Link-Data".SystemCommands	P#DB1.DBX3804...

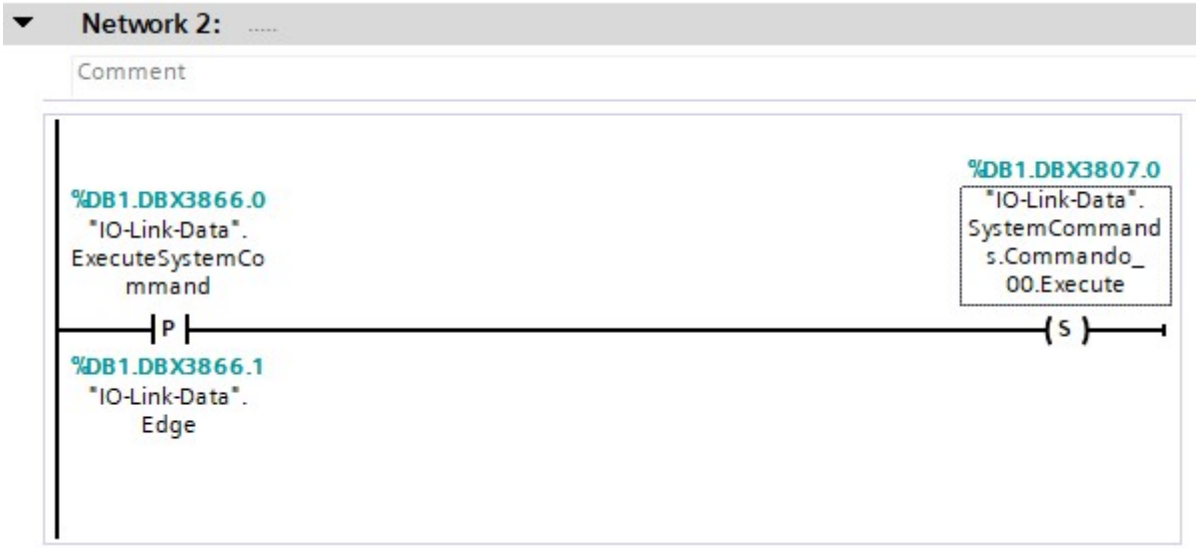
This function block sends IO-Link system commands to the device.
The system commands that are supported are dependent on the device. In each example is an UDT for the device which contains all the system commands which can be sent to the device.

Formal operant	Format	Description
IA_Commando	ANY	Pointer to the system command interface UDT. Please see also description of the data block in this document.
IDI_HardwareAddress	HWIO	Hardware-IO of the module the device is connected to.
II_CAP	INT	CAP-ID of the IO-Link Master 255 for AL1000 -19456 for all other ifm master
II_Port	INT	Number of the port the device is connected to.
IO_Reset	BOOL	To reset a fault message from the function block latch this bit. The bit will be unlatched by the function block
O_Busy	Bool	System command is actually sent to the device.
O_Fault	BOOL	0 = no fault 1 = Fault occurred during the communication.
ODW_Status	DWORD	DP/ PNIO - error status ; ERROR Flag = 1 - communication error status in detail
ODW_IOL_Status	DWORD	IO-Link error status; ERROR flag = 1: IO-Link error status in detail

Execute system commands

Commando_00	Struct	3806.0									V_SystemCommand
Value	Byte	3806.0	B#16#82								2
Execute	Bool	3807.0	false								
Index	Int	3808.0	2								parameter index
Subindex	Int	3810.0	0								parameter subindex

In the system command UDT there is a structure for each system command.
The parameters Value, Index and Sub-index are preset. Please do not change these settings.



In order to execute a system command in the device, please latch the associated "execute" bit.
The function block transfers the request to the device and unlatches the request.

Read events Index 545

History

The examples contain three versions of this function block.
The function has remained the same, only the user-friendliness has been improved.
In the first version, all events were executed individually as formal operands.
This has resulted in a very large building block, which is why in version two the events are passed as a structure.
The change in version three is that the feedback signals from the IO-Link device function block have been moved to the outside and are therefore available to the user.

Event UDT

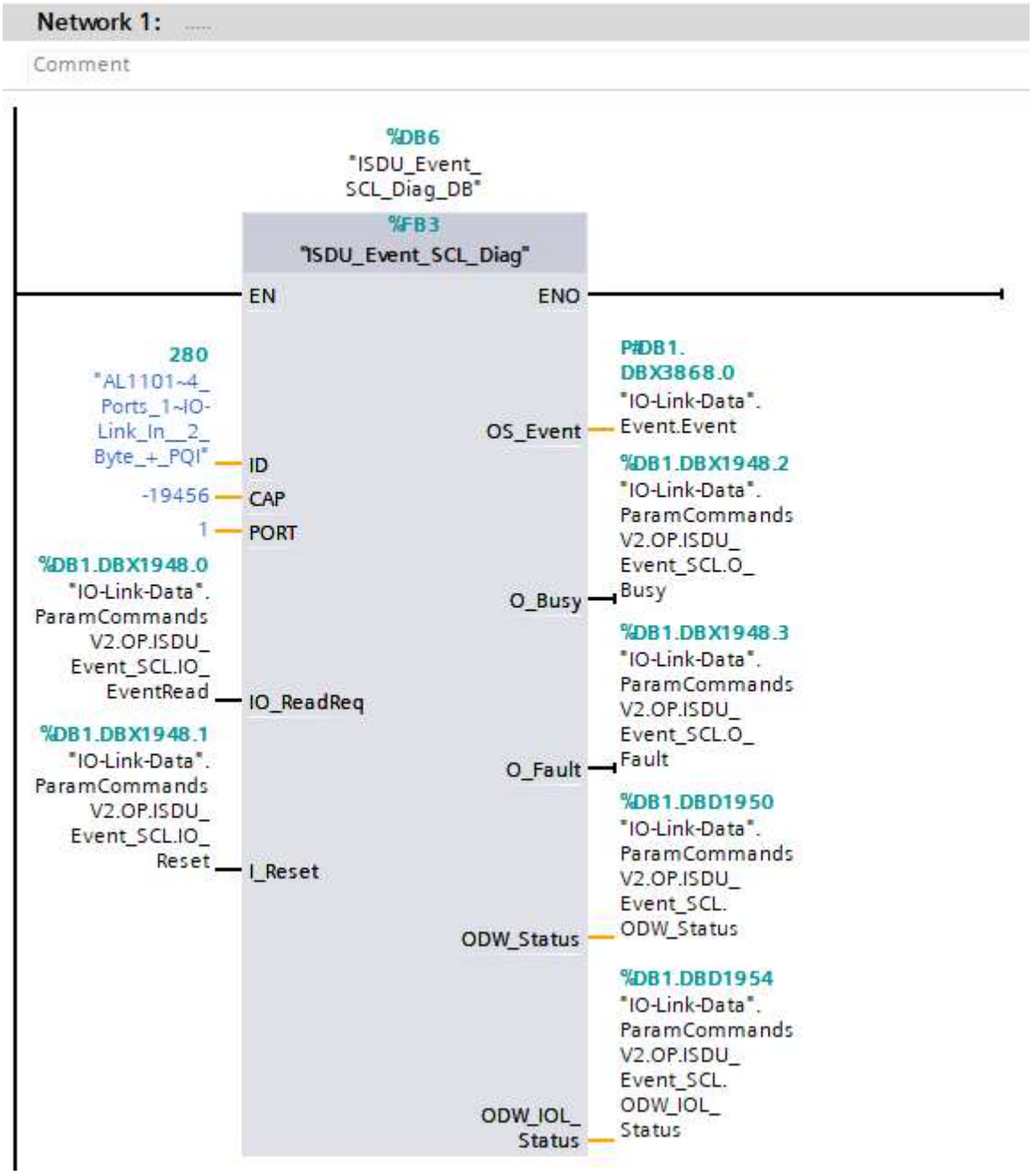
Event_PL

	Name	Data type	Default value	Accessible f...	Writa...	Visible in ...	Setpoint	Comment
1	Event	Struct		☑	☑	☑	☐	bit coded events
2	Event_00	Bool	false	☑	☑	☑	☐	0x5000 Device hardware fault
3	Event_01	Bool	false	☑	☑	☑	☐	0x6320 Parameter error
4	Event_02	Bool	false	☑	☑	☑	☐	0x7710 Short circuit
5	Event_03	Bool	false	☑	☑	☑	☐	not used
6	Event_04	Bool	false	☑	☑	☑	☐	not used
7	Event_05	Bool	false	☑	☑	☑	☐	not used
8	Event_06	Bool	false	☑	☑	☑	☐	not used
9	Event_07	Bool	false	☑	☑	☑	☐	not used
10	Event_08	Bool	false	☑	☑	☑	☐	0x8C10 Process variable range over-run
11	Event_09	Bool	false	☑	☑	☑	☐	0x8C30 Process variable range under-run
12	Event_10	Bool	false	☑	☑	☑	☐	not used
13	Event_11	Bool	false	☑	☑	☑	☐	not used
14	Event_12	Bool	false	☑	☑	☑	☐	not used
15	Event_13	Bool	false	☑	☑	☑	☐	not used
16	Event_14	Bool	false	☑	☑	☑	☐	not used
17	Event_15	Bool	false	☑	☑	☑	☐	not used
18	Event_16	Bool	false	☑	☑	☑	☐	not used
19	Event_17	Bool	false	☑	☑	☑	☐	not used
20	Event_18	Bool	false	☑	☑	☑	☐	not used
21	Event_19	Bool	false	☑	☑	☑	☐	not used
22	Event_20	Bool	false	☑	☑	☑	☐	not used
23	Event_21	Bool	false	☑	☑	☑	☐	not used
24	Event_22	Bool	false	☑	☑	☑	☐	not used
25	Event_23	Bool	false	☑	☑	☑	☐	not used
26	Event_24	Bool	false	☑	☑	☑	☐	not used
27	Event_25	Bool	false	☑	☑	☑	☐	not used
28	Event_26	Bool	false	☑	☑	☑	☐	not used
29	Event_27	Bool	false	☑	☑	☑	☐	not used
30	Event_28	Bool	false	☑	☑	☑	☐	not used
31	Event_29	Bool	false	☑	☑	☑	☐	not used
32	Event_30	Bool	false	☑	☑	☑	☐	0x8DFE Test Event 1
33	Event_31	Bool	false	☑	☑	☑	☐	0x8DFF Test Event 2

The examples contain UDTs suitable for the device in which the events provided by the device are listed.

If, after the reading process, the corresponding bit is true, the device reports the corresponding event.

ISDU_Event_SCL_Diag



"AL1101~4_Ports_1~IO-Link_In__2_Byte_...	280	
"IO-Link-Data".Event.Event	P#DB1.DBX3868...	bit coded events
"IO-Link-Data".ParamCommandsV2.OP.I...	%DB1.DBX1948.0	Read events over ISDU
"IO-Link-Data".ParamCommandsV2.OP.I...	%DB1.DBX1948.1	
"IO-Link-Data".ParamCommandsV2.OP.I...	%DB1.DBX1948.2	
"IO-Link-Data".ParamCommandsV2.OP.I...	%DB1.DBX1948.3	
"IO-Link-Data".ParamCommandsV2.OP.I...	%DB1.DBD1954	
"IO-Link-Data".ParamCommandsV2.OP.I...	%DB1.DBD1950	

Formal operant	Format	Description
ID	HWIO	Hardware-IO of the module the device is connected to.
CAP	INT	CAP-ID of the IO-Link Master 255 for AL1000 -19456 for all other ifm master
Port	INT	Number of the port the device is connected to.
IO_ReadReq	Bool	Start read request
I_Reset	BOOL	To reset a fault message from the function block latch this bit. The bit will be unlatched by the function block
OS_Events	STRUCT	Struct-interface for events.
O_Busy	Bool	System command is actually sent to the device.
O_Fault	BOOL	0 = no fault 1 = Fault occurred during the communication.
ODW_Status	DWORD	DP/ PNIO - error status ; ERROR Flag = 1 - communication error status in detail
ODW_IOL_Status	DWORD	IO-Link error status; ERROR flag = 1: IO-Link error status in detail