

GEFRAN

GFX4-IR PROFINET

USER MANUAL



code: 80992E - 07-2021 - ENGLISH



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1 • INTRODUCTION

The RTE (Real Time Ethernet) card is a device that connects slaves for data transmission and reception with the Profinet protocol. The connection diagram is shown below.

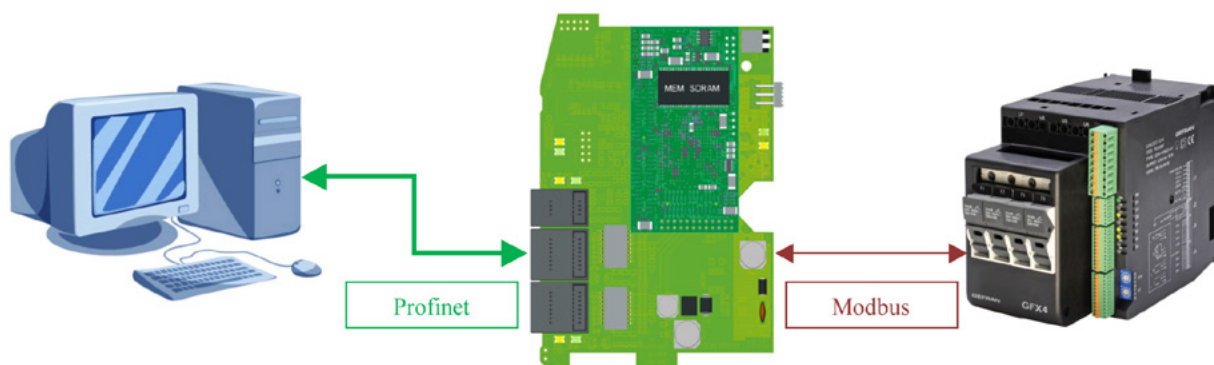


Figure 1

We have:

- A Profinet-controller master connected to a Profinet-IO device (Gefran RTE Profinet Bridge) via the Profinet protocol (green)
- A Modbus RTU master running on the RTE card (Gefran Profinet Bridge) connected via serial line to a Modbus slave RTU

2 • MAIN CHARACTERISTICS

- Profinet-IO module ↔ Modbus RTU
- Two Ethernet RJ45 ports: Eth 0 and Eth 1
- Internal switch
- Baud rate 100Mbits
- Auto_Negotiation, Auto_Polarity, Auto_Crossover
- Internal installation
- Data transport layer Ethernet II , IEEE 802.3
- RTC – Real time Cyclic Protocol- Class 1 & Class 2 (unsynchronised)
- RTA – Real time Acyclic Protocol
- Device address via DCP– Discovery and Configuration Protocol (No DHCP)
- CL-RPC – Connectionless Remote Procedure Call
- LLDP – Link Layer Discovery Protocol
- No fast star-tup
- 32 input words (16 bits per word) for each GFX4-IR
- 32 output words (16 bits per word) for each GFX4-IR
- Minimum device interval for Profinet cyclic data: 8ms
- Supports GFX4 standard address mode (dip-switch 7 off)

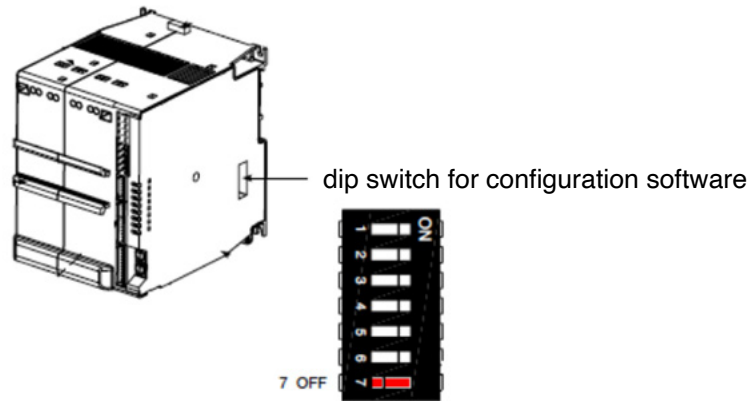


Figure 2

- Minimum cycle time on serial: 50ms for 16 contiguous words using GFX4-IR custom map function

- DCP signal LED on front panel

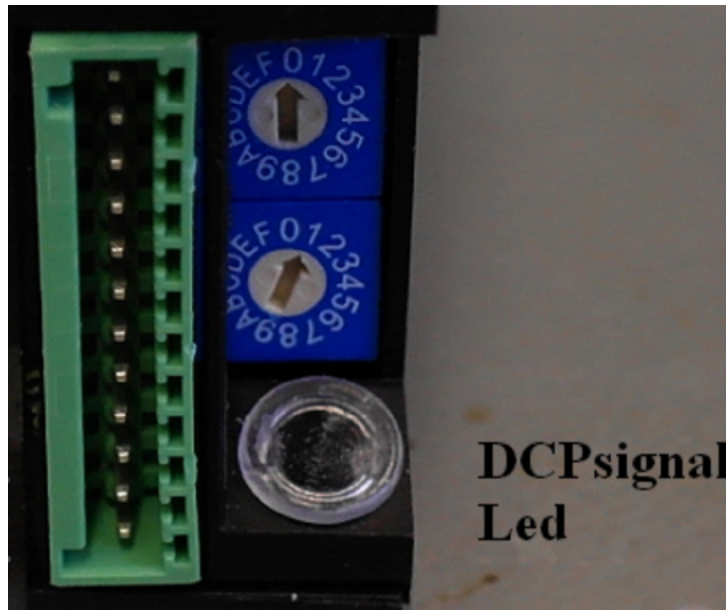


Figure 3

Serial communication time constraints in Modbus RTU

The following time constraints must be complied with in order to allow correct serial data exchange with the device:

Reading Word/Register parameters: Reading N consecutive parameters, with N from 1 to 16, requires a time of almost 50 ms. In this case the following read and write Modbus command, to the same node, must be sent after this interval time.

Writing Word/Register parameters: Writing N consecutive parameters, with N ranging from 1 to 16, if all values (maximum 16) on the device are updated, will take a time of: $50\text{ms} + N \times 80\text{ms}^{(*)}$ with N from 1 to 16.

The times reported refer to the case in which the Baudrate of the serial line (parameter bAu Modbus address 45) is 19200.

(*) If STATUS_W parameters (Modbus address 305) are included in the write request and their value is different from the one currently present in the slave, the time required to write each one will be 240ms (instead of 80ms).

3 • CONNECTING HOST DEVICES

Data is exchanged in the GFX4-IR device by encapsulating Modbus data in Profinet packets.

The serial port must be configured as follows:

- Serial link speed: 19200 baud
- No parity
- Data 8 bits
- Modbus node addresses MUST BE between 1 and 4 in sequence
- The GFX4-IR with Profinet card MUST have address 1

3.1. Possible connections

The following pages show possible combinations for connection and address of GFX4-IR modules.

Connection combinations other than those shown below WILL NOT allow Profinet communication with a Controller!

3.3.1. Connection diagram 1 (4 zones) :

1 GFX4-IR with Modbus node address = 1 and dip switch 7 Off.

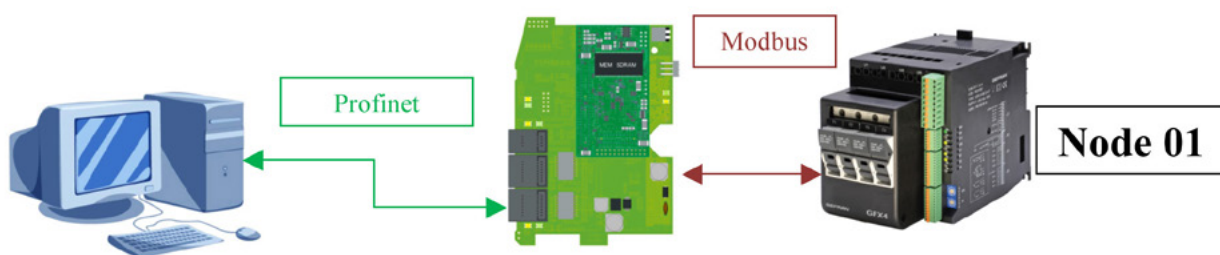


Figure 4

3.3.2. Connection diagram 2 (8 zones):

2 GFX4-IRs with Modbus node addresses = 1 and 2 and dip switch 7 Off.

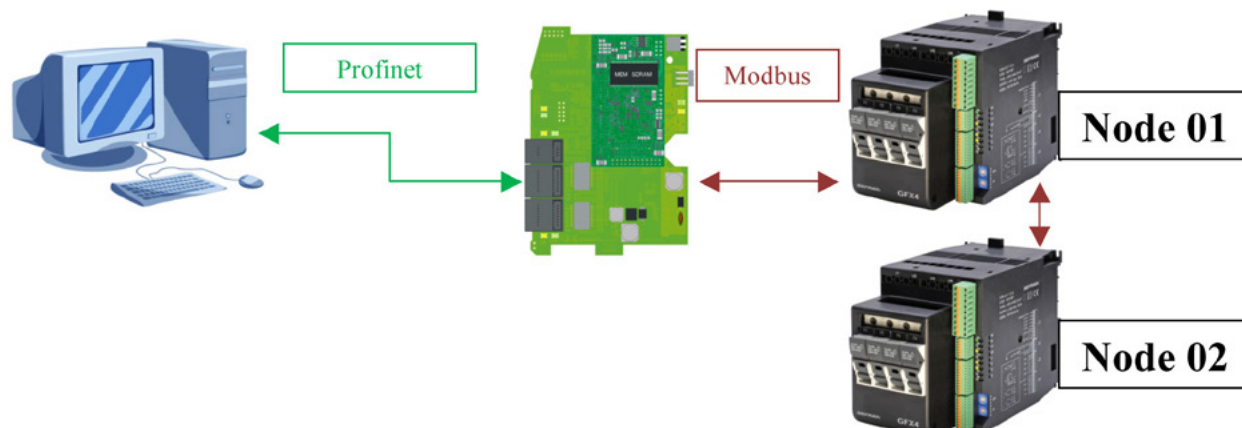


Figure 5

3.3.3. Connection diagram 3 (12 zones) :

3 GFX4-IRs with Modbus node addresses = 1 2 and 3 and dip switch 7 Off.

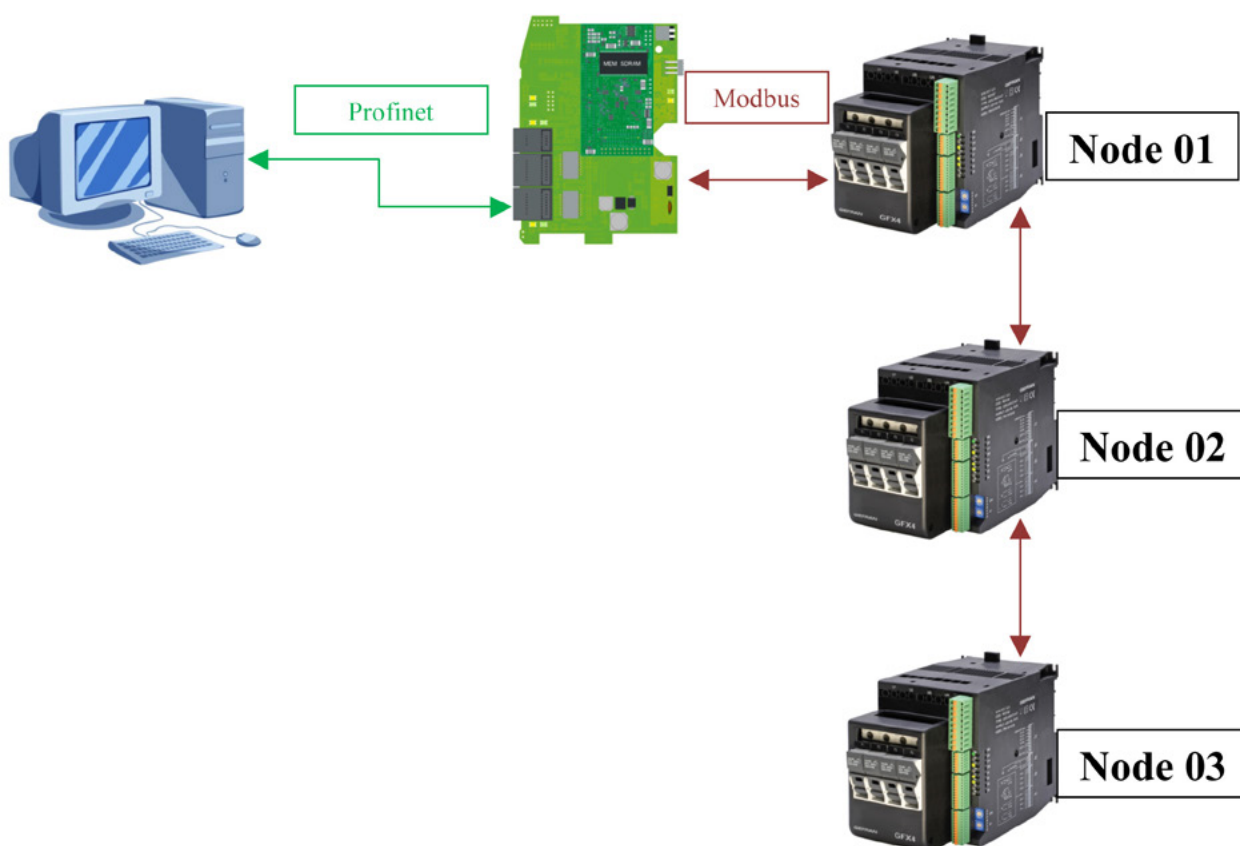


Figure 6

3.3.4. Connection diagram 4 (16 zones) :

4 GFX4-IRs with Modbus node addresses = 1,2,3 and 4 dip switch 7 Off.

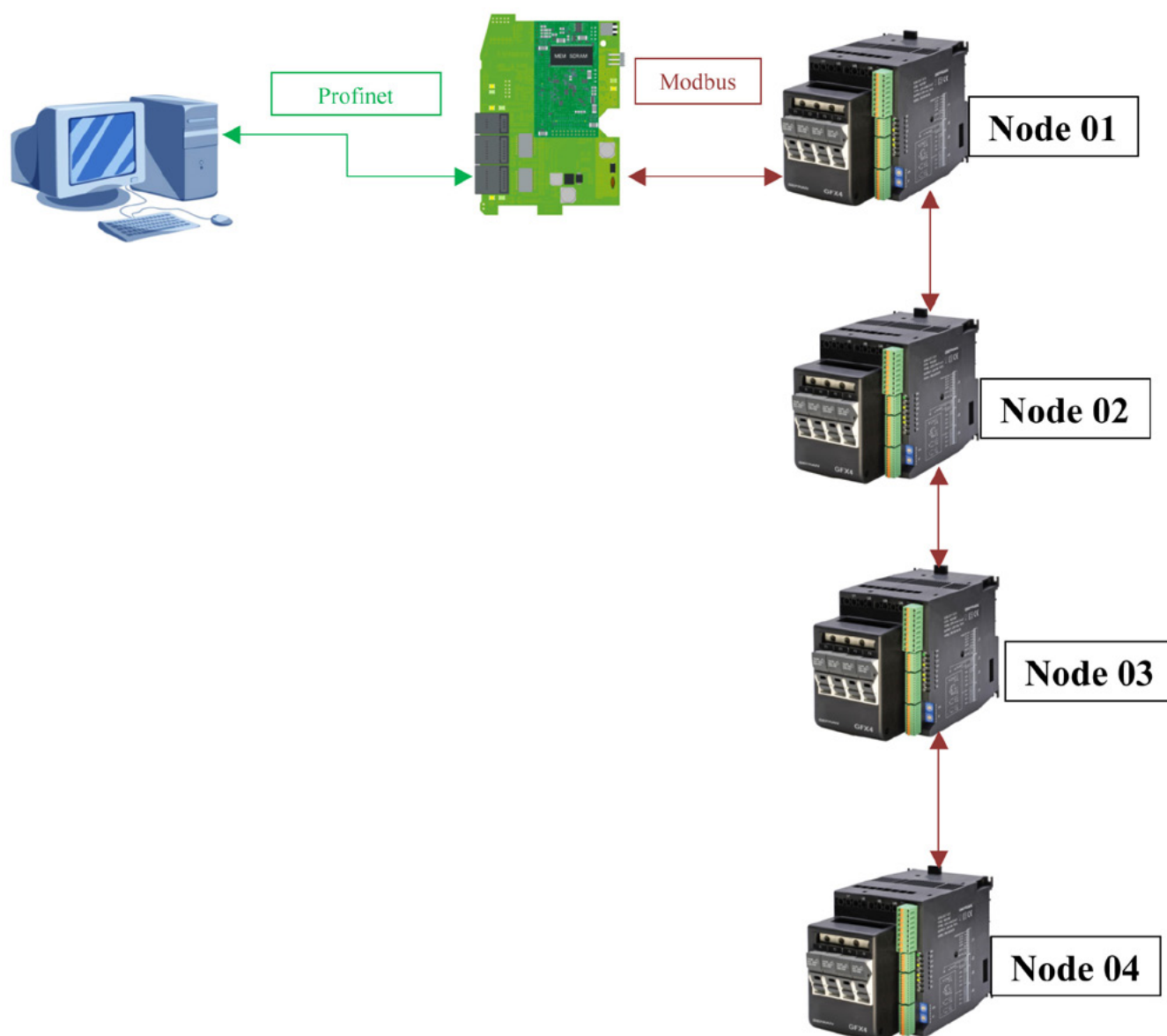


Figure 7

3.2. Description of data exchange

The Profinet-IO module on the GFX4-IR device supports the following data types

- Parameter data
- Cyclic data
- Acyclic data

This data is characterised by device description file GSDML .

Data flows must be interpreted by the application that produces/consumes the data transmitted/received by the device.

The Gefran Profinet-IO card acts like a bridge between Modbus serial and Profinet Ethernet.

Data flows as follows:

- from Profinet-controller master to Profinet-IO slave and vice versa via acyclic mailboxes (acyclic and parameter data)
- or via cyclic data for fast IO data.

Use a configuration tool to define which slave data are exchanged via fast cyclic data.

4.1. From gsdml description file to data exchange

To activate data exchange, download the GSDML product description file (GSDML-V2.2-GEFRANGFX4IR-20120102.xml) from www.gefran.com and install it in the programming environment.

After this, you can see the Controllers ▢ Geflex folders with the GFX4-IR Standard Mode module (Figure 8)



Figure 8

You can now connect to the network (2) by dragging the device (1) as shown in Figure 9

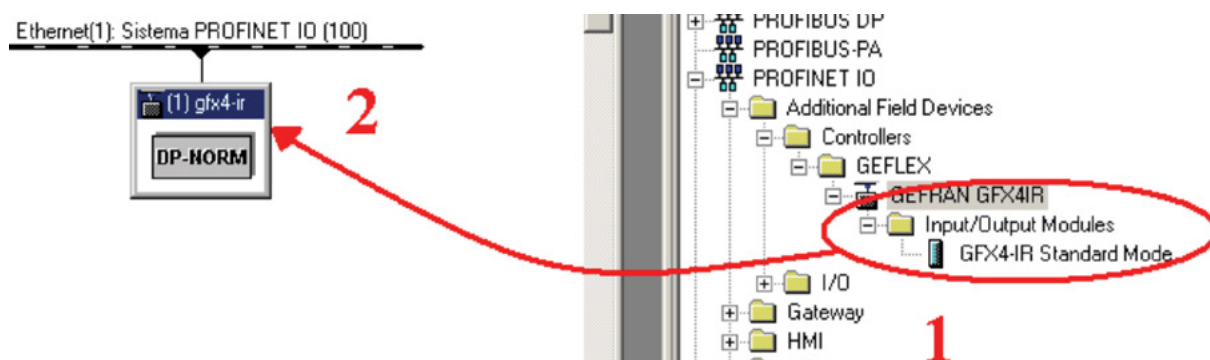


Figure 9

If you need to set a device name/ip address, do it with the System Manager tool using the PLC → Ethernet → Edit Ethernet Node menus (Figure 10)

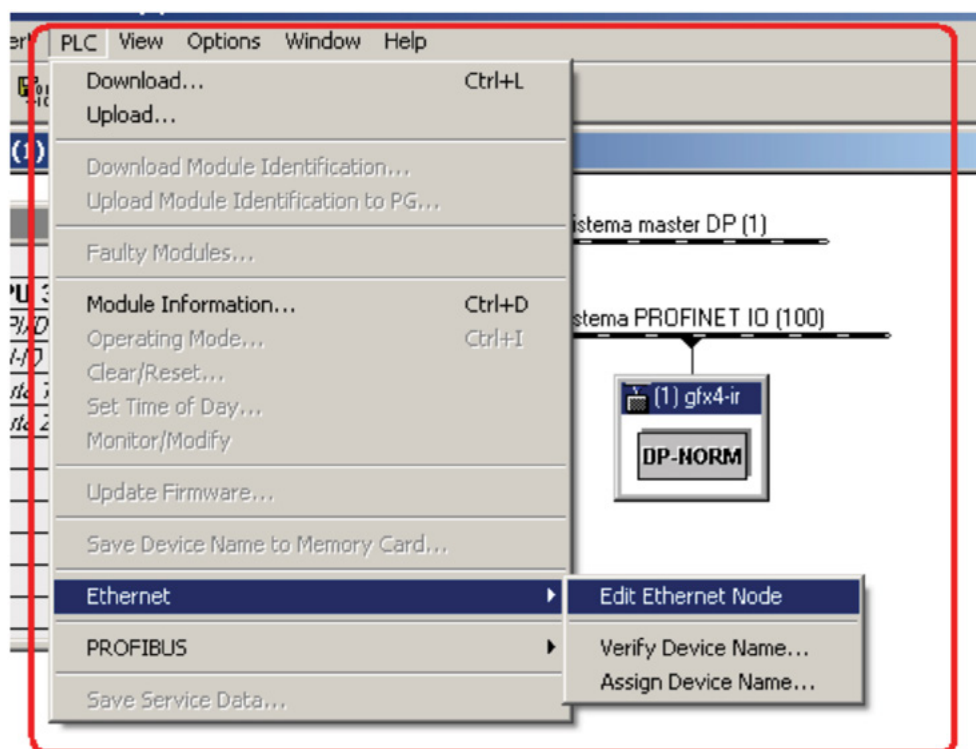


Figure 10

In the Edit Ethernet Node window, click the Browse button (Figure 11) to search for nodes accessible online. This will take a few seconds

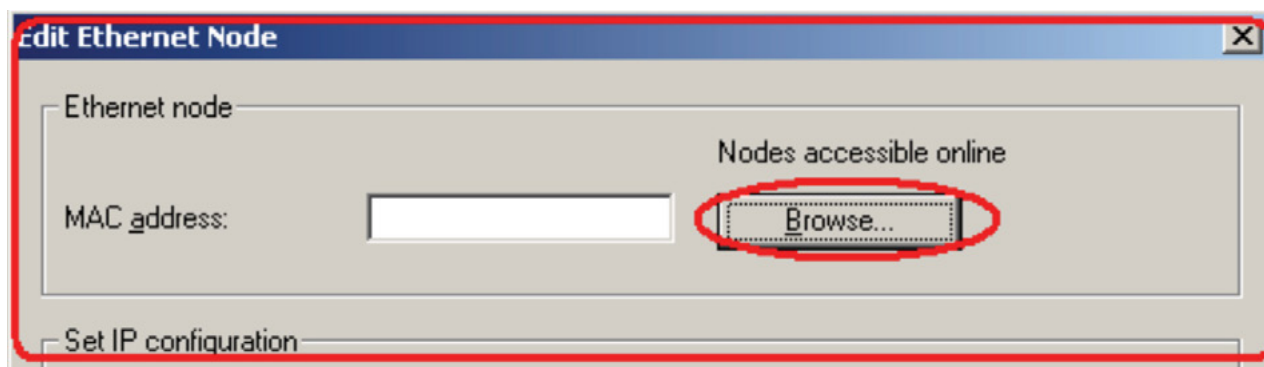


Figure 11

After a few seconds, the Browse Network window appears, summarising the current settings of the nodes connected to the network.

The example shows a network consisting of two nodes:

- a controller
- a GFX4-IR device

To change the settings (Figure 12) of the GFX4-IR, select the line with Device type = GEFLEX (1) and confirm with OK (2)

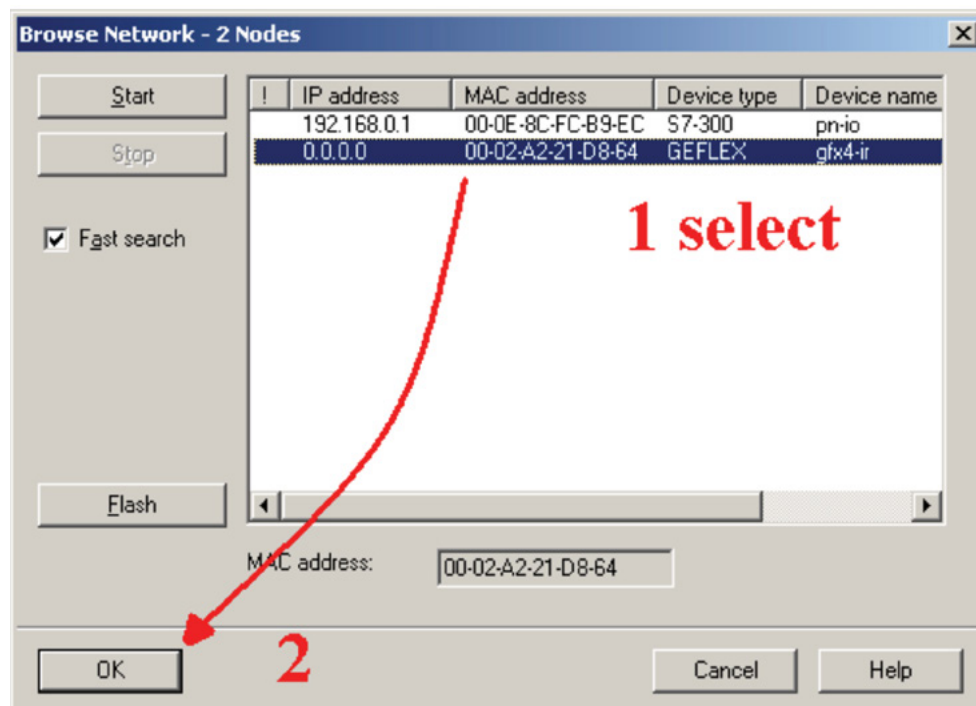


Figure 12

The next window opens (Figure 13) for setting the Device name / ip address. DHCP protocol is not supported.

Edit Ethernet Node

Ethernet node

MAC address: 00-02-A2-21-D8-64 Nodes accessible online
Browse...

Set IP configuration

☒ Use IP parameters

IP address:

Subnet mask:

Gateway

☒ Do not use router

☐ Use router

Address:

☐ Obtain IP address from a DHCP server

Identified by

☒ Client ID ☐ MAC address ☐ Device name

Client ID:

Assign IP Configuration

Assign device name

Device name: gfx4-ir Assign Name

Reset to factory settings

Reset

Close Help

Figure 13

Let's see how to insert a device in the configuration tool (HW-config window).

4.4.1. Configuration for Connection 1 (4 zones) :

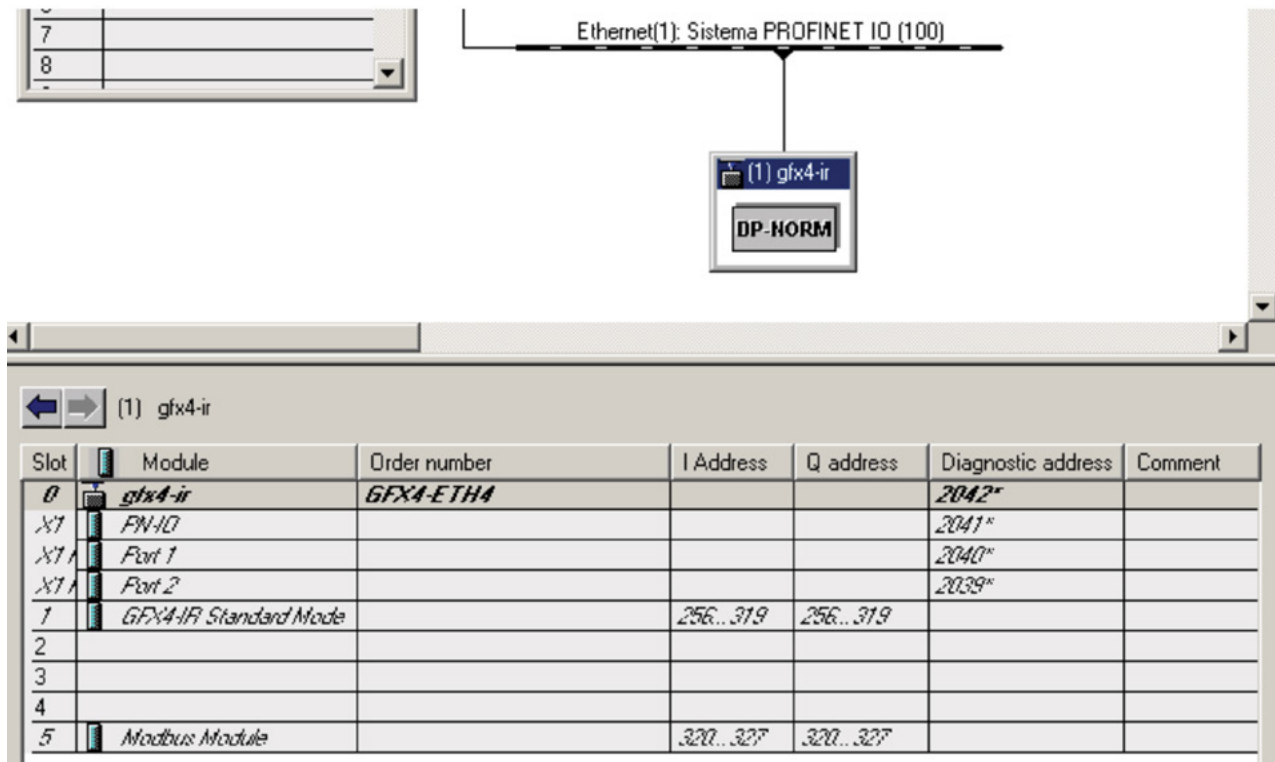


Figure 14

Figure 14 shows the GFX4-IR device in slot 1, controlling 4 zones.

There is also a generic Modbus channel in slot 5 (see description of Modbus channel).
If you click the module, slot 1 is as shown in Figure 15:

Slot	Module	Order number	I Address	Q address
0	gfx4-ir	GFX4-ETH4		
X1	FW-ID			
X1	Port 1			
X1	Port 2			
1	GFX4-IR Standard Mode		256...319	256...319
2				
3				
4				
5	Modbus Module		320...327	320...327

Double click

Figure 15

You can check/change the parameters of the process I/O variables (Figure 16)

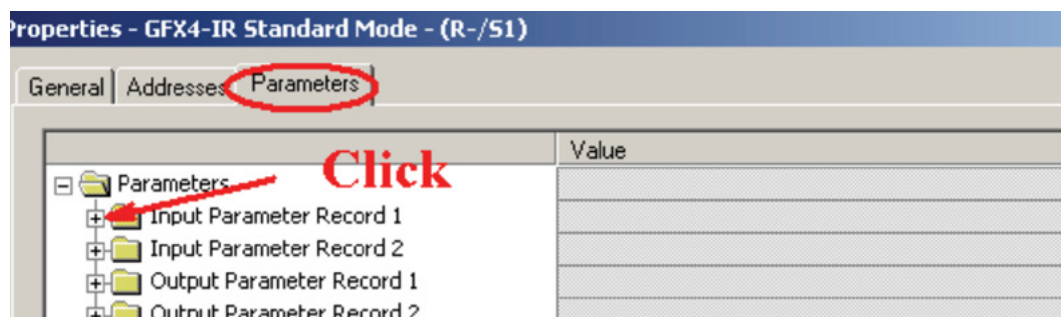


Figure 16

There are 32 input variables in two blocks

- Input Parameter Record 1 (16 words)
- Input Parameter Record 2 (16 words)

In the Value column, you can change the parameter value if necessary (Figure 17)

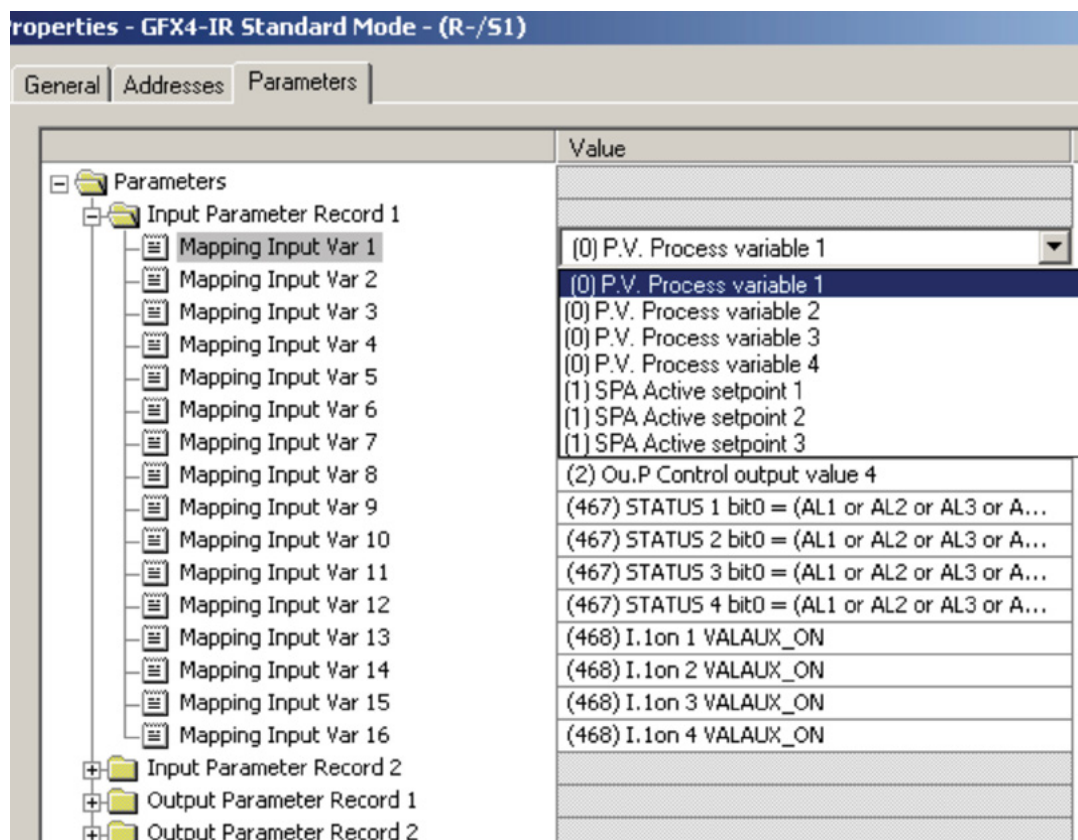


Figure 17

In the Value column, you can change the parameter value if necessary:

- Output Parameter Record 1
- Output Parameter Record 2

In the Value column, you can change the output variables if necessary (Figure 18)

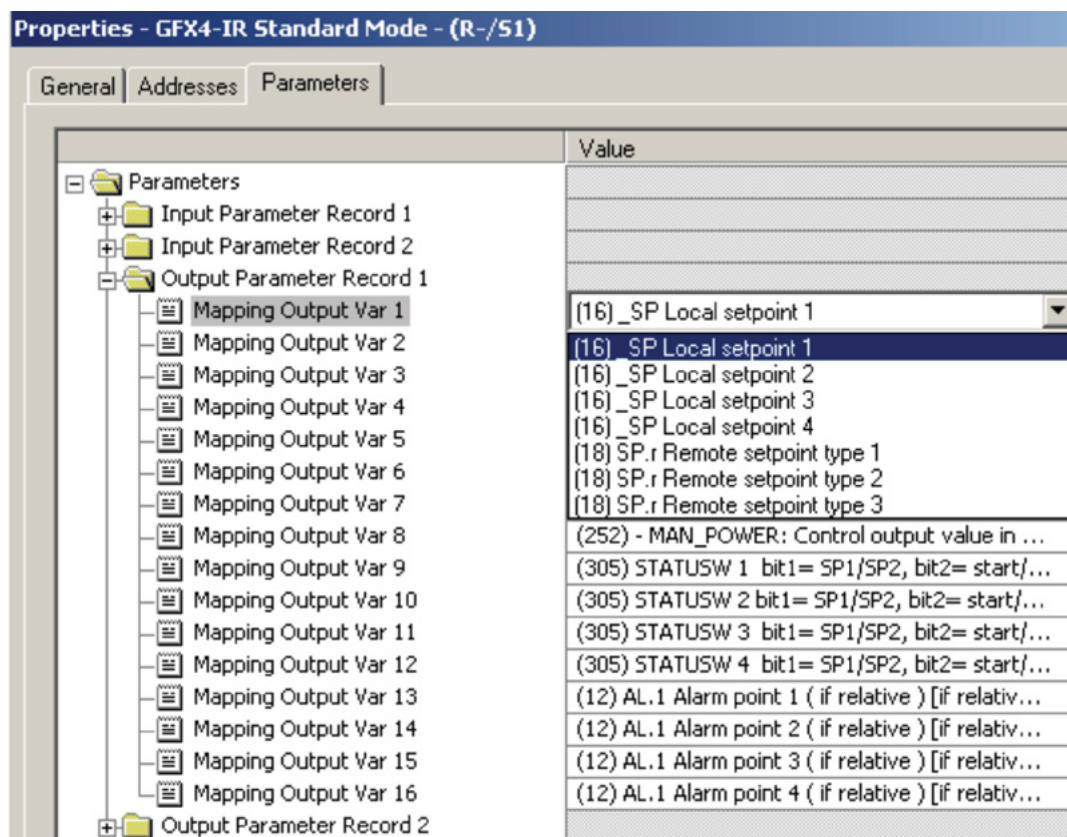


Figure 18

4.4.2. ConConfiguration for Connection 2 (8 zones) :

Select the GFX4-IR Standard Mode module with the configuration tool and drag it to slot 2. The Modbus module is in slot 5 (Figure 19)

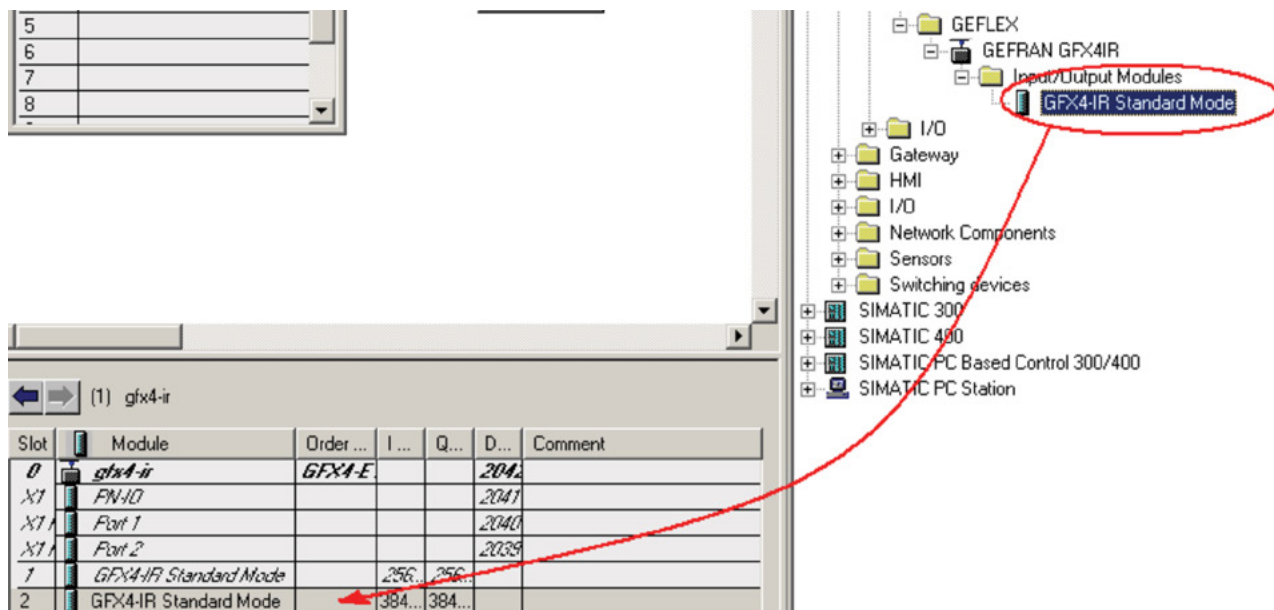


Figure 19

As described above, you can parameterise input and output data in the parameters window of each module.

4.4.3. Configuration for Connection 3 (12 zones) :

Select the GFX4-IR Standard Mode module with the configuration tool, drag it to slot 2 and then to slot 3. The Modbus module is in slot 5 (Figure 20).

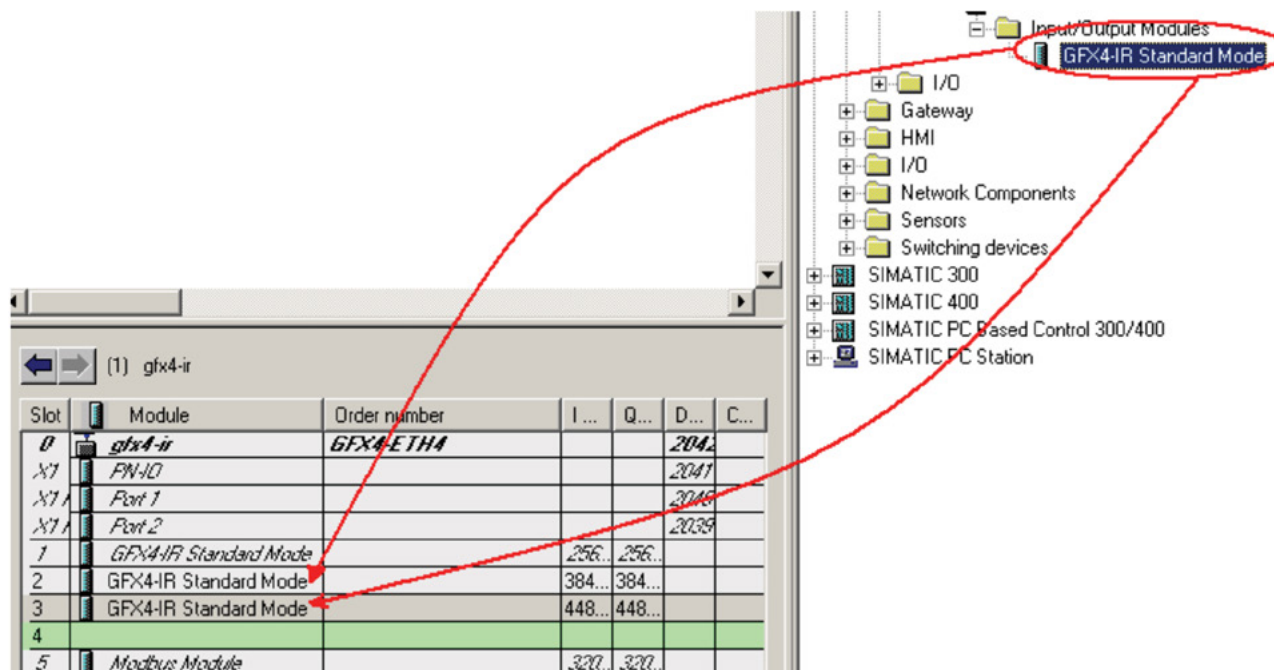


Figure 20

As described above, you can parameterise input and output data in the parameters window of each module.

4.4.4. Configuration for Connection 4 (16 zones) :

Select the GFX4-IR Standard Mode module with the configuration tool, drag it to slot 2 , 3 and then to slot 4. The Modbus module is in slot 5 (Figure 21).

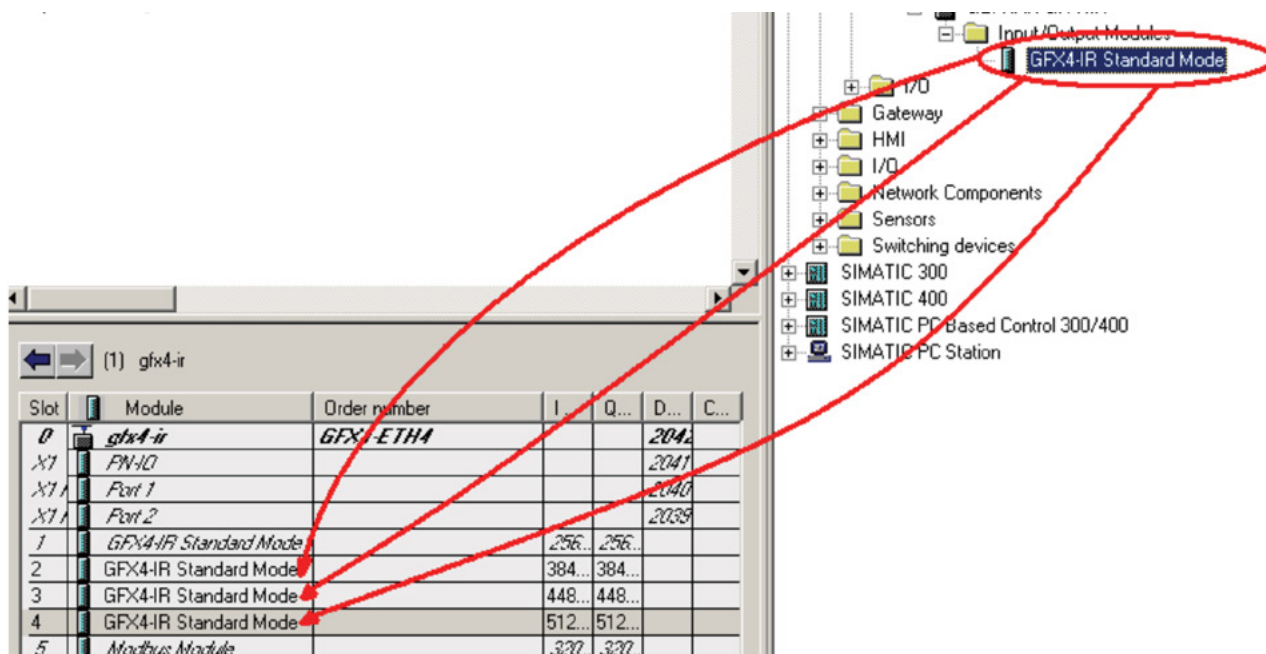


Figure 21

As described above, you can parameterise input and output data in the parameters window of each module.

4.4.5. Modbus virtual slot 5

Slot 5 (Figure 22) is a virtual device that encapsulates a Modbus control in cyclic Profinet data.

Slot	Module	Order ...	I ...	Q...	D...	Comment
0	gfx4-ir	GFX4-E			2042	
X1	FN-IO				2041	
X1	Port 1				2040	
X1	Port 2				2039	
1	GFX4-IR Standard Mode		256...	256...		
2	GFX4-IR Standard Mode		384...	384...		
3	GFX4-IR Standard Mode		448...	448...		
4	GFX4-IR Standard Mode		512...	512...		
5	Modbus Module		320...	320...		

Figure 22

You can configure a few communication aspects in the module parameters.

- Fault Mode (Fig.16) : if Profinet communication fails, you may set the modules as follows

- V Take no action
- V Device to Software Off mode
- V Device to manual mode
- V Set SP2 as Setpoint

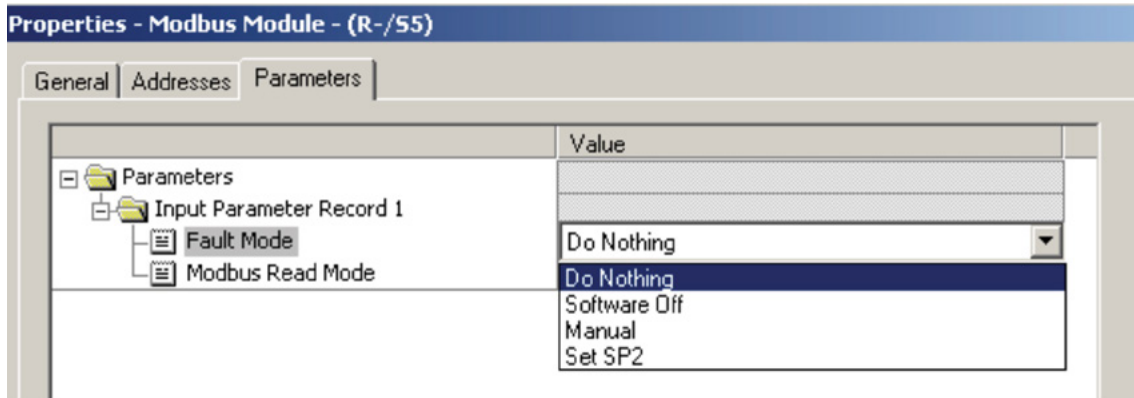


Figure 23

- Modbus Read Mode (Figure 24) :

- V Normal Modbus read: all 32 input words are updated in read (Input parameter record 1 and Input parameter record 2)
- V Half Modbus read: if the read variables needed by the application are equal to a maximum of 16 words, only the parameter record 1 inputs are updated

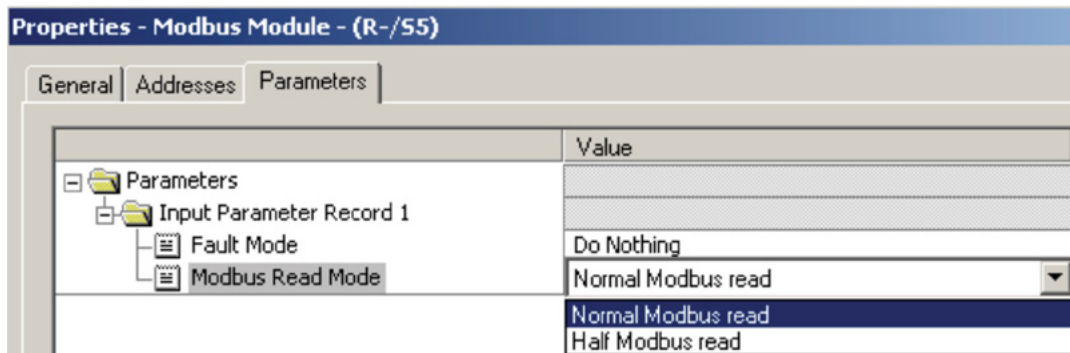


Figure 24

Modbus slot 5 has a dimension of 8 bytes in write and 8 bytes in read. With this channel you can read or write any variable on the Modbus map of the GFX4-IR modules connected to the network.

Modbus channel, slot 5 output, size 8 bytes

MODBUS OUTPUT CHANNEL						
BYTE1 BYTE2	BYTE 3	BYTE 4	BYTE 5	BYTE 6	BYTE 7	BYTE 8
REQUEST TRIGGER WORD	MODBUS ADDRESS	FUNCTION CODE	DATA 1	DATA 2	DATA 3	DATA 4

Canale modbus , slot 5 input , size 8bytes

MODBUS INPUT CHANNEL						
BYTE1 BYTE2	BYTE 3	BYTE 4	BYTE 5	BYTE 6	BYTE 7	BYTE 8
REQUEST TRIGGER WORD	MODBUS ADDRESS	FUNCTION CODE	DATA 1	DATA 2	DATA 3	DATA 4

DESCRIPTION		
BYTE OFFSET	PARAMETER	DESCRIPTION
0	REQUEST/RESPONSE TRIGGER WORD	TRIGGER WORD REQUEST: MUST BE INCREASED BY 1 FOR EACH NEW REQUEST.THE ANSWER IS VALID WHEN THE TRIGGER WORD RESPONSE IS EQUAL TO THE TRIGGER WORD REQUEST
2	SLAVE ADDRESS	MODBUS ADDRESS OF GFX4-IR
3	FUNCTION CODE	FUNCTION CODE BIT/WORD READ/WRITE
4	DATA 1	DEPENDS ON FUNCTION CODE
5	DATA 2	DEPENDS ON FUNCTION CODE
6	DATA 3	DEPENDS ON FUNCTION CODE
7	DATA 4	DEPENDS ON FUNCTION CODE

Reading a bit (1,2)

REQUEST						
TRG	SLAVE ADDRESS	FUNCTION CODE	ADDRESS BIT BYTE + MEANING	ADDRESS BIT BYTE - MEANING	NUMBER BIT BYTE + MEANING	NUMBER BIT BYTE - MEANING
REQUEST TRIGGER WORD	SLAVE ADDRESS	1 or 2	ADDRESS OF BIT TO READ	ADDRESS OF BIT TO READ	NUMBER OF BITS TO READ. (MUST BE 0)	NUMBER OF BITS TO READ

RESPONSE						
TRG	SLAVE ADDRESS	FUNCTION CODE	BYTES COUNT	BIT	BIT	#
RESPONSE TRIGGER WORD	SLAVE ADDRESS	CONFIRM CODE	NUMBER OF BYTE (1 OR 2)	VALUE OF BITS (1÷8)	VALUE OF BITS (9÷16)	DUMMY

Reading a word (3,4)

REQUEST						
TRG	ADD SLAVE	FUNCTION CODE	ADDRESS WORD + MEANING	ADDRESS WORD - MEANING	NUMBER WORD + MEANING	NUMBER WORD - MEANING
REQUEST TRIGGER WORD	SLAVE ADDRESS	3 O 4	ADDRESS OF WORD TO READ	ADDRESS OF WORD TO READ	0	1

RESPONSE						
TRG	ADD SLAVE	FUNCTION CODE	BYTES COUNT	DATA WORD + MEANING	DATA WORD - MEANING	#
RESPONSE TRIGGER WORD	SLAVE ADDRESS	CODICE FUNZIONE	NUMBER OF BYTES READ	VALUE	VALUE	DUMMY

Scrittura bit (5)

REQUEST						
TRG	ADD SLAVE	FUNCTION CODE	ADDRESS + MEANING	ADDRESS - MEANING	BIT	#
REQUEST TRIGGER WORD	SLAVE ADDRESS	5	ADDRESS OF BIT TO WRITE	ADDRESS OF BIT TO WRITE	VALUE OF BIT 00 = OFF o FFHEX = ON)	0

RESPONSE						
TRG	ADD SLAVE	FUNCTION CODE	ADDRESS + MEANING	ADDRESS - MEANING	BIT	00
RESPONSE TRIGGER WORD	SLAVE ADDRESS	CONFIRM CODE	ADDRESS OF BIT WRITTEN	ADDRESS OF BIT WRITTEN	VALUE OF BIT 00 = OFF o FFHEX = ON)	0

Writing a word (6)

REQUEST						
TRG	SLAVE ADDRESS	FUNCTION CODE	ADDRESS + MEANING	ADDRESS - MEANING	DATA + MEANING	DATA - MEANING
REQUEST TRIGGER WORD	SLAVE ADDRESS	6	ADDRESS OF WORD TO WRITE	ADDRESS OF WORD TO WRITE	VALUE OF WORD TO WRITE	VALUE OF WORD TO WRITE

RISPOSTA						
TRG	SLAVE ADDRESS	FUNCTION CODE	ADDRESS + MEANING	ADDRESS - MEANING	DATA + MEANING	DATA - MEANING
RESPONSE TRIGGER WORD	SLAVE ADDRESS	CONFIRM CODE	ADDRESS OF WORD WRITTEN	ADDRESS OF WORD WRITTEN	VALUE OF WORD WRITTEN	VALUE OF WORD WRITTEN

In case of error, 80 hex plus the value of the request function code is returned in the response function code

RESPONSE						
TRG	SLAVE ADDRESS	FUNCTION CODE	ERROR CODE	#	#	#
RESPONSE TRIGGER WORD	CONFIRM SLAVE ADDRESS	REQUEST FUNCTION CODE + 80HEX	ERROR CODE	DUMMY	DUMMY	DUMMY

Error Code

1	2	3	9	10
ILLEGAL FC	ILLEGAL DATA ADDRESS	ILLEGAL DATA	ILLEGAL NUMBER OF DATA	DATA IS READ ONLY

5.1. From descriptive GSDML file to data exchange

In order to activate the data exchange, you must obtain the GSDML file describing the product (GSDML-V2.2-GEFRAN-GFX4IR-20120102.xml), downloadable from www.gefran.com, and install it in the programming environment. To install the device, select “Options/Manage general station description files (GSD)” (Figure 25).

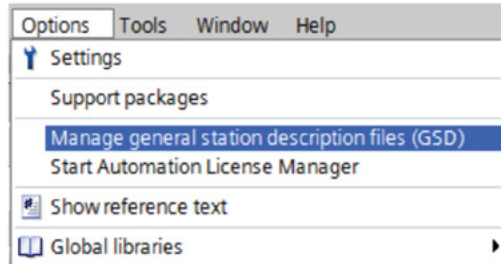


Figure 25

Select the desired item in the dialogue box that appears and click on “Install” (Figure 26).

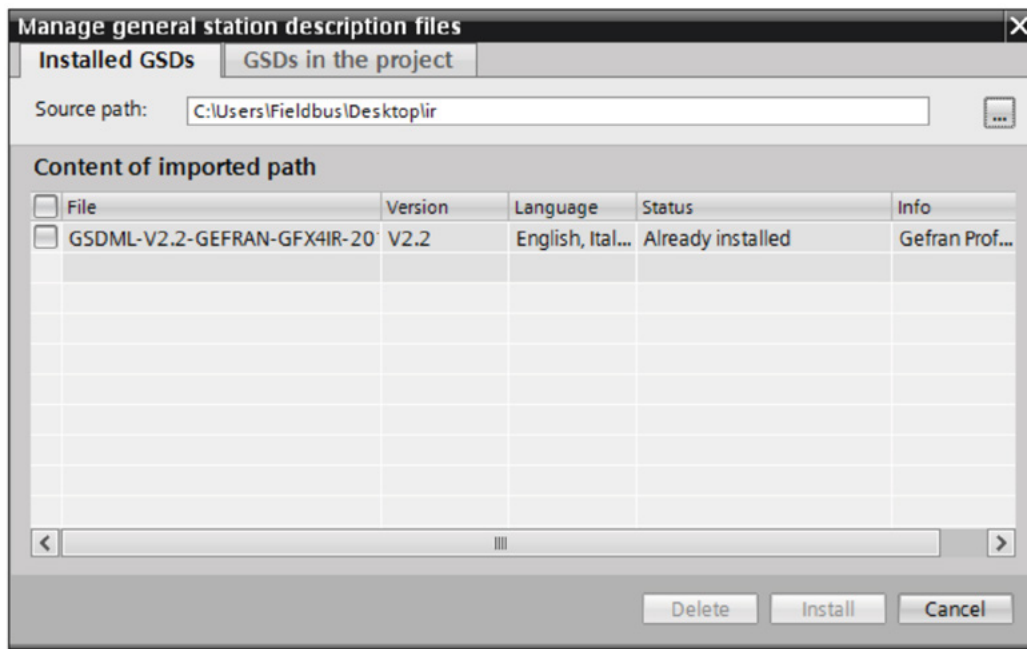


Figure 26

After doing this, you will see the selected device in the catalogue “Other field devices/Controllers/Gefran Spa/GEFLEX/GEFRAN GFX4IR” (Figure 27):

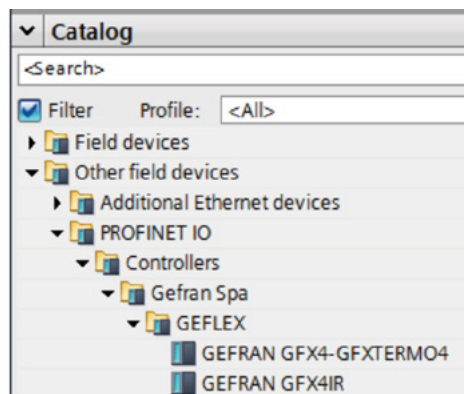


Figure 27

Once you have added and configured your master plc, you may insert your slave device, dragging it as shown in Figure 28

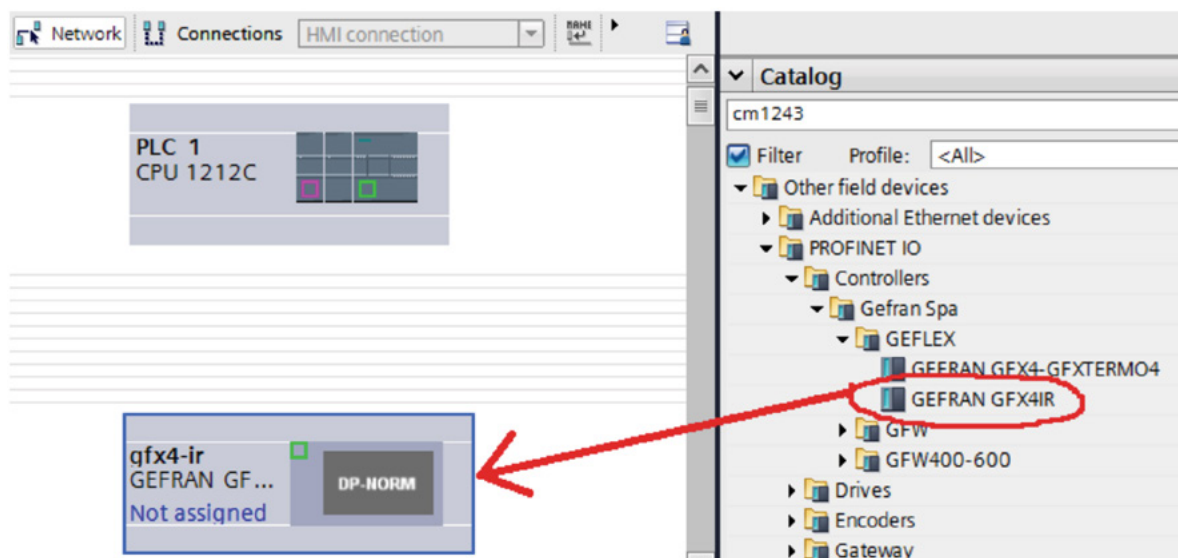


Figure 28

You must now connect the slave (GFX4IR) to the Master's ProfiNET network, joining the two green squares with the mouse as shown in Figure 29.

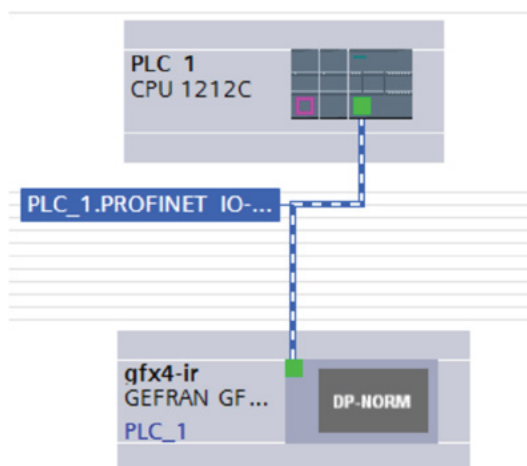


Figure 29

5.2. Setting Names and IP Addresses

Follow this procedure if it is necessary to set a different device name or IP address.

Establish a point-to-point connection with the desired device, for example first with the master plc and then with the GFX4IR slave. Double click on the project tree, at the item “Update accessible devices” (Figure 30 and Figure 31)

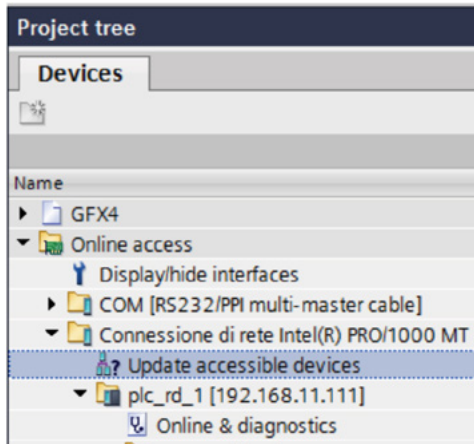


Figure 30

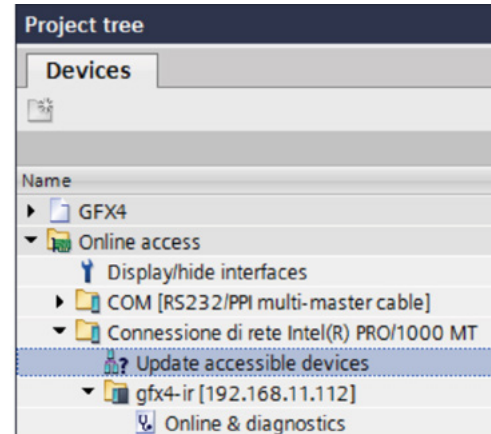


Figure 31

Once we have identified the device, double click on “Online & diagnostics” to access the necessary commands in the corresponding “Functions” menus (Figure 32 and Figure 33).

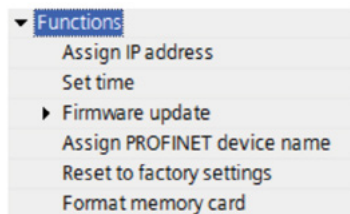


Figure 32



Figure 33

You may change the IP address under the item “Functions/Assign IP address” (Figure 34).

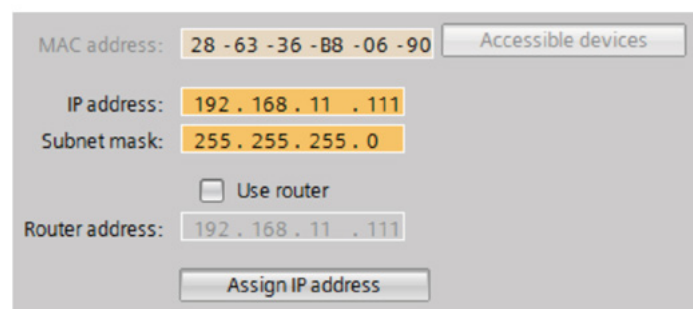


Figure 34

You may change the name under the item “Functions/Assign PROFINET device name” (Figure 35).

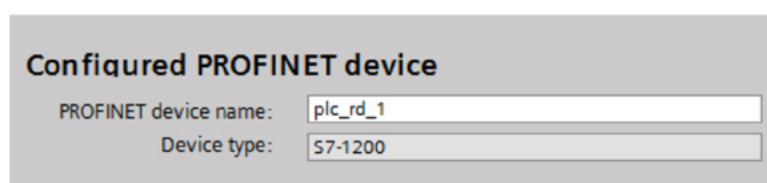


Figure 35

5.3. Configuration for Connection Diagram 1 (4 zones):

Figure 36 shows the GFX4-IR device in slot 1 controlling 4 zones.

There is also a generic modbus channel in slot 5 (refer to the description of the modbus channel).

Device overview								
Module	Rack	Slot	I address	Q address	Type	Article no.	Firmware	Comment
gfox4-ir	0	0			GEFRAN GFX4IR	GFX4-ETH4	1.0.0.0	
PN-IO	0	0 X1			gfox4-ir			
GFX4-IR Standard Mode_1	0	1	68...131	64...127	GFX4-IR Standard Mode			
	0	2						
	0	3						
	0	4						
Modbus Module 1	0	5	132...139	128...135	Modbus Module			

Figure 36

The same information may be accessed via a similar representation (empty slots not shown) in the project tree on the left (Figure 37).



Figure 37

Double click on “GFX4-IR Standard Mode_1” in the “Device overview” in Figure 12 to go to the “Properties” window, where the item “Module parameters” shows a map of the device's memory (Figure 38).

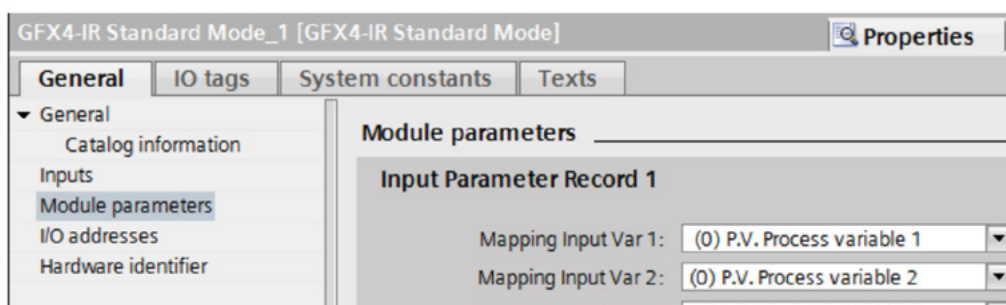


Figure 38

The same information may be accessed in a dialogue box, using the project tree shown in Figure 13.

Select “GFX4-IR Standard Mode_1”, click with the right mouse button and select the item “Properties” in the context-specific menu that appears.

The following default variables are available:

- 32 input variables in two blocks
 - V Input Parameter Record 1 (16 words)
 - V Input Parameter Record 2 (16 words)
- 32 output variables in two blocks
 - V Output Parameter Record 1 (16 words)
 - V Output Parameter Record 2 (16 words)

To modify them, simply click on the item in question and select the desired variable from among those proposed.

Input Parameter Record 1

Mapping Input Var 1:	(0) P.V. Process variable 1
Mapping Input Var 2:	(0) P.V. Process variable 1
Mapping Input Var 3:	(0) P.V. Process variable 2
Mapping Input Var 4:	(0) P.V. Process variable 3
Mapping Input Var 5:	(0) P.V. Process variable 4
Mapping Input Var 6:	(1) SPA Active setpoint 1
Mapping Input Var 7:	(1) SPA Active setpoint 2
Mapping Input Var 8:	(1) SPA Active setpoint 3
	(1) SPA Active setpoint 4
	(2) Ou.P Control output value 1
	(2) Ou.P Control output value 2
	(2) Ou.P Control output value 3
	(2) Ou.P Control output value 4

Figure 39

5.4. Default process data

The table below shows the default map

Input Parameter Record 1	
1	(0) P.V. Process variable 1
2	(0) P.V. Process variable 2
3	(0) P.V. Process variable 3
4	(0) P.V. Process variable 4
5	(2) Ou.P. Control output value 1
6	(2) Ou.P. Control output value 2
7	(2) Ou.P. Control output value 3
8	(2) Ou.P. Control output value 4
9	(467) STATUS 1 bit0 = (AL1 or AL2 or AL3 or AL4 or ALHB.TA1 or ALHB.TA2 or ALHB.TA3 or POWER_FAULT), bit1 = input Lo, bit2 = input Hi, bit3 = input Err, bit4 = input Sbr, bit5 = heat, bit6 = cool, bit7 = LBA, bit8 = AL1, bit9 = AL2, bit10 = AL3, bit11 = AL4, bit12 = ALHB or POWER_FAULT, bit13 = ON/OFF, bit14 = AUTO/MAN, bit15 = LOC/REM 1
10	(467) STATUS 2 bit0 = (AL1 or AL2 or AL3 or AL4 or ALHB.TA1 or ALHB.TA2 or ALHB.TA3 or POWER_FAULT), bit1 = input Lo, bit2 = input Hi, bit3 = input Err, bit4 = input Sbr, bit5 = heat, bit6 = cool, bit7 = LBA, bit8 = AL1, bit9 = AL2, bit10 = AL3, bit11 = AL4, bit12 = ALHB or POWER_FAULT, bit13 = ON/OFF, bit14 = AUTO/MAN, bit15 = LOC/REM 1
11	(467) STATUS 3 bit0 = (AL1 or AL2 or AL3 or AL4 or ALHB.TA1 or ALHB.TA2 or ALHB.TA3 or POWER_FAULT), bit1 = input Lo, bit2 = input Hi, bit3 = input Err, bit4 = input Sbr, bit5 = heat, bit6 = cool, bit7 = LBA, bit8 = AL1, bit9 = AL2, bit10 = AL3, bit11 = AL4, bit12 = ALHB or POWER_FAULT, bit13 = ON/OFF, bit14 = AUTO/MAN, bit15 = LOC/REM 1
12	(467) STATUS 4 bit0 = (AL1 or AL2 or AL3 or AL4 or ALHB.TA1 or ALHB.TA2 or ALHB.TA3 or POWER_FAULT), bit1 = input Lo, bit2 = input Hi, bit3 = input Err, bit4 = input Sbr, bit5 = heat, bit6 = cool, bit7 = LBA, bit8 = AL1, bit9 = AL2, bit10 = AL3, bit11 = AL4, bit12 = ALHB or POWER_FAULT, bit13 = ON/OFF, bit14 = AUTO/MAN, bit15 = LOC/REM 1
13	(468) I.1on 1 VALAUX_ON
14	(468) I.1on 2 VALAUX_ON
15	(468) I.1on 3 VALAUX_ON
16	(468) I.1on 4 VALAUX_ON
Input Parameter Record 2	
17	(498) I.2on VAL_TA2_ON
18	(499) I.3on VAL_TA2_ON
19	(1) SPA Active setpoint 1
20	(1) SPA Active setpoint 2
21	(1) SPA Active setpoint 3
22	(1) SPA Active setpoint 4
23	(232) I.tV1 TV 1 input value 1
24	(232) I.tV1 TV 1 input value 2
25	(232) I.tV1 TV 1 input value 3
26	(232) I.tV1 TV 1 input value 4
27	(322) I.VF1 VALAUXTV_F 1
28	(322) I.VF1 VALAUXTV_F 2

Input Parameter Record 1	
29	(322) I.VF1 VALAUXTV_F 3
30	(322) I.VF1 VALAUXTV_F 4
31	(317) - Digital input status INPUT_DIG
32	(140) diG. Digital input function
Output Parameter Record 1	
1	(16) _SP Local setpoint 1
2	(16) _SP Local setpoint 2
3	(16) _SP Local setpoint 3
4	(16) _SP Local setpoint 4
5	(252) - MAN_POWER: Control output value in manual mode 1
6	(252) - MAN_POWER: Control output value in manual mode 2
7	(252) - MAN_POWER: Control output value in manual mode 3
8	(252) - MAN_POWER: Control output value in manual mode 4
9	(305) STATUSW 1 bit1= SP1/SP2, bit2= start/stop selftuning, bit3 = ON/OFF, bit4 = AUTO/MAN, bit5= start/stop autotuning, bit6 = LOC/REM
10	(305) STATUSW 2 bit1= SP1/SP2, bit2= start/stop selftuning, bit3 = ON/OFF, bit4 = AUTO/MAN, bit5= start/stop autotuning, bit6 = LOC/REM
11	(305) STATUSW 3 bit1= SP1/SP2, bit2= start/stop selftuning, bit3 = ON/OFF, bit4 = AUTO/MAN, bit5= start/stop autotuning, bit6 = LOC/REM
12	(305) STATUSW 4 bit1= SP1/SP2, bit2= start/stop selftuning, bit3 = ON/OFF, bit4 = AUTO/MAN, bit5= start/stop autotuning, bit6 = LOC/REM
13	(12) AL.1 Alarm point 1 (if relative) [if relative and symmetrical]
14	(12) AL.1 Alarm point 2 (if relative) [if relative and symmetrical]
15	(12) AL.1 Alarm point 3 (if relative) [if relative and symmetrical]
16	(12) AL.1 Alarm point 4 (if relative) [if relative and symmetrical]
Output Parameter Record 2	
17	(13) AL.2 Alarm point 1 (if relative) [if relative and symmetrical]
18	(13) AL.2 Alarm point 2 (if relative) [if relative and symmetrical]
19	(13) AL.2 Alarm point 3 (if relative) [if relative and symmetrical]
20	(13) AL.2 Alarm point 4 (if relative) [if relative and symmetrical]
21	(14) AL.3 Alarm point 1 (if relative) [if relative and symmetrical]
22	(14) AL.3 Alarm point 2 (if relative) [if relative and symmetrical]
23	(14) AL.3 Alarm point 3 (if relative) [if relative and symmetrical]
24	(14) AL.3 Alarm point 4 (if relative) [if relative and symmetrical]
25	(230) SP.1 Setpoint1 1
26	(230) SP.1 Setpoint1 2
27	(230) SP.1 Setpoint1 3
28	(230) SP.1 Setpoint1 4
29	(231) SP.2 Setpoint2 1
30	(231) SP.2 Setpoint2 2
31	(231) SP.2 Setpoint2 3
32	(231) SP.2 Setpoint2 4

5.5. Configuration for Connection Diagram 2 (8 zones):

In the project tree, double click on the “gfx4-ir” item to go to the “Device overview”.

In the catalogue, select the item “Module/Input Output Modules/GFX4-IR” and drag it into the first free slot (slot 2).

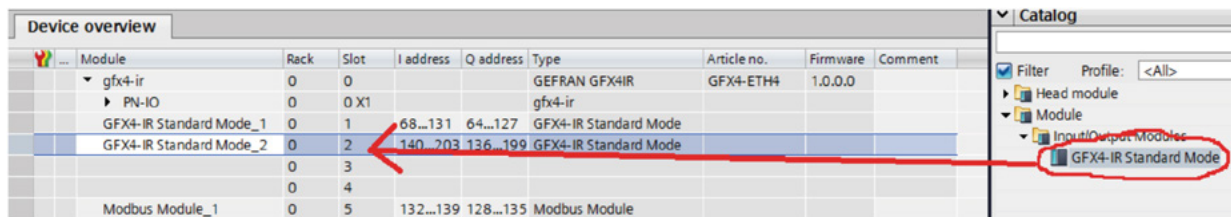


Figure 40

In the properties window in each module (accessible by clicking on the new item entered), you may set the parameters for input and output data as seen above.

5.6. Configuration for Connection Diagram 3 (12 zones):

In the project tree, double click on the “gfx4-ir” item to go to the “Device overview”.

In the catalogue, select the item “Module/Input Output Modules/GFX4-IR” and drag it into the first free slot (slot 3).

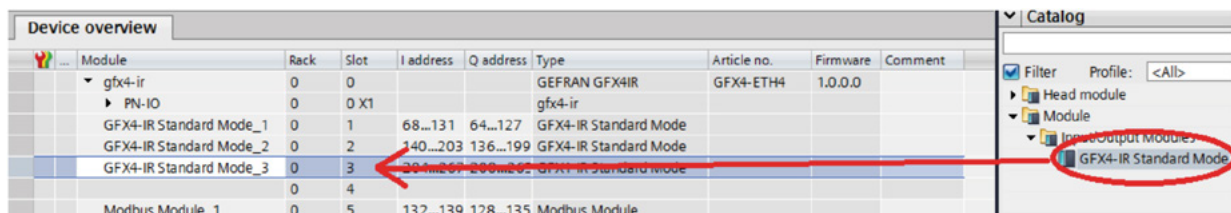


Figure 41

In the properties window in each module (accessible by clicking on the new item entered), you may set the parameters for input and output data as seen above.

5.7. Configuration for Connection Diagram 4 (16 zones):

In the project tree, double click on the “gfx4-ir” item to go to the “Device overview”.

In the catalogue, select the item “Module/Input Output Modules/GFX4-IR” and drag it into the first free slot (slot 4).

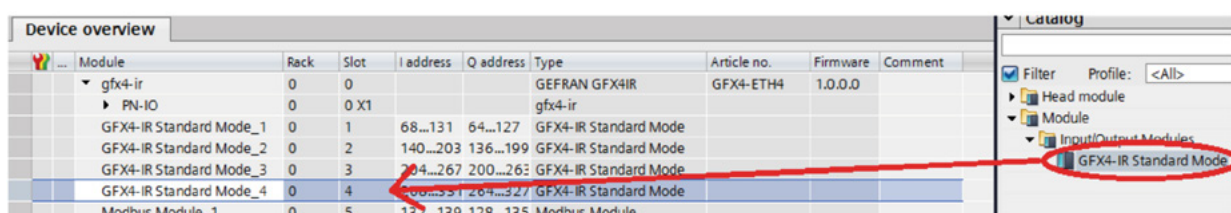
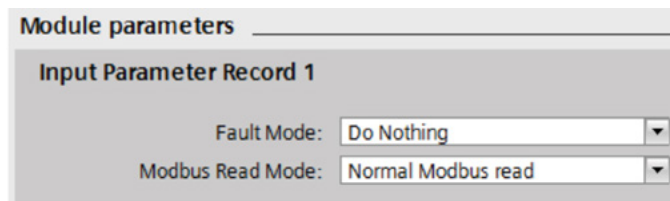


Figure 42

In the properties window in each module (accessible by clicking on the new item entered), you may set the parameters for input and output data as seen above.

5.8. Modbus Virtual slot 5:

Slot 5 (Figure 43) is a virtual device encapsulating a modbus control in cyclic ProfiNET data.



Module parameters	
Input Parameter Record 1	
Fault Mode:	Do Nothing
Modbus Read Mode:	Normal Modbus read

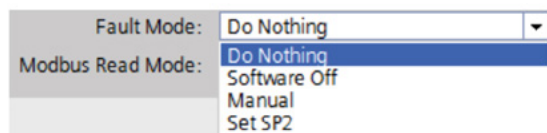
Figure 43

A number of communications-related aspects may be configured in the module parameters.

Fault Mode

If Profinet communication fails, you may set the modules as follows (Figure 44)

- Take no action
- Control the device in Software Off mode
- Control the device in manual mode
- Set SP2 as Setpoint



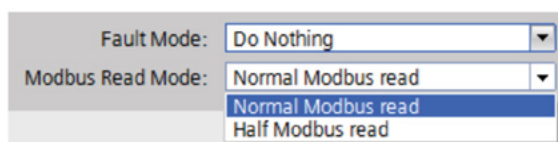
Fault Mode:	Do Nothing
Modbus Read Mode:	Do Nothing Software Off Manual Set SP2

Figure 44

Modbus Read Mode

Indicates the read mode for Modbus parameters (Figure 45)

- Normal read mode; all 32 input words are updated in read (Input parameter record 1 and Input parameter record 2)
- Half read mode; if the read variables needed by the application are equal to a maximum of 16 words, only the Input parameter record 1 variables are updated



Fault Mode:	Do Nothing
Modbus Read Mode:	Normal Modbus read Half Modbus read

Figure 45

Modbus slot 5 has a size of 8 bytes in write mode and 8 bytes in read mode. This channel may be used to read or write any of the variables published in the modbus map of GFX4-IR modules connected to the network.

To see the composition of the bytes in the message, refer to the corresponding section (virtual modbus slot 5) in the paragraph on STEP 7.

6 • DIAGNOSTICS USING STEP 7

6.1. Incorrect setting of dip-switch 7

Come detto in precedenza il dispositivo GFX4-IR DEVE lavorare in modalità Geflex standard , con il dip-switch 7 in posizione OFF all'accensione.

Se il dispositivo viene fatto partire con il dip-switch 7 in posizione ON la comunicazione non può avvenire. Un messaggio di errore (Figure 46) is sent to the Profinet-Controller station

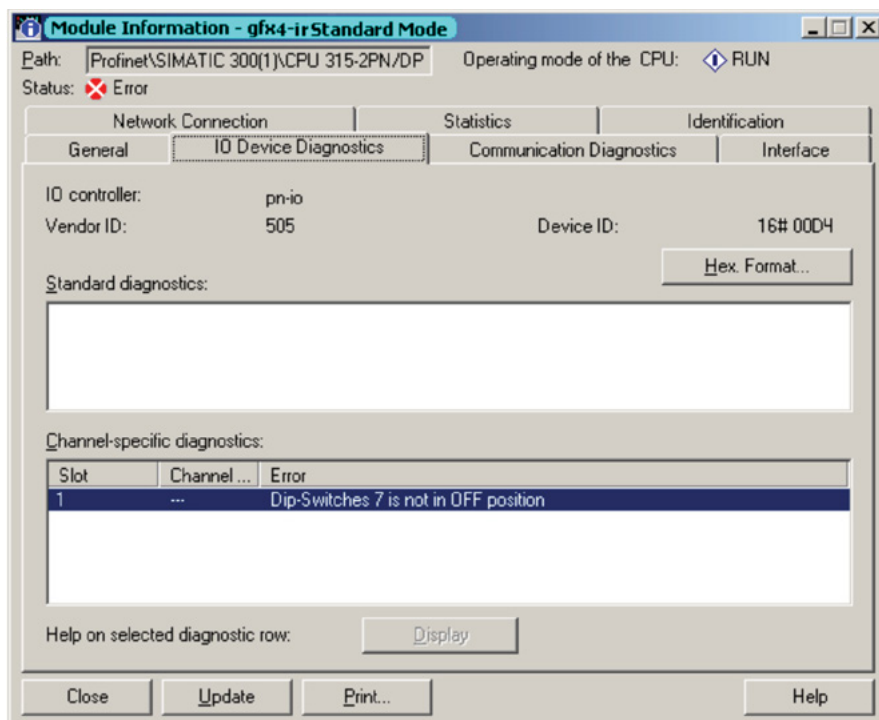


Figure 46

The slot specified in the diagnostics message corresponds to the node of the device with dip switch 7 incorrectly set.

6.2. Communication fault on Modbus serial

This occurs when communication fails between the Modbus master of the Profinet-IO card and the Modbus slave running in GFX4-IR, as shown in Figure 47

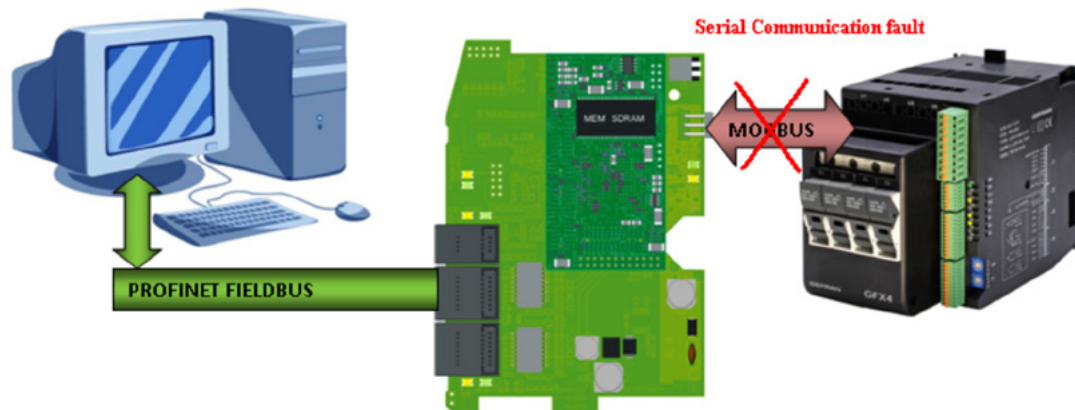


Figure 47

When this occurs, the Profinet-IO device sends the Profinet-Controller the Communication error message Figure 48

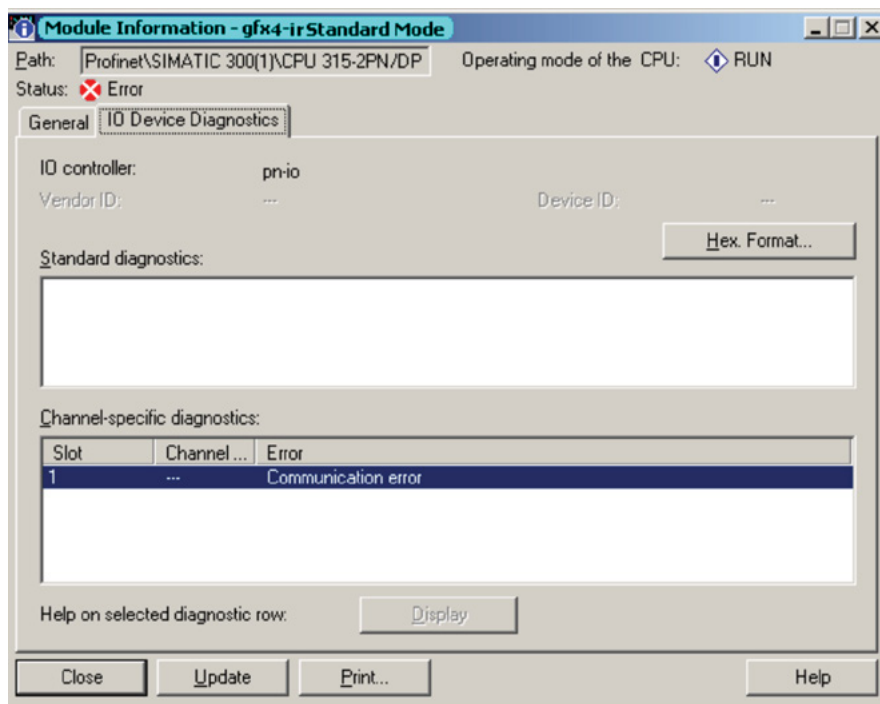


Figure 48

The slot specified in the error message corresponds to the node of the device in which the error occurred.

7 · DIAGNOSTICS USING THE TIA PORTAL

7.1. Communication fault on modbus serial

This condition applies when communication between the master modbus on the Profinet-io card and the slave modbus in execution in gfx 4-ir is no longer active.

The error may be simulated by disconnecting the rj10 connection between the devices.

For example, by disconnecting the cable connecting GFX4-IR number 2 with GFX4-IR number 3. Error signals will appear in the project tree for the plc and the modules with which communication has been lost (in the case at hand, modules 3 and 4) (Figure 49 and Figure 50).

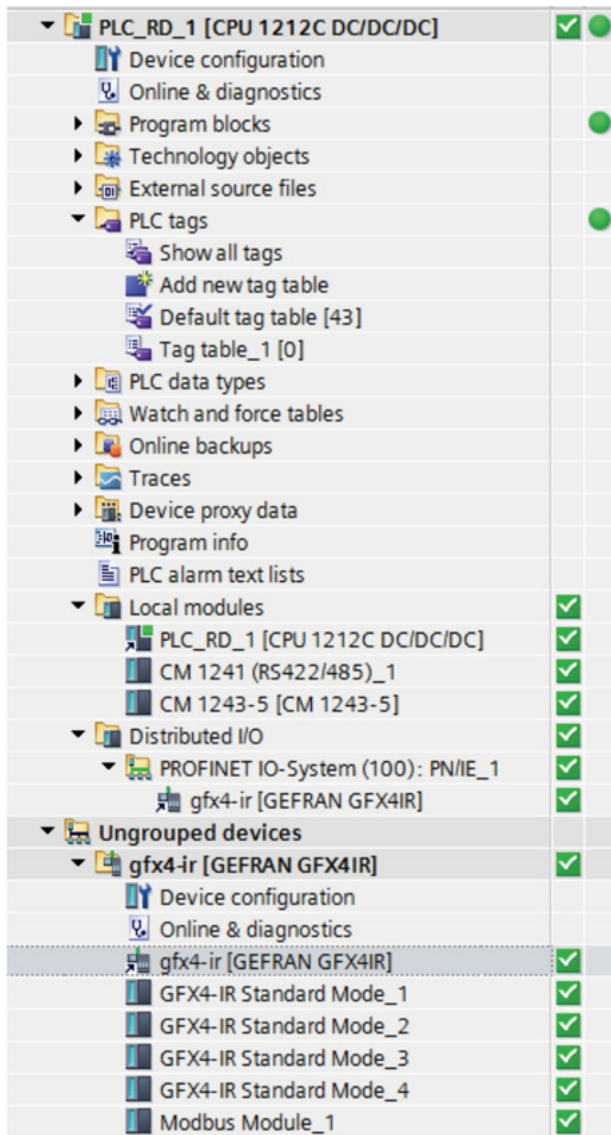


Figure 49

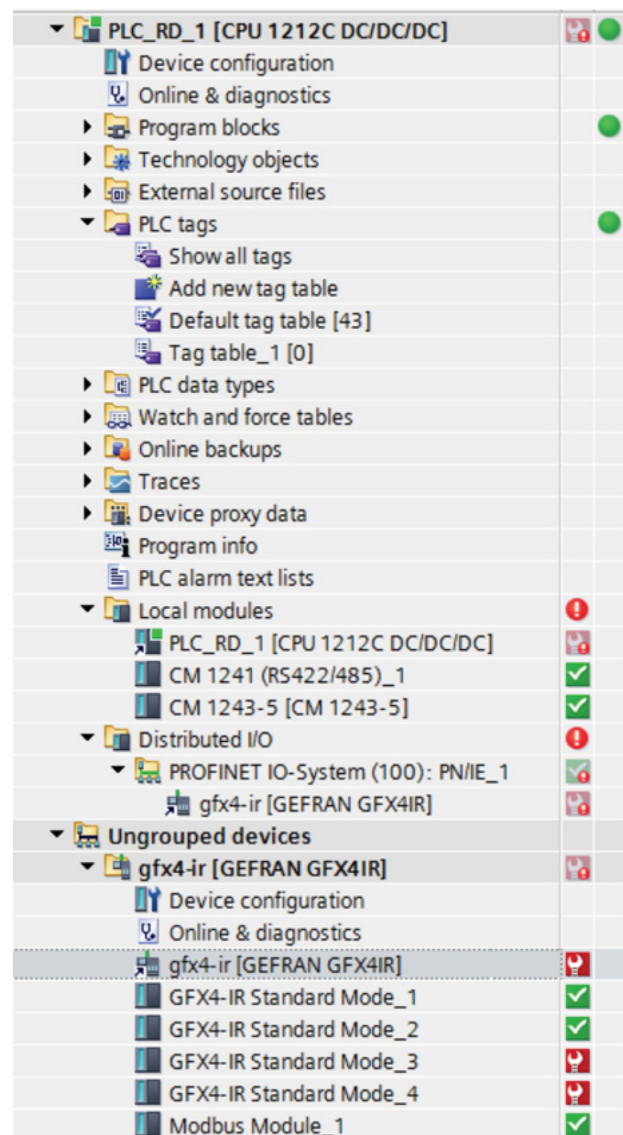


Figure 50

At the same time, the errors detected will be shown in the “Device Information” window (Figure 51).

Device information					
Connection information					
Alarm display					
2 Devices with problems					
Online status	Opera..	Device/module	Connection establis..	Message	Details
Error, Error in lower-level component		gfx4-ir	PLC_RD_1	Error, Error in lower-level ..	For more detailed information, refer to device diagnostics.
Error, Error in lower-level component	RUN	PLC_RD_1	Direct	Error, Error in lower-level ..	For more detailed information, refer to device diagnostics.

Figure 51

To access a possible detailed description of the error, select the item “Online & diagnostics” on the context-specific menu for the module for which the error is shown in the project tree (Figure 50 item GFX4-IR Standard Mode_3). Select the “Diagnostic status” item in which the description of the error appears.

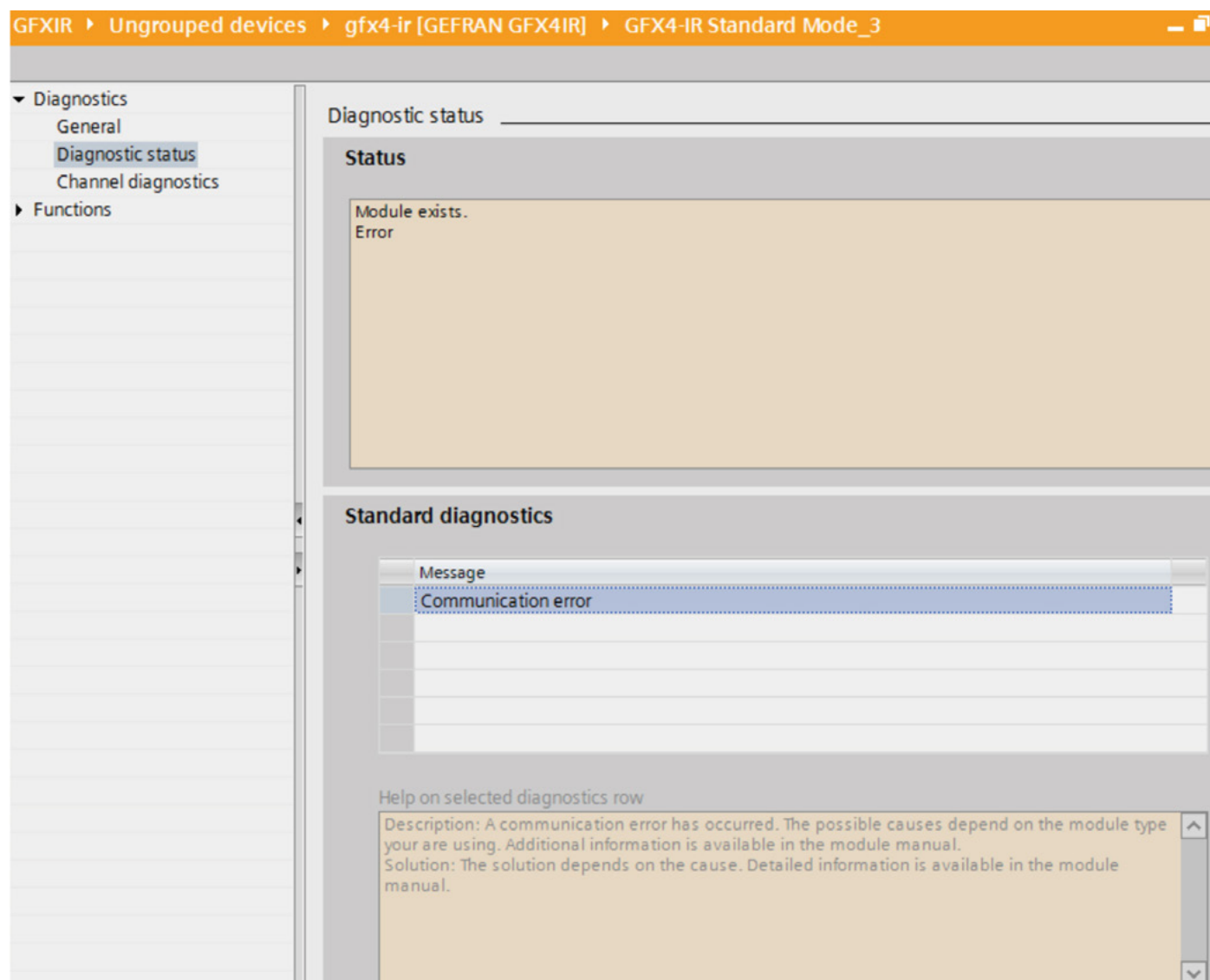


Figure 52

8 • MODBUS RTU CONNECTION DIAGRAM

Ethernet/Profinet connectors are shown in green; serial connectors in blue.

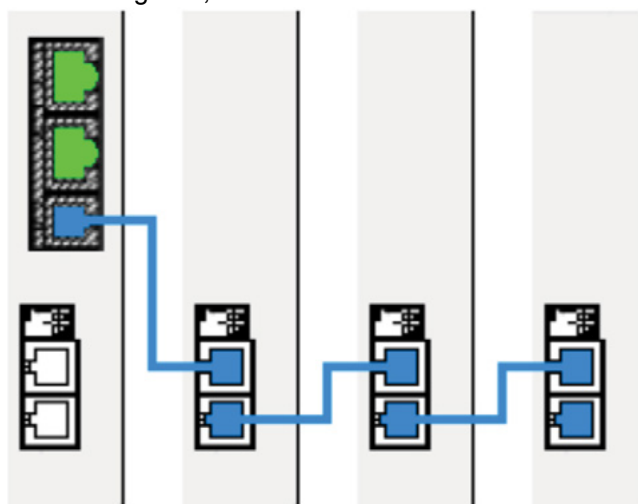


Figure 53

GEFRAN S.p.A. supplies a series of library files to facilitate installation of the GFX4-IR and management of process data in SIEMENS STEP7 environment.

These libraries are contained in a compressed file “GefranProfinet_V2-00.zip” on the CD enclosed with the product or downloadable from www.gefran.com.

After launching SIMATIC Manager, select the Unarchive command on the File drop-down menu and open the “GefranProfinet_V2-00.zip” file from the folder in which it was copied..

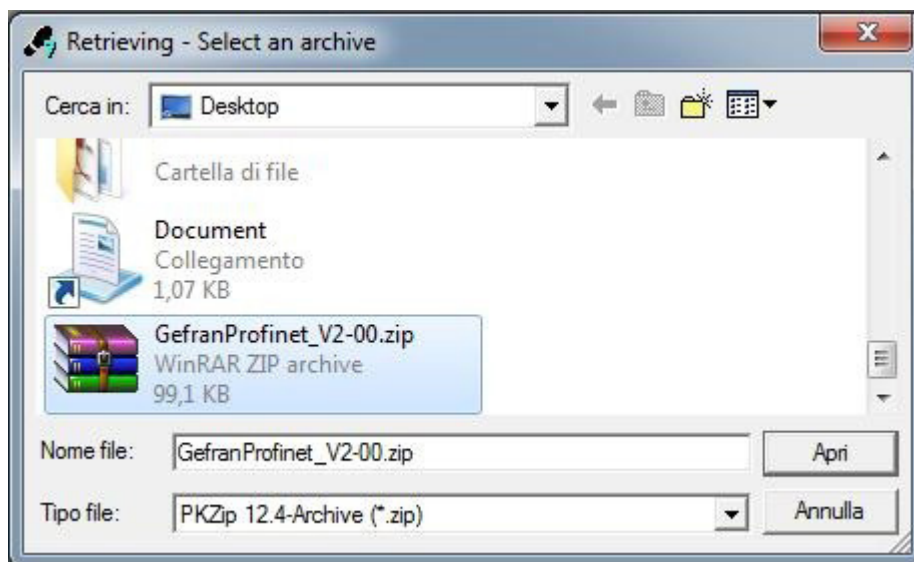


Figure 54

Then select the destination folder in ..STEP7/S7Proj.

When extraction is complete, select the Open Project command on the File drop-down menu and open the Libraries folder to display the GefranProfinet_V2-00 library for the GFX4-IR.

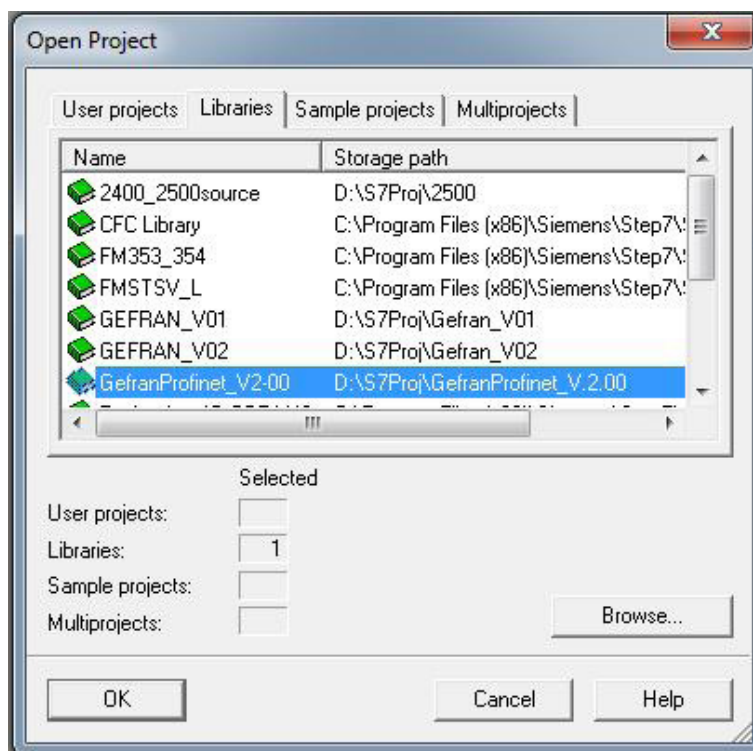


Figure 55

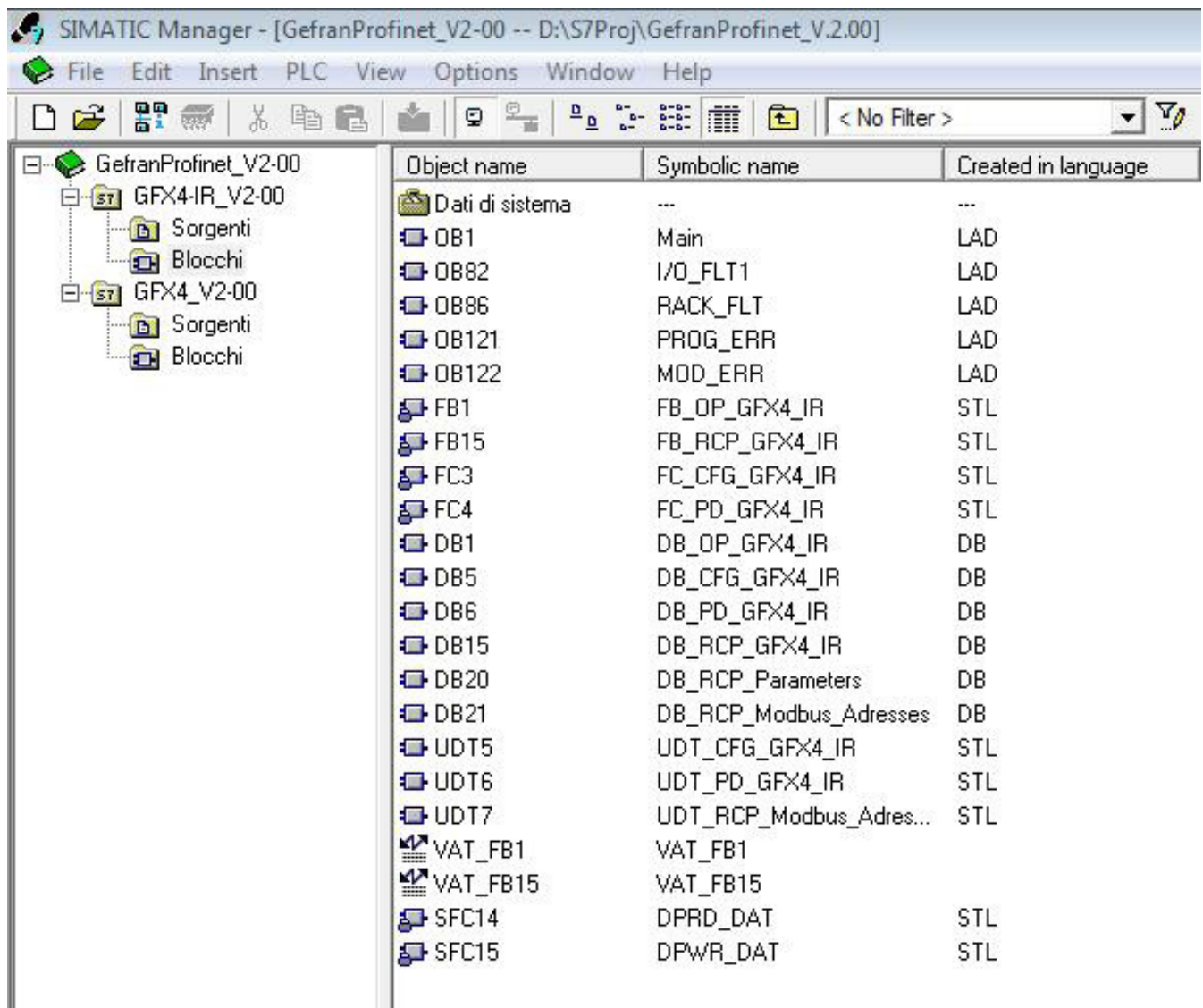


Figure 56

This provides Function Blocks, Data Blocks, and Functions:
GFX4_IR in HIGH PERFORMANCE mode

OBJECT	DESCRIPTION
UDT6	DATA TYPE FOR PROCESS DATA MANAGEMENT
FC4	FUNCTION FOR MANAGEMENT OF PROCESS DATA AREA
UDT5	ACYCLIC DATA EXCHANGE BLOCK
FC3	MANAGEMENT FUNCTION DATA PARAMETRIC
FB1	FUNCTION BLOCK FOR MANAGEMENT OF PARAMETERS
FB15	FUNCTION BLOCK FOR MANAGEMENT OF PARAMETER RECIPES

9.2. Functions

9.9.1. UDT6

Data type for GFX4-IR process data management

Data block in read from word 0 address to word 62 address

Data block in write from word 64 address to word 126 address

Address	Name	Type	Initial value	Comment
0.0		STRUCT		
+ 0.0	GFX4_IR_Read_W01	INT	0	GFX4_IR Read Process Word 01
+ 2.0	GFX4_IR_Read_W02	INT	0	GFX4_IR Read Process Word 02
+ 4.0	GFX4_IR_Read_W03	INT	0	GFX4_IR Read Process Word 03
+ 6.0	GFX4_IR_Read_W04	INT	0	GFX4_IR Read Process Word 04
+ 8.0	GFX4_IR_Read_W05	INT	0	GFX4_IR Read Process Word 05
+ 10.0	GFX4_IR_Read_W06	INT	0	GFX4_IR Read Process Word 06
+ 12.0	GFX4_IR_Read_W07	INT	0	GFX4_IR Read Process Word 07
+ 14.0	GFX4_IR_Read_W08	INT	0	GFX4_IR Read Process Word 08
+ 16.0	GFX4_IR_Read_W09	INT	0	GFX4_IR Read Process Word 09
+ 18.0	GFX4_IR_Read_W10	INT	0	GFX4_IR Read Process Word 10
+ 20.0	GFX4_IR_Read_W11	INT	0	GFX4_IR Read Process Word 11
+ 22.0	GFX4_IR_Read_W12	INT	0	GFX4_IR Read Process Word 12
+ 24.0	GFX4_IR_Read_W13	INT	0	GFX4_IR Read Process Word 13
+ 26.0	GFX4_IR_Read_W14	INT	0	GFX4_IR Read Process Word 14
+ 28.0	GFX4_IR_Read_W15	INT	0	GFX4_IR Read Process Word 15
+ 30.0	GFX4_IR_Read_W16	INT	0	GFX4_IR Read Process Word 16
+ 32.0	GFX4_IR_Read_W17	INT	0	GFX4_IR Read Process Word 17
+ 34.0	GFX4_IR_Read_W18	INT	0	GFX4_IR Read Process Word 18
+ 36.0	GFX4_IR_Read_W19	INT	0	GFX4_IR Read Process Word 19
+ 38.0	GFX4_IR_Read_W20	INT	0	GFX4_IR Read Process Word 20
+ 40.0	GFX4_IR_Read_W21	INT	0	GFX4_IR Read Process Word 21
+ 42.0	GFX4_IR_Read_W22	INT	0	GFX4_IR Read Process Word 22
+ 44.0	GFX4_IR_Read_W23	INT	0	GFX4_IR Read Process Word 23
+ 46.0	GFX4_IR_Read_W24	INT	0	GFX4_IR Read Process Word 24
+ 48.0	GFX4_IR_Read_W25	INT	0	GFX4_IR Read Process Word 25
+ 50.0	GFX4_IR_Read_W26	INT	0	GFX4_IR Read Process Word 26
+ 52.0	GFX4_IR_Read_W27	INT	0	GFX4_IR Read Process Word 27
+ 54.0	GFX4_IR_Read_W28	INT	0	GFX4_IR Read Process Word 28
+ 56.0	GFX4_IR_Read_W29	INT	0	GFX4_IR Read Process Word 29
+ 58.0	GFX4_IR_Read_W30	INT	0	GFX4_IR Read Process Word 30
+ 60.0	GFX4_IR_Read_W31	INT	0	GFX4_IR Read Process Word 31
+ 62.0	GFX4_IR_Read_W32	INT	0	GFX4_IR Read Process Word 32
+ 64.0	GFX4_IR_Write_W01	INT	0	GFX4_IR Write Process Word 01
+ 66.0	GFX4_IR_Write_W02	INT	0	GFX4_IR Write Process Word 02
+ 68.0	GFX4_IR_Write_W03	INT	0	GFX4_IR Write Process Word 03
+ 70.0	GFX4_IR_Write_W04	INT	0	GFX4_IR Write Process Word 04

Address	Name	Type	Initial value	Comment
+ 72.0	GFX4_IR_Write_W05	INT	0	GFX4_IR Write Process Word 05
+ 74.0	GFX4_IR_Write_W06	INT	0	GFX4_IR Write Process Word 06
+ 76.0	GFX4_IR_Write_W07	INT	0	GFX4_IR Write Process Word 07
+ 78.0	GFX4_IR_Write_W08	INT	0	GFX4_IR Write Process Word 08
+ 80.0	GFX4_IR_Write_W09	INT	0	GFX4_IR Write Process Word 09
+ 82.0	GFX4_IR_Write_W10	INT	0	GFX4_IR Write Process Word 10
+ 84.0	GFX4_IR_Read_W11	INT	0	GFX4_IR Write Process Word 11
+ 86.0	GFX4_IR_Read_W12	INT	0	GFX4_IR Write Process Word 12
+ 88.0	GFX4_IR_Read_W13	INT	0	GFX4_IR Write Process Word 13
+ 90.0	GFX4_IR_Read_W14	INT	0	GFX4_IR Write Process Word 14
+ 92.0	GFX4_IR_Read_W15	INT	0	GFX4_IR Write Process Word 15
+ 94.0	GFX4_IR_Write_W16	INT	0	GFX4_IR Write Process Word 16
+ 96.0	GFX4_IR_Write_W17	INT	0	GFX4_IR Write Process Word 17
+ 98.0	GFX4_IR_Write_W18	INT	0	GFX4_IR Write Process Word 18
+ 100.0	GFX4_IR_Write_W19	INT	0	GFX4_IR Write Process Word 19
+ 102.0	GFX4_IR_Write_W20	INT	0	GFX4_IR Write Process Word 20
+ 104.0	GFX4_IR_Write_W21	INT	0	GFX4_IR Write Process Word 21
+ 106.0	GFX4_IR_Write_W22	INT	0	GFX4_IR Write Process Word 22
+ 108.0	GFX4_IR_Write_W23	INT	0	GFX4_IR Write Process Word 23
+ 110.0	GFX4_IR_Write_W24	INT	0	GFX4_IR Write Process Word 24
+ 112.0	GFX4_IR_Write_W25	INT	0	GFX4_IR Write Process Word 25
+ 114.0	GFX4_IR_Write_W26	INT	0	GFX4_IR Write Process Word 26
+ 116.0	GFX4_IR_Write_W27	INT	0	GFX4_IR Write Process Word 27
+ 118.0	GFX4_IR_Write_W28	INT	0	GFX4_IR Write Process Word 28
+ 120.0	GFX4_IR_Write_W29	INT	0	GFX4_IR Write Process Word 29
+ 122.0	GFX4_IR_Write_W30	INT	0	GFX4_IR Write Process Word 30
+ 124.0	GFX4_IR_Write_W31	INT	0	GFX4_IR Write Process Word 31
+ 126.0	GFX4_IR_Write_W32	INT	0	GFX4_IR Write Process Word 32
= 128.0		END_STRUCT		

9.9.2. FC4 “FC_PD_GFX4_IR” (FUNCTION CALL) ”

Function for management of GFX4-IR process data area

This function provides the entire area of process data exchange between PLC and GFX4-IR in the data block created with the UDT6 described above.

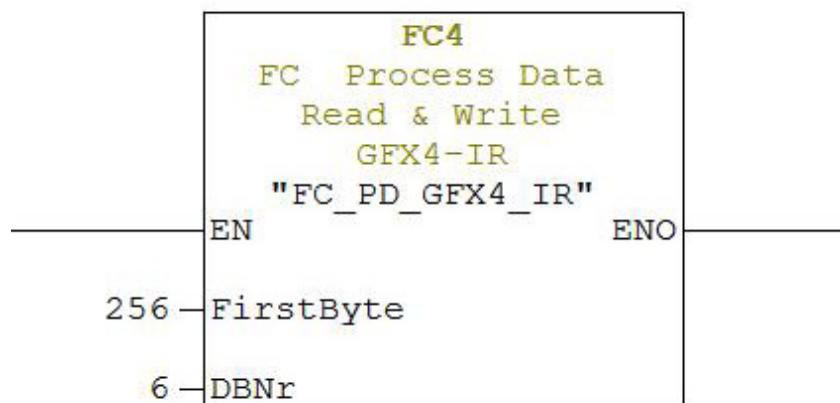


Figure 57

FC4 is called so that each scan updates the data.

Two input parameters are required:

1. FirstByte : (INT)) the first memory address assigned in the GFX4-IR Hardware configuration
2. DBNr : (INT) the number of the data block created with UDT6 for date exchange between GFX4-IR and PLC.

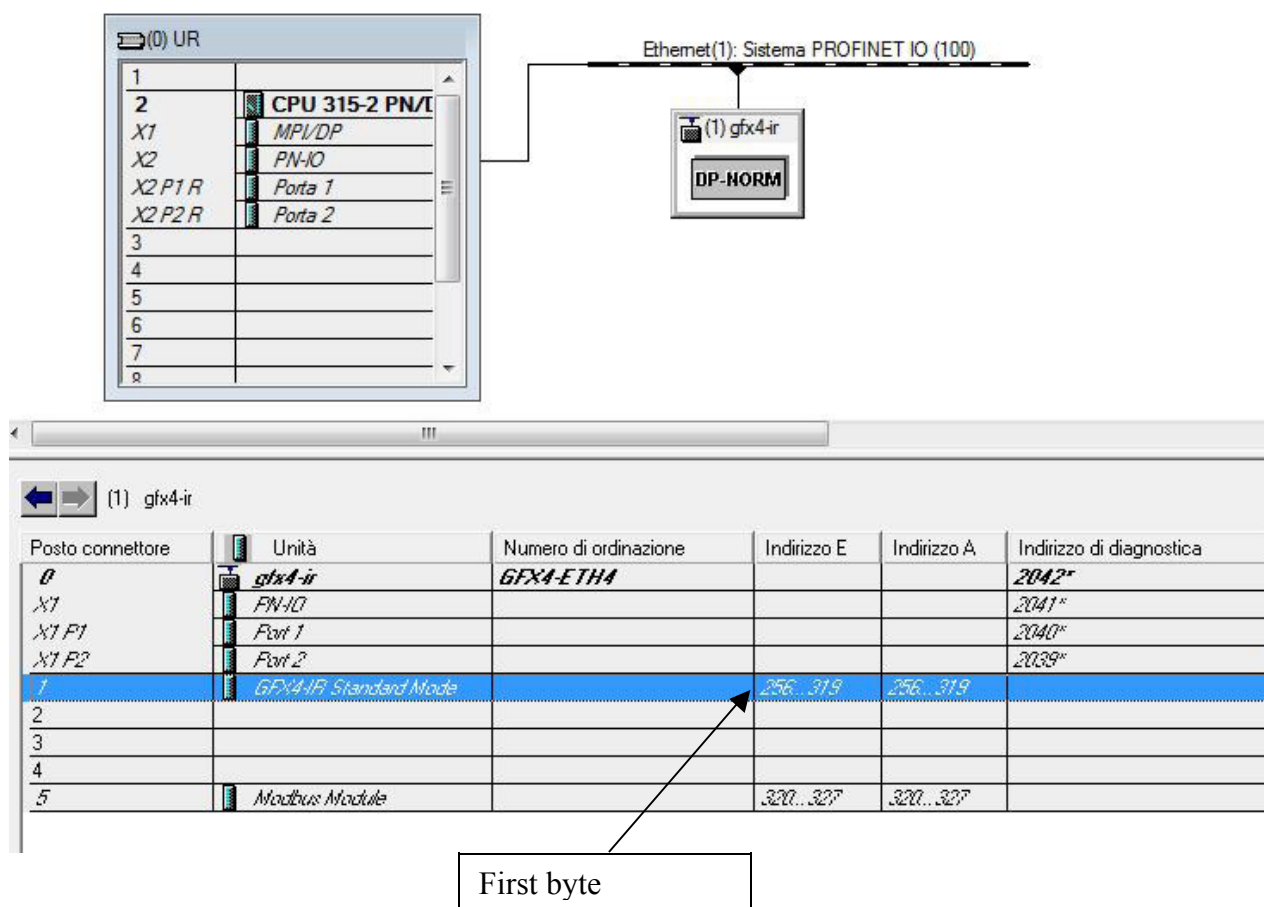


Figure 58

4 slaves are connected in the following figure

HW Config - [SIMATIC 300(1) (Configuration) -- GFX4_IR_Profinet]

Station Edit Insert PLC View Options Window Help

(0) UR

1	
2	CPU 315-2 PN/DP
X1	MPV/DP
X2	PN-IO
X2 P1 R	Porta 1
X2 P2 R	Porta 2
3	
4	
5	
6	
7	
8	

Ethernet(1): Sistema PROFINET IO (10)

(1) gfx4-ir

DP-NORM

Search: []

Profile: Standard

- PROFIBUS DP
- PROFIBUS-PA
- PROFINET IO
 - Additional Field Devices
 - Controllers
 - GEFLEX
 - GEFRAN GFX4-GFXTERM04
 - GEFRAN GFX4IR
 - Input/Output Modules
 - GFX4-IR Standard Mode
 - Drives
 - Gateway
 - HMI
 - I/O
 - Network Components
 - Sensors
 - Switching devices
- SIMATIC 300
- SIMATIC 400
- SIMATIC HMI Station
- SIMATIC PC Based Control 300/400
- SIMATIC PC Station

Gefran Spa
GFX4-IR Standard Mode
GSDML-V2.2-GEFRAN-GFX4IR-20120102.xml

(1) gfx4-ir

Slot	Module	Order number	I address	Q address	Diagnostic addre...	Com...
0	gfx4-ir	GFX4-ETH4			2042*	
X1	PN-IO				2041*	
X1	Port 1				2040*	
X1	Port 2				2039*	
1	GFX4-IR Standard Mode		256...319	256...319		
2	GFX4-IR Standard Mode		328...391	328...391		
3	GFX4-IR Standard Mode		392...455	392...455		
4	GFX4-IR Standard Mode		456...519	456...519		
5	Modbus Module		320...327	320...327		

Figure 59

9.9.3. UDT5

Acyclic data exchange block

Address	Name	Type	Initial value	Comment
0.0		STRUCT		
+ 0.0	Trigger	BYTE	B#16#0	Reserved
+ 1.0	Cont	BYTE	B#16#0	Reserved
+ 2.0	ParamWord1	WORD	W#16#0	Request Byte 1 e 2
+ 4.0	ParamByte3	BYTE	B#16#0	Request Byte 3
+ 5.0	ParamByte4	BYTE	B#16#0	Request Byte 4
+ 6.0	ParamByte5	BYTE	B#16#0	Request Byte 5
+ 7.0	ParamByte6	BYTE	B#16#0	Request Byte 6
+ 8.0	ParamByte7	BYTE	B#16#0	Request Byte 7
+ 9.0	ParamByte8	BYTE	B#16#0	Request Byte 8
+ 10.0	StatusWord1	WORD	W#16#0	Answer Byte 1 e 2
+ 12.0	StatusByte3	BYTE	B#16#0	Answer Byte 3
+ 13.0	StatusByte4	BYTE	B#16#0	Answer Byte 4
+ 14.0	StatusByte5	BYTE	B#16#0	Answer Byte 5
+ 15.0	StatusByte6	BYTE	B#16#0	Answer Byte 6
+ 16.0	StatusByte7	BYTE	B#16#0	Answer Byte 7
+ 17.0	StatusByte8	BYTE	B#16#0	Answer Byte 8
+ 18.0	ParamWriteDiag	INT	0	Status Word write param operation
+ 20.0	StatusReadDiag	INT	0	Status Word read param operation
= 22.0		END_STRUCT		

9.9.4. FC3 "FC_CFG_GFX4-IR" (FUNCTION CALL) "

Function for management of the parametric data GFX4-IR

This Function provides the Parametric Data of the instrument needed for functioning of FB1 in the data block created with the UDT5s described in the previous paragraph.

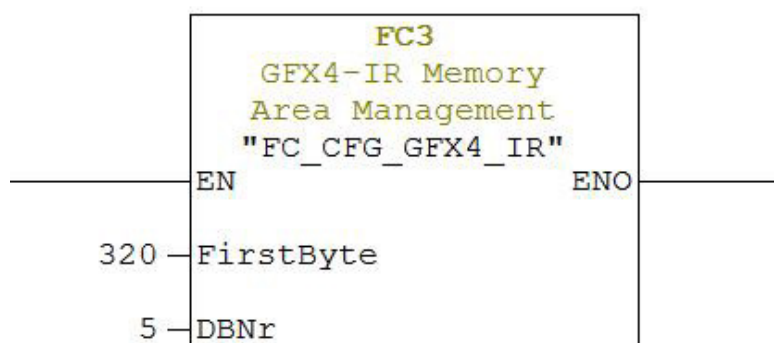


Figure 60

The FC is called in OB1, without conditions, so that each scan updates the data.

Two input parameters are required:

1. FirstByte : (INT) the first memory address assigned in the GFX4-IR Hardware configuration.
2. DBNr : (INT) the number of the data block created with UDT5 for date exchange between GFX4-IR and PLC

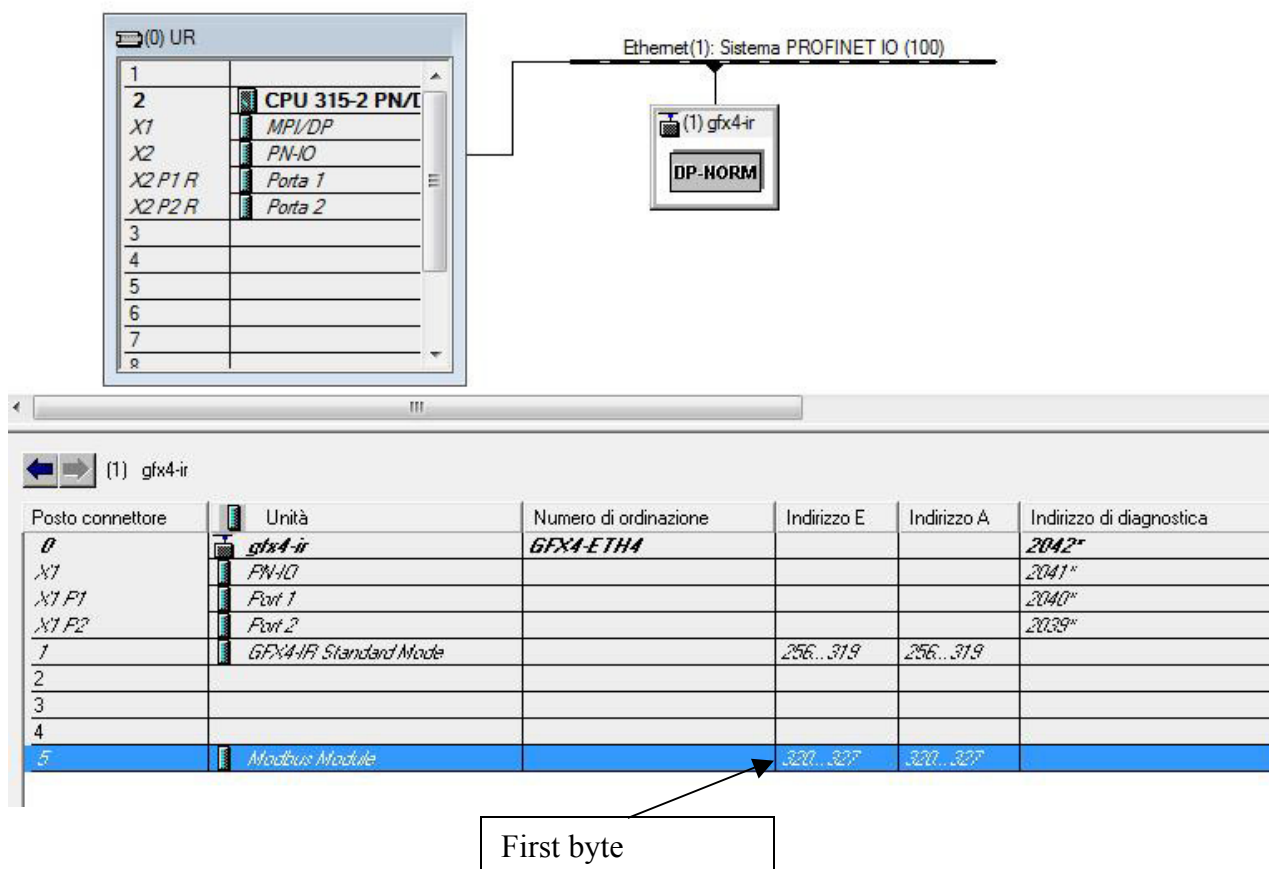


Figure 61

All Function Blocks require a freely assignable instance DB. They must be called only on request and kept active until completion of the operation.

Typically, you set a Bit that enables the branch (EN) and is reset with the rising edge of the Done bit.

9.9.1. FB1 “FB_OP_GFX4_IR” (FUNCTION BLOCK)

Manages basic Parametric Data operations for the GFX4-IR configuration.

There are 4 operations:

1. Read bit (op. code 1)
2. Read word (op. code 3)
3. Write bit (op. code 5)
4. Write word (op. code 6)

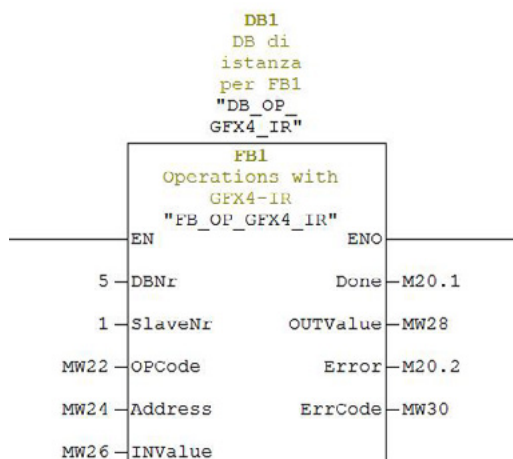


Figure 62

The block requires 5 input parameters and responds with 4 output parameters.

Input parameters:

1. DBNr (INT): the data block number assigned to the GFX4-IR to be interrogated or controlled.
2. SlaveNr (INT): the MODBUS address of the slave to be worked with.
3. OPCode (INT): the operation code that tells the function whether you want to read or write a word or a bit.
The operation codes are:
 - Read bit Operation Code: 1
 - Read word Operation Code: 3
 - Write bit Operation Code: 5
 - Write word Operation Code: 6
4. Address (INT): the address of the word or bit to be read or written.
(Refer to the GFX4-IR manual for the MODBUS addresses of words and bits.)
5. INValue (INT): the value to be written in the selected word or bit.
Of course, only values 1 and 0 are allowed when writing a bit.
This parameter is ignored in read operations

Output parameters:

- Done (BOOL): value is 1 when reading is done.
- OUTValue (INT): value read in the specified word or bit.

In write operations, 1 is written if the action ended correctly or 0 if it ended with an error.

- Error (BOOL): value is 1 when operation ended with an error.
- ErrCode (INT): error code displayed:
 - 1 Illegal function

- 2 Illegal data address
- 3 Illegal data value
- 6 Slave device busy
- 9 Illegal number data
- 10 Read only data
- 20 Timeout Communication
- 21 Input value error

9.9.2. FB15 “FB_RCP_GFX4_IR” (FUNCTION BLOCK)

Archives a set of parameters from a GFX4-IR in a DB or sends a set of parameters contained in a DB to a GFX4-IR.

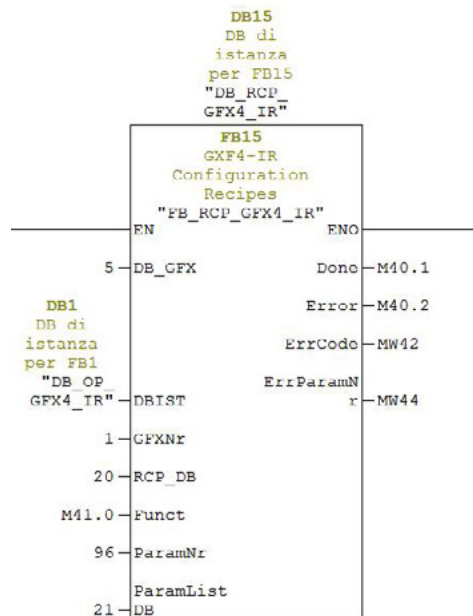


Figure 63

Input parameters:

- DB_GFX (INT): indicates the number (only the number in digits or an INT variable that contains its value) of the DB assigned to the GFX4-IR to be worked on.
- DBIST (BLOCK_DB): indicates the name (use the symbolic name of the DB or the indication “DBxx” in full) of the instance DB of FB1 “OP_GFX4-IR” assigned to the GFX4-IR.
- GFXNr (INT): the address of the GFX4-IR to be worked with.
- RCP_DB (INT): the number of the DB in which to write or from which to read the data set.
- Funct (BOOL): specifies the type of operation to be done:
False = Store (save GFX4-IR parameters in the DB)
True = Load (load parameters saved in DB in the GFX4-IR)
- ParamNr (INT): the number of parameters to be saved/read.
- ParamListDB (INT): the number of the DB in which each line specifies the modbus address of the parameters to be read/written

Output parameters:

- Done (BOOL): value is 1 when the operation is done.
- Error (BOOL): value is 1 when there was an error during write.
- ErrorCode (INT): the error code is displayed in case of error:
 - 1 Illegal function
 - 2 Illegal data address
 - 3 Illegal data value
 - 6 Slave device busy
 - 9 Illegal number data
 - 10 Read only data
 - 20 Timeout Communication
 - 21 Input value error
- ErrorParamNr (INT): in case of error, you see the ordinal number in the DB with a list of the addresses of the parameter that caused the error.

9.9.3. UDT7

List of Modbus addresses of parameters used in FB15

Address	Name	Type	Initial value	Comment
0.0		STRUCT		
+ 0.0	TYP_ZONE_1	INT	1424	TYPE OF PROBE, SIGNAL AND SCALE OF MAIN INPUT (ZONE 1)
+ 2.0	PS_TA_ZONE_1	INT	1730	MAXIMUM PREAK CURRENT LIMIT DURING PHASE SOFTSTART (ZONE 1)
+ 4.0	AL_ZONE_1	INT	1219	SELECT NUMBER OF ENABLED ALARMS (ZONE 1)
+ 6.0	HD_2_ZONE_1	INT	1684	ENABLE POWER FAULT ALARM (ZONE 1)
+ 8.0	HD_5_ZONE_1	INT	1727	ENABLE TRIGGER MODES (ZONE 1)
+ 10.0	CTR_ZONE_1	INT	1204	TYPE OF CONTROL (ZONE 1)
+ 12.0	PS_TM_ZONE_1	INT	1729	DURATION OF PHASE ANGLE SOFTSTART RAMP (ZONE 1)
+ 14.0	PS_OF_ZONE_1	INT	1653	MINIMUM NON CONDUCTION TIME TO REACTIVATE THE PHASE SOFTSTART RAMP (ZONE 1)
+ 16.0	HB_T_ZONE_1	INT	1080	DELAY TIME FOR ACTIVATION OF HB ALARM (ZONE 1)
+ 18.0	HB_P_ZONE_1	INT	1761	PERCENTAGE HB ALARM SETPOINT OF CURRENT READ IN HB CALIBRATION (ZONE 1)
+ 20.0	IR_00_ZONE_1	INT	1782	CT INPUT AT HB CALIBRATION PHASE 0 (FOR IR LAMPS) (ZONE 1)
+ 22.0	IR_01_ZONE_1	INT	1783	CT INPUT AT HB CALIBRATION PHASE 1 (FOR IR LAMPS) (ZONE 1)
+ 24.0	IR_02_ZONE_1	INT	1784	CT INPUT AT HB CALIBRATION PHASE 2 (FOR IR LAMPS) (ZONE 1)
+ 26.0	IR_03_ZONE_1	INT	1785	CT INPUT AT HB CALIBRATION PHASE 3 (FOR IR LAMPS) (ZONE 1)
+ 28.0	IR_04_ZONE_1	INT	1791	CT INPUT AT HB CALIBRATION PHASE 4 (FOR IR LAMPS IN PA MODE) (ZONE 1)
+ 30.0	IR_05_ZONE_1	INT	1792	CT INPUT AT HB CALIBRATION PHASE 5 (FOR IR LAMPS IN PA MODE) (ZONE 1)
+ 32.0	IR_06_ZONE_1	INT	1793	CT INPUT AT HB CALIBRATION PHASE 6 (FOR IR LAMPS IN PA MODE) (ZONE 1)
+ 34.0	P_ON_T_ZONE_1	INT	1723	SWITCHING ON MODE (ZONE 1)
+ 36.0	FU_TA_ZONE_1	INT	1731	MAXIMUM LIMIT OF RMS CURRENT IN NORMAL OPERATION (ZONE 1)
+ 38.0	H_PB_ZONE_1	INT	1029	PROPORTIONAL BAND FOR HEATING OR HYSTERESIS IN ON-OFF CONTROL (ZONE 1)
+ 40.0	H_IT_ZONE_1	INT	1031	INTEGRAL HEATING TIME (ZONE 1)
+ 42.0	H_DT_ZONE_1	INT	1032	DERIVATIVE HEATING TIME (ZONE 1)
+ 44.0	HI_S_ZONE_1	INT	1426	MAXIMUM LIMIT OF MAIN INPUT SCALE (ZONE 1)
+ 46.0	HI_L_ZONE_1	INT	1167	UPPER LIMIT OF SETPOINT (ZONE 1)
+ 48.0	TYP_ZONE_2	INT	2448	TYPE OF PROBE, SIGNAL AND SCALE OF MAIN INPUT (ZONE 2)
+ 50.0	PS_TA_ZONE_2	INT	2754	MAXIMUM PREAK CURRENT LIMIT DURING PHASE SOFTSTART (ZONE 2)
+ 52.0	AL_ZONE_2	INT	2243	SELECT NUMBER OF ENABLED ALARMS (ZONE 2)
+ 54.0	HD_2_ZONE_2	INT	2708	ENABLE POWER FAULT ALARM (ZONE 2)
+ 56.0	HD_5_ZONE_2	INT	2751	ENABLE TRIGGER MODES (ZONE 2)
+ 58.0	CTR_ZONE_2	INT	2228	TYPE OF CONTROL (ZONE 2)
+ 60.0	PS_TM_ZONE_2	INT	2753	DURATION OF PHASE ANGLE SOFTSTART RAMP (ZONE 2)
+ 62.0	PS_OF_ZONE_2	INT	2677	MINIMUM NON CONDUCTION TIME TO REACTIVATE THE PHASE SOFTSTART RAMP (ZONE 2)
+ 64.0	HB_T_ZONE_2	INT	2104	DELAY TIME FOR ACTIVATION OF HB ALARM (ZONE 2)
+ 66.0	HB_P_ZONE_2	INT	2785	PERCENTAGE HB ALARM SETPOINT OF CURRENT READ IN HB CALIBRATION (ZONE 2)
+ 68.0	IR_00_ZONE_2	INT	2806	CT INPUT AT HB CALIBRATION PHASE 0 (FOR IR LAMPS) (ZONE 2)
+ 70.0	IR_01_ZONE_2	INT	2807	CT INPUT AT HB CALIBRATION PHASE 1 (FOR IR LAMPS) (ZONE 2)

Address	Name	Type	Initial value	Comment
+ 72.0	IR_02_ZONE_2	INT	2808	CT INPUT AT HB CALIBRATION PHASE 2 (FOR IR LAMPS) (ZONE 2)
+ 74.0	IR_03_ZONE_2	INT	2809	CT INPUT AT HB CALIBRATION PHASE 3 (FOR IR LAMPS) (ZONE 2)
+ 76.0	IR_04_ZONE_2	INT	2815	CT INPUT AT HB CALIBRATION PHASE 4 (FOR IR LAMPS IN PA MODE) (ZONE 2)
+ 78.0	IR_05_ZONE_2	INT	2816	CT INPUT AT HB CALIBRATION PHASE 5 (FOR IR LAMPS IN PA MODE) (ZONE 2)
+ 80.0	IR_06_ZONE_2	INT	2817	CT INPUT AT HB CALIBRATION PHASE 6 (FOR IR LAMPS IN PA MODE) (ZONE 2)
+ 82.0	P_ON_T_ZONE_2	INT	2747	SWITCHING ON MODE (ZONE 2)
+ 84.0	FU_TA_ZONE_2	INT	2755	MAXIMUM LIMIT OF RMS CURRENT IN NORMAL OPERATION (ZONE 2)
+ 86.0	H_PB_ZONE_2	INT	2053	PROPORTIONAL BAND FOR HEATING OR HYSTERESIS IN ON-OFF CONTROL (ZONE 2)
+ 88.0	H_IT_ZONE_2	INT	2055	INTEGRAL HEATING TIME (ZONE 2)
+ 90.0	H_DT_ZONE_2	INT	2056	DERIVATIVE HEATING TIME (ZONE 2)
+ 92.0	HI_S_ZONE_2	INT	2450	MAXIMUM LIMIT OF MAIN INPUT SCALE (ZONE 2)
+ 94.0	HI_L_ZONE_2	INT	2191	UPPER LIMIT OF SETPOINT (ZONE 2)
+ 96.0	TYP_ZONE_3	INT	4496	TYPE OF PROBE, SIGNAL AND SCALE OF MAIN INPUT (ZONE 3)
+ 98.0	PS_TA_ZONE_3	INT	4802	MAXIMUM PREAK CURRENT LIMIT DURING PHASE SOFTSTART (ZONE 3)
+ 100.0	AL_ZONE_3	INT	4291	SELECT NUMBER OF ENABLED ALARMS (ZONE 3)
+ 102.0	HD_2_ZONE_3	INT	4756	ENABLE POWER FAULT ALARM (ZONE 3)
+ 104.0	HD_5_ZONE_3	INT	4799	ENABLE TRIGGER MODES (ZONE 3)
+ 106.0	CTR_ZONE_3	INT	4276	TYPE OF CONTROL (ZONE 3)
+ 108.0	PS_TM_ZONE_3	INT	4801	DURATION OF PHASE ANGLE SOFTSTART RAMP (ZONE 3)
+ 110.0	PS_OF_ZONE_3	INT	4725	MINIMUM NON CONDUCTION TIME TO REACTIVATE THE PHASE SOFTSTART RAMP (ZONE 3)
+ 112.0	HB_T_ZONE_3	INT	4152	DELAY TIME FOR ACTIVATION OF HB ALARM (ZONE 3)
+ 114.0	HB_P_ZONE_3	INT	4833	PERCENTAGE HB ALARM SETPOINT OF CURRENT READ IN HB CALIBRATION (ZONE 3)
+ 116.0	IR_00_ZONE_3	INT	4854	CT INPUT AT HB CALIBRATION PHASE 0 (FOR IR LAMPS) (ZONE 3)
+ 118.0	IR_01_ZONE_3	INT	4855	CT INPUT AT HB CALIBRATION PHASE 1 (FOR IR LAMPS) (ZONE 3)
+ 120.0	IR_02_ZONE_3	INT	4856	CT INPUT AT HB CALIBRATION PHASE 2 (FOR IR LAMPS) (ZONE 3)
+ 122.0	IR_03_ZONE_3	INT	4857	CT INPUT AT HB CALIBRATION PHASE 3 (FOR IR LAMPS) (ZONE 3)
+ 124.0	IR_04_ZONE_3	INT	4863	CT INPUT AT HB CALIBRATION PHASE 4 (FOR IR LAMPS IN PA MODE) (ZONE 3)
+ 126.0	IR_05_ZONE_3	INT	4864	CT INPUT AT HB CALIBRATION PHASE 5 (FOR IR LAMPS IN PA MODE) (ZONE 3)
+ 128.0	IR_06_ZONE_3	INT	4865	CT INPUT AT HB CALIBRATION PHASE 6 (FOR IR LAMPS IN PA MODE) (ZONE 3)
+ 130.0	P_ON_T_ZONE_3	INT	4795	SWITCHING ON MODE (ZONE 3)
+ 132.0	FU_TA_ZONE_3	INT	4803	MAXIMUM LIMIT OF RMS CURRENT IN NORMAL OPERATION (ZONE 3)
+ 134.0	H_PB_ZONE_3	INT	4101	PROPORTIONAL BAND FOR HEATING OR HYSTERESIS IN ON-OFF CONTROL (ZONE 3)
+ 136.0	H_IT_ZONE_3	INT	4103	INTEGRAL HEATING TIME (ZONE 3)
+ 138.0	H_DT_ZONE_3	INT	4104	DERIVATIVE HEATING TIME (ZONE 3)
+ 140.0	HI_S_ZONE_3	INT	4498	MAXIMUM LIMIT OF MAIN INPUT SCALE (ZONE 3)
+ 142.0	HI_L_ZONE_3	INT	4239	UPPER LIMIT OF SETPOINT (ZONE 3)
+ 144.0	TYP_ZONE_4	INT	8592	TYPE OF PROBE, SIGNAL AND SCALE OF MAIN INPUT (ZONE 4)

Address	Name	Type	Initial value	Comment
+ 146.0	PS_TA_ZONE_4	INT	8898	MAXIMUM PREAK CURRENT LIMIT DURING PHASE SOFTSTART (ZONE 4)
+ 148.0	AL_ZONE_4	INT	8387	SELECT NUMBER OF ENABLED ALARMS (ZONE 4)
+ 150.0	HD_2_ZONE_4	INT	8852	ENABLE POWER FAULT ALARM (ZONE 4)
+ 152.0	HD_5_ZONE_4	INT	8895	ENABLE TRIGGER MODES (ZONE 4)
+ 154.0	CTR_ZONE_4	INT	8372	TYPE OF CONTROL (ZONE 4)
+ 156.0	PS_TM_ZONE_4	INT	8897	DURATION OF PHASE ANGLE SOFTSTART RAMP (ZONE 4)
+ 158.0	PS_OF_ZONE_4	INT	8821	MINIMUM NON CONDUCTION TIME TO REACTIVATE THE PHASE SOFTSTART RAMP (ZONE 4)
+ 160.0	HB_T_ZONE_4	INT	8248	DELAY TIME FOR ACTIVATION OF HB ALARM (ZONE 4)
+ 162.0	HB_P_ZONE_4	INT	8929	PERCENTAGE HB ALARM SETPOINT OF CURRENT READ IN HB CALIBRATION (ZONE 4)
+ 164.0	IR_00_ZONE_4	INT	8950	CT INPUT AT HB CALIBRATION PHASE 0 (FOR IR LAMPS) (ZONE 4)
+ 166.0	IR_01_ZONE_4	INT	8951	CT INPUT AT HB CALIBRATION PHASE 1 (FOR IR LAMPS) (ZONE 4)
+ 168.0	IR_02_ZONE_4	INT	8952	CT INPUT AT HB CALIBRATION PHASE 2 (FOR IR LAMPS) (ZONE 4)
+ 170.0	IR_03_ZONE_4	INT	8953	CT INPUT AT HB CALIBRATION PHASE 3 (FOR IR LAMPS) (ZONE 4)
+ 172.0	IR_04_ZONE_4	INT	8959	CT INPUT AT HB CALIBRATION PHASE 4 (FOR IR LAMPS IN PA MODE) (ZONE 4)
+ 174.0	IR_05_ZONE_4	INT	8960	CT INPUT AT HB CALIBRATION PHASE 5 (FOR IR LAMPS IN PA MODE) (ZONE 4)
+ 176.0	IR_06_ZONE_4	INT	8961	CT INPUT AT HB CALIBRATION PHASE 6 (FOR IR LAMPS IN PA MODE) (ZONE 4)
+ 178.0	P_ON_T_ZONE_4	INT	8891	SWITCHING ON MODE (ZONE 4)
+ 180.0	FU_TA_ZONE_4	INT	8899	MAXIMUM LIMIT OF RMS CURRENT IN NORMAL OPERATION (ZONE 4)
+ 182.0	H_PB_ZONE_4	INT	8197	PROPORTIONAL BAND FOR HEATING OR HYSTERESIS IN ON-OFF CONTROL (ZONE 4)
+ 184.0	H_IT_ZONE_4	INT	8199	INTEGRAL HEATING TIME (ZONE 4)
+ 186.0	H_DT_ZONE_4	INT	8200	DERIVATIVE HEATING TIME (ZONE 4)
+ 188.0	HI_S_ZONE_4	INT	8594	MAXIMUM LIMIT OF MAIN INPUT SCALE (ZONE 4)
+ 190.0	HI_L_ZONE_4	INT	8335	UPPER LIMIT OF SETPOINT (ZONE 4)
= 192.0		END_STRUCT		

9.9.4. DB20

List of parameters used in FB15

Address	Name	Type	Initial value	Comment
0.0		STRUCT		
+ 0.0	TYP_ZONE_1	INT	40	TYPE OF PROBE, SIGNAL AND SCALE OF MAIN INPUT(ZONE 1)
+ 2.0	PS_TA_ZONE_1	INT	800	MAXIMUM PREAK CURRENT LIMIT DURING PHASE SOFTSTART (ZONE 1)
+ 4.0	AL_ZONE_1	INT	16	SELECT NUMBER OF ENABLED ALARMS (ZONE 1)
+ 6.0	HD_2_ZONE_1	INT	11	ENABLE POWER FAULT ALARM (ZONE 1)
+ 8.0	HD_5_ZONE_1	INT	155	ENABLE TRIGGER MODES (ZONE 1)
+ 10.0	CTR_ZONE_1	INT	198	TYPE OF CONTROL (ZONE 1)
+ 12.0	PS_TM_ZONE_1	INT	100	DURATION OF PHASE ANGLE SOFTSTART RAMP (ZONE 1)
+ 14.0	PS_OF_ZONE_1	INT	1	MINIMUM NON CONDUCTION TIME TO REACTIVATE THE PHASE SOFTSTART RAMP (ZONE 1)
+ 16.0	HB_T_ZONE_1	INT	4	DELAY TIME FOR ACTIVATION OF HB ALARM (ZONE 1)
+ 18.0	HB_P_ZONE_1	INT	800	PERCENTAGE HB ALARM SETPOINT OF CURRENT READ IN HB CALIBRATION (ZONE 1)
+ 20.0	IR_00_ZONE_1	INT	240	CT INPUT AT HB CALIBRATION PHASE 0 (FOR IR LAMPS) (ZONE 1)
+ 22.0	IR_01_ZONE_1	INT	200	CT INPUT AT HB CALIBRATION PHASE 1 (FOR IR LAMPS) (ZONE 1)
+ 24.0	IR_02_ZONE_1	INT	180	CT INPUT AT HB CALIBRATION PHASE 2 (FOR IR LAMPS) (ZONE 1)
+ 26.0	IR_03_ZONE_1	INT	160	CT INPUT AT HB CALIBRATION PHASE 3 (FOR IR LAMPS) (ZONE 1)
+ 28.0	IR_04_ZONE_1	INT	150	CT INPUT AT HB CALIBRATION PHASE 4 (FOR IR LAMPS IN PA MODE) (ZONE 1)
+ 30.0	IR_05_ZONE_1	INT	140	CT INPUT AT HB CALIBRATION PHASE 5 (FOR IR LAMPS IN PA MODE) (ZONE 1)
+ 32.0	IR_06_ZONE_1	INT	120	CT INPUT AT HB CALIBRATION PHASE 6 (FOR IR LAMPS IN PA MODE) (ZONE 1)
+ 34.0	P_ON_T_ZONE_1	INT	1	SWITCHING ON MODE (ZONE 1)
+ 36.0	FU_TA_ZONE_1	INT	500	MAXIMUM LIMIT OF RMS CURRENT IN NORMAL OPERATION (ZONE 1)
+ 38.0	H_PB_ZONE_1	INT	10	PROPORTIONAL BAND FOR HEATING OR HYSTERESIS IN ON-OFF CONTROL (ZONE 1)
+ 40.0	H_IT_ZONE_1	INT	1	INTEGRAL HEATING TIME (ZONE 1)
+ 42.0	H_DT_ZONE_1	INT	0	DERIVATIVE HEATING TIME (ZONE 1)
+ 44.0	HI_S_ZONE_1	INT	200	MAXIMUM LIMIT OF MAIN INPUT SCALE (ZONE 1)
+ 46.0	HI_L_ZONE_1	INT	200	UPPER LIMIT OF SETPOINT (ZONE 1)
+ 48.0	TYP_ZONE_2	INT	40	TYPE OF PROBE, SIGNAL AND SCALE OF MAIN INPUT(ZONE 2)
+ 50.0	PS_TA_ZONE_2	INT	800	MAXIMUM PREAK CURRENT LIMIT DURING PHASE SOFTSTART (ZONE 2)
+ 52.0	AL_ZONE_2	INT	16	SELECT NUMBER OF ENABLED ALARMS (ZONE 2)
+ 54.0	HD_2_ZONE_2	INT	11	ENABLE POWER FAULT ALARM (ZONE 2)
+ 56.0	HD_5_ZONE_2	INT	155	ENABLE TRIGGER MODES (ZONE 2)
+ 58.0	CTR_ZONE_2	INT	198	TYPE OF CONTROL (ZONE 2)
+ 60.0	PS_TM_ZONE_2	INT	100	DURATION OF PHASE ANGLE SOFTSTART RAMP (ZONE 2)
+ 62.0	PS_OF_ZONE_2	INT	1	MINIMUM NON CONDUCTION TIME TO REACTIVATE THE PHASE SOFTSTART RAMP (ZONE 2)
+ 64.0	HB_T_ZONE_2	INT	4	DELAY TIME FOR ACTIVATION OF HB ALARM (ZONE 2)
+ 66.0	HB_P_ZONE_2	INT	800	PERCENTAGE HB ALARM SETPOINT OF CURRENT READ IN HB CALIBRATION (ZONE 2)
+ 68.0	IR_00_ZONE_2	INT	240	CT INPUT AT HB CALIBRATION PHASE 0 (FOR IR LAMPS) (ZONE 2)

Address	Name	Type	Initial value	Comment
+ 70.0	IR_01_ZONE_2	INT	200	CT INPUT AT HB CALIBRATION PHASE 1 (FOR IR LAMPS) (ZONE 2)
+ 72.0	IR_02_ZONE_2	INT	180	CT INPUT AT HB CALIBRATION PHASE 2 (FOR IR LAMPS) (ZONE 2)
+ 74.0	IR_03_ZONE_2	INT	160	CT INPUT AT HB CALIBRATION PHASE 3 (FOR IR LAMPS) (ZONE 2)
+ 76.0	IR_04_ZONE_2	INT	150	CT INPUT AT HB CALIBRATION PHASE 4 (FOR IR LAMPS IN PA MODE) (ZONE 2)
+ 78.0	IR_05_ZONE_2	INT	140	CT INPUT AT HB CALIBRATION PHASE 5 (FOR IR LAMPS IN PA MODE) (ZONE 2)
+ 80.0	IR_06_ZONE_2	INT	120	CT INPUT AT HB CALIBRATION PHASE 6 (FOR IR LAMPS IN PA MODE) (ZONE 2)
+ 82.0	P_ON_T_ZONE_2	INT	1	SWITCHING ON MODE (ZONE 2)
+ 84.0	FU_TA_ZONE_2	INT	500	MAXIMUM LIMIT OF RMS CURRENT IN NORMAL OPERATION (ZONE 2)
+ 86.0	H_PB_ZONE_2	INT	10	PROPORTIONAL BAND FOR HEATING OR HYSTERESIS IN ON-OFF CONTROL (ZONE 2)
+ 88.0	H_IT_ZONE_2	INT	1	INTEGRAL HEATING TIME (ZONE 2)
+ 90.0	H_DT_ZONE_2	INT	0	DERIVATIVE HEATING TIME (ZONE 2)
+ 92.0	HI_S_ZONE_2	INT	200	MAXIMUM LIMIT OF MAIN INPUT SCALE (ZONE 2)
+ 94.0	HI_L_ZONE_2	INT	200	UPPER LIMIT OF SETPOINT (ZONE 2)
+ 96.0	TYP_ZONE_3	INT	40	TYPE OF PROBE, SIGNAL AND SCALE OF MAIN INPUT(ZONE 3)
+ 98.0	PS_TA_ZONE_3	INT	800	MAXIMUM PREAK CURRENT LIMIT DURING PHASE SOFTSTART (ZONE 3)
+ 100.0	AL_ZONE_3	INT	16	SELECT NUMBER OF ENABLED ALARMS (ZONE 3)
+ 102.0	HD_2_ZONE_3	INT	11	ENABLE POWER FAULT ALARM (ZONE 3)
+ 104.0	HD_5_ZONE_3	INT	155	ENABLE TRIGGER MODES (ZONE 3)
+ 106.0	CTR_ZONE_3	INT	198	TYPE OF CONTROL (ZONE 3)
+ 108.0	PS_TM_ZONE_3	INT	100	DURATION OF PHASE ANGLE SOFTSTART RAMP (ZONE 3)
+ 110.0	PS_OF_ZONE_3	INT	1	MINIMUM NON CONDUCTION TIME TO REACTIVATE THE PHASE SOFTSTART RAMP (ZONE 3)
+ 112.0	HB_T_ZONE_3	INT	4	DELAY TIME FOR ACTIVATION OF HB ALARM (ZONE 3)
+ 114.0	HB_P_ZONE_3	INT	800	PERCENTAGE HB ALARM SETPOINT OF CURRENT READ IN HB CALIBRATION (ZONE 3)
+ 116.0	IR_00_ZONE_3	INT	240	CT INPUT AT HB CALIBRATION PHASE 0 (FOR IR LAMPS) (ZONE 3)
+ 118.0	IR_01_ZONE_3	INT	200	CT INPUT AT HB CALIBRATION PHASE 1 (FOR IR LAMPS) (ZONE 3)
+ 120.0	IR_02_ZONE_3	INT	180	CT INPUT AT HB CALIBRATION PHASE 2 (FOR IR LAMPS) (ZONE 3)
+ 122.0	IR_03_ZONE_3	INT	160	CT INPUT AT HB CALIBRATION PHASE 3 (FOR IR LAMPS) (ZONE 3)
+ 124.0	IR_04_ZONE_3	INT	150	CT INPUT AT HB CALIBRATION PHASE 4 (FOR IR LAMPS IN PA MODE) (ZONE 3)
+ 126.0	IR_05_ZONE_3	INT	140	CT INPUT AT HB CALIBRATION PHASE 5 (FOR IR LAMPS IN PA MODE) (ZONE 3)
+ 128.0	IR_06_ZONE_3	INT	120	CT INPUT AT HB CALIBRATION PHASE 6 (FOR IR LAMPS IN PA MODE) (ZONE 3)
+ 130.0	P_ON_T_ZONE_3	INT	1	SWITCHING ON MODE (ZONE 3)
+ 132.0	FU_TA_ZONE_3	INT	500	MAXIMUM LIMIT OF RMS CURRENT IN NORMAL OPERATION (ZONE 3)
+ 134.0	H_PB_ZONE_3	INT	10	PROPORTIONAL BAND FOR HEATING OR HYSTERESIS IN ON-OFF CONTROL (ZONE 3)
+ 136.0	H_IT_ZONE_3	INT	1	INTEGRAL HEATING TIME (ZONE 3)
+ 138.0	H_DT_ZONE_3	INT	0	DERIVATIVE HEATING TIME (ZONE 3)
+ 140.0	HI_S_ZONE_3	INT	200	MAXIMUM LIMIT OF MAIN INPUT SCALE (ZONE 3)
+ 142.0	HI_L_ZONE_3	INT	200	UPPER LIMIT OF SETPOINT (ZONE 3)

Address	Name	Type	Initial value	Comment
+ 144.0	TYP_ZONE_4	INT	40	TYPE OF PROBE, SIGNAL AND SCALE OF MAIN INPUT(ZONE 4)
+ 146.0	PS_TA_ZONE_4	INT	800	MAXIMUM PREAK CURRENT LIMIT DURING PHASE SOFTSTART (ZONE 4)
+ 148.0	AL_ZONE_4	INT	16	SELECT NUMBER OF ENABLED ALARMS (ZONE 4)
+ 150.0	HD_2_ZONE_4	INT	11	ENABLE POWER FAULT ALARM (ZONE 4)
+ 152.0	HD_5_ZONE_4	INT	155	ENABLE TRIGGER MODES (ZONE 4)
+ 154.0	CTR_ZONE_4	INT	198	TYPE OF CONTROL (ZONE 4)
+ 156.0	PS_TM_ZONE_4	INT	100	DURATION OF PHASE ANGLE SOFTSTART RAMP (ZONE 4)
+ 158.0	PS_OF_ZONE_4	INT	1	MINIMUM NON CONDUCTION TIME TO REACTIVATE THE PHASE SOFTSTART RAMP (ZONE 4)
+ 160.0	HB_T_ZONE_4	INT	4	DELAY TIME FOR ACTIVATION OF HB ALARM (ZONE 4)
+ 162.0	HB_P_ZONE_4	INT	800	PERCENTAGE HB ALARM SETPOINT OF CURRENT READ IN HB CALIBRATION (ZONE 4)
+ 164.0	IR_00_ZONE_4	INT	240	CT INPUT AT HB CALIBRATION PHASE 0 (FOR IR LAMPS) (ZONE 4)
+ 166.0	IR_01_ZONE_4	INT	200	CT INPUT AT HB CALIBRATION PHASE 1 (FOR IR LAMPS) (ZONE 4)
+ 168.0	IR_02_ZONE_4	INT	180	CT INPUT AT HB CALIBRATION PHASE 2 (FOR IR LAMPS) (ZONE 4)
+ 170.0	IR_03_ZONE_4	INT	160	CT INPUT AT HB CALIBRATION PHASE 3 (FOR IR LAMPS) (ZONE 4)
+ 172.0	IR_04_ZONE_4	INT	150	CT INPUT AT HB CALIBRATION PHASE 4 (FOR IR LAMPS IN PA MODE) (ZONE 4)
+ 174.0	IR_05_ZONE_4	INT	140	CT INPUT AT HB CALIBRATION PHASE 5 (FOR IR LAMPS IN PA MODE) (ZONE 4)
+ 176.0	IR_06_ZONE_4	INT	120	CT INPUT AT HB CALIBRATION PHASE 6 (FOR IR LAMPS IN PA MODE) (ZONE 4)
+ 178.0	P_ON_T_ZONE_4	INT	1	SWITCHING ON MODE (ZONE 4)
+ 180.0	FU_TA_ZONE_4	INT	500	MAXIMUM LIMIT OF RMS CURRENT IN NORMAL OPERATION (ZONE 4)
+ 182.0	H_PB_ZONE_4	INT	10	PROPORTIONAL BAND FOR HEATING OR HYSTERESIS IN ON-OFF CONTROL (ZONE 4)
+ 184.0	H_IT_ZONE_4	INT	1	INTEGRAL HEATING TIME (ZONE 4)
+ 186.0	H_DT_ZONE_4	INT	0	DERIVATIVE HEATING TIME (ZONE 4)
+ 188.0	HI_S_ZONE_4	INT	200	MAXIMUM LIMIT OF MAIN INPUT SCALE (ZONE 4)
+ 190.0	HI_L_ZONE_4	INT	200	UPPER LIMIT OF SETPOINT (ZONE 4)
= 192.0		END_STRUCT		

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