

Diagnostic communication setup with MB/TCP and E/IP fieldbus modules FW 1.7 or 1.8

Application Technical note

XPSMCM Preventa Modular Safety Controller addressing setup

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Safety Information



Important Information

NOTICE

Read these instructions carefully, and look at the equipment to become familiar with the device before trying to install, operate, or maintain it. The following special messages may appear throughout this documentation or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.



The addition of this symbol to a “Danger” or “Warning” safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

DANGER

DANGER indicates a hazardous situation which, if not avoided, **will result in** death or serious injury.

WARNING

WARNING indicates a hazardous situation which, if not avoided, **could result in** death or serious injury.

CAUTION

CAUTION indicates a hazardous situation which, if not avoided, **could result in** minor or moderate injury.

NOTICE

NOTICE is used to address practices not related to physical injury.

About the Book



At a Glance

Document Scope

This Technical guide describes how to setup Fieldbus communication with either firmware 1.7 or 1.8 for Modbus TCP and Ethernet/IP.

Note: This guide is based upon SoSafe Configurable 1.5 (Safety Designer 1.5.0 and Bus Configurator V3.4.0 Beta) in English.

Validity Note

The technical characteristics of the devices described in this document also appear online. To access this information online:

Step	Action
1	Go to the Schneider Electric home page www.schneider-electric.com .
2	In the Search box type the reference of a product or the name of a product range. <ul style="list-style-type: none">• Do not include blank spaces in the model number/product range.• To get information on grouping similar modules, use asterisks (*).
3	If you entered a reference, go to the Product Datasheets search results and click on the reference that interests you. If you entered the name of a product range, go to the Product Ranges search results and click on the product range that interests you.
4	If more than one reference appears in the Products search results, click on the reference that interests you.
5	Depending on the size of your screen, you may need to scroll down to see the data sheet.
6	To save or print a data sheet as a .pdf file, click Download XXX product datasheet .

The characteristics that are presented in this manual should be the same as those characteristics that appear online. In line with our policy of constant improvement, we may revise content over time to improve clarity and accuracy. If you see a difference between the manual and online information, use the online information as your reference.

Product Related Information

The XPSMCM• is built to the following safety integrity levels: SIL 3 according to EN/IEC 61508, SILcl 3 according to EN/IEC 62061, PL e category 4 according to EN ISO 13849-1 in accordance with the applicable standards. However, the definitive SIL and PL of the application depends on the number of safety components, their parameters, and the connections that are made, as per the risk analysis.

The module must be configured in accordance with the application-specific risk analysis and all the applicable standards.

Pay particular attention in conforming to any safety information, different electrical requirements, and normative standards that would apply to your adaptation.

WARNING

UNINTENDED EQUIPMENT OPERATION

Perform an in-depth risk analysis to determine the appropriate safety integrity level for your specific application, based on all the applicable standards.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

NOTE: Configuration of the module is the sole responsibility of the installer or user.

XPSMCM Preventa Modular Safety Controller addressing setup

Explanation of abbreviations

- FW = FirmWare (marked in the side of the module and packaging SV(Software Version))
- hb = high byte
- lb = low byte
- * = in the end of references is standing either for "" (empty) for modules equipped with screw terminals or "G" for modules equipped with cage clamp terminals.

Explanation of terms

- Bus client = Ethernet based communication device managing bus communication
- Bus master = serial communication device managing bus communication
- Bus server = Ethernet based device allowing bus master to read and /or to write its defined memory area(s)
- Bus slave = serial communication device allowing bus master to read and /or to write its defined memory area(s)
- Fieldbus input = bus inputs from controller point of view.
- Fieldbus probe = bus outputs from controller point of view
- IEC 61131-3 addressing = a standardized style to point to information, here used to point server or slave memory area. For example for bit type: %MWx.x and for word type: %MWx
- Modbus addressing = a conventional style to point to server or slave memory area using Modbus function codes. For example for reading a word from holding register: 3000x, writing a word to input register: 4000x
- Process image = all the user accessible data (possible to change using Bus Configurator – tool configuration) in fieldbus communication frame, for example statuses of CPU, I/O, diagnostic data and fieldbus inputs and probes.

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General information concerning process image

When adding an input module or several, the process image will not be extended only into end, but the process image will be automatically rearranged according to type of modules following the order in next list:

1. XPSMCMCP0802*
2. XPSMCMMX0802*
3. XPSMCM DI1600*
4. XPSMCM DI0800*
5. XPSMCM DI1200MT*
6. XPSMCMEN0200SC* or XPSMCMEN0200HT* or XPSMCMEN0200TT*
7. XPSMCMEN0100SC* or XPSMCMEN0100HT* or XPSMCMEN0100TT*
8. XPSMCMEN0200*

This means, if adding a XPSMCMMX0802 module to rack and configuration behind an existing DI module, the addressing of inputs of MX module will appear in front of addressing of inputs of DI module. Change of order in Configuration –window is presented in Picture1.

In addition also order of outputs will be automatically rearranged according to type of modules following the order in next list:

1. XPSMCMCP0802*
2. XPSMCMMX0802*
3. XPSMCMDO0004*
4. XPSMCMRO0004*
5. XPSMCMRO0004DA*



Picture1. Project configuration before and after clicking OK box.

XPSMCM Preventa Modular Safety Controller addressing setup

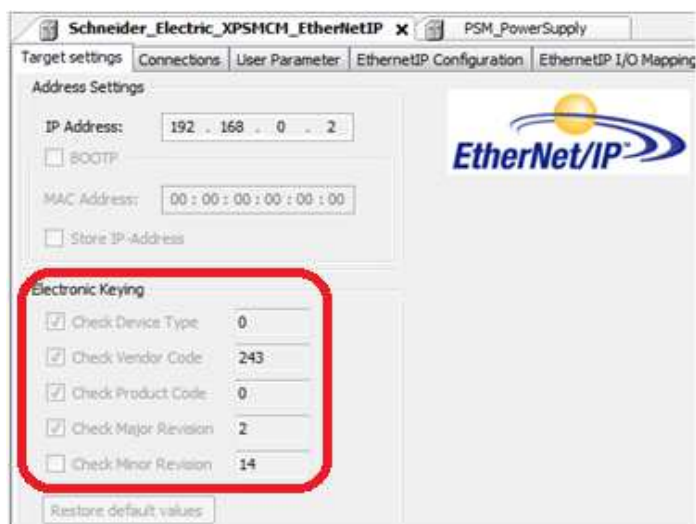
General information concerning Ethernet/IP EDS-file and FW V1.8

In the new firmware V1.8 version the Vendor data contents have been updated. The previous EDS -files are not in accordance with the new data. This incompatibility appears also in combination of latest EDS file with EIP communication modules having previous FW version. As a result, during setup of the communication, it is not allowed to use the feature "Electronic Keying" (Vendor data checking).

To enable the communication with EIP communication module FW V1.8 it is mandatory to remove ticks from "Electronic Keying" check boxes (Picture 2) until EDS -file SE_ET_XPSMCM_0108E_20150916.eds in XPSMCM_Ethernet_EDS_V1_8_20150916.zip is imported into usage from BOX(copy URL to your browser address field):

<https://schneider-electric.box.com/s/w7odmxi3jn3zpzfwmwn9hda0ohxcn66jl>

Or from SE.com -> Products and Services -> Automation and Control -> PAC, PLC and other Controllers -> Preventa XPS MP, XPS MC, XPSMCM -> Documents and Downloads



Picture2. Disabling "electronic keying"

Additional information for how to import EDS -file and for how to setup EIP module configuration as well as MB/TCP module configuration are available on document "XPSMCM_Description_quick startup for a controller configuration_YYYYMMDD.pdf" in BOX(copy URL to your browser address field):

<https://schneider-electric.box.com/s/5hygzgtp6tawbuomzg0jcv35zzlveuql>

XPSMCM Preventa Modular Safety Controller addressing setup

FW V1.7 and FW V1.8 in Modbus TCP and Ethernet/IP

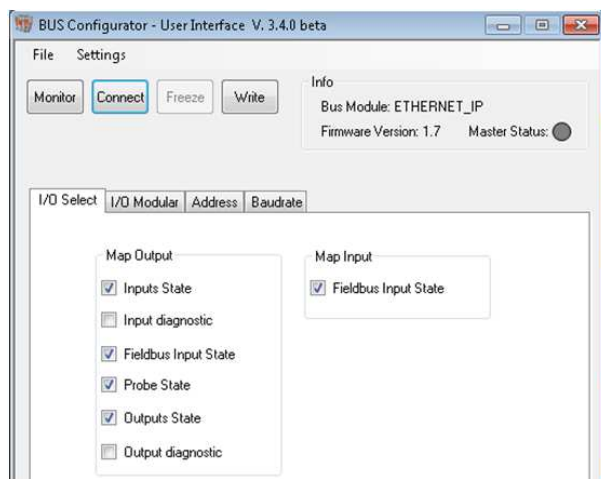
The fundamental difference is that FW V1.7 has a dynamic process image by default and FW V1.8 has a static process image by default. Full process image explanation is in Annexes 1 and 2, detailed difference between FW V1.7 and V1.8 can be found in Annex 3 and details for given examples in Annexes 4 and 5.

Default mapping of dynamic process image in FW V1.7

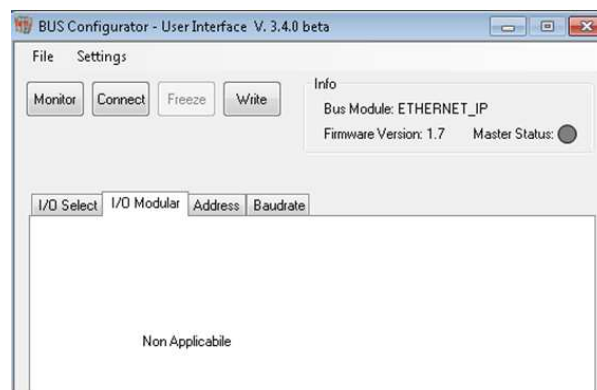
In firmware V1.7 addressing of process image is created based on the number and type of expansion IO cards added within the configuration of SoSafe configurable software.

	Size[b]	Modbus traditional	Modbus IEC 61131-3	Ethernet/IP
Fieldbus input	1	40001lb	%MW0lb	96 _n /1 _n
System status	1	30001lb	%MW256lb	64 _n /1 _n
Inputs status*	1...16	30001hb...30009lb	%MW256hb...%MW264lb	64 _n /2 _n ...64 _n /17 _n
Fieldbus inputs*	1	30002lb...30009hb	%MW257lb...%MW264hb	64 _n /3 _n ...64 _n /18 _n
Fieldbus probe*	2	30002hb...30010hb	%MW257hb...%MW265hb	64 _n /4 _n ...64 _n /20 _n
OSSD & RO status*	1...2	30003hb...30011hb	%MW258hb...%MW266hb	64 _n /6 _n ...64 _n /22 _n
Diagnostic index and code**	0/2	30004lb...30012hb	%MW259lb...%MW267hb	64 _n /7 _n ...64 _n /24 _n
* Must not be unselected in I/O select tab to reserve bytes				
** Must be selected either "Input diagnostic" and/or "output diagnostic" in I/O select tab to reserve bytes				

Table 1. Addressing principle of default setting with FW V1.7



Picture 3. Default selection of the setup list in I/O select tab for FW V1.7



Picture 4. Default view to the frame size tab for FW V1.7

Also selected features in Bus Configurator affect the length of the process image. In pictures 3 and 4 presented the default configuration for FW V1.7 and in table 1 addressing.

CASE 1: Example of CPU and a communication module with FW V1.7

Hardware:

- CPU + Modbus TCP
- CPU + Ethernet/IP

	Size[b]	Modbus traditional	Modbus IEC 61131-3	Ethernet/IP
Fieldbus input	1	40001lb	%MW0lb	96 _n /1 _n
System status	1	30001lb	%MW256lb	64 _n /1 _n
Inputs status	1	30001hb	%MW256hb	64 _n /2 _n
Fieldbus inputs*	1	30002lb	%MW257lb	64 _n /3 _n
Fieldbus probe*	2	30002hb, 30003lb	%MW257hb, %MW258lb	64 _n /4 _n , 64 _n /5 _n
OSSD & RO status	1	30003hb	%MW258hb	64 _n /6 _n
Diagnostic	0			
* Must not be unselected in I/O select tab to reserve bytes				

Table 2. Addressing example with FW V1.7, default setting, case 1

Using only CPU and a communication module with default configuration will occupy 1 byte from input section and 1 byte from output section which results to a process image and addressing in table 2, which shows process image with only CPU and communication module.

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Case 2: Example of communication module with FW V1.7

Hardware:

- CPU + DI16 + 2 x MX0802 + RO4 + [Modbus TCP](#)
- CPU + DI16 + 2 x MX0802 + RO4 + [Ethernet/IP](#)

	Size[b]	Modbus traditional	Modbus IEC 61131-3	Ethernet/IP
Fieldbus input	1	40001lb	%MW0lb	96 _n /1 _n
System status	1	30001lb	%MW256lb	64 _n /1 _n
Inputs status	5	30001hb...30003hb	%MW256hb...%MW258hb	64h/2h...64h/6h
Fieldbus inputs*	1	30004lb	%MW259lb	64 _n /7 _n
Fieldbus probe*	2	30004hb, 30005lb	%MW259hb, %MW260lb	64 _n /8 _n , 64 _n /9 _n
OSSD & RO status	1	30005hb	%MW260hb	64 _n /10 _n
Diagnostic	0			

* Must not be unselected in I/O select tab to reserve bytes

Table 3. Addressing example with FW V1.7, default setting, case 2

Using case 2 with default configuration will occupy 5 bytes from input section and 2 bytes from output section which results to a process image and addressing in table 3. Table 3 shows process image with CPU and additional I/O and communication module.

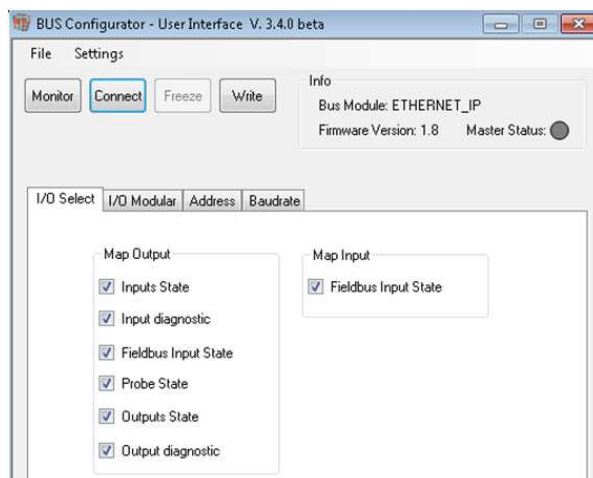
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Default mapping of static process image in FW V1.8

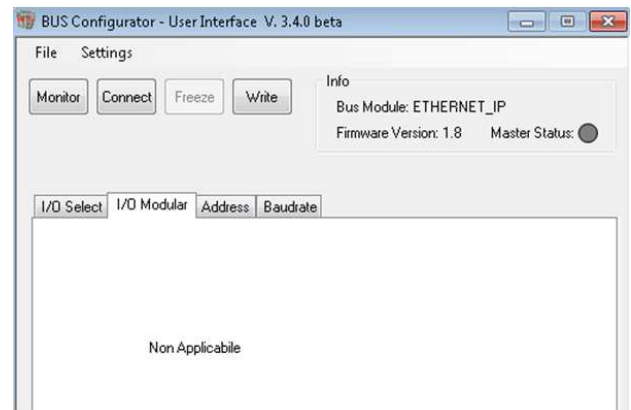
With default configuration of Bus Configurator, addressing of data is basing to a static process image. The hardware setup in Safety Designer does not affect the address size. Only unselecting features in Bus Configurator affects to length of the process image. In pictures 5 and 6 presented the default configuration for FW V1.8 and in table 4 addressing.

	Size[b]	Modbus traditional	Modbus IEC 61131-3	Ethernet/IP
Fieldbus input	1	40001lb	%MW0 lb	96 _h /1 _h
System status	1	30001lb	%MW256 lb	64 _h /1 _h
Inputs status*	16	30001hb...30009lb	%MW256hb...%MW264lb	64 _h /2 _h ...64 _h /17 _h
Fieldbus inputs*	1	30009hb	%MW264hb	64 _h /18 _h
Fieldbus probe*	2	30010lb...30010hb	%MW265lb...%MW265hb	64 _h /19 _h ...64 _h /20 _h
OSSD & RO status*	2	30011lb...30011hb	%MW266lb...%MW266hb	64 _h /21 _h ...64 _h /22 _h
Diagnostic index and code*/**	2	30012lb...30012hb	%MW267lb...%MW267hb	64 _h /23 _h ...64 _h /24 _h
* Must not be unselected in I/O select tab to reserve bytes				
** Must not be unselected both "Input diagnostic" and "output diagnostic" in I/O select tab to reserve bytes				

Table 4. Addressing principle of default setting with FW V1.8



Picture 5. Default selection of the setup list in I/O select tab for FW V1.8



Picture 6. Default view to the frame size tab for FW V1.8

Case 1: Example of CPU and communication module with FW V1.8

Hardware:

- CPU + Modbus TCP
- CPU + Ethernet/IP

	Size[b]	Modbus traditional	Modbus IEC 61131-3	Ethernet/IP
Fieldbus input	1	40001lb	%MW0 lb	96 _h /1 _h
System status	1	30001lb	%MW256 lb	64 _h /1 _h
Inputs status*	1	30001hb	%MW256hb	64 _h /2 _h
Fieldbus inputs*	1	30009hb	%MW264hb	64 _h /18 _h
Fieldbus probe*	2	30010lb...30010hb	%MW265lb...%MW265hb	64 _h /19 _h ...64 _h /20 _h
OSSD & RO status*	1	30011lb	%MW266lb	64 _h /21 _h
Diagnostic index and code*/**	2	30012lb...30012hb	%MW267lb...%MW267hb	64 _h /23 _h ...64 _h /24 _h
* Must not be unselected in I/O select tab to reserve bytes				
** Must not be unselected both "Input diagnostic" and "output diagnostic" in I/O select tab to reserve bytes				

Table 5. Addressing example with FW V1.8, default setting, case 1

Using only CPU and a communication module with default configuration will occupy 1 byte from input section and 1 byte from output section which results to a process image and addressing in table 5.

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Case 2: Example of CPU and communication module with FW V1.8

Hardware:

- CPU + DI16 + 2 x MX0802 + RO4 + Modbus TCP
- CPU + DI16 + 2 x MX0802 + RO4 + Ethernet/IP

	Size[b]	Modbus traditional	Modbus IEC 61131-3	Ethernet/IP
Fieldbus input	1	40001lb	%MW0 lb	96 _h /1 _h
System status	1	30001lb	%MW256 lb	64 _h /1 _h
Inputs status*	5	30001hb...30004hb	%MW256hb...%MW258lb	64 _h /2 _h ...64 _h /8 _h
Fieldbus inputs*	1	30009hb	%MW264hb	64 _h /18 _h
Fieldbus probe*	2	30010lb...30010hb	%MW265lb...%MW265hb	64 _h /19 _h ...64 _h /20 _h
OSSD & RO status*	2	30011lb...30011hb	%MW266lb...%MW266hb	64 _h /21 _h ...64 _h /22 _h
Diagnostic index and code**	2	30012lb...30012hb	%MW267lb...%MW267hb	64 _h /23 _h ...64 _h /24 _h
* Must not be unselected in I/O select tab to reserve bytes				
** Must not be unselected both "Input diagnostic" and "output diagnostic" in I/O select tab to reserve bytes				

Table 6. Addressing example with FW V1.8, default setting, case 2

Using case 2 with default configuration will occupy 5 bytes from input section and 2 bytes from output section which results to a process image and addressing in table 6.

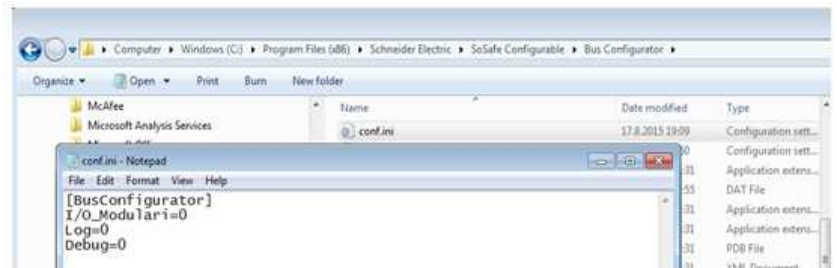
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How to change from static mapping to dynamic mapping

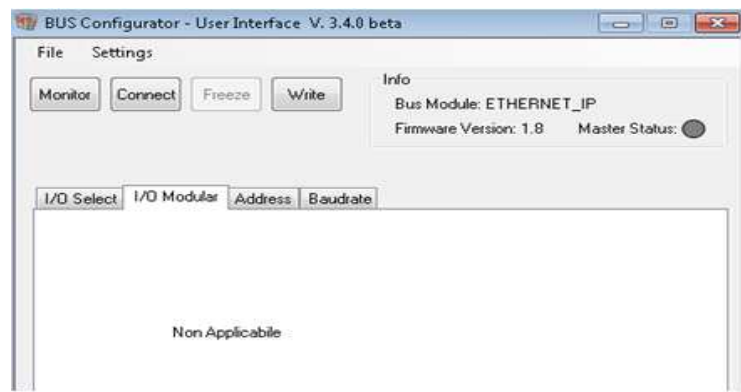
In order to keep the existing fieldbus master configuration in the PLC, motion controller, etc. unchanged while the FW of diagnostic communication module evolves, there is a possibility to change back to dynamic mapping of the addressing. To revert back to dynamic mapping a change must be made to a configuration settings file: [conf.ini](#). The change enables the settings in Bus configurator [I/O-modular tab](#).

Default conf.ini

The [conf.ini](#) configuration file can be found in (when SoSafe Configurable configuration tool was installed with default settings) from path "[C:\Program Files \(x86\)\Schneider Electric\SoSafe Configurable\Bus Configurator](#)" (Picture 7), when the installation has been done with default settings. In picture 8 a view to Bus configurator "I/O Modular" tab with default [conf.ini](#).



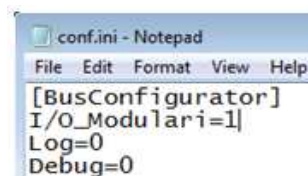
Picture 7: Default [conf.ini](#) and its default path in Windows 7



Picture 8: Bus configurator I/O-modular tab with default [conf.ini](#)

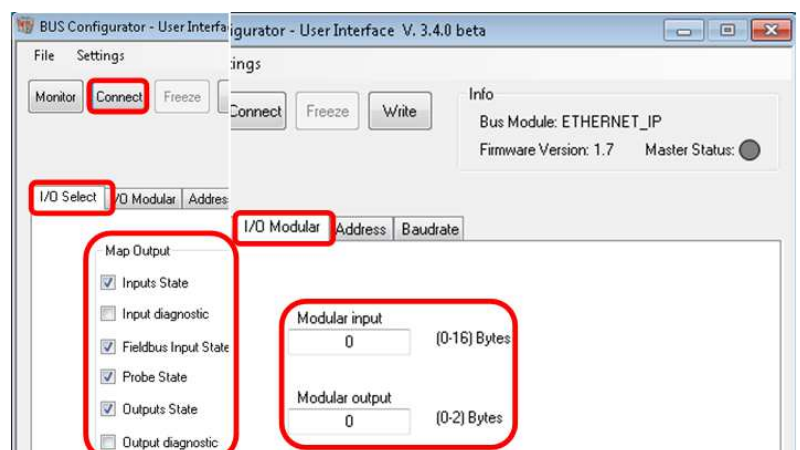
Adjusting the conf.ini file

Editing variable "I/O_Modular" value from 0 to 1 (Picture 9) and saving [conf.ini](#) file causes the contents of "I/O Modular" –tab to become visible when reopening the Bus configurator.



Picture 9: Editing the variable "I/O_Modular" value from 0 to 1

When opening the tab while there is a **FW V1.7** module connected to PC USB-port and clicking "Connect", shows the default setting of FW V1.7: Inputs and Outputs State chosen and Modular input and output set to 0 (picture 10). Setting "0&0" in "I/O Modular" –tab cells means [dynamic](#) process image.

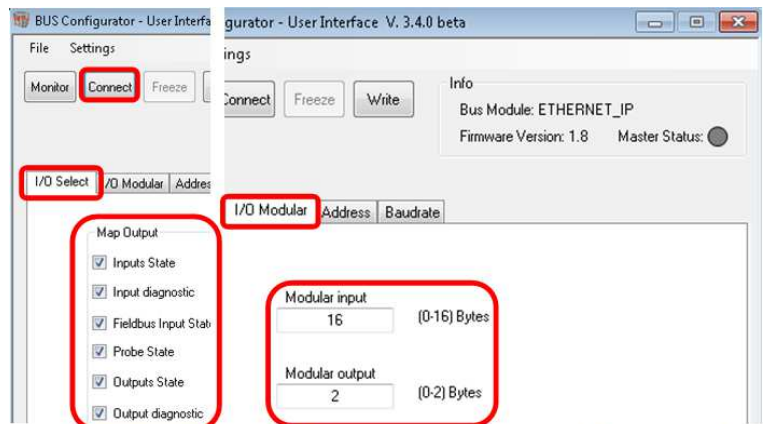


Picture 10. Default settings of I/O select and I/O modular tabs in FW V1.7

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Connecting to a fieldbus module with **FW V1.8**, all available check boxes within the I/O select tab are selected.

Within the I/O Modular tab the Modular input is set to 16 and the Modular output is set to 2 (picture 11). These settings in I/O-modular -tab occupy always 16 bits for Input States and 2 bits for Output States and creates a static process image.



Picture 11. Default settings of I/O select and I/O modular tabs in FW V1.8

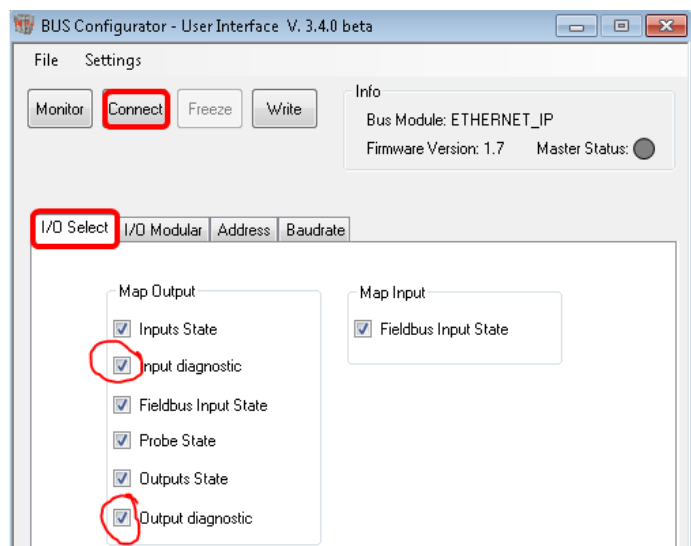
Adjusting the Fieldbus module with FW V1.7 to behave with static addressing as in FW V1.8

To have the static process image on a fieldbus module with FW V1.7

Step 1: change the `conf.ini` file Editing variable "I/O_Modulari" value from 0 to 1 (see Picture 9) and save `conf.ini` without any change of name.

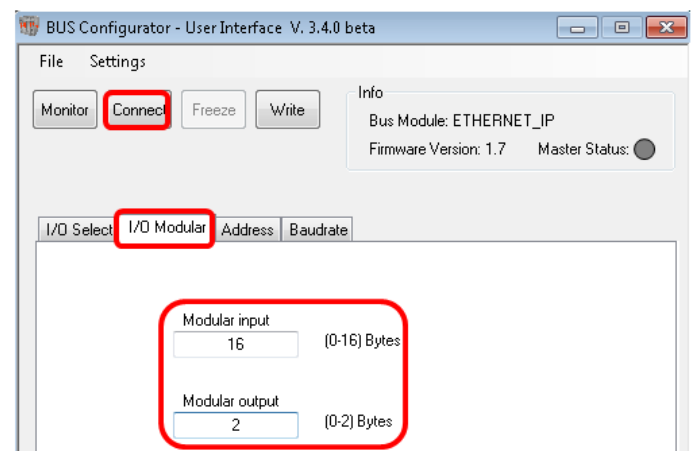
Step 2: Open the Bus configurator interface and connect to the fieldbus module.

Within the tab "I/O select" Select the "Input diagnostic" and "Output diagnostic" (Picture 12) and ensure all options are selected.



Picture 12. Edited settings of I/O select tab in FW 1.7

Step 3: Within tab "I/O Modular" change Modular input to 16 and Modular output to 2 (Picture 13).



Picture 13. Edited settings of I/O modular tab in FW 1.7

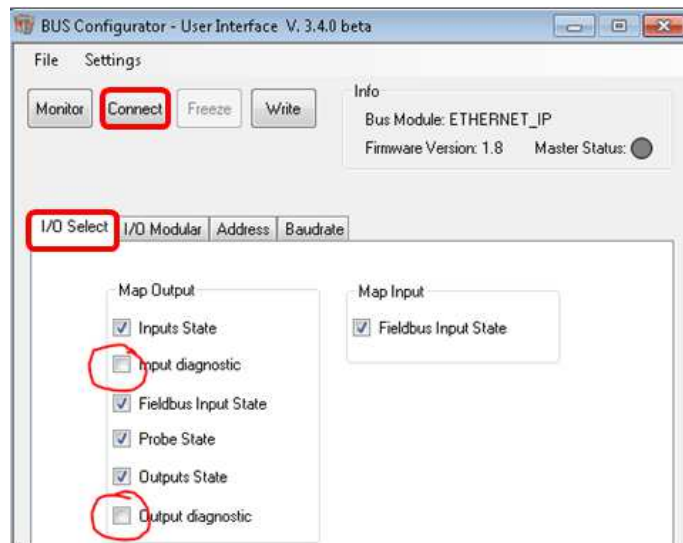
XPSMCM Preventa Modular Safety Controller addressing setup

Adjusting the Fieldbus module with FW V1.8 to behave with dynamic addressing as in FW V1.7

To have the dynamic process image on a fieldbus module with FW V1.8

Step 1: change the conf.ini file Editing variable "I/O_Modulari" value from 0 to 1 (see Picture 9) and save conf.ini without any change of name.

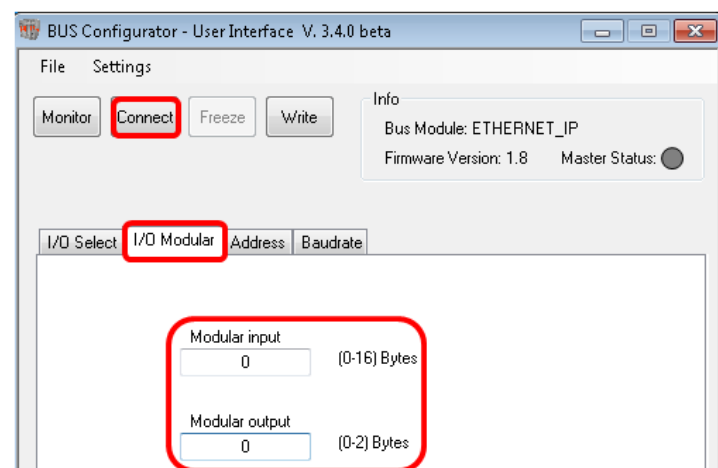
Step 2: Open the Bus configurator interface and connect to the fieldbus module.



Picture 14. Edited settings of I/O select tab in FW 1.8

Within the tab "I/O select" Unselect the "Input diagnostic" and "Output diagnostic" (Picture 12).

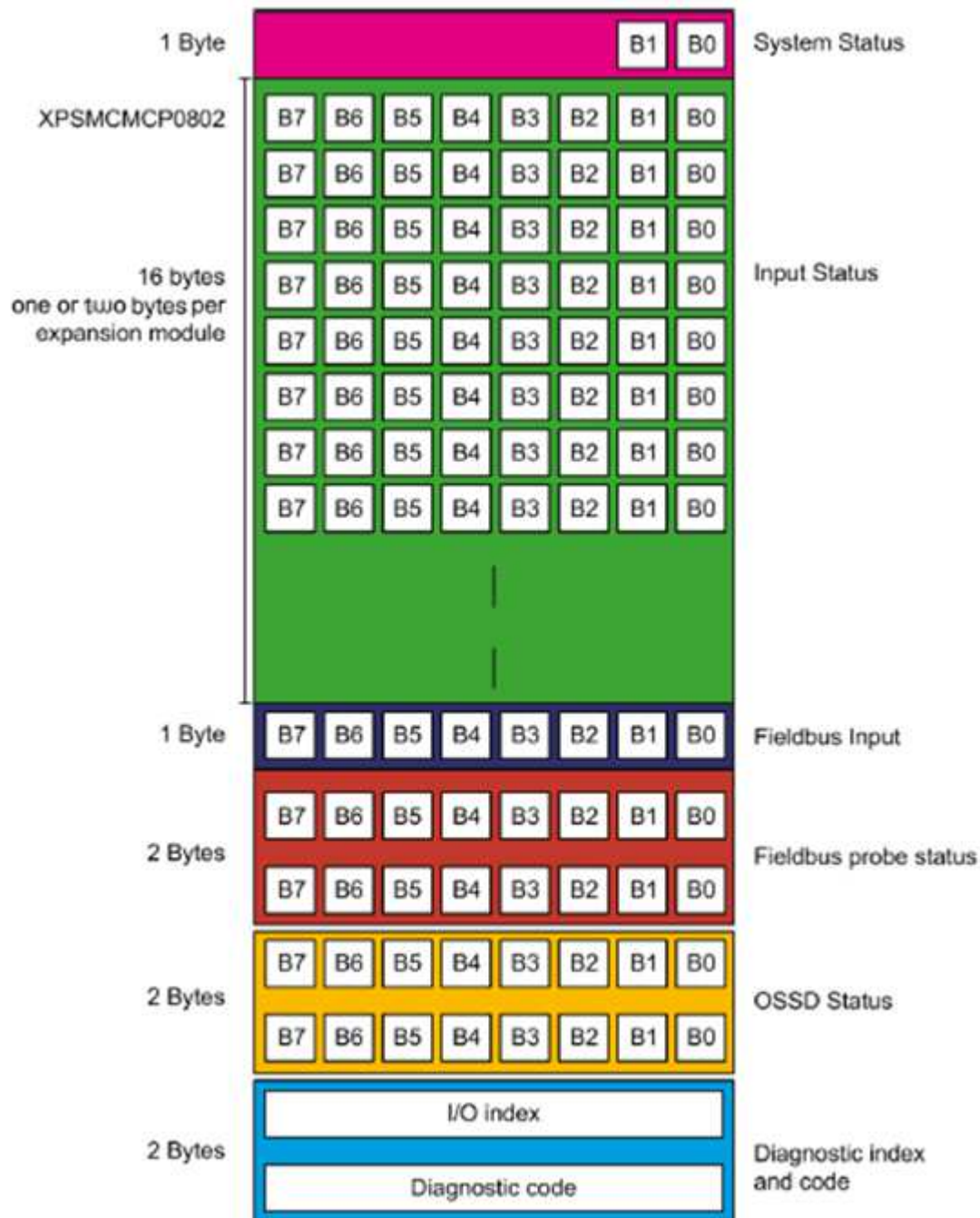
Step 3: Within tab "I/O Modular" change both Modular input and Modular output values to 0 (Picture 13).



Picture 15. Edited settings of I/O modular tab in FW 1.8

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ANNEX 1: Construction of static communication table.



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ANNEX 2: The full static process image byte vice

to XPS- MCM	I/O [byte]	Index	MB Register	IEC 61131-3 Register		EIP				
				lb	hb	Main	Sub			
	FB inputs	1	1	40001	lb	%MW0	lb	96 _h	1 _h	
out from XPS- MCM	CPU status	1	1	30001	lb	%MW256	lb	64 _h	1 _h	
	CPU inputs	1	2	30001	hb	%MW256	hb	64 _h	2 _h	
	other Inputs		2	3	30002	lb	%MW257	lb	64 _h	3 _h
			3	4	30002	hb	%MW257	hb	64 _h	4 _h
			4	5	30003	lb	%MW258	lb	64 _h	5 _h
			5	6	30003	hb	%MW258	hb	64 _h	6 _h
			6	7	30004	lb	%MW259	lb	64 _h	7 _h
			7	8	30004	hb	%MW259	hb	64 _h	8 _h
			8	9	30005	lb	%MW260	lb	64 _h	9 _h
			9	10	30005	hb	%MW260	hb	64 _h	10 _h
			10	11	30006	lb	%MW261	lb	64 _h	11 _h
			11	12	30006	hb	%MW261	hb	64 _h	12 _h
			12	13	30007	lb	%MW262	lb	64 _h	13 _h
			13	14	30007	hb	%MW262	hb	64 _h	14 _h
			14	15	30008	lb	%MW263	lb	64 _h	15 _h
			15	16	30008	hb	%MW263	hb	64 _h	16 _h
			16	17	30009	lb	%MW264	lb	64 _h	17 _h
			FB inputs	1	18	30009	hb	%MW264	hb	64 _h
		FB probes	1	19	30010	lb	%MW265	lb	64 _h	19 _h
			2	20	30010	hb	%MW265	hb	64 _h	20 _h
		OSSD & RO - relays	1	21	30011	lb	%MW266	lb	64 _h	21 _h
			2	22	30011	hb	%MW266	hb	64 _h	22 _h
		STATUS	1	23	30012	lb	%MW267	lb	64 _h	23 _h
			2	24	30012	hb	%MW267	hb	64 _h	24 _h


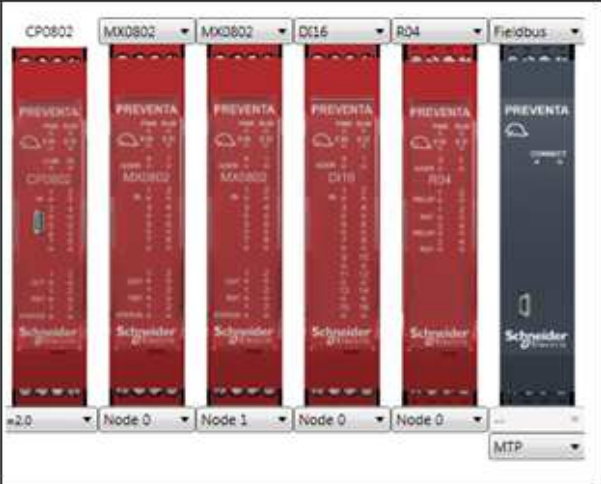
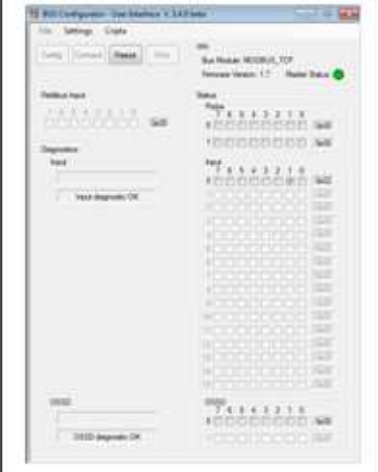
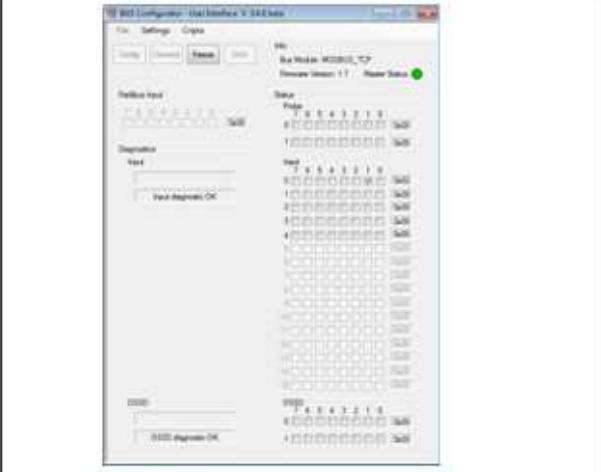
XPSMCM Preventa Modular Safety Controller addressing setup

ANNEX 3: Comparison table between features in FW V1.7 and V1.8

	Firmware version	Mapping type	I/O_Modulari	I/O Select	I/O Modular
Default	1,7	Dynamic	0	Input State x Input diagnostics x Fieldbus Input State x Probe State x Output State x Output diagnostics x	Not visible, but containing: Modular input 0 Modular output 0
Custom	1,7	Static	1	Input State x Input diagnostics x Fieldbus Input State x Probe State x Output State x Output diagnostics x	Modular input 16 Modular output 2
Default	1,8	Static	0	Input State x Input diagnostics x Fieldbus Input State x Probe State x Output State x Output diagnostics x	Not visible, but containing: Modular input 16 Modular output 2
Custom	1,8	Dynamic	1	Input State x Input diagnostics x Fieldbus Input State x Probe State x Output State x Output diagnostics x	Modular input 0 Modular output 0


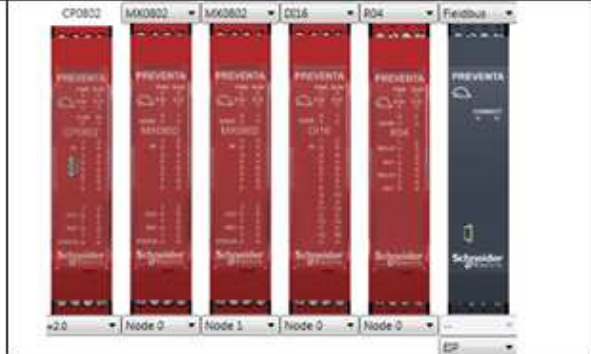
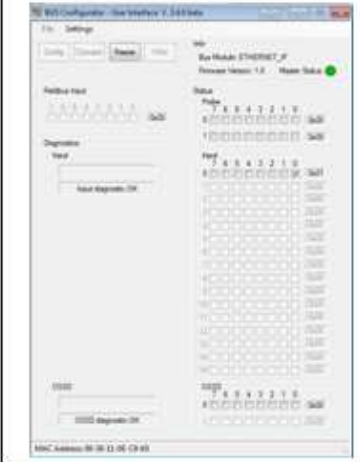
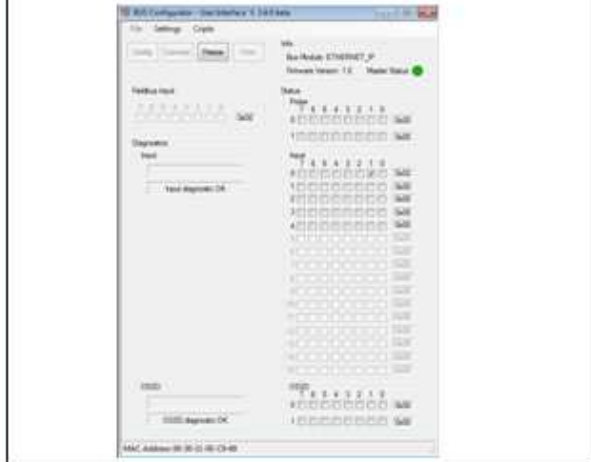
XPSMCM Preventa Modular Safety Controller addressing setup

ANNEX 4: Default configuration FW V1.7 dynamic process image in two examples

			
			
Out from XPS-MCM	Byte 1	System status	System status
	Byte 2	CPU Input_1	CPU Input_1
	Byte 3	Fieldbus Input	MX_1 Input_2
	Byte 4	Fieldbus Probe_1	MX_2 Input_3
	Byte 5	Fieldbus Probe_2	DI16(In 1...8) Input_4
	Byte 6	CPU OSSD	DI16(In 9...16) Input_5
	Byte 7	Not in use	Fieldbus Input
	Byte 8	Not in use	Fieldbus Probe_1
	Byte 9	Not in use	Fieldbus Probe_2
	Byte 10	Not in use	CPU, MX_1 & MX_2 OSSD & RO4(Out 1 & 2)
	Byte 11	Not in use	RO4(Out 3 & 4)

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ANNEX 5: Default configuration FW V1.8 static process image in two examples

			
			
Out from XPS-MCM	Byte 1	System status	System status
	Byte 2	CPU Input_1	CPU Input_1
	Byte 3	Reserved	MX_1 Input_2
	Byte 4	Reserved	MX_2 Input_3
	Byte 5	Reserved	DI16(In 1...8) Input_4
	Byte 6	Reserved	DI16(In 9...16) Input_5
	Byte 7	Reserved	Reserved
	Byte 8	Reserved	Reserved
	Byte 9	Reserved	Reserved
	Byte 10	Reserved	Reserved
	Byte 11	Reserved	Reserved
	Byte 12	Reserved	Reserved
	Byte 13	Reserved	Reserved
	Byte 14	Reserved	Reserved
	Byte 15	Reserved	Reserved
	Byte 16	Reserved	Reserved
	Byte 17	Reserved	Reserved
	Byte 18	Fieldbus Input	Fieldbus Input
	Byte 19	Fieldbus Probe_1	Fieldbus Probe_1
	Byte 20	Fieldbus Probe_2	Fieldbus Probe_2
	Byte 21	CPU OSSD	CPU, MX_1 & MX_2 OSSD & RO4(Out 1 & 2)
	Byte 22	Reserved	RO4(Out 3 & 4)
	Byte 23	Diagnostic index	Diagnostic index
	Byte 24	Diagnostic code	Diagnostic code