MOSAIC FIELDBUS MODULES



Installation and use

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INTRODUCTION

This technical sheet describes the operation of the fieldbus modules of the MOSAIC series:
MBP (PROFIBUS DP-V1), MBD (DeviceNet), MBC (CANOpen), MBEC (ETHERCAT), MBEI (ETHERNET/IP), MBEP (PROFINET), MBEM (Modbus TCP), MBMR (Modbus RTU), MBCCL (CC-Link), MBU (USB), MBEPL (POWERLINK).

ELECTRICAL CONNECTIONS

Each module is provided with four connectors (Figure 1):

1) 5 way connector MSC --> to the system MOSAIC
2) USB miniB connect --> to the PC
3) BUS connector --> to the fieldbus (not present on MBU)
4) Front terminal --> power supply

TERMINAL BLOCK (SIDE A - TOP)		TERMINAL BLOCK (SIDE B - BOTTOM)	
TERMINAL	**SIGNAL**	**TERMINAL**	**SIGNAL**
1	*+24VDC ± 20%*	*5*	*-*
2	*-*	*6*	*Serial line RS-485 -(A)*
3	*-*	*7*	*GND*
4	*GND*	*8*	*Serial line RS-485 +(B)*
		➔ *The bottom connector with RS-485 interface is used only for the data exchange with HM1*	

Table 1

- Install safety units in an enclosure with a protection class of at least IP54.
- The supply voltage to the units must be 24Vdc ±20% (PELV, in compliance with the standard EN 60204-1).
- Do not use MOSAIC to supply external devices.
- The same ground connection (0VDC) must be used for all system components.

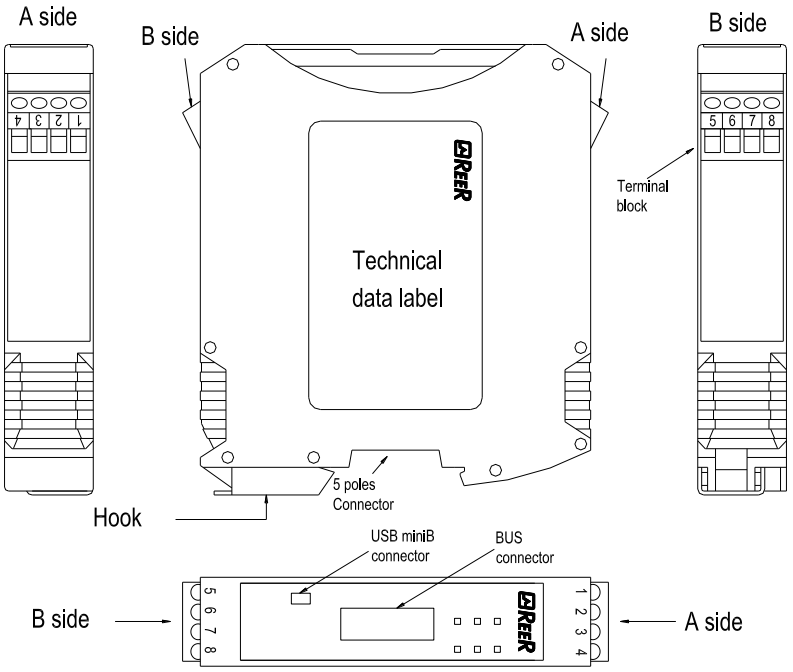


Figure 1

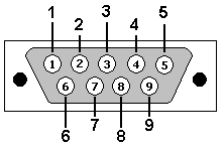
SIGNALS AND PINOUT

MEANING	LED					
	ON	RUN	IN FAIL	EXT FAIL	LED1	LED2
	GREEN	GREEN	RED	RED	RED/GREEN	RED/GREEN
Startup - Initial test	ON	ON	ON	ON	ON	ON
Waiting for configuration from Master	ON	OFF	OFF	OFF	see the modules tables	
Received configuration from Master	ON	ON	OFF	OFF		

Table 2 – Initial/ dynamic view.

Module MBC





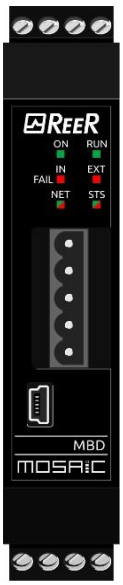
DB9 – male
(front view)

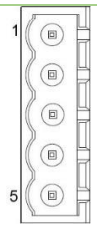
Pin	Signal
1	**-**
2	**CAN_L**
3	**CAN_GND**
4	**-**
5	**CAN_SHIELD**
6	**-**
7	**CAN_H**
8	**-**
9	**-**
Housing	**CAN_SHIELD**

LED OPR		
STATUS	**INDICATION**	**DESCRIPTION**
GREEN	OPERATIONAL	OPERATIONAL status
GREEN blinking slow	PRE-OPERATIONAL	PRE-OPERATIONAL status
GREEN 1 flash	STOPPED	STOPPED status
GREEN blinking fast	Autobaud	Baud rate detection
RED	EXCEPTION	EXCEPTION status

LED ERR		
STATUS	**INDICATION**	**DESCRIPTION**
OFF	-	Normal operation
RED 1 flash	Warning level	A bus error counter has reached the warning level
RED blinking fast	LSS	LSS service operative
RED 2 flashes	Event Control	Detected ***Node Guarding*** (NMT master or slave) or ***Heartbeat*** (Consumer)
RED	Lack of BUS	BUS not working

Module MBD





Pin	Signal	Description
1	**V-**	Negative BUS power supply
2	**CAN_L**	CAN low bus line
3	**SHIELD**	Cable shield
4	**CAN_H**	CAN high bus line
5	**V+**	Positive BUS power supply

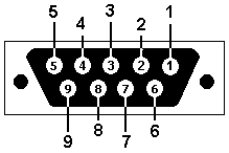
(front view)

LED NET		
STATUS	**INDICATION**	**DESCRIPTION**
GREEN	On-line connected	1 or more connections established
GREEN blinking (1Hz)	On-line non connected	No connection established
RED	Critical connection error	MBD unable to communicate
RED blinking (1Hz)	Time-out of 1 or more connection	One or more I/O device in time-out
GREEN/RED alternate	TEST	MBD in Test

LED STS		
STATUS	**INDICATION**	**DESCRIPTION**
GREEN	-	Normal operation
GREEN blinking (1Hz)	Pending	Configuration incomplete, MBD waiting for activation
RED	Fatal error	One or more unrecoverable errors detected
RED blinking (1Hz)	Error	One or more recoverable errors detected
GREEN/RED alternate	TEST	MBD in Test

Module MBP





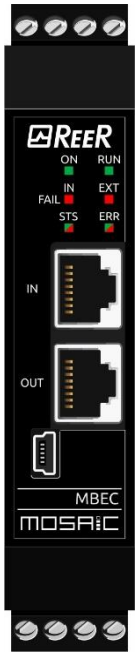
DB9 – female
(front view)

Pin	Signal	Description
1	-	-
2	-	-
3	**B-line**	Positive RxD/TxD, RS485 level
4	**RTS**	Request to send
5	**GND Bus**	0VDC (isolated)
6	**5V**	+5VDC (isolated/short circuit protected)
7	-	-
8	**A-line**	Negative RxD/TxD, RS485 level
9	-	-
Housing	**Cable shield**	Internally connected to the Anybus protective earth via cable shield filters according to the PROFIBUS standard.

LED MODE		
STATUS	**INDICATION**	**DESCRIPTION**
GREEN	On-line	data exchange
GREEN blinking	On-line	CLEAR
RED blinking (1 flash)	Parameterization error	rif. IEC 61158-6
RED blinking (2 flashes)	PROFIBUS configuration error	configuration data MASTER or MBP wrong

LED STS		
STATUS	**INDICATION**	**DESCRIPTION**
OFF	MBP not initialized	Status **SETUP** o **NW_INIT**
GREEN	Initialized	End of initialization **NW_INIT**
GREEN blinking	Initialized with diagnostic active	**EXTENDED DIAGNOSTIC** bit set
RED	Exception error	**EXCEPTION** status

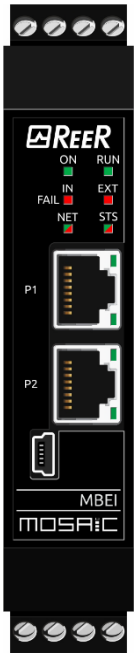
Module MBEC



LED STS		
STATUS	**INDICATES**	**DESCRIPTION**
OFF	INIT	INIT or no power
GREEN	OPERATIONAL	OPERATIONAL state
GREEN blinking	PRE-OPERATIONAL	PRE-OPERATIONAL state
GREEN blinking (1 flash)	SAFE-OPERATIONAL	SAFE-OPERATIONAL state
Flickering	BOOT	Module in BOOT state
Red	(Fatal Event)	System locked

LED ERR		
STATUS	**INDICATES**	**DESCRIPTION**
OFF	No error	No error or no power
RED blinking	Configuration not valid	Status change requested by master not possible
RED blinking (1 flash)	Unsolicited state change	Slave device application has changed the module state
RED blinking (2 flashes)	Watchdog timeout	Synch manager watchdog timeout
Red	Controller failure	Anybus module in EXCEPTION state
Flickering	Booting error	E.g. due to firmware download failure

Module MBEI

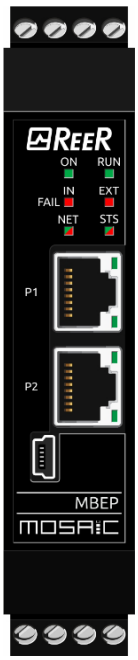


LED NET	
STATE	**INDICATES/DESCRIPTION**
OFF	No power or no IP address
GREEN	On-line, connected
GREEN blinking	On-line, not connected
RED	Duplicate IP address
RED blinking	Connection timeout

LED STS		
STATE	**INDICATES**	**DESCRIPTION**
OFF	No power	-
GREEN	RUN state	-
GREEN blinking	Not configured	-
RED	Fatal error	One or more non-recoverable errors detected
RED blinking	Error	One or more recoverable errors detected

1. **MBEI module comes with 2x RJ45 ports. This is a dual port switch.**
2. **MBEI module supports both linear and ring topology (DLR, Device Level Ring)**

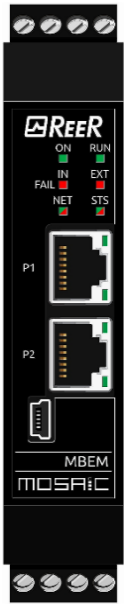
Module MBEP



LED NET		
STATE	**INDICATES**	**DESCRIPTION**
OFF	Offline	• No power • Connection with IO controller not present
GREEN	Online (RUN)	• Established connection with IO controller • IO controller in RUN state
GREEN blinking (1 flash)	Online (STOP)	• Established connection with IO Controller • IO Controller in STOP state or IO data bad • IRT synchronization not finished
GREEN blinking	Blink	Used to identify the network node
RED	Fatal event	Major internal error (combined with a red module STS led)
RED blinking (1 flash)	Station Name error	Station Name not set
RED blinking (2 flashes)	IP address error	IP address not set
RED blinking (3 flash)	Configuration error	Expected identification differs from real identification

LED STS		
STATE	**INDICATES**	**DESCRIPTION**
OFF	Not initialized	No power or Module in SETUP or NW_INIT state
GREEN	Normal operation	Module has shifted from the NW_INIT state
GREEN blinking (1 flash)	Diagnostic event (s)	Diagnostic event (s) present
RED	Exception error	Device in state EXCEPTION
	Fatal event	Major internal error (combined with a red NET led module)
Alternating RED/GREEN	Firmware update	Do NOT power off the module. It could cause a permanent damage.

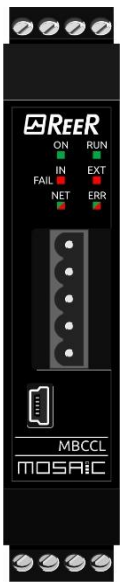
Module MBEM

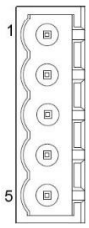


LED NET	
STATE	**INDICATES / DESCRIPTION**
OFF	Module in EXCEPTION state or no IP address
GREEN	On-line, at least one message received
GREEN blinking	On-line, waiting for first message
RED	IP address conflict, FATAL ERROR
RED blinking	Connection Timeout. No message received

LED STS	
STATE	**INDICATES / DESCRIPTION**
OFF	No power
GREEN	Normal operation
RED	Major fault; module in state EXCEPTION (or fatal event)
RED blinking	Minor fault detected
Alternating RED/GREEN	Firmware update from file system in progress

Module MBCCL





Pin	Signal	Description
1	**DA**	Positive RS485 RxD/TxD
2	**DB**	Negative RS485 RxD/TxD
3	**DG**	Signal Ground
4	**SLD**	Cable shield
5	**FG**	Protective Earth

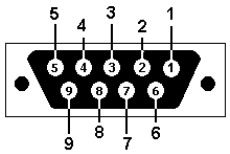
(front view)

LED NET		
STATUS	**DESCRIPTION**	
OFF	No network participation, timeout status (no power)	
GREEN	Participating, normal operation	
RED	Major fault (FATAL error)	

LED ERR		
STATUS	**INDICATION**	**DESCRIPTION**
OFF	No error (no power)	Normal operation
RED	Major fault	Exception or FATAL event
RED flickering	(Temporary flickering) CRC	CRC Error
RED flashing	(Continuous flashing) PARAMETERS	Station Number or Baud Rate has changed since startup

Module MBMR





DB9 – female
(front view)

Pin	Direction	Signal	Description
Housing	-	**PE**	Protective Earth
1	-	**GND**	Bus polarization 0VDC (isolated)
2	OUT	**5V**	Bus polarization +5VDC (isolated)
3	IN	**PMC**	Connect to pin 2 for RS-232 / Leave unconnected for RS-485
4	-	**-**	-
5	Bidirectional	**B-line**	RS-485 B-line
6	-	**-**	-
7	IN	**Rx**	RS-232 Data Receive
8	OUT	**Tx**	RS-232 Data Transmit
9	Bidirectional	**A-line**	RS-485 A-line

LED NET		
STATE	**INDICATES**	**DESCRIPTION**
OFF	No power or no data exchange	-
YELLOW	Frame Reception or Transmission	Data exchange
RED	Fatal Error	One or more non-recoverable errors detected

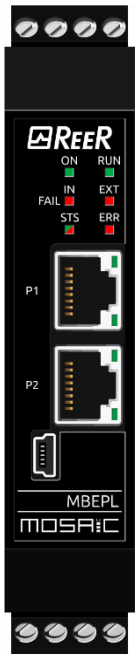
LED STS		
STATE	**INDICATES**	**DESCRIPTION**
OFF	Initializing or no power	-
GREEN	Module initialized	Module initialized – no error
RED	Fatal Error	One or more non-recoverable errors detected
RED blinking (1 flash)	Communication fault or configuration error	• Invalid setting in Network Configuration Object • Setting in Network Configuration Object has been changed during operation
RED blinking (2 flashes)	Application diagnostic available	-

Module MBU



LED CONNECT		
STATE	**INDICATES**	**DESCRIPTION**
Green	USB connected	Module connected to Pc via USB
OFF	USB not connected	Module not connected

Module MBEPL



LED STS		
STATE	**INDICATES**	**DESCRIPTION**
OFF	Off	Module is off, initializing, or not active.
GREEN fast flashing (on 50ms - off 50ms)	NMT_CS_BASIC_ETHERNET	Basic Ethernet state: no POWERLINK traffic has been detected.
GREEN single flash	NMT_CS_PRE_OPERATIONAL_1	Only asynchronous data.
GREEN double flash	NMT_CS_PRE_OPERATIONAL_2	Asynchronous and synchronous data. No PDO data. Any process data sent is declared not valid a d received process data must be ignored in this state.
GREEN triple flash	NMT_CS_READY_TO_OPERATE	Ready to operate. Asynchronous and synchronous data. No PDO data. Any process data sent is declared not valid and received process data must be ignored in this state.
GREEN	NMT_CS_OPERATIONAL	Fully operational. Asynchronous and synchronous data. PDO data is sent and received.
GREEN slow flashing (on 200ms - off 200ms)	NMT_CS_STOPPED	Module stopped (for controlled shutdown, for example). Asynchronous and synchronous data. No PDO data. Any process data sent is declared not valid and received process data must be ignored in this state.
RED	Error	If the ERROR LED also is red, a fatal event was encountered.

LED ERR		
STATE	**INDICATES**	**DESCRIPTION**
OFF	No error	No error.
RED	Error	If the STATUS LED is not red, a non-fatal error has been detected. If the STATUS LED is red, a fatal event was encountered.

FAULT DIAGNOSIS						
MEANING	**LED**					
	ON GREEN	**RUN GREEN**	**IN FAIL RED**	**EXT FAIL RED**	**LED1 RED/GREEN**	**LED2 RED/GREEN**
Internal fault microcontroller	ON	OFF	2 flashes*	OFF	see the modules tables	
Internal board fault	ON	OFF	3 flashes*	OFF		
Configuration Error	ON	OFF	5 flashes*	OFF		
BUS communication Error	ON	OFF	5 flashes*	OFF		
BUS communication interruption	ON	OFF	ON	OFF		
Detected an identical module	ON	OFF	5 flashes*	5 flashes		

Table 3

*** The LED frequency of flashing is: ON for 300ms and OFF for 400ms, with an interval between two sequences of 1s.**

DESCRIPTION

The MBx communication module gives access to various information related to the Mosaic system and allows to send commands from the PLC.

Each device connected to the Mosaic inputs is characterized by an ON/OFF status and a possible diagnostic. The processing of the inputs according to the program loaded on the Mosaic generates the ON/OFF status of the safety outputs which can also have diagnostics.

PROCESS IMAGE

System status and I/O status are available on the cyclic process image, while I/O diagnostics, system errors and the M1/M1S program CRC are accessible as acyclic data.

The process image has a fixed size with subsections for each information group: there are sections showing the status of the Mosaic inputs, the status of the safety outputs, the status of the probes and, if the dedicated module is present, the value of the analogue measures.

The Fieldbus inputs allows the PLC to cyclically send up to 32 ON/OFF status and are used as unsafe inputs in the Mosaic program.

The System status bits are described as follows:

1. Bit 0: present Mosaic presence
2. Bit 1: present diagnostic presence
3. Bit 2: error presence

The acyclic sections for diagnostics or errors report significant data if the relative bit is present in the status byte.

The section dedicated to the **input status** has a size of 16 bytes and allows to know the status of up to 128 inputs. The priority order of the modules is as follows:

- **M1/M1S, MI8O2, MI16, MI8, MI12T8, MV2T/MV2H/MV2S, MV1, MV0, MA4, MI8O4, MA2.**

The section dedicated to the **safety outputs status** has a size of 4 bytes and allows to know the status of up to 32 outputs. The priority order of the modules is as follows:

- **M1/M1S, MI8O2, MO2, MO4, MOR4, MOR4S8, MO4LHCS8, MI8O4, MO4L.**

If two or more modules of the same type are installed the one with the lowest node number is shown first.

Each module with digital inputs occupies a number of bits corresponding to the number of physical inputs; thus modules M1/M1S, MI8, MI8O2, MI8O4 will use 1 byte, modules MI12T8 and MI16 will use 2 bytes. Modules MV0, MV1 and MV2 uses 1 byte each. Modules MA4 and MA2 will use 1 byte each.
The status of the probe is represented with 4 bytes.

In fieldbus where the allocation is important (e.g. PROFIBUS, PROFINET), the Fieldbus input bytes must be mapped before the bytes in output.

If there is a fieldbus module in the Mosaic system, MSDesigner will include in the report a table with the I/O index for all inputs, fieldbus inputs, probes and safety outputs in the circuit diagram. For the process data mapping description for your fieldbus please refer to the Addendum1: **“Process data mapping for MBx Fieldbus expansion modules”** annex at the bottom of the present manual.

DIAGNOSTICS

Each input and each safety output can generate a diagnostic code.
When the I/O is connected correctly, the diagnostic code is OK and is not exported to the fieldbus; when a problem on the I/O is detected, the system exports 2 bytes to the fieldbus with:

- **the index of the I/O in question**
- **the relative diagnostic code**

The "I/O index" field

This field indicates the number used to identify the I/O with a diagnostic code other than OK.
The I/O index range depends from the system version used. Refer to the following tables to know these data.

SYSTEM VERSION IN USE (version for M1 fw < 5.0.0)	
TYPE OF SIGNAL	**I/O INDEX**
Input	1-128
Output	192-255

Table 4

SYSTEM VERSION IN USE (version for M1S fw ≥ 5.0.0)	
TYPE OF SIGNAL	**I/O INDEX**
Input	1-128
Output	1-32

Table 5

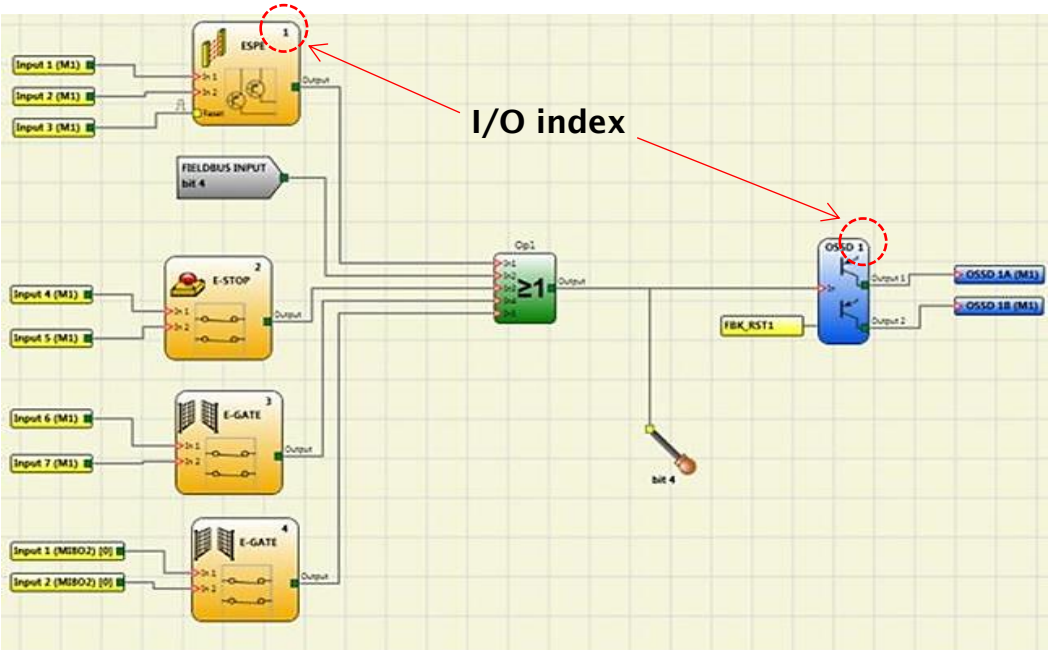


Figure 2 - Index of I/O

The "Diagnostic code" field

The *"Diagnostic code"* field indicates the diagnostics for the I/O. Possible values for this field are shown in the following tables.

Input diagnostics		
CODE	**NAME**	**MEANING**
128	Input diagnostics OK	
1	Not passed from zero	Both contacts have not returned to their rest position
2	Simultaneous control failed	The two contacts of a generic two-channel input do not close simultaneously
3	Two hands Simultaneity failed hand 1	Incorrect connection of one side of a two-hand command
4	Two hands Simultaneity failed hand 2	Incorrect connection of one side of a two-hand command
7	Incoherent selector	The selector cannot have more than one active input
8	Disconnected selector	The selector cannot have any active input
10	OUT_TEST error	Presence of diagnostics on an OUT_TEST connected to the input
11	Second input KO	Redundancy check failed on entry
13	Output connected to other inputs	The test output is not connected to the configured input
14	Output OK but input connected to 24DC	Input blocked
15	Short circuit between photocell test and photocell input	The response time of the photocell is too low
16	Photocell does not respond	Test signal on the emitter is not present on the photocell receiver
17	Short circuit between photocells	Test signal is present on two different photocells
18	Safety carpet not connected	One of the two carpet connections is not correct
19	Output not congruent to feedback	Test signal applied to the input is present on more than one OUT_TEST
20	Wrong connection	Test signal is present on more than one input
21	Stucked output	Test signal applied to the input is not present on the OUT_TEST
22	Second OUT_TEST KO	Redundancy check failed on OUT_TEST
23	MVx Proxy resource missing	
24	MVx Encoder resource missing	
25	MVx Resource proxy encoder missing	
26	MVx Resource proxy1 proxy2 missing	
27	MVx Resource encoder1 encoder2 missing	
28	MVx Frequency congruence error	
29	MVx Encoder supply missing	
30	MVx Encoder fault	
40	MA4 Reading out of lower threshold	
41	MA4 Disconnected sensor	
42	MA4 Reading out of upper threshold	
43	MA4 Overload	
44	MA4 Mismatch between channels	
133	Simultaneity two failed hands	The two contacts of a two-handed control do not close at the same time
134	Never started	Input with failed test at startup
137	Waiting for restart	Reset to an input with manual reset has not been activated
133 (0x85)[1]	TWO-HAND concurrent failed	Two-hands switch has to change state simultaneously
134 (0x86)[2]	Not started	Start test failed
137 (0x89)[3]	Waiting for restart	The input has manual reset and has not been restarted

Table 6

1 The diagnostic 133 does not provide visual error message on the LED Mosaic
2 The diagnostic 134 does not provide visual error message on the LED Mosaic
3 The diagnostic 137 does not provide visual error message on the LED Mosaic

Output diagnostics		
CODE	**NAME**	**MEANING**
0	Output diagnostics OK	
1	Enable missing	
2	Waiting for OSSD to restart	
3	Feedback K1 K2 missing	
4	Waiting for other micro	Redundancy check failed on the OSSD
5	OSSD power supply missing	
6	Exceeded maximum time restart	
7	Feedback K1 K2 external not congruous	
8	Waiting feedback K1 K2	
9	OSSD output overload	
10	OSSD with load set to 24V	

Table 7

EXAMPLES OF DIAGNOSTICS

Example 1

In the example shown in Figure 3, Input 1 (connected to module M1/M1S) is tested with the M1-T1 test signal. During wiring, the 24Vdc is connected to input 1 instead of the M1-T1 test signal.

- The I/O index and Diagnostic code fields assume the following values: 1 - 20 to indicate the diagnostics on input 1 of module M1/M1S *(Connection error).*

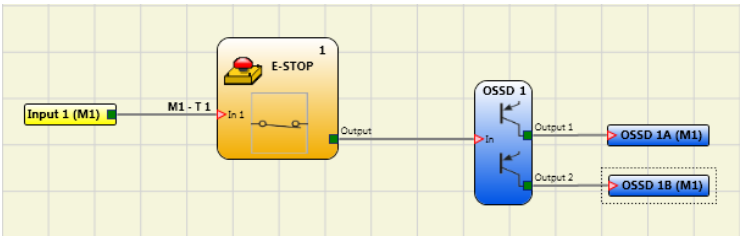


Figure 3

Example 2

In this example, the I/O index corresponds to the logical block and not to the physical terminal on module M1/M1S.
In Figure 4 for example, the two-hand element connected to the Input 1 and Input 2 physical terminals corresponds to *I/O index No. 1* and the emergency stop connected to the Input 3 and Input 4 terminals corresponds to *I/O index No. 2.*

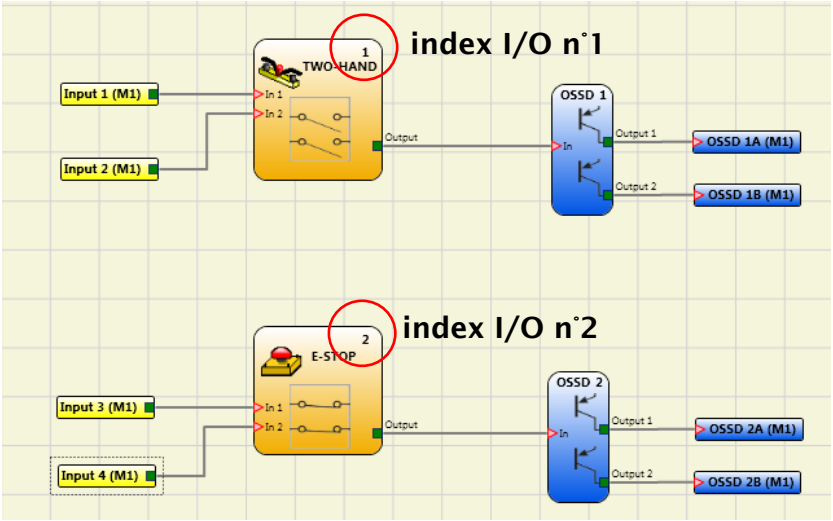


Figure 4

Example 3

The example in Figure 5 is similar to example 1, except in this case Input1 is connected to module MI16 and is tested with the MI16-T1 test signal.
During wiring, the 24Vdc is connected to input 1 instead of the MI16-T1 test signal.
Input 1 has diagnostic code 20 (Wrong connection).

- The I/O index and Diagnostic code fields assume the following values: 1 - 20 to indicate the diagnostics on input 1 of module MI16.

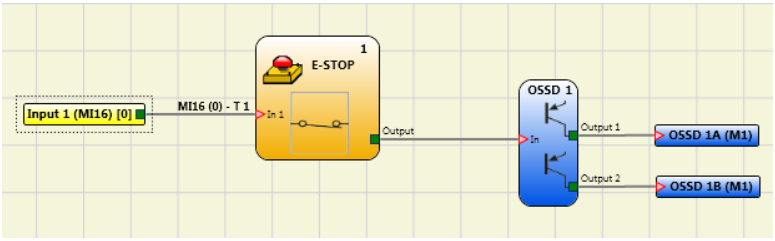


Figure 5

Example 4

In the example shown in Figure 6 the manual reset function is enabled on OSSD 1.
The pushbutton connected to input 1 is pressed without sending a reset command.

- The I/O index and Diagnostics code fields assume the following values: 192 - 2
- to indicate the diagnostics on OSSD 1A/1B *(Table 4: 192 = first output)*.
- to indicate the diagnostic code *(Table 7: 2 = Waiting for OSSD to restart)*.

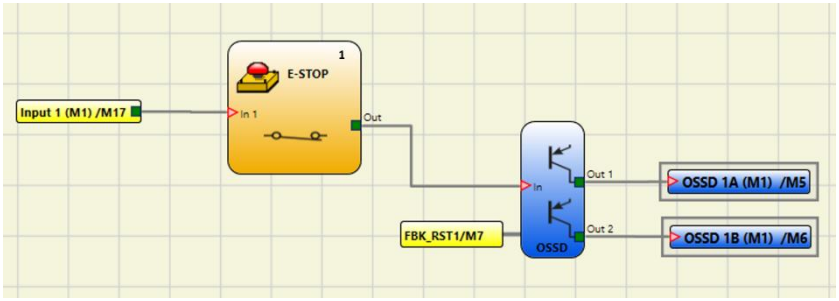


Figure 6

BUS CONFIGURATOR USER INTERFACE

The bus module is configured using the USB miniB interface on the front panel and the "Bus Configurator – User interface" software installed on the MSDESIGNER CD ROM disk.

This software can be used for configuration/communication of the MOSAIC system with a PC (using an MBU module) or to monitor the data transmitted on the fieldbus (via connection to the USB port of a bus module).
The diagram below is helpful for understanding possible connections:

EXAMPLES OF CONNECTION

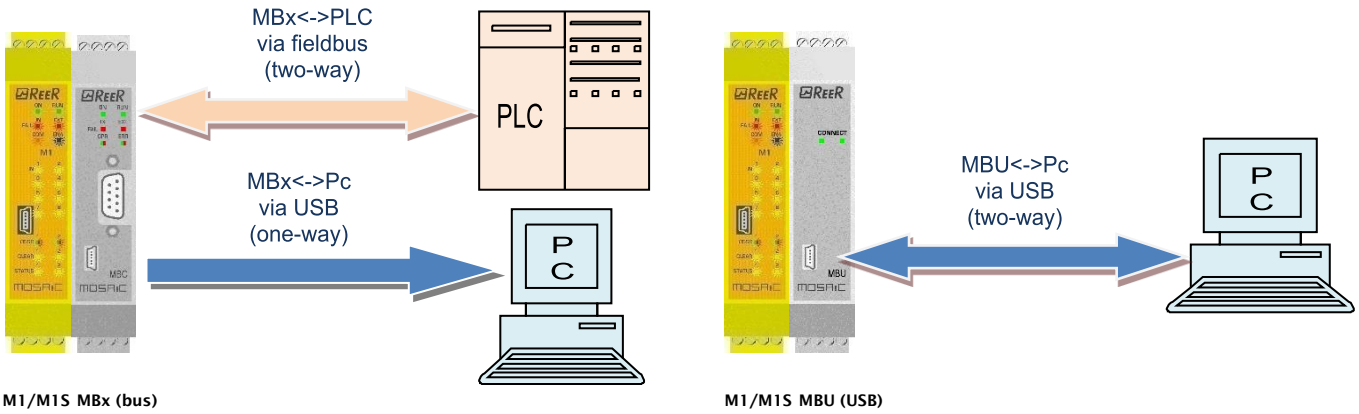


Figure 7

It is important to note that the Bus Configurator behaves differently, depending on whether communication is with an MBx module or an MBU module:

- MBx MODULE: THE SOFTWARE ONLY ALLOWS DATA TRANSMITTED VIA BUS TO BE DISPLAYED.
- MBU MODULE: THE SOFTWARE ALLOWS TWO-WAY DATA TRANSMISSION MBU↔PC (in this case the programmer can set the Fieldbus input directly via computer).

The configuration data depend on the type of the fieldbus module that is connected: the address field range and the baudrate data will adapt to the fieldbus type.
Selecting the checkbox Analog data will enable the data to be present on the Process image, changing its size.

Graphical User Interface

➔ Module configuration must be performed with the system switched off (outputs OFF).

Operator can query module configuration at any time while the module is in use.
To configure the MBx module, proceed as follows:

1. connect the module to the 24VDC±20% power supply via the terminal block;
2. connect the USB cable to the PC and to the MBx module;
3. double click on the "***BUS CONFIGURATOR – USER INTERFACE***" desktop icon.

The configuration window is displayed:

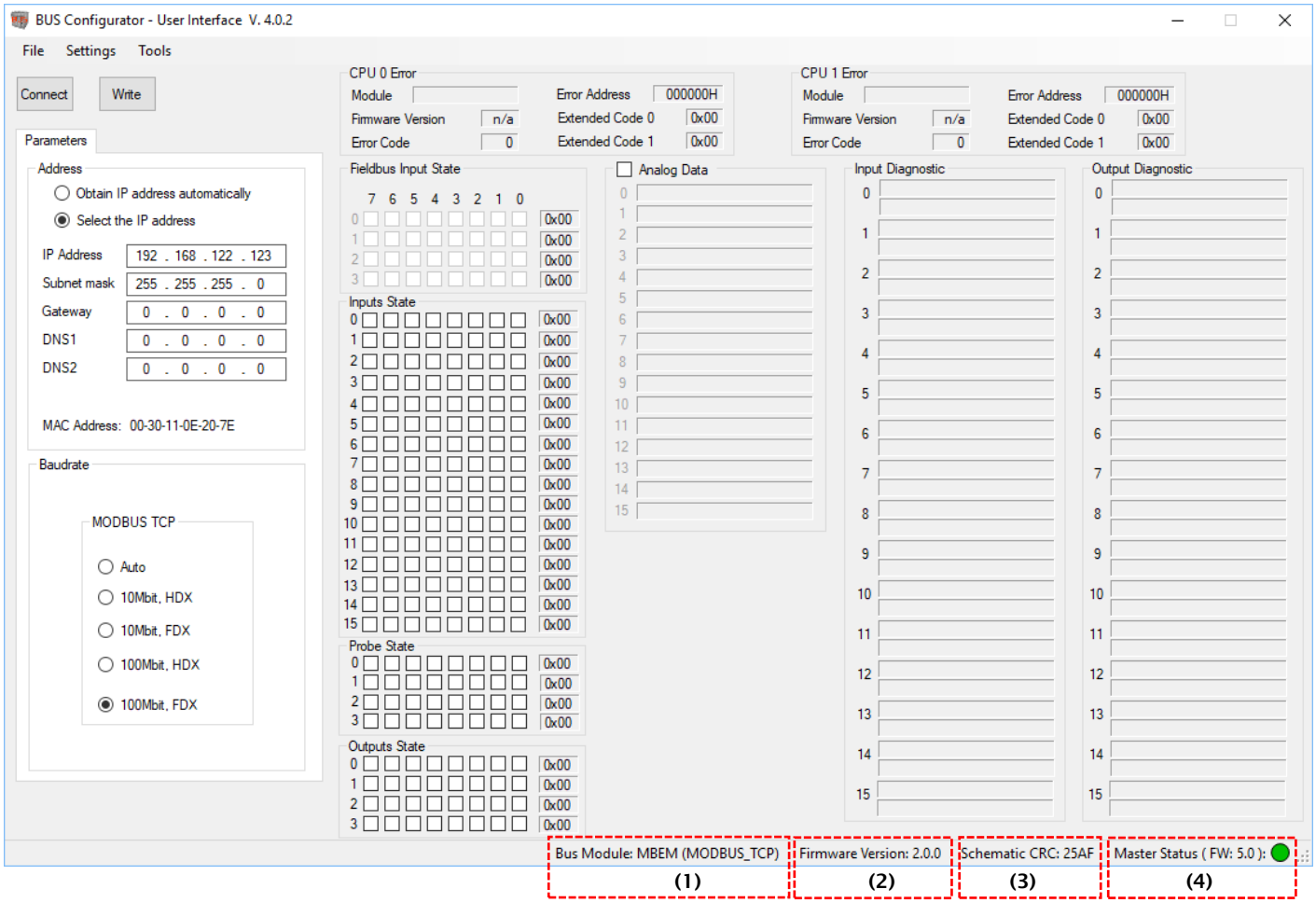


Figure 8

4. Press the "CONNECT" button.

The program recognizes that a MBx bus module is connected (Figure 8); the status bar shows the the MBx fieldbus model **(1)**, the MBx firmware version **(2)**, the schematic CRC **(3)** and the Master status and firmware version **(4)**:

- gray: the MBx is not connected
- orange: the MBx is getting/sending the configuration from the Bus configurator
- green: the Master is active (RUN)
- red: the Master is not active (e.g. communication with Designer)

Once the module is connected it is recognized and the operator can configure the parameters by selecting the different areas shown in *Figure 8*; press the ***WRITE*** button to send the configuration data to the module.
As soon as the bus module receives the data, the configurator enters the monitor condition.
The input, output, analog data status and relative diagnostics are illustrated in Figure 8.
Only the first 16 input diagnostics and output diagnostics are shown, if there are more than 16 diagnostics the exceeding one are displayed after the previous one are solved.
The Fieldbus input logical status can be changed by the user only with the MBU module, they are in read only mode for all the other fieldbuses and they'll display the status written by the external PLC.

BACKWARD COMPATIBILITY (VERSION FOR M1 fw < 5.0.0)

Process Image in backward compatibility (version for M1 fw < 5.0.0)

The backward compatibility mode allows the Bus module to use the "old" process image mapping, i.e.: it will adapt to the hardware installed on the system. This allows to replace an existing Bus module without changing the PLC program.

➔ The backward compatibility mode works only if the Bus module is connected to an M1 master module. If a Bus device is set-up in backward compatibility mode and is connected to an M1S the Bus module will go in fault.

System status, I/O status and I/O diagnostics are available on the cyclic process image.

The process image has a variable size depending on which modules are installed in the Mosaic system.

In the process image there are subsections for each information group: there are sections showing the status of the Mosaic inputs, the status of the safety outputs, the status of the probes.

The Fieldbus inputs allows the PLC to cyclically send up to 8 ON/OFF status and are used as unsafe inputs in the Mosaic program.

The System status bits are described as follows:

1. Bit 0: present Mosaic presence
2. Bit 1: present diagnostic presence

The section for diagnostics reports significant data if the relative bit is present in the status byte.

The section dedicated to the **input status** has a size of 16 bytes and allows to know the status of up to 128 inputs. The priority order of the modules is as follows:

- **M1, MI8O2, MI16, MI8, MI12, MV2, MV1, MV0.**

The section dedicated to the **safety outputs status** has a size of 1 or 2 bytes and allows to know the status of up to 16 outputs. The priority order of the modules is as follows:

- **M1, MI8O2, MO2, MO4, MOR4, MOR4S8, MO4LHCS8.**

If two or more modules of the same type are installed the one with the lowest node number is shown first.

Each module with inputs has a number of bits corresponding to the number of physical inputs; thus modules M1, MI8, MI8O2, MI8O4 will use 1 byte and modules MI12T8 and MI16 2 bytes. Modules MV0, MV1 and MV2 uses 1 byte each.
The status of the probe is represented with 2 bytes.

In fieldbus where the allocation is important (e.g. PROFIBUS, PROFINET), the Fieldbus input bytes must be mapped before the bytes in output.

If there is a fieldbus module in the Mosaic system, MSDesigner will include in the report a table with the I/O index for all inputs, fieldbus inputs, probes and safety outputs in the circuit diagram.

The input and output memory maps are described in Figure 10.

Diagnostic elements will use 2 bytes which indicate the number of the I/O with the problem and the value of the diagnostic element. If there is more than one diagnostic element, the relative values alternate every 500ms.

Each set of information:

- input status,
- input diagnostics,
- fieldbus input status,
- probe status,
- safety output status,
- safety output diagnostics

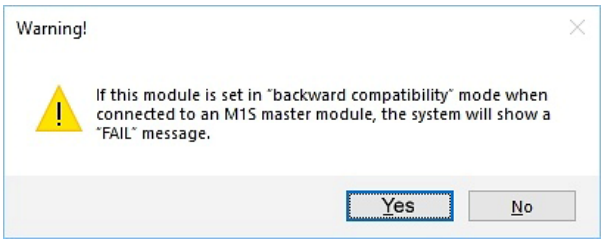
can be enabled/disabled in order to control the information and thus the number of bytes exported to the fieldbus.

The definition of the process image in the input and output is shown from the point of view of the Mosaic.

Graphical User Interface, backward compatibility (version for M1 fw< 5.0.0.)

➔ The backward compatibility mode allows the operator to use the MSD software by having an M1 master module with firmware version lower than 5.0.0.

This mode can be enabled from the menu: "**settings -> enable backward compatibility**"
This will bring up a pop-up window with the following message:



The user can choose which subsection must be exported in the fieldbus (refer to Figure 9).
Once the configuration data are selected the operator must press the "WRITE" key to send them to the module.

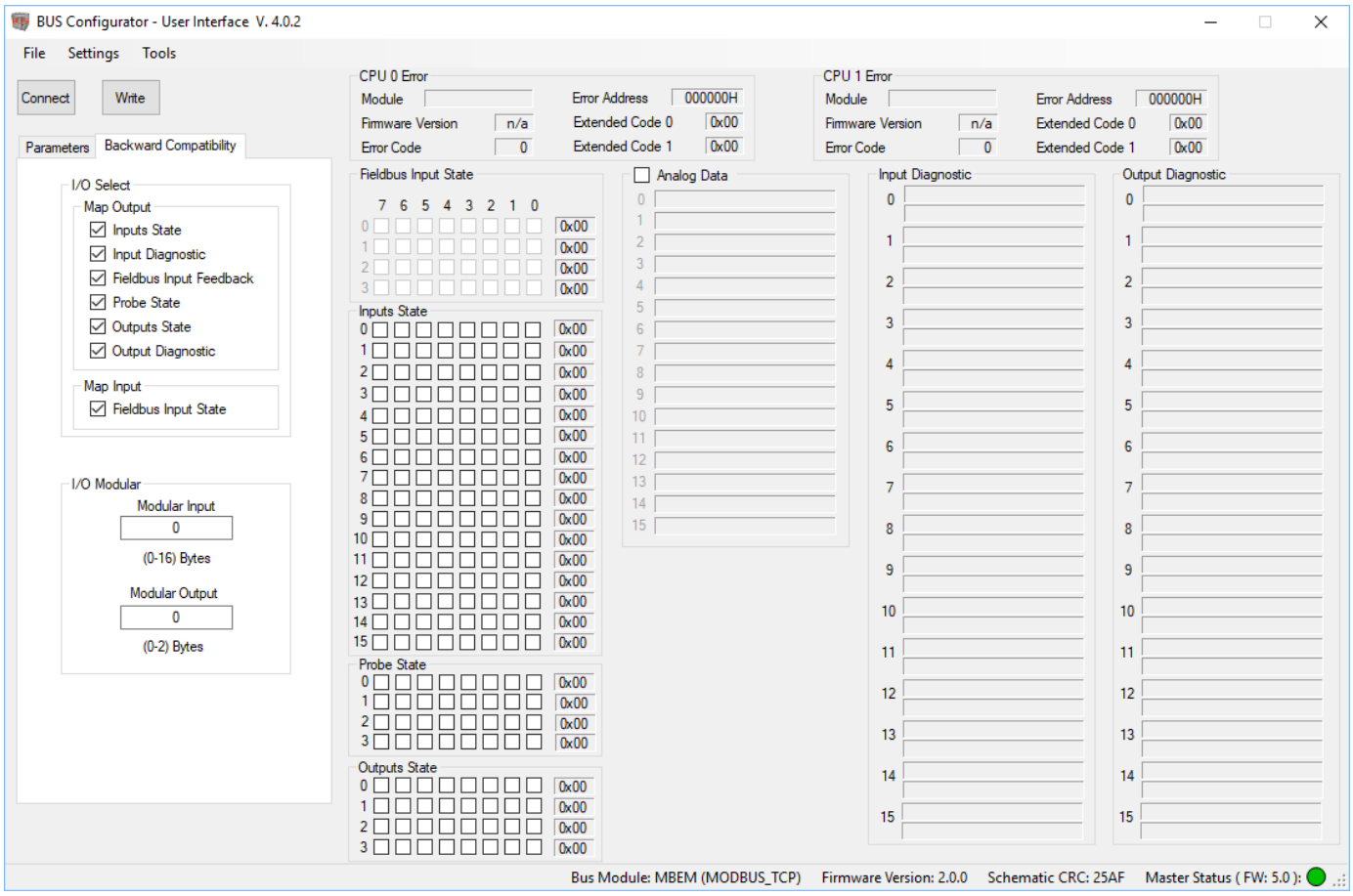


Figure 9 - Backward Compatibility

If more than one I/O has some diagnostic the I/O index and diagnostic code data will cycle every 500ms between all the diagnostics present.

Process image configuration in backward compatibility

The input process image and the output process image can be configured using the Bus Configurator User Interface software.

With this software the user can choose which subsection must be exported in the fieldbus, changing the size of each process image and then the size used in the PLC physical memory. Once the module is connected all the data are showed in the main window of the software.

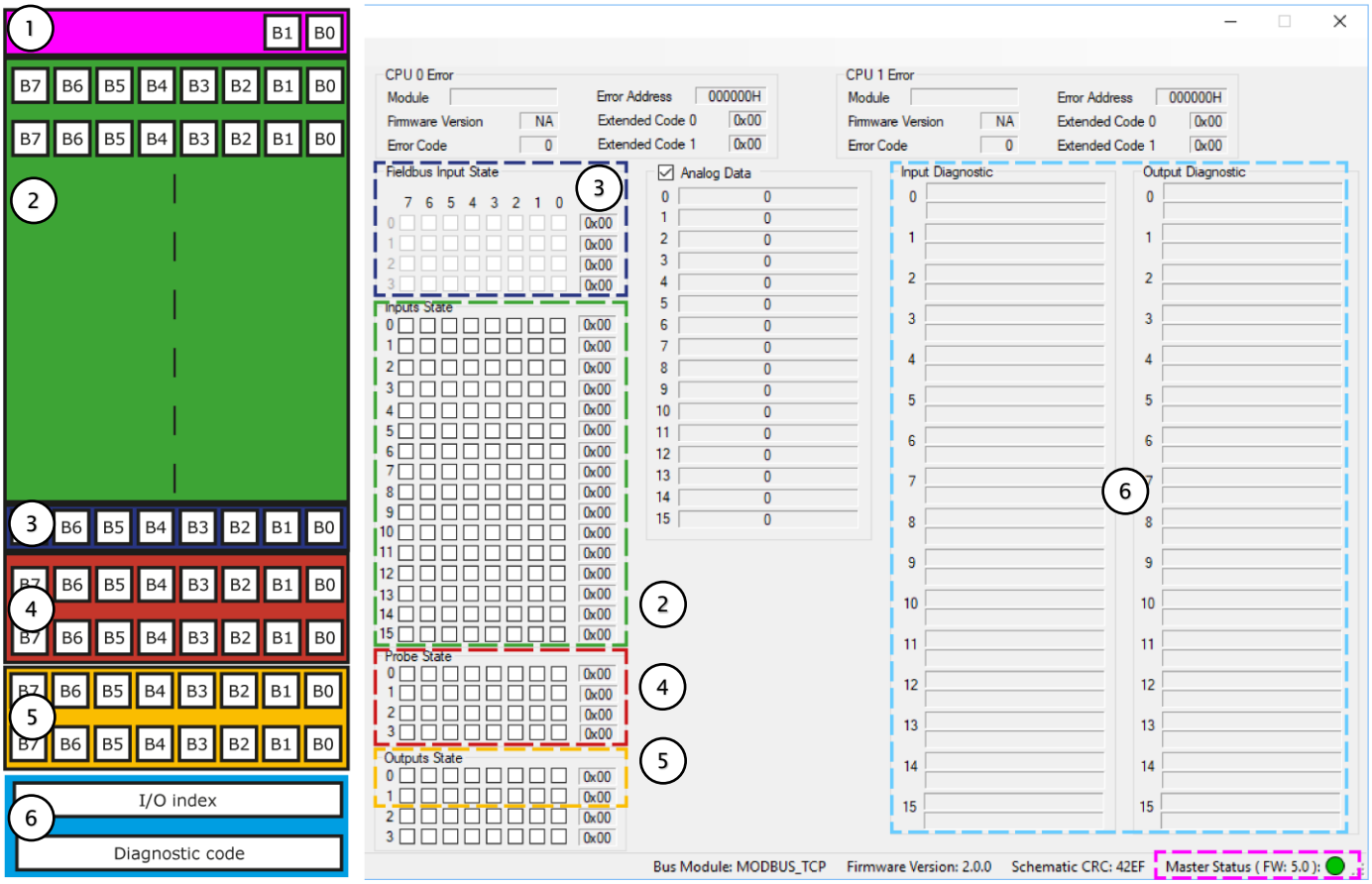


Figure 10 - Data Package Composition in backward compatibility

EXAMPLES OF MSD CONFIGURATION AS PRESENTED BY THE BUS CONFIGURATOR

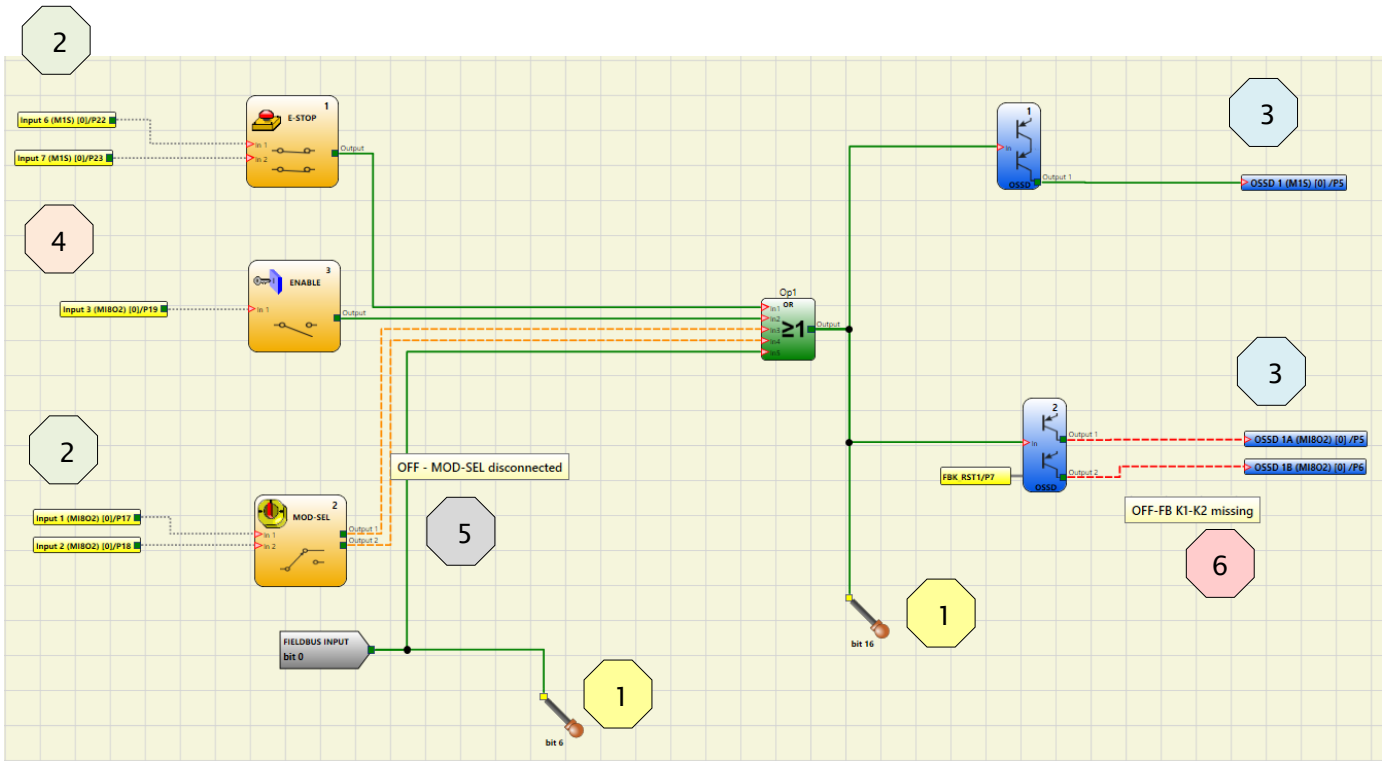


Figure 11 – Example of project on MSD

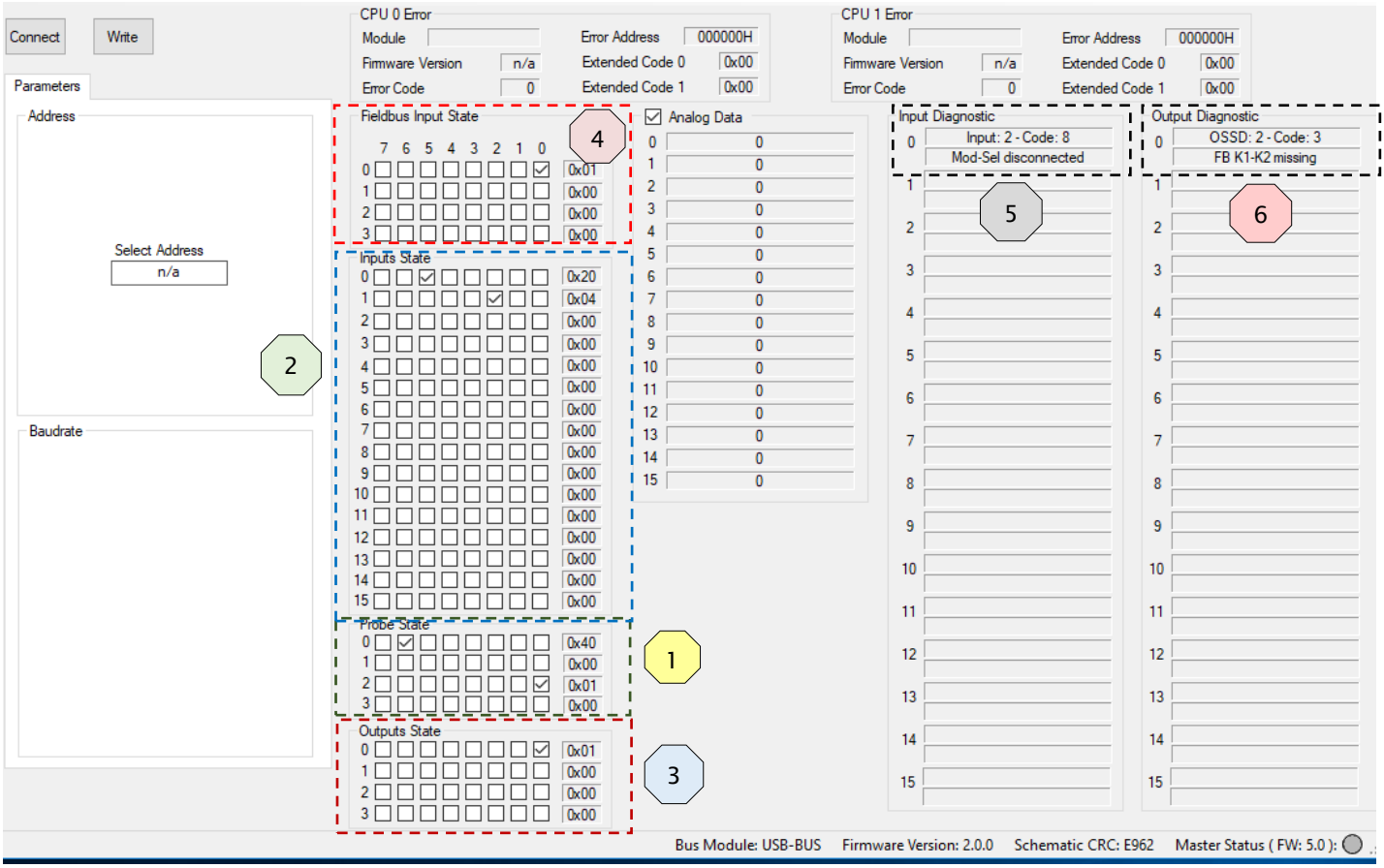
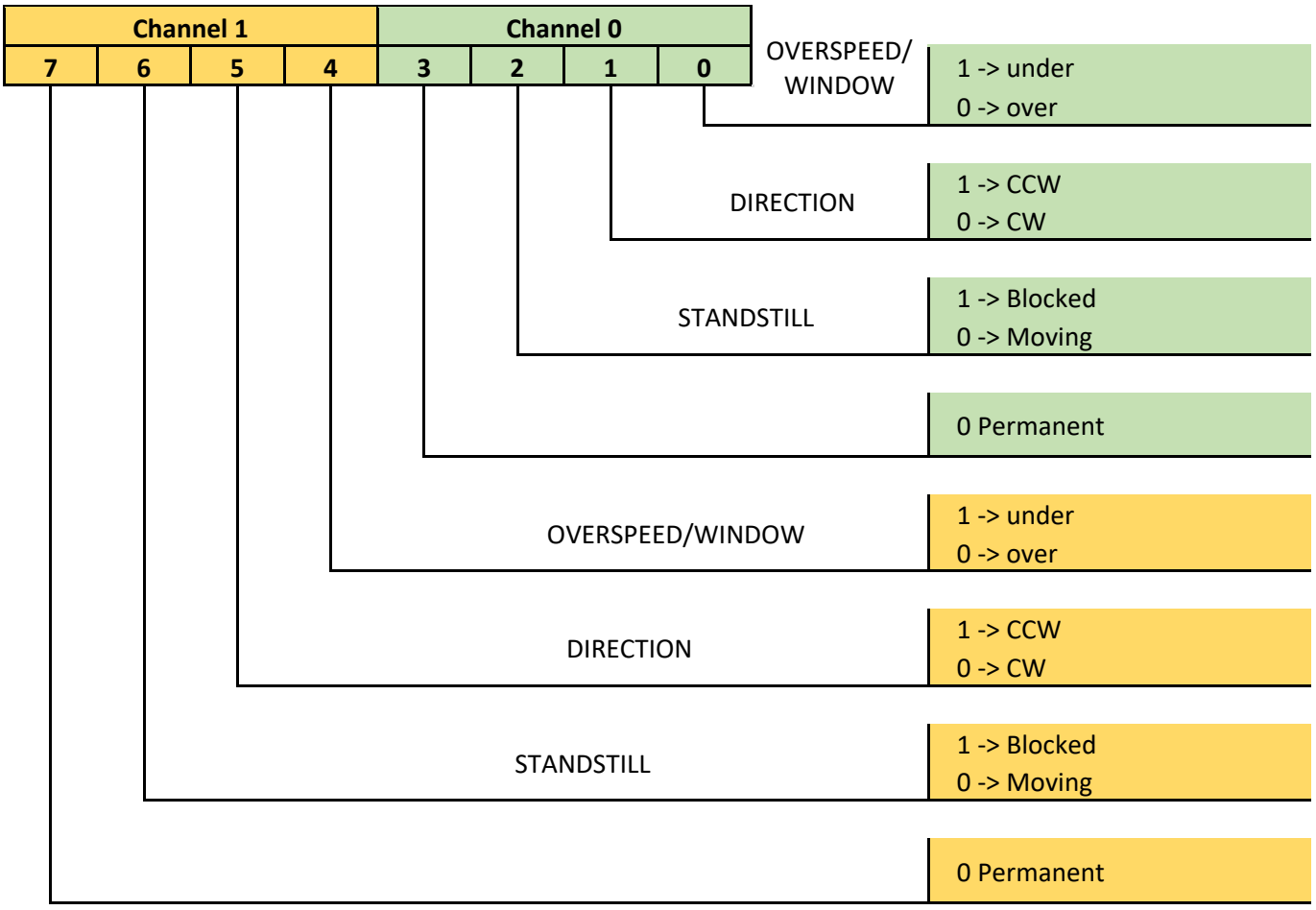


Figure 12

- Input 1 E-STOP is connected to screws 6 and 7 on M1/M1S. Its status (zero or one) is shown on bit 5 of byte 0 reserved for inputs. The bit 6 is always set to zero, it is kept busy to signal that the E STOP occupies two screws on M1/M1S.
- Input 2 ENABLE is connected to screw 8 on M1/M1S. Its status (zero or one) is shown on bit 7 of byte 0 reserved for M1/M1S inputs.
- Input 3 MOD-SEL is connected to screws 1 and 2 on MI802 with a diagnostic signaling that the MOD-SEL is disconnected. Its status is shown on bits 0 and 1 of byte 1 reserved for MI802 inputs. The diagnostic is shown in the section reserved for input diagnostics with the index 2 and the relative diagnostic.
- The probes on bit 6 and bit 8 are green and the relative bits on the Probe section are checked. Probe 8 is shown as bit 0 of the second byte.
- OSSD 1 is ON and connected to the second pair of M1/M1S outputs. Its status is shown on bit 1 of byte 0 reserved for outputs.
- OSSD 2 is OFF with diagnostic indicating wait for restart and is connected to the second pair of MI802 outputs. Its status is shown on bit 2 of byte 0 reserved for outputs. The diagnostic is shown in the section reserved for OSSD diagnostics with the index 3 and the relative diagnostic.
- In the Fieldbus Input section, bit 0 has been selected so the Fieldbus input on bit 0 is green in the MSD project.

MV MODULES INPUT STATUS

In presence of MV modules, the output data (in the "State Inputs" of the Process Image) will follow the diagram:



Reer S.p.A.

Process data mapping

for MBx Fieldbus expansion modules V1.2.6

(Addendum of Technical manual 8540467)

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Version history

Version	Date	Author(s)	Modifications
1.2.6	29/01/2021	mferrero	Fixed CANOpen and EtherCAT default mapping
1.2.5	19/06/2020	mferrero	Minor fix in CC-Link section
1.2.4	16/04/2020	mferrero	Added modules in the Errors data CPU field
1.2.3	20/03/2020	mferrero	Reworked Profibus mapping
1.2.2	10/03/2020	mferrero	Added CC-Link mapping; fixed the Errors data objects
1.2.1	05/02/2019	mferrero	Fixed minor descriptions
1.2	01/10/2019	mferrero	Changed Modbus TCP and RTU registers to adapt to HMS Common ethernet module
1.1	12/12/2018	mferrero	Acyclic data: specification for Errors data format
1.0	26/09/2018	mferrero	New mapping for the fieldbus communication modules with FW 2.0.x

General Notes

1. The process data size is fixed, this means that the size and mapping of the process data image of the bus communication devices does not change depending on how many input or output modules are connected to the configurable safety controller.

2. “Reserved”-Bytes are allocated as variables where necessary (e.g., to maintain the inner sub-index structure of the CANopen user defined objects when an object in enlarged beyond 1 byte size)

3. Some data are available only if the communication module is used in a system where the M1 firmware version is greater that a miminum value (i.e., Errors data are only available if M1 firmware version is greater than 5.0, Analog data are available only with M1 greater than 4.0, Project CRC data are available only with M1 greater than 3.0)

4. The Analog data section is optional: it can be turned on or off using the Bus configurator software; if the Analog data checkbox in the software is selected then the bytes are present in the process image, if the box is unchecked the bytes are not present; the process image size will adapt to the actual number of bytes.

EtherCAT (MBEC)

PDO predefined connection set

PDO Designation	Name	Length	Mapping Object
RxPDO 1	RxPDO 1	4 Byte	1600h
TxPDO 1	TxPDO 1	96 Byte	1A00h

Process data mapping (PDO)

RxPDO		Mapped object		Name
Index	Subindex	Index	Subindex	
1600h	01h	2101h	01h	Fieldbus input byte 0
1600h	02h	2101h	02h	Fieldbus input byte 1
1600h	03h	2101h	03h	Fieldbus input byte 2
1600h	04h	2101h	04h	Fieldbus input byte 3

TxPDO		Mapped object		Name
Index	Subindex	Index	Subindex	
1A00h	01h	2001h	01h	System status
1A00h	02h	2001h	02h	Reserved_2001_02
1A00h	03h	2001h	03h	Reserved_2001_03
1A00h	04h	2001h	04h	Reserved_2001_04
1A00h	05h	2201h	01h	Input status byte 0
1A00h	06h	2201h	02h	Input status byte 1
1A00h	07h	2201h	03h	Input status byte 2
1A00h	08h	2201h	04h	Input status byte 3
1A00h	09h	2201h	05h	Input status byte 4
1A00h	0Ah	2201h	06h	Input status byte 5
1A00h	0Bh	2201h	07h	Input status byte 6
1A00h	0Ch	2201h	08h	Input status byte 7
1A00h	0Dh	2201h	09h	Input status byte 8
1A00h	0Eh	2201h	0Ah	Input status byte 9
1A00h	0Fh	2201h	0Bh	Input status byte 10
1A00h	10h	2201h	0Ch	Input status byte 11
1A00h	11h	2201h	0Dh	Input status byte 12
1A00h	12h	2201h	0Eh	Input status byte 13
1A00h	13h	2201h	0Fh	Input status byte 14
1A00h	14h	2201h	10h	Input status byte 15
1A00h	15h	2181h	01h	Fieldbus input byte 0 feedback
1A00h	16h	2181h	02h	Fieldbus input byte 1 feedback
1A00h	17h	2181h	03h	Fieldbus input byte 2 feedback
1A00h	18h	2181h	04h	Fieldbus input byte 3 feedback
1A00h	19h	2203h	01h	Probe status byte 0
1A00h	1Ah	2203h	02h	Probe status byte 1
1A00h	1Bh	2203h	03h	Probe status byte 2
1A00h	1Ch	2203h	04h	Probe status byte 3
1A00h	1Dh	2202h	01h	OSSD status byte 0
1A00h	1Eh	2202h	02h	OSSD status byte 1
1A00h	1Fh	2202h	03h	OSSD status byte 2
1A00h	20h	2202h	04h	OSSD status byte 3

TxPDO		Mapped object		Name
Index	Subindex	Index	Subindex	
1A00h	21h	2204h	01h	Analog data float 0
1A00h	22h	2204h	02h	Analog data float 1
1A00h	23h	2204h	03h	Analog data float 2
1A00h	24h	2204h	04h	Analog data float 3
1A00h	25h	2204h	05h	Analog data float 4
1A00h	26h	2204h	06h	Analog data float 5
1A00h	27h	2204h	07h	Analog data float 6
1A00h	28h	2204h	08h	Analog data float 7
1A00h	29h	2204h	09h	Analog data float 8
1A00h	2Ah	2204h	0Ah	Analog data float 9
1A00h	2Bh	2204h	0Bh	Analog data float 10
1A00h	2Ch	2204h	0Ch	Analog data float 11
1A00h	2Dh	2204h	0Dh	Analog data float 12
1A00h	2Eh	2204h	0Eh	Analog data float 13
1A00h	2Fh	2204h	0Fh	Analog data float 14
1A00h	30h	2204h	10h	Analog data float 15

Vendor specific Objects

Object Index 2001h – System status

Object Type: Array

Subindex	Type	Name
00h	UNSIGNED8	Number Of Entries
01h	UNSIGNED8	System status
02h	UNSIGNED8	Reserved_2001_02
02h	UNSIGNED8	Reserved_2001_03
02h	UNSIGNED8	Reserved_2001_04

Object Index 2003h – Errors data CPU 0

Object Type: Array

Subindex	Type	Name
00h	UNSIGNED8	Number Of Entries
01h	UNSIGNED8	Module name
02h	UNSIGNED8	Error code
03h	UNSIGNED8	Error address byte 0
04h	UNSIGNED8	Error address byte 1
05h	UNSIGNED8	Error address byte 2
06h	UNSIGNED8	Error address byte 3
07h	UNSIGNED8	CPU firmware version
08h	UNSIGNED8	Extended code 0
09h	UNSIGNED8	Extended code 1

Object Index 2004h – Errors data CPU 1

Object Type: Array

Subindex	Type	Name
00h	UNSIGNED8	Number Of Entries
01h	UNSIGNED8	Module name
02h	UNSIGNED8	Error code
03h	UNSIGNED8	Error address byte 0
04h	UNSIGNED8	Error address byte 1
05h	UNSIGNED8	Error address byte 2
06h	UNSIGNED8	Error address byte 3
07h	UNSIGNED8	CPU firmware version
08h	UNSIGNED8	Extended code 0
09h	UNSIGNED8	Extended code 1

Object Index 2005h – Input diagnostics

Object Type: Array

Subindex	Type	Name
00h	UNSIGNED8	Number Of Entries
01h	UNSIGNED8	Diagnostic index 0
02h	UNSIGNED8	Diagnostic code 0
03h	UNSIGNED8	Diagnostic index 1
04h	UNSIGNED8	Diagnostic code 1
05h	UNSIGNED8	Diagnostic index 2
06h	UNSIGNED8	Diagnostic code 2
07h	UNSIGNED8	Diagnostic index 3
08h	UNSIGNED8	Diagnostic code 3
09h	UNSIGNED8	Diagnostic index 4
0Ah	UNSIGNED8	Diagnostic code 4
0Bh	UNSIGNED8	Diagnostic index 5
0Ch	UNSIGNED8	Diagnostic code 5
0Dh	UNSIGNED8	Diagnostic index 6
0Eh	UNSIGNED8	Diagnostic code 6
0Fh	UNSIGNED8	Diagnostic index 7
10h	UNSIGNED8	Diagnostic code 7
11h	UNSIGNED8	Diagnostic index 8
12h	UNSIGNED8	Diagnostic code 8
13h	UNSIGNED8	Diagnostic index 9
14h	UNSIGNED8	Diagnostic code 9
15h	UNSIGNED8	Diagnostic index 10
16h	UNSIGNED8	Diagnostic code 10
17h	UNSIGNED8	Diagnostic index 11
18h	UNSIGNED8	Diagnostic code 11
19h	UNSIGNED8	Diagnostic index 12
1Ah	UNSIGNED8	Diagnostic code 12
1Bh	UNSIGNED8	Diagnostic index 13
1Ch	UNSIGNED8	Diagnostic code 13
1Dh	UNSIGNED8	Diagnostic index 14
1Eh	UNSIGNED8	Diagnostic code 14
1Fh	UNSIGNED8	Diagnostic index 15
20h	UNSIGNED8	Diagnostic code 15

A maximum of 16 Input diagnostics are transferred, if more diagnostics are present on the system only the first 16 are available on the fieldbus

Object Index 2006h – OSSD diagnostics

Object Type: Array

Subindex	Type	Name
00h	UNSIGNED8	Number Of Entries
01h	UNSIGNED8	Diagnostic index 0
02h	UNSIGNED8	Diagnostic code 0
03h	UNSIGNED8	Diagnostic index 1
04h	UNSIGNED8	Diagnostic code 1
05h	UNSIGNED8	Diagnostic index 2
06h	UNSIGNED8	Diagnostic code 2
07h	UNSIGNED8	Diagnostic index 3
08h	UNSIGNED8	Diagnostic code 3
09h	UNSIGNED8	Diagnostic index 4
0Ah	UNSIGNED8	Diagnostic code 4
0Bh	UNSIGNED8	Diagnostic index 5
0Ch	UNSIGNED8	Diagnostic code 5
0Dh	UNSIGNED8	Diagnostic index 6
0Eh	UNSIGNED8	Diagnostic code 6
0Fh	UNSIGNED8	Diagnostic index 7
10h	UNSIGNED8	Diagnostic code 7
11h	UNSIGNED8	Diagnostic index 8
12h	UNSIGNED8	Diagnostic code 8
13h	UNSIGNED8	Diagnostic index 9
14h	UNSIGNED8	Diagnostic code 9
15h	UNSIGNED8	Diagnostic index 10
16h	UNSIGNED8	Diagnostic code 10
17h	UNSIGNED8	Diagnostic index 11
18h	UNSIGNED8	Diagnostic code 11
19h	UNSIGNED8	Diagnostic index 12
1Ah	UNSIGNED8	Diagnostic code 12
1Bh	UNSIGNED8	Diagnostic index 13
1Ch	UNSIGNED8	Diagnostic code 13
1Dh	UNSIGNED8	Diagnostic index 14
1Eh	UNSIGNED8	Diagnostic code 14
1Fh	UNSIGNED8	Diagnostic index 15
20h	UNSIGNED8	Diagnostic code 15

A maximum of 16 OSSD diagnostics are transferred, if more diagnostics are present on the system only the first 16 are available on the fieldbus

Object Index 2007h – Project CRC

Object Type: Array

Subindex	Type	Name
00h	UNSIGNED8	Number Of Entries
01h	UNSIGNED8	Project CRC High byte
02h	UNSIGNED8	Project CRC Low byte

Object Index 2101h – Fieldbus inputs

Object Type: Array

Subindex	Type	Name
00h	UNSIGNED8	Number Of Entries
01h	UNSIGNED8	Fieldbus input byte 0
02h	UNSIGNED8	Fieldbus input byte 1
03h	UNSIGNED8	Fieldbus input byte 2
04h	UNSIGNED8	Fieldbus input byte 3

Object Index 2181h – Fieldbus inputs feedback

Object Type: Array

Subindex	Type	Name
00h	UNSIGNED8	Number Of Entries
01h	UNSIGNED8	Fieldbus input byte 0 feedback
02h	UNSIGNED8	Fieldbus input byte 1 feedback
03h	UNSIGNED8	Fieldbus input byte 2 feedback
04h	UNSIGNED8	Fieldbus input byte 3 feedback

Object Index 2201h – Input status

Object Type: Array

Subindex	Type	Name
00h	UNSIGNED8	Number Of Entries
01h	UNSIGNED8	Input status byte 0
02h	UNSIGNED8	Input status byte 1
03h	UNSIGNED8	Input status byte 2
04h	UNSIGNED8	Input status byte 3
05h	UNSIGNED8	Input status byte 4
06h	UNSIGNED8	Input status byte 5
07h	UNSIGNED8	Input status byte 6
08h	UNSIGNED8	Input status byte 7
09h	UNSIGNED8	Input status byte 8
0Ah	UNSIGNED8	Input status byte 9
0Bh	UNSIGNED8	Input status byte 10
0Ch	UNSIGNED8	Input status byte 11
0Dh	UNSIGNED8	Input status byte 12
0Eh	UNSIGNED8	Input status byte 13
0Fh	UNSIGNED8	Input status byte 14
10h	UNSIGNED8	Input status byte 15

Object Index 2202h – OSSD status

Object Type: Array

Subindex	Type	Name
00h	UNSIGNED8	Number Of Entries
01h	UNSIGNED8	OSSD status byte 0
02h	UNSIGNED8	OSSD status byte 1
03h	UNSIGNED8	OSSD status byte 2
04h	UNSIGNED8	OSSD status byte 3

Object Index 2203h – Probe status

Object Type: Array

Subindex	Type	Name
00h	UNSIGNED8	Number Of Entries
01h	UNSIGNED8	Probe status byte 0
02h	UNSIGNED8	Probe status byte 1
03h	UNSIGNED8	Probe status byte 2
04h	UNSIGNED8	Probe status byte 3

Object Index 2204h – Analog data

Object Type: Array

Subindex	Type	Name
00h	UNSIGNED8	Number Of Entries
01h	REAL32	Analog data float 0
02h	REAL32	Analog data float 1
03h	REAL32	Analog data float 2
04h	REAL32	Analog data float 3
05h	REAL32	Analog data float 4
06h	REAL32	Analog data float 5
07h	REAL32	Analog data float 6
08h	REAL32	Analog data float 7
09h	REAL32	Analog data float 8
0Ah	REAL32	Analog data float 9
0Bh	REAL32	Analog data float 10
0Ch	REAL32	Analog data float 11
0Dh	REAL32	Analog data float 12
0Eh	REAL32	Analog data float 13
0Fh	REAL32	Analog data float 14
10h	REAL32	Analog data float 15

CANopen (MBC)

PDO predefined connection set

PDO	Name	Length	Parameter	Mapping	Remarks
RxPDO 1	Fieldbus inputs	8 Byte	1400h	1600h	Part of the standard communication set
RxPDO 2	Dummy	8 Byte	1401h	1601h	Part of the standard communication set; not used; disabled by default
RxPDO 3	Dummy	8 Byte	1402h	1602h	Part of the standard communication set; not used; disabled by default
RxPDO 4	Dummy	8 Byte	1403h	1603h	Part of the standard communication set; not used; disabled by default
TxPDO 1	Status, Fieldbus inputs feedback	8 Byte	1800h	1A00h	Part of the standard communication set
TxPDO 2	Inputs status 1	8 Byte	1801h	1A01h	Part of the standard communication set
TxPDO 3	Inputs status 2	8 Byte	1802h	1A02h	Part of the standard communication set
TxPDO 4	Outputs & Probes status	8 Byte	1803h	1A03h	Part of the standard communication set
TxPDO 5	Analog data 1	8 Byte	1804h	1A04h	
TxPDO 6	Analog data 2	8 Byte	1805h	1A05h	
TxPDO 7	Analog data 3	8 Byte	1806h	1A06h	
TxPDO 8	Analog data 4	8 Byte	1807h	1A07h	
TxPDO 9	Analog data 5	8 Byte	1808h	1A08h	
TxPDO 10	Analog data 6	8 Byte	1809h	1A09h	
TxPDO 11	Analog data 7	8 Byte	180Ah	1A0Ah	
TxPDO 12	Analog data 8	8 Byte	180Bh	1A0Bh	

Process data mapping (PDO)

RxPDO		Mapped object		Name
Index	Subindex	Index	Subindex	
1600h	01h	2101h	01h	Fieldbus input byte 0
1600h	02h	2101h	02h	Fieldbus input byte 1
1600h	03h	2101h	03h	Fieldbus input byte 2
1600h	04h	2101h	04h	Fieldbus input byte 3
1600h	05h	0005h	05h	Dummy entry
1600h	06h	0005h	06h	Dummy entry
1600h	07h	0005h	07h	Dummy entry
1600h	08h	0005h	08h	Dummy entry
1601h	01h	0005h	01h	Dummy entry
1601h	02h	0005h	02h	Dummy entry
1601h	03h	0005h	03h	Dummy entry
1601h	04h	0005h	04h	Dummy entry
1601h	05h	0005h	05h	Dummy entry
1601h	06h	0005h	06h	Dummy entry
1601h	07h	0005h	07h	Dummy entry
1601h	08h	0005h	08h	Dummy entry
1602h	01h	0005h	01h	Dummy entry
1602h	02h	0005h	02h	Dummy entry
1602h	03h	0005h	03h	Dummy entry
1602h	04h	0005h	04h	Dummy entry
1602h	05h	0005h	05h	Dummy entry
1602h	06h	0005h	06h	Dummy entry
1602h	07h	0005h	07h	Dummy entry
1602h	08h	0005h	08h	Dummy entry
1603h	01h	0005h	01h	Dummy entry
1603h	02h	0005h	02h	Dummy entry
1603h	03h	0005h	03h	Dummy entry
1603h	04h	0005h	04h	Dummy entry
1603h	05h	0005h	05h	Dummy entry
1603h	06h	0005h	06h	Dummy entry
1603h	07h	0005h	07h	Dummy entry
1603h	08h	0005h	08h	Dummy entry

TxPDO		Mapped object		Name
Index	Subindex	Index	Subindex	
1A00h	01h	2001h	01h	System status
1A00h	02h	0005h	00h	Dummy entry
1A00h	03h	0005h	00h	Dummy entry
1A00h	04h	0005h	00h	Dummy entry
1A00h	05h	2181h	01h	Fieldbus input byte 0 feedback
1A00h	06h	2181h	02h	Fieldbus input byte 1 feedback
1A00h	07h	2181h	03h	Fieldbus input byte 2 feedback
1A00h	08h	2181h	04h	Fieldbus input byte 3 feedback
1A01h	01h	2201h	01h	Input status byte 0
1A01h	02h	2201h	02h	Input status byte 1
1A01h	03h	2201h	03h	Input status byte 2
1A01h	04h	2201h	04h	Input status byte 3
1A01h	05h	2201h	05h	Input status byte 4
1A01h	06h	2201h	06h	Input status byte 5
1A01h	07h	2201h	07h	Input status byte 6
1A01h	08h	2201h	08h	Input status byte 7
1A02h	01h	2201h	09h	Input status byte 8
1A02h	02h	2201h	0Ah	Input status byte 9
1A02h	03h	2201h	0Bh	Input status byte 10
1A02h	04h	2201h	0Ch	Input status byte 11
1A02h	05h	2201h	0Dh	Input status byte 12
1A02h	06h	2201h	0Eh	Input status byte 13
1A02h	07h	2201h	0Fh	Input status byte 14
1A02h	08h	2201h	10h	Input status byte 15
1A03h	01h	2203h	01h	Probe status byte 0
1A03h	02h	2203h	02h	Probe status byte 1
1A03h	03h	2203h	03h	Probe status byte 2
1A03h	04h	2203h	04h	Probe status byte 3
1A03h	05h	2202h	01h	OSSD status byte 0
1A03h	06h	2202h	02h	OSSD status byte 1
1A03h	07h	2202h	03h	OSSD status byte 2
1A03h	08h	2202h	04h	OSSD status byte 3
1A04h	01h	2204h	01h	Analog data float 0
1A04h	02h	2204h	02h	Analog data float 1
1A05h	01h	2204h	03h	Analog data float 2
1A05h	02h	2204h	04h	Analog data float 3
1A06h	01h	2204h	05h	Analog data float 4
1A06h	02h	2204h	06h	Analog data float 5
1A07h	01h	2204h	07h	Analog data float 6
1A07h	02h	2204h	08h	Analog data float 7
1A08h	01h	2204h	09h	Analog data float 8
1A08h	02h	2204h	0Ah	Analog data float 9
1A09h	01h	2204h	0Bh	Analog data float 10
1A09h	02h	2204h	0Ch	Analog data float 11
1A0Ah	01h	2204h	0Dh	Analog data float 12
1A0Ah	02h	2204h	0Eh	Analog data float 13
1A0Bh	01h	2204h	0Fh	Analog data float 14
1A0Bh	02h	2204h	10h	Analog data float 15

Vendor specific Objects

Object Index 2001h – System status

Object Type: Array

Subindex	Type	Name
00h	UNSIGNED8	Number Of Entries
01h	UNSIGNED8	System status
02h	UNSIGNED8	Reserved
03h	UNSIGNED8	Reserved
04h	UNSIGNED8	Reserved

Object Index 2003h – Errors data CPU 0

Object Type: Array

Subindex	Type	Name
00h	UNSIGNED8	Number Of Entries
01h	UNSIGNED8	Module name
02h	UNSIGNED8	Error code
03h	UNSIGNED8	Error address byte 0
04h	UNSIGNED8	Error address byte 1
05h	UNSIGNED8	Error address byte 2
06h	UNSIGNED8	Error address byte 3
07h	UNSIGNED8	CPU firmware version
08h	UNSIGNED8	Extended code 0
09h	UNSIGNED8	Extended code 1

Object Index 2004h – Errors data CPU 1

Object Type: Array

Subindex	Type	Name
00h	UNSIGNED8	Number Of Entries
01h	UNSIGNED8	Module name
02h	UNSIGNED8	Error code
03h	UNSIGNED8	Error address byte 0
04h	UNSIGNED8	Error address byte 1
05h	UNSIGNED8	Error address byte 2
06h	UNSIGNED8	Error address byte 3
07h	UNSIGNED8	CPU firmware version
08h	UNSIGNED8	Extended code 0
09h	UNSIGNED8	Extended code 1

Object Index 2005h – Input diagnostics

Object Type: Array

Subindex	Type	Name
00h	UNSIGNED8	Number Of Entries
01h	UNSIGNED8	Diagnostic index 0
02h	UNSIGNED8	Diagnostic code 0
03h	UNSIGNED8	Diagnostic index 1
04h	UNSIGNED8	Diagnostic code 1
05h	UNSIGNED8	Diagnostic index 2
06h	UNSIGNED8	Diagnostic code 2
07h	UNSIGNED8	Diagnostic index 3
08h	UNSIGNED8	Diagnostic code 3
09h	UNSIGNED8	Diagnostic index 4
0Ah	UNSIGNED8	Diagnostic code 4
0Bh	UNSIGNED8	Diagnostic index 5
0Ch	UNSIGNED8	Diagnostic code 5
0Dh	UNSIGNED8	Diagnostic index 6
0Eh	UNSIGNED8	Diagnostic code 6
0Fh	UNSIGNED8	Diagnostic index 7
10h	UNSIGNED8	Diagnostic code 7
11h	UNSIGNED8	Diagnostic index 8
12h	UNSIGNED8	Diagnostic code 8
13h	UNSIGNED8	Diagnostic index 9
14h	UNSIGNED8	Diagnostic code 9
15h	UNSIGNED8	Diagnostic index 10
16h	UNSIGNED8	Diagnostic code 10
17h	UNSIGNED8	Diagnostic index 11
18h	UNSIGNED8	Diagnostic code 11
19h	UNSIGNED8	Diagnostic index 12
1Ah	UNSIGNED8	Diagnostic code 12
1Bh	UNSIGNED8	Diagnostic index 13
1Ch	UNSIGNED8	Diagnostic code 13
1Dh	UNSIGNED8	Diagnostic index 14
1Eh	UNSIGNED8	Diagnostic code 14
1Fh	UNSIGNED8	Diagnostic index 15
20h	UNSIGNED8	Diagnostic code 15

A maximum of 16 Input diagnostics are transferred, if more diagnostics are present on the system only the first 16 are available on the fieldbus

Object Index 2006h – OSSD diagnostics

Object Type: Array

Subindex	Type	Name
00h	UNSIGNED8	Number Of Entries
01h	UNSIGNED8	Diagnostic index 0
02h	UNSIGNED8	Diagnostic code 0
03h	UNSIGNED8	Diagnostic index 1
04h	UNSIGNED8	Diagnostic code 1
05h	UNSIGNED8	Diagnostic index 2
06h	UNSIGNED8	Diagnostic code 2
07h	UNSIGNED8	Diagnostic index 3
08h	UNSIGNED8	Diagnostic code 3
09h	UNSIGNED8	Diagnostic index 4
0Ah	UNSIGNED8	Diagnostic code 4
0Bh	UNSIGNED8	Diagnostic index 5
0Ch	UNSIGNED8	Diagnostic code 5
0Dh	UNSIGNED8	Diagnostic index 6
0Eh	UNSIGNED8	Diagnostic code 6
0Fh	UNSIGNED8	Diagnostic index 7
10h	UNSIGNED8	Diagnostic code 7
11h	UNSIGNED8	Diagnostic index 8
12h	UNSIGNED8	Diagnostic code 8
13h	UNSIGNED8	Diagnostic index 9
14h	UNSIGNED8	Diagnostic code 9
15h	UNSIGNED8	Diagnostic index 10
16h	UNSIGNED8	Diagnostic code 10
17h	UNSIGNED8	Diagnostic index 11
18h	UNSIGNED8	Diagnostic code 11
19h	UNSIGNED8	Diagnostic index 12
1Ah	UNSIGNED8	Diagnostic code 12
1Bh	UNSIGNED8	Diagnostic index 13
1Ch	UNSIGNED8	Diagnostic code 13
1Dh	UNSIGNED8	Diagnostic index 14
1Eh	UNSIGNED8	Diagnostic code 14
1Fh	UNSIGNED8	Diagnostic index 15
20h	UNSIGNED8	Diagnostic code 15

A maximum of 16 OSSD diagnostics are transferred, if more diagnostics are present on the system only the first 16 are available on the fieldbus

Object Index 2007h – Project CRC

Object Type: Array

Subindex	Type	Name
00h	UNSIGNED8	Number Of Entries
01h	UNSIGNED8	Project CRC Low byte
02h	UNSIGNED8	Project CRC High byte

Object Index 2101h – Fieldbus inputs

Object Type: Array

Subindex	Type	Name
00h	UNSIGNED8	Number Of Entries
01h	UNSIGNED8	Fieldbus input byte 0
02h	UNSIGNED8	Fieldbus input byte 1
03h	UNSIGNED8	Fieldbus input byte 2
04h	UNSIGNED8	Fieldbus input byte 3

Object Index 2181h – Fieldbus input feedback

Object Type: Array

Subindex	Type	Name
00h	UNSIGNED8	Number Of Entries
01h	UNSIGNED8	Fieldbus input byte 0 feedback
02h	UNSIGNED8	Fieldbus input byte 1 feedback
03h	UNSIGNED8	Fieldbus input byte 2 feedback
04h	UNSIGNED8	Fieldbus input byte 3 feedback

Object Index 2201h – Input status

Object Type: Array

Subindex	Type	Name
00h	UNSIGNED8	Number Of Entries
01h	UNSIGNED8	Input status byte 0
02h	UNSIGNED8	Input status byte 1
03h	UNSIGNED8	Input status byte 2
04h	UNSIGNED8	Input status byte 3
05h	UNSIGNED8	Input status byte 4
06h	UNSIGNED8	Input status byte 5
07h	UNSIGNED8	Input status byte 6
08h	UNSIGNED8	Input status byte 7
09h	UNSIGNED8	Input status byte 8
0Ah	UNSIGNED8	Input status byte 9
0Bh	UNSIGNED8	Input status byte 10
0Ch	UNSIGNED8	Input status byte 11
0Dh	UNSIGNED8	Input status byte 12
0Eh	UNSIGNED8	Input status byte 13
0Fh	UNSIGNED8	Input status byte 14
10h	UNSIGNED8	Input status byte 15

Object Index 2202h – OSSD status

Object Type: Array

Subindex	Type	Name
00h	UNSIGNED8	Number Of Entries
01h	UNSIGNED8	OSSD status byte 0
02h	UNSIGNED8	OSSD status byte 1
03h	UNSIGNED8	OSSD status byte 2
04h	UNSIGNED8	OSSD status byte 3

Object Index 2203h – Probe status

Object Type: Array

Subindex	Type	Name
00h	UNSIGNED8	Number Of Entries
01h	UNSIGNED8	Probe status byte 0
02h	UNSIGNED8	Probe status byte 1
03h	UNSIGNED8	Probe status byte 2
04h	UNSIGNED8	Probe status byte 3

Object Index 2204h – Analog data

Object Type: Array

Subindex	Type	Name
00h	UNSIGNED8	Number Of Entries
01h	REAL32	Analog data float 0
02h	REAL32	Analog data float 1
03h	REAL32	Analog data float 2
04h	REAL32	Analog data float 3
05h	REAL32	Analog data float 4
06h	REAL32	Analog data float 5
07h	REAL32	Analog data float 6
08h	REAL32	Analog data float 7
09h	REAL32	Analog data float 8
0Ah	REAL32	Analog data float 9
0Bh	REAL32	Analog data float 10
0Ch	REAL32	Analog data float 11
0Dh	REAL32	Analog data float 12
0Eh	REAL32	Analog data float 13
0Fh	REAL32	Analog data float 14
10h	REAL32	Analog data float 15

EtherNet/IP (MBEI)

Process data mapping (Class 1 Connection)

Assembly instance 96h (Connection point O->T Consuming Instance)

Byte offset	Size	Name
0	USINT	Fieldbus input byte 0
1	USINT	Fieldbus input byte 1
2	USINT	Fieldbus input byte 2
3	USINT	Fieldbus input byte 3

O->T connection type: Point-to-point

Assembly instance 64h (Connection point T->O Producing Instance)

Byte offset	Size	Name
0	USINT	System status
1	USINT	Reserved
2	USINT	Input status byte 0
3	USINT	Input status byte 1
4	USINT	Input status byte 2
5	USINT	Input status byte 3
6	USINT	Input status byte 4
7	USINT	Input status byte 5
8	USINT	Input status byte 6
9	USINT	Input status byte 7
10	USINT	Input status byte 8
11	USINT	Input status byte 9
12	USINT	Input status byte 10
13	USINT	Input status byte 11
14	USINT	Input status byte 12
15	USINT	Input status byte 13
16	USINT	Input status byte 14
17	USINT	Input status byte 15
18	USINT	Fieldbus input byte 0 feedback
19	USINT	Fieldbus input byte 1 feedback
20	USINT	Fieldbus input byte 2 feedback
21	USINT	Fieldbus input byte 3 feedback
22	USINT	Probe status byte 0
23	USINT	Probe status byte 1
24	USINT	Probe status byte 2
25	USINT	Probe status byte 3
26	USINT	OSSD status byte 0
27	USINT	OSSD status byte 1
28	USINT	OSSD status byte 2
29	USINT	OSSD status byte 3
30	REAL	Analog data float 0
34	REAL	Analog data float 1
38	REAL	Analog data float 2
42	REAL	Analog data float 3
46	REAL	Analog data float 4
50	REAL	Analog data float 5
54	REAL	Analog data float 6
58	REAL	Analog data float 7
62	REAL	Analog data float 8
66	REAL	Analog data float 9
70	REAL	Analog data float 10
74	REAL	Analog data float 11
78	REAL	Analog data float 12
82	REAL	Analog data float 13
86	REAL	Analog data float 14
90	REAL	Analog data float 15

T->O connection type: Point-to-point,Multicast.

Assembly instance 05h (Configuration Data)

Set this instance to size 0

Supported trigger types: Cyclic

Explicit messaging[1]

To access Errors data, Input diagnostics, OSSD diagnostic and Project CRC the service 0x0E (Get attribute single) shall be used.

Name	Class	Instance	Attribute	Length (byte)	Access type
Fieldbus inputs	A2h	101h	05h	4	Set/Get
System I/O	A2h	01h	05h	30	Get
Analog data	A2h	204h	05h	64	Get
Errors data CPU 0	A2h	03h	05h	9	Get
Errors data CPU 1	A2h	04h	05h	9	Get
Input diagnostics	A2h	05h	05h	32	Get
OSSD diagnostics	A2h	06h	05h	32	Get
Project CRC	A2h	07h	05h	2	Get

[1] See Acyclic data format at the end of the document for more information

DeviceNet (MBD)

Process data mapping

Assembly instance 96h (Consuming Instance)

Byte offset	Size	Name
0	USINT	Fieldbus input byte 0
1	USINT	Fieldbus input byte 1
2	USINT	Fieldbus input byte 2
3	USINT	Fieldbus input byte 3

Assembly instance 64h (Producing Instance)

Byte offset	Size	Name
0	USINT	System status
1	USINT	Reserved
2	USINT	Input status byte 0
3	USINT	Input status byte 1
4	USINT	Input status byte 2
5	USINT	Input status byte 3
6	USINT	Input status byte 4
7	USINT	Input status byte 5
8	USINT	Input status byte 6
9	USINT	Input status byte 7
10	USINT	Input status byte 8
11	USINT	Input status byte 9
12	USINT	Input status byte 10
13	USINT	Input status byte 11
14	USINT	Input status byte 12
15	USINT	Input status byte 13
16	USINT	Input status byte 14
17	USINT	Input status byte 15
18	USINT	Fieldbus input byte 0 feedback
19	USINT	Fieldbus input byte 1 feedback
20	USINT	Fieldbus input byte 2 feedback
21	USINT	Fieldbus input byte 3 feedback
22	USINT	Probe status byte 0
23	USINT	Probe status byte 1
24	USINT	Probe status byte 2
25	USINT	Probe status byte 3
26	USINT	OSSD status byte 0
27	USINT	OSSD status byte 1
28	USINT	OSSD status byte 2
29	USINT	OSSD status byte 3
30	REAL	Analog data float 0
34	REAL	Analog data float 1
38	REAL	Analog data float 2
42	REAL	Analog data float 3
46	REAL	Analog data float 4
50	REAL	Analog data float 5
54	REAL	Analog data float 6
58	REAL	Analog data float 7
62	REAL	Analog data float 8
66	REAL	Analog data float 9
70	REAL	Analog data float 10
74	REAL	Analog data float 11
78	REAL	Analog data float 12
82	REAL	Analog data float 13
86	REAL	Analog data float 14
90	REAL	Analog data float 15

Explicit messaging[1]

To access Errors data, Input diagnostics, OSSD diagnostic and Project CRC the service 0x0E (Get attribute single) shall be used.

Name	Class	Instance	Attribute	Length (byte)	Access type
Fieldbus inputs	A2h	101h	05h	4	Set/Get
System I/O	A2h	01h	05h	30	Get
Analog data	A2h	204h	05h	64	Get
Errors data CPU 0	A2h	03h	05h	9	Get
Errors data CPU 1	A2h	04h	05h	9	Get
Input diagnostics	A2h	05h	05h	32	Get
OSSD diagnostics	A2h	06h	05h	32	Get
Project CRC	A2h	07h	05h	2	Get

[1] See Acyclic data format for more information

Modbus TCP/IP (MBEM)

Modbus Serial (MBMR)

Register mapping

Holding Registers (4x)

Register(s)	Size	Name
000h Low byte	UINT8	Fieldbus input byte 0
000h High byte	UINT8	Fieldbus input byte 1
001h Low byte	UINT8	Fieldbus input byte 2
001h High byte	UINT8	Fieldbus input byte 3
800h Low byte	UINT8	System status
800h High byte	UINT8	Reserved
801h Low byte	UINT8	Input status byte 0
801h High byte	UINT8	Input status byte 1
802h Low byte	UINT8	Input status byte 2
802h High byte	UINT8	Input status byte 3
803h Low byte	UINT8	Input status byte 4
803h High byte	UINT8	Input status byte 5
804h Low byte	UINT8	Input status byte 6
804h High byte	UINT8	Input status byte 7
805h Low byte	UINT8	Input status byte 8
805h High byte	UINT8	Input status byte 9
806h Low byte	UINT8	Input status byte 10
806h High byte	UINT8	Input status byte 11
807h Low byte	UINT8	Input status byte 12
807h High byte	UINT8	Input status byte 13
808h Low byte	UINT8	Input status byte 14
808h High byte	UINT8	Input status byte 15
809h Low byte	UINT8	Fieldbus input feedback byte 0
809h High byte	UINT8	Fieldbus input feedback byte 1
80Ah Low byte	UINT8	Fieldbus input feedback byte 2
80Ah High byte	UINT8	Fieldbus input feedback byte 3
80Bh Low byte	UINT8	Probe status byte 0
80Bh High byte	UINT8	Probe status byte 1
80Ch Low byte	UINT8	Probe status byte 2
80Ch High byte	UINT8	Probe status byte 3
80Dh High byte	UINT8	OSSD status byte 0
80Dh Low byte	UINT8	OSSD status byte 1
80Eh High byte	UINT8	OSSD status byte 2
80Eh Low byte	UINT8	OSSD status byte 3

Register(s)	Size	Name
80Fh-810h	FLOAT	Analog data float 0
811h-812h	FLOAT	Analog data float 1
813h-814h	FLOAT	Analog data float 2
815h-816h	FLOAT	Analog data float 3
817h-818h	FLOAT	Analog data float 4
819h-81Ah	FLOAT	Analog data float 5

Register(s)	Size	Name
81Bh-81Ch	FLOAT	Analog data float 6
81Dh-81Eh	FLOAT	Analog data float 7
81Fh-820h	FLOAT	Analog data float 8
821h-822h	FLOAT	Analog data float 9
823h-824h	FLOAT	Analog data float 10
825h-826h	FLOAT	Analog data float 11
827h-828h	FLOAT	Analog data float 12
829h-82Ah	FLOAT	Analog data float 13
82Bh-82Ch	FLOAT	Analog data float 14
82Dh-82Eh	FLOAT	Analog data float 15

Register(s)	Size	Name
1030h Low byte	UINT8	Error CPU0 – Module
1030h High byte	UINT8	Error CPU0 – Error code
1031h-1032h	UINT32	Error CPU0 – Error address
1033h Low byte	UINT8	Error CPU0 – Firmware version
1033h High byte	UINT8	Error CPU0 – Extended code 0
1034h Low byte	UINT8	Error CPU0 – Extended code 1
1040h Low byte	UINT8	Error CPU1 – Module
1040h High byte	UINT8	Error CPU1 – Error code
1041h-1042h	UINT32	Error CPU1 – Error address
1043h Low byte	UINT8	Error CPU1 – Firmware version
1043h High byte	UINT8	Error CPU1 – Extended code 0
1044h Low byte	UINT8	Error CPU1 – Extended code 1

Register(s)	Size	Name
1050h Low byte	UINT8	Input diagnostics index 1
1050h High byte	UINT8	Input diagnostics code 1
1051h Low byte	UINT8	Input diagnostics index 2
1051h High byte	UINT8	Input diagnostics code 2
1052h Low byte	UINT8	Input diagnostics index 3
1052h High byte	UINT8	Input diagnostics code 3
1053h Low byte	UINT8	Input diagnostics index 4
1053h High byte	UINT8	Input diagnostics code 4
1054h Low byte	UINT8	Input diagnostics index 5
1054h High byte	UINT8	Input diagnostics code 5
1055h Low byte	UINT8	Input diagnostics index 6
1055h High byte	UINT8	Input diagnostics code 6
1056h Low byte	UINT8	Input diagnostics index 7
1056h High byte	UINT8	Input diagnostics code 7
1057h Low byte	UINT8	Input diagnostics index 8
1057h High byte	UINT8	Input diagnostics code 8
1058h Low byte	UINT8	Input diagnostics index 9
1058h High byte	UINT8	Input diagnostics code 9
1059h Low byte	UINT8	Input diagnostics index 10
1059h High byte	UINT8	Input diagnostics code 10
105Ah Low byte	UINT8	Input diagnostics index 11
105Ah High byte	UINT8	Input diagnostics code 11
105Bh Low byte	UINT8	Input diagnostics index 12
105Bh High byte	UINT8	Input diagnostics code 12
105Ch Low byte	UINT8	Input diagnostics index 13
105Ch High byte	UINT8	Input diagnostics code 13
105Dh Low byte	UINT8	Input diagnostics index 14
105Dh High byte	UINT8	Input diagnostics code 14
105Eh Low byte	UINT8	Input diagnostics index 15
105Eh High byte	UINT8	Input diagnostics code 15
105Fh Low byte	UINT8	Input diagnostics index 16
105Fh High byte	UINT8	Input diagnostics code 16

Register(s)	Size	Name
1060h Low byte	UINT8	Output diagnostics index 1
1060h High byte	UINT8	Output diagnostics code 1
1061h Low byte	UINT8	Output diagnostics index 2
1061h High byte	UINT8	Output diagnostics code 2
1062h Low byte	UINT8	Output diagnostics index 3
1062h High byte	UINT8	Output diagnostics code 3
1063h Low byte	UINT8	Output diagnostics index 4
1063h High byte	UINT8	Output diagnostics code 4
1064h Low byte	UINT8	Output diagnostics index 5
1064h High byte	UINT8	Output diagnostics code 5
1065h Low byte	UINT8	Output diagnostics index 6
1065h High byte	UINT8	Output diagnostics code 6
1066h Low byte	UINT8	Output diagnostics index 7
1066h High byte	UINT8	Output diagnostics code 7
1067h Low byte	UINT8	Output diagnostics index 8
1067h High byte	UINT8	Output diagnostics code 8
1068h Low byte	UINT8	Output diagnostics index 9
1068h High byte	UINT8	Output diagnostics code 9
1069h Low byte	UINT8	Output diagnostics index 10
1069h High byte	UINT8	Output diagnostics code 10
106Ah Low byte	UINT8	Output diagnostics index 11
106Ah High byte	UINT8	Output diagnostics code 11
106Bh Low byte	UINT8	Output diagnostics index 12
106Bh High byte	UINT8	Output diagnostics code 12
106Ch Low byte	UINT8	Output diagnostics index 13
106Ch High byte	UINT8	Output diagnostics code 13
106Dh Low byte	UINT8	Output diagnostics index 14
106Dh High byte	UINT8	Output diagnostics code 14
106Eh Low byte	UINT8	Output diagnostics index 15
106Eh High byte	UINT8	Output diagnostics code 15
106Fh Low byte	UINT8	Output diagnostics index 16
106Fh High byte	UINT8	Output diagnostics code 16

Register(s)	Size	Name
1070h Low byte	UINT8	Project CRC High byte
1070h High byte	UINT8	Project CRC Low byte

CC-LINK (MBCCL)

Process data mapping

Master to slave

Bit area content

Register(s)	Content
RY #7... 0	System area
RY #15…8	

Word area content

Point(s)	Content (LSB)	Content (MSB)
RWw #0	Fieldbus input byte 1	Fieldbus input byte 0
RWw #1	Fieldbus input byte 3	Fieldbus input byte 2

Slave to master

Bit area content

Register(s)	Content
RX #7... 0	System area
Rx #15…8	

Word area content

RWr #0	Reserved	System status
RWr #1	Input status byte 1	Input status byte 0
RWr #2	Input status byte 3	Input status byte 2
RWr #3	Input status byte 5	Input status byte 4
RWr #4	Input status byte 7	Input status byte 6
RWr #5	Input status byte 9	Input status byte 8
RWr #&	Input status byte 11	Input status byte 10
RWr #7	Input status byte 13	Input status byte 12
RWr #8	Input status byte 15	Input status byte 14
RWr #9	Fieldbus input feedback byte 1	Fieldbus input feedback byte 0
RWr #10	Fieldbus input feedback byte 3	Fieldbus input feedback byte 2
RWr #11	Probe status byte 1	Probe status byte 0
RWr #12	Probe status byte 3	Probe status byte 2
RWr #13	OSSD status byte 1	OSSD status byte 0
RWr #14	OSSD status byte 3	OSSD status byte 2
RWr #15	Analog data 0 byte 1	Analog data 0 byte 0
RWr #16	Analog data 0 byte 3	Analog data 0 byte 2
RWr #17	Analog data 1 byte 1	Analog data 1 byte 0
RWr #18	Analog data 1 byte 3	Analog data 1 byte 2
RWr #19	Analog data 2 byte 1	Analog data 2 byte 0
RWr #20	Analog data 2 byte 3	Analog data 2 byte 2
RWr #21	Analog data 3 byte 1	Analog data 3 byte 0
RWr #22	Analog data 3 byte 3	Analog data 3 byte 2
RWr #23	Analog data 4 byte 1	Analog data 4 byte 0
RWr #24	Analog data 4 byte 3	Analog data 4 byte 2
RWr #25	Analog data 5 byte 1	Analog data 5 byte 0
RWr #26	Analog data 5 byte 3	Analog data 5 byte 2
RWr #27	Analog data & byte 1	Analog data 6 byte 0
RWr #28	Analog data 6 byte 3	Analog data 6 byte 2
RWr #29	Analog data 7 byte 1	Analog data 7 byte 0
RWr #30	Analog data 7 byte 3	Analog data 7 byte 2
RWr #31	Analog data 8 byte 1	Analog data 8 byte 0
RWr #32	Analog data 8 byte 3	Analog data 8 byte 2
RWr #33	Analog data 9 byte 1	Analog data 9 byte 0
RWr #34	Analog data 9 byte 3	Analog data 9 byte 2

RWr #35	Analog data 10 byte 1	Analog data 10 byte 0
RWr #36	Analog data 10 byte 3	Analog data 10 byte 2
RWr #37	Analog data 11 byte 1	Analog data 11 byte 0
RWr #38	Analog data 11 byte 3	Analog data 11 byte 2
RWr #39	Analog data 12 byte 1	Analog data 12 byte 0
RWr #40	Analog data 12 byte 3	Analog data 12 byte 2
RWr #41	Analog data 13 byte 1	Analog data 13 byte 0
RWr #42	Analog data 13 byte 3	Analog data 13 byte 2
RWr #43	Analog data 14 byte 1	Analog data 14 byte 0
RWr #44	Analog data 14 byte 3	Analog data 14 byte 2
RWr #45	Analog data 15 byte 1	Analog data 15 byte 0
RWr #46	Analog data 15 byte 3	Analog data 15 byte 2
RWr #47	Error Code[LSB]	Error Code[MSB]

Please note that CC-Link does not allow acyclic exchange, so all the acyclic data like Errors, Diagnostics and Project CRC are not availabe.

PROFINET (MBEP)

Process data mapping

Module Fieldbus input

Byte offset	Data direction[1]	Size	Name
0	In	UINT8	Fieldbus input byte 0
1	In	UINT8	Fieldbus input byte 1
2	In	UINT8	Fieldbus input byte 2
3	In	UINT8	Fieldbus input byte 3

Module System I/O

Byte offset	Data direction	Size	Name
0	Out	UINT8	System status
1	Out	UINT8	Reserved
2	Out	UINT8	Input status byte 0
3	Out	UINT8	Input status byte 1
4	Out	UINT8	Input status byte 2
5	Out	UINT8	Input status byte 3
6	Out	UINT8	Input status byte 4
7	Out	UINT8	Input status byte 5
8	Out	UINT8	Input status byte 6
9	Out	UINT8	Input status byte 7
10	Out	UINT8	Input status byte 8
11	Out	UINT8	Input status byte 9
12	Out	UINT8	Input status byte 10
13	Out	UINT8	Input status byte 11
14	Out	UINT8	Input status byte 12
15	Out	UINT8	Input status byte 13
16	Out	UINT8	Input status byte 14
17	Out	UINT8	Input status byte 15
18	Out	UINT8	Fieldbus input byte 0 feedback
19	Out	UINT8	Fieldbus input byte 1 feedback
20	Out	UINT8	Fieldbus input byte 2 feedback
21	Out	UINT8	Fieldbus input byte 3 feedback
22	Out	UINT8	Probe status byte 0
23	Out	UINT8	Probe status byte 1
24	Out	UINT8	Probe status byte 2
25	Out	UINT8	Probe status byte 3
26	Out	UINT8	OSSD status byte 0
27	Out	UINT8	OSSD status byte 1
28	Out	UINT8	OSSD status byte 2
29	Out	UINT8	OSSD status byte 3

[1] Direction from the Mosaic point of view

Module Analog data

Byte offset	Data direction	Size	Name
0	Out	FLOAT	Analog data float 0
4	Out	FLOAT	Analog data float 1
8	Out	FLOAT	Analog data float 2
12	Out	FLOAT	Analog data float 3
16	Out	FLOAT	Analog data float 4
20	Out	FLOAT	Analog data float 5
24	Out	FLOAT	Analog data float 6
28	Out	FLOAT	Analog data float 7
32	Out	FLOAT	Analog data float 8
36	Out	FLOAT	Analog data float 9
40	Out	FLOAT	Analog data float 10
44	Out	FLOAT	Analog data float 11
48	Out	FLOAT	Analog data float 12
52	Out	FLOAT	Analog data float 13
56	Out	FLOAT	Analog data float 14
60	Out	FLOAT	Analog data float 15

Record Data read/write services[1]

Name	Slot	Index	Length (byte)	Access type
Fieldbus inputs	01h	01h	4	Set/Get
System I/O	00h	00h	30	Get
Analog data	02h	05h	64	Get
Error data CPU0	00h	02h	9	Get
Error data CPU1	00h	03h	9	Get
Input diagnostics	00h	04h	32	Get
OSSD diagnostics	00h	05h	32	Get
Project CRC	00h	06h	2	Get

[1] See Acyclic data format at the end of the document for more information

PROFIBUS DP (MBP)

Process data mapping

Module 1 (with Analog data)

Byte offset	Data direction1	Size	Name
0	Out	UINT8	System status
1	Out	UINT8	Reserved
2	Out	UINT8	Input status byte 0
3	Out	UINT8	Input status byte 1
4	Out	UINT8	Input status byte 2
5	Out	UINT8	Input status byte 3
6	Out	UINT8	Input status byte 4
7	Out	UINT8	Input status byte 5
8	Out	UINT8	Input status byte 6
9	Out	UINT8	Input status byte 7
10	Out	UINT8	Input status byte 8
11	Out	UINT8	Input status byte 9
12	Out	UINT8	Input status byte 10
13	Out	UINT8	Input status byte 11
14	Out	UINT8	Input status byte 12
15	Out	UINT8	Input status byte 13
16	Out	UINT8	Input status byte 14
17	Out	UINT8	Input status byte 15
18	Out	UINT8	Fieldbus input byte 0 feedback
19	Out	UINT8	Fieldbus input byte 1 feedback
20	Out	UINT8	Fieldbus input byte 2 feedback
21	Out	UINT8	Fieldbus input byte 3 feedback
22	Out	UINT8	Probe status byte 0
23	Out	UINT8	Probe status byte 1
24	Out	UINT8	Probe status byte 2
25	Out	UINT8	Probe status byte 3
26	Out	UINT8	OSSD status byte 0
27	Out	UINT8	OSSD status byte 1
28	Out	UINT8	OSSD status byte 2
29	Out	UINT8	OSSD status byte 3
30-33	Out	FLOAT	Analog data float 0
34-37	Out	FLOAT	Analog data float 1
38-41	Out	FLOAT	Analog data float 2
42-45	Out	FLOAT	Analog data float 3
46-49	Out	FLOAT	Analog data float 4
50-53	Out	FLOAT	Analog data float 5
54-57	Out	FLOAT	Analog data float 6
58-61	Out	FLOAT	Analog data float 7
62-65	Out	FLOAT	Analog data float 8
66-69	Out	FLOAT	Analog data float 9
70-73	Out	FLOAT	Analog data float 10
74-77	Out	FLOAT	Analog data float 11
78-81	Out	FLOAT	Analog data float 12
82-85	Out	FLOAT	Analog data float 13

[1] Direction from the Mosaic point of view

86-89	Out	FLOAT	Analog data float 14
90-94	Out	FLOAT	Analog data float 15
0	In	UINT8	Fieldbus input byte 0
1	In	UINT8	Fieldbus input byte 1
2	In	UINT8	Fieldbus input byte 2
3	In	UINT8	Fieldbus input byte 3

Module 2 (without Analog data)

Byte offset	Data direction1	Size	Name
0	Out	UINT8	System status
1	Out	UINT8	Reserved
2	Out	UINT8	Input status byte 0
3	Out	UINT8	Input status byte 1
4	Out	UINT8	Input status byte 2
5	Out	UINT8	Input status byte 3
6	Out	UINT8	Input status byte 4
7	Out	UINT8	Input status byte 5
8	Out	UINT8	Input status byte 6
9	Out	UINT8	Input status byte 7
10	Out	UINT8	Input status byte 8
11	Out	UINT8	Input status byte 9
12	Out	UINT8	Input status byte 10
13	Out	UINT8	Input status byte 11
14	Out	UINT8	Input status byte 12
15	Out	UINT8	Input status byte 13
16	Out	UINT8	Input status byte 14
17	Out	UINT8	Input status byte 15
18	Out	UINT8	Fieldbus input byte 0 feedback
19	Out	UINT8	Fieldbus input byte 1 feedback
20	Out	UINT8	Fieldbus input byte 2 feedback
21	Out	UINT8	Fieldbus input byte 3 feedback
22	Out	UINT8	Probe status byte 0
23	Out	UINT8	Probe status byte 1
24	Out	UINT8	Probe status byte 2
25	Out	UINT8	Probe status byte 3
26	Out	UINT8	OSSD status byte 0
27	Out	UINT8	OSSD status byte 1
28	Out	UINT8	OSSD status byte 2
29	Out	UINT8	OSSD status byte 3
0	In	UINT8	Fieldbus input byte 0
1	In	UINT8	Fieldbus input byte 1
2	In	UINT8	Fieldbus input byte 2
3	In	UINT8	Fieldbus input byte 3

[1] Direction from the Mosaic point of view

Record Data read/write services[1]

Name	Slot	Index	Length (byte)	Access type
Fieldbus inputs	01h	01h	4	Set/Get
System I/O	00h	00h	30	Get
Analog data	02h	05h	64	Get
Error data CPU0	00h	02h	9	Get
Error data CPU1	00h	03h	9	Get
Input diagnostics	00h	04h	32	Get
OSSD diagnostics	00h	05h	32	Get
Project CRC	00h	06h	2	Get

[1] See Acyclic data format at the end of the document for more information

Acyclic data format

Errors data CPUx format

Name	Size
Module	UINT8
Error code	UINT8
Error address	UINT32
Firmware version (x.y in hexadecimal format)	UINT8
Extended code 0 (optional)	UINT8
Extended code 1 (optional)	UINT8

The Module field is defined as follow:

B7-B2	B1-B0
Module name	Node

The subfield Module name is defined as follow:

Name	Code	Name	Code
MI8O2	2	MOR4	11
MO2	3	MOR4S8	12
MI16	4	MOS8	13
MI8	5	MOS16	14
MO4	6	MO4LHCS8	15
MI12T8	7	MA4	16
MV2	8	MI8O4	17
MV1	9	MO4L	18
MV0	10	MA2	19

For the Error code field please refer to the Mosaic manual.
The optional Extended codes are only meaningful to Reer.

Input diagnostics format

Name	Size
Diagnostic index	UINT8
Diagnostic code	UINT8

A maximum of 16 Input diagnostics are transferred, if more diagnostics are present on the system only the first 16 are available on the fieldbus.

OSSD diagnostics format

Name	Size
Diagnostic index	UINT8
Diagnostic code	UINT8

A maximum of 16 OSSD diagnostics are tranfserred, if more diagnostics are present on the system only the first 16 are available on the fieldbus.

Project CRC format

Name	Size
CRC byte 0	UINT8
CRC byte 1	UINT8