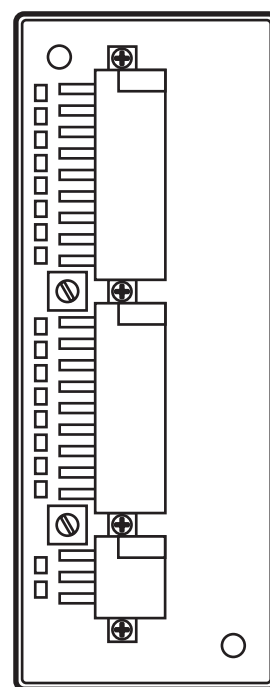




Device manual
CabinetModule
Input/output module

UK

CR2012



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This device manual applies to devices as from the production status CR2012AH
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1 Preliminary note

Technische Daten, Zulassungen, Zubehör und weitere Informationen unter www.ifm.com.

1.1 Symbols used

- Instruction
- > Reaction, result
- [...] Designation of keys, buttons or indications
- Cross-reference
-  Important note
Non-compliance may result in malfunction or interference.
-  Information
Supplementary note

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WARNING

Warning of serious personal injury.
Death or serious irreversible injuries may result.

CAUTION

Warning of personal injury.
Slight reversible injuries may result.

NOTE

Warning of damage to property.

2 Safety instructions

This description is part of the unit. It contains texts and drawings concerning the correct handling of the module and must be read before installation or use.

Observe the information of the description. Non-observance of the notes, operation which is not in accordance with use as prescribed below, wrong installation or handling can result in serious harm concerning the safety of persons and plant.

The instructions are for authorised persons according to the EMC and low voltage guidelines. The unit must be installed and commissioned by a skilled electrician (programmer or service technician). The device may only be installed, connected and commissioned by qualified personnel.

Disconnect the device externally before doing any work on it. If necessary, also disconnect separately supplied output load circuits.

If the unit is not supplied by the mobile on-board system (12/24 V battery operation) it must be ensured that the external voltage is generated and supplied according to the criteria for safety extra-low voltage (SELV) as this is supplied without further measures to the connected controller, the sensors, and the actuators.

The wiring of all signals in connection with the SELV circuit of the unit must also comply with the SELV criteria (safe extra-low voltage, safe electrical separation from other electric circuits).

If the supplied SELV voltage has an external connection to ground (SELV becomes PELV) the responsibility lies with the user and the respective national regulations for installation must be complied with. All statements in these operating instructions refer to the unit the SELV voltage of which is not grounded.

The terminals may only be supplied with the signals indicated in the technical data or on the unit label and only the approved accessories of ifm electronic gmbh may be connected.

The unit can be operated within a wide temperature range according to the technical specification indicated below. Due to the additional self-heating the housing walls can have high perceptible temperatures when touched in hot environments.

In case of malfunctions or uncertainties please contact the manufacturer.

Tampering with the unit can lead to considerable risks for the safety of persons and plant. It is not permitted and leads to the exclusion of any liability and warranty claims.

3 Functions and features

The device enables decentralised evaluation of sensor signals and decentralised triggering of actuators and proportional valves.

WARNING

The device is not approved for safety tasks with respect to the protection of persons.

3.1 CAN communication

- The device supports binary/analogue inputs/outputs and is therefore classified in the device class “I/O module” to CiA DS 401.
- As regards the input/output functions, the device can be configured and it supports the following functions:
 - analogue inputs
 - binary inputs
 - binary outputs
 - PWM outputs

- There are 1 server SDO and 4 default PDOs according to CiA DS 401. The PDO mapping can be changed (dynamic PDO mapping). The default identifiers are assigned according to the “predefined connection set”.
- The COB IDs of the PDOs as well as the transmission type (synch/asynch) of the individual PDOs can be configured.
- The device expects a synch object. The CAN identifier of the synch object can be configured.
- The device supports “node guarding” and “heartbeat”. The “guard time”, the “life time factor” and the “heartbeat time” can be configured.
- The device generates an emergency object. The COB ID of the EMCY object can be configured.
- The device stores the last error. The error code of the corresponding emergency object is stored.
- The device supports a reset function, i.e. the assignment of the parameters to the factory default settings on request.
Factory default settings (→ 7.3 Communication profiles; Idx 1000 to 1FFF) and (→ 7.4 Manufacturer-specific profiles; Idx 2000 to 6FFF)

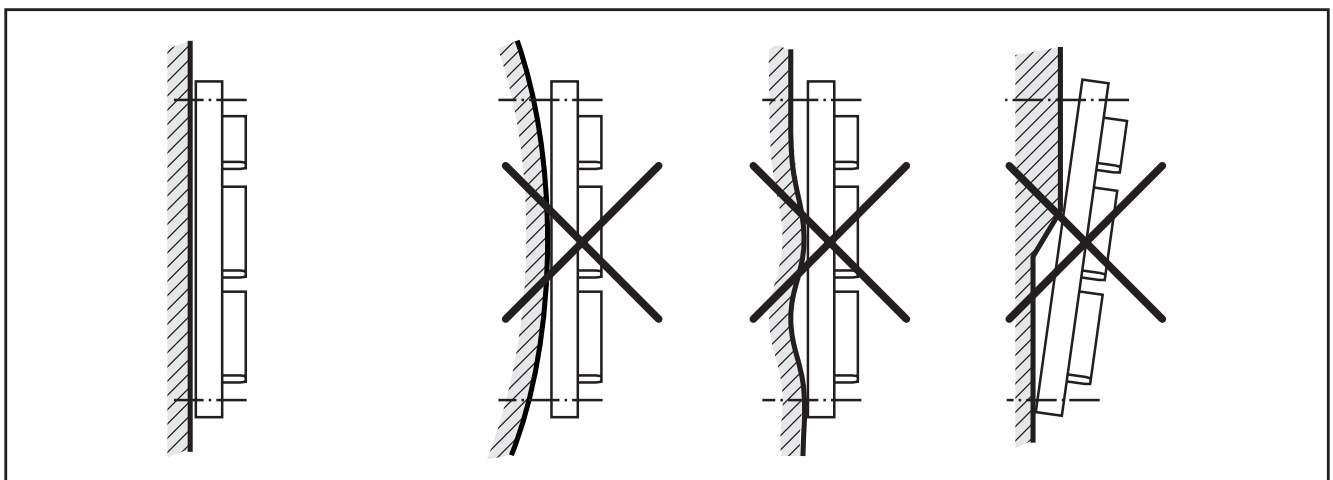
4 Mounting

4.1 Mounting location

- The device is to be mounted in a dry and enclosed environment (e.g. control panel of the driver's cab, separate control boxes, etc.).

ATTENTION

The housing must not be exposed to any torsion forces or mechanical stress.

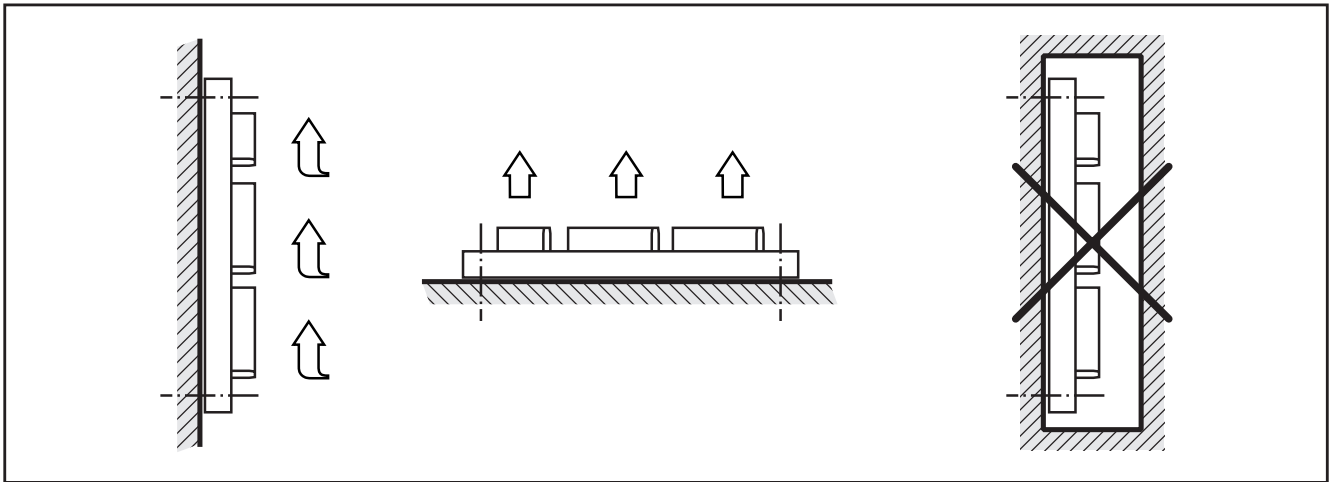


4.2 Fixing

- Fix the device using 2 M4 x L screws via transversely arranged bore holes. Tighten the screws alternately crosswise.
 - Tightening torque: 1.5 Nm
 - Mounting position: as required
 - Hole dimensions: (→ 8.1 Dimensions, mechanics, electronics)

4.3 Cooling

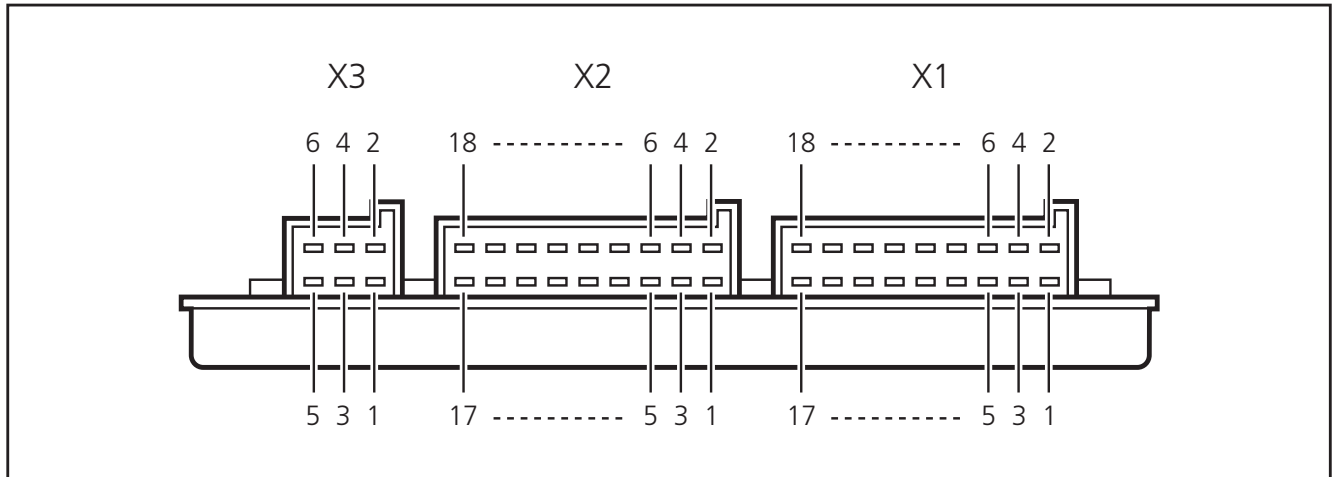
- As the internal heating of the electronics is conducted away via the housing, ensure sufficient heat dissipation.



5 Electrical connection

5.1 Connectors

The supply cables and inputs/outputs are connected via AMP crimp connectors on the front of the device.



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Pin connection (→ 8.4 Wiring)

You can find more information about the available connector accessories at:
www.ifm.com → Data sheet direct → CR2012 → Accessories

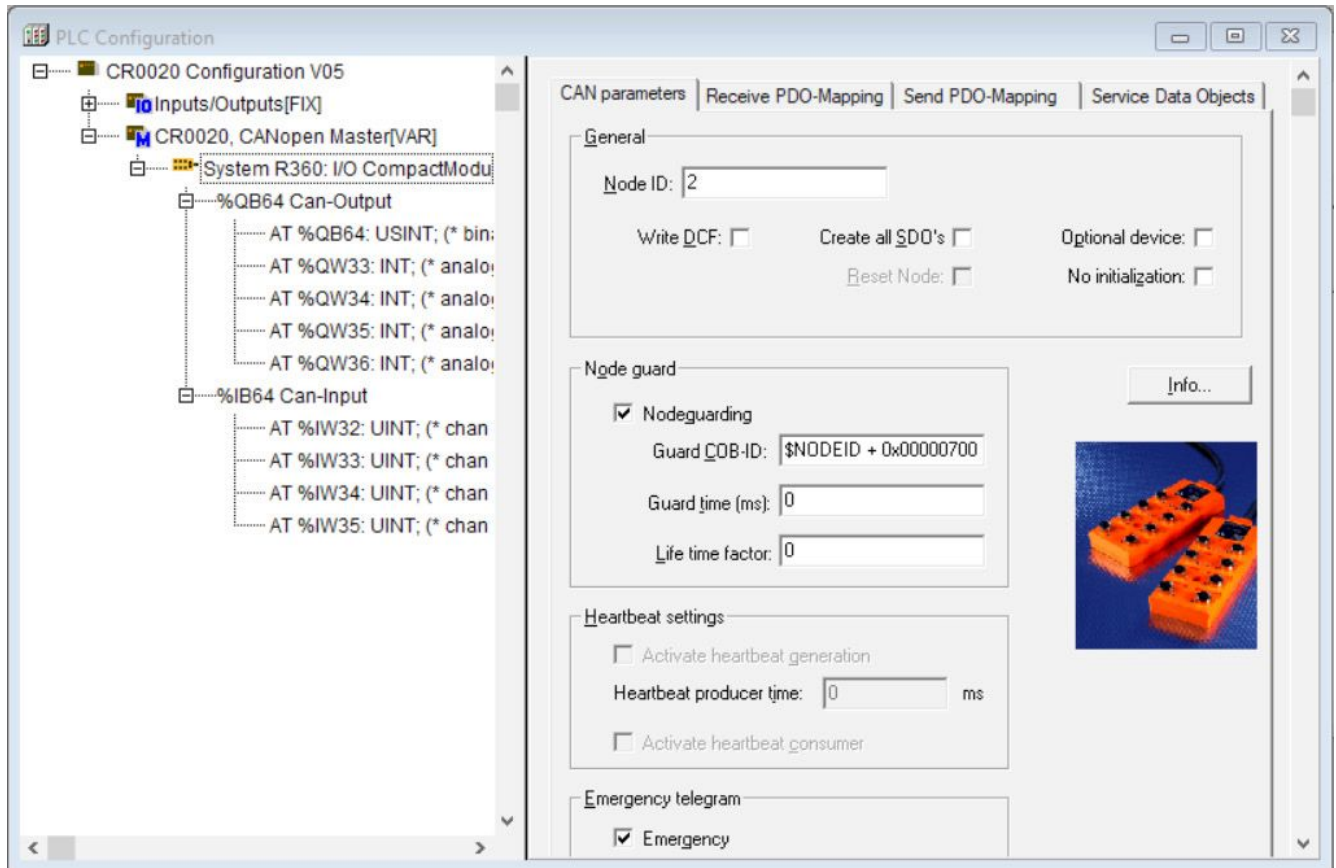
5.2 Fuses

- To protect the whole system (wiring and device) the individual electric circuits must be protected with max. 8 A.

6 Set-up

6.1 PLC configuration in CODESYS 2.3

Parameter setting of the device functions and of the CAN interface is directly done from the application programmed with CODESYS 2.3. To do so, the „Electronic Data Sheet“ (EDS) is integrated via the CODESYS PLC configuration.



CODESYS dialogue „PLC configuration“ (example)

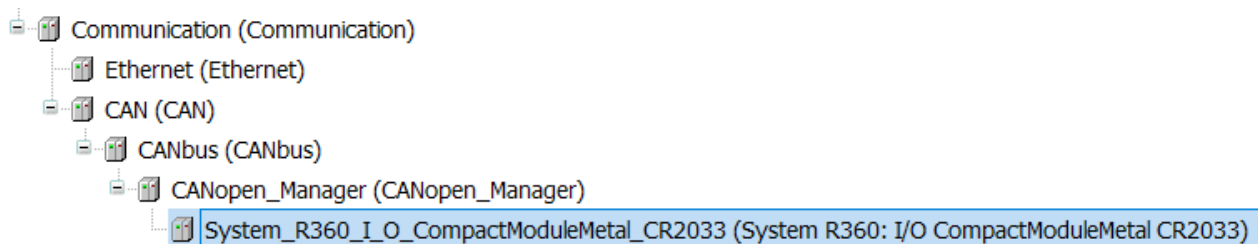
For a description of the setting and application of the „PLC configuration“ dialogue see the CODESY manual and the CODESYS online help.

6.2 PLC configuration in CODESYS 3.5

The „Electronic Data Sheet“ (EDS) is installed in the [Device Repository]. Proceed as follows in the main menu:

- ▶ Click on [Tools] / [Device Repository].
 - ▶ Select [Fieldbuses] / [CiA CANopen] / [CiA Remote Device] and click on [Install].
 - ▶ Select EDS file and click on [Open].
- > In CODESYS 3.5 the devices are integrated as CiA remote devices in the device tree under a [CANopen_Manager] element.

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The CANopen communication is configured via the CODESYS configuration editor.

6.2.1 Heartbeat configuration

The function [Reset Node] must be activated on the tab [General] so that the device applies the parameters set for heartbeat monitoring of the CANopen Manager.

General

Node ID: 1 SDO Channels (1/1 active) **CANopen**

☒ Enable Expert Settings ☐ Optional Device

☐ Enable Sync Producing ☐ No Initialisation ☐ Reset Node: Sub:001

▲ **Nodeguarding**

☐ Enable Nodeguarding ☒ Enable Heartbeat Producing

Guard Time (ms): 0 Producer Time (ms): 200

Life Time Factor: 0 **Heartbeat Consuming (1/1 active)**

▲ **Emergency**

☒ Enable Emergency

COB-ID: \$NODEID+16#80

▲ **TIME**

☐ Enable TIME Producing

COB-ID (Hex): 16# 100

☐ Enable TIME Consuming

▲ **Checks at Startup**

☒ Check Vendor ID ☐ Check Product Number ☐ Check Revision Number

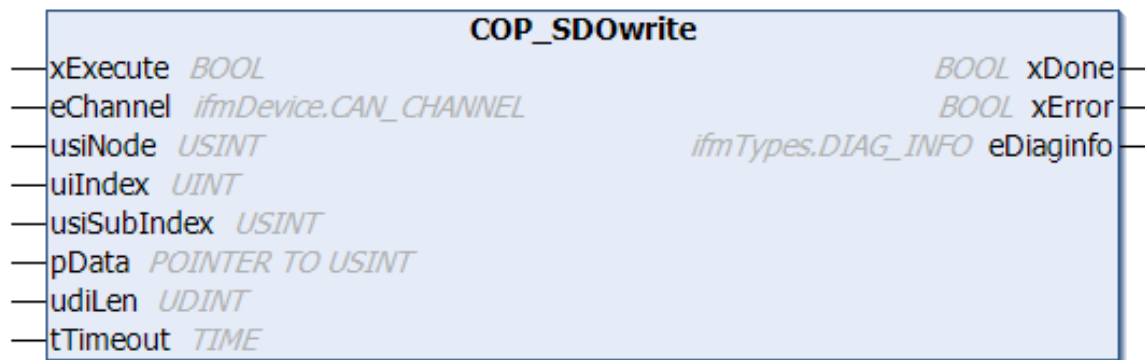
6.2.2 SyncMonitoring

To activate the device-internal monitoring of the Sync cycle, the monitoring time has to be written into the object directory entry 0x1006. This is possible by supplementing the SDO list in the CANopen configurator or during the operating time via the function block COP_SDOWrite.

The monitoring time is indicated in microseconds [μ s].

The screenshot shows the CANopen configurator interface. On the left, a sidebar lists categories: General, PDOs, SDOs, CANopen I/O Mapping, Status, and Information. The main area displays a table of SDOs. A dialog box titled 'Select Item from Object Directory' is open, showing a list of objects. The object 16#1006:16#00, 'Communication cycle period', is selected. Below the list, the 'Name' field is set to 'Unknown Object', 'Index' is 16#1006, 'SubIndex' is 16#0, 'Bit length' is 8, and 'Value' is 100000.

Line	Index:Subindex	Name	Value	Bit length	Abort if error	Jump to line if error	Next
1	16#100C:16#00	Set Guardtime	16#00000000	16	<input type="checkbox"/>	<input type="checkbox"/>	0
2	16#100D:16#00	Life time factor					
3	16#100E:16#00	Store parameters					
4	16#100F:16#00	Restore default parameters					
5	16#1010:16#00	COB-ID SYNC message					
6	16#1011:16#00	Communication cycle period					
7	16#1012:16#00	Guard time					
8	16#1013:16#00	Life time factor					
9	16#1014:16#00	COB-ID EMCY message					
10	16#1015:16#00	Consumer heartbeat time					
11	16#1016:16#00	Producer heartbeat time					
12	16#1017:16#00	1. receive PDO parameter					
13	16#1018:16#00	2. receive PDO parameter					
14	16#1019:16#00	1. transmit PDO parameter					
15	16#101A:16#00	2. transmit PDO parameter					
16	16#101B:16#00						
17	16#101C:16#00						
18	16#101D:16#00						
19	16#101E:16#00						
20	16#101F:16#00						
21	16#1020:16#00						
22	16#1021:16#00						



6.3 Electronic Data Sheet

The EDS contains the description of all parameters and I/O data of the device in a format defined by CANopen. The EDS files are provided for all CANopen slaves by ifm electronic.

The EDS files are available at www.ifm.com.

7 Parameter setting

7.1 Automatic saving

Automatic saving of the communication and device parameters can be activated or deactivated by means of the “save parameter” entry (object directory, index 1010, S-Idx 01).

- Value 0x00:

There is no automatic saving. Changed parameters are only valid until the device is switched off or until the next reset.

- Value 0x01:

Changed parameters will be saved if the string “save” is written in S-Idx 01. Otherwise changed parameters are only valid until the device is switched off or until the next reset.

- Value 0x02:

Changed parameters are saved automatically.

7.2 Restoring the factory setting

With the function “restore” (object directory, index 1011, subindex 01) the factory default values can be restored (except for the baud rate and the node ID). They become valid with the next power on.

7.3 Communication profiles; Idx 1000 to 1FFF

Parameters	Index in object directory	Default value (factory preset)	Change saved automatically	Change effective
COB ID Synch Object	1005 00	0x80	adjustable	after PreOp
Communication Cycle	1006 00	0x00 (Off)	adjustable	immediately
Guard Time	100C 00	0x00 (Off)	adjustable	immediately
Life Time Factor	100D 00	0x00	adjustable	immediately
Save Parameter	1010 01	0x02 (AutoSave ON)	yes	immediately
COB-ID EMCY	1014 00	0x80 + node ID	adjustable	after a reset
Consumer Heartbeat Time	1016 01	0x00 (Off)	adjustable	immediately
Producer Heartbeat Time	1017 00	0x00 (Off)	adjustable	immediately
COB-ID Rx PDO 1	1400 01	0x200 + node ID	adjustable	after PreOp
Trans Type Rx PDO 1	1400 02	0x01 (synchronous)	adjustable	immediately
COB-ID Rx PDO 2	1401 01	0x300 + node ID	adjustable	after PreOp
Trans Type Rx PDO 2	1401 02	0x01 (synchronous)	adjustable	immediately
COB-ID Tx PDO 1	1800 01	0x180 + node ID	adjustable	after PreOp
Trans Type Tx PDO 1	1800 02	0xFF (asynchronous)	adjustable	immediately
Inhibit Timer Tx PDO 1	1800 03	0x0000	adjustable	immediately
Event Timer Tx PDO 1	1800 05	0x00	adjustable	immediately
COB-ID Tx PDO 2	1801 01	0x280 + node ID	adjustable	after PreOp
Trans Type Tx PDO 2	1801 02	0x01 (synchronous)	adjustable	immediately
Inhibit Timer Tx PDO 2	1801 03	0x0000	adjustable	immediately
Event Timer Tx PDO 2	1801 05	0x00	adjustable	immediately

The life time factor 0 is interpreted as 1. The first guard protocol is interpreted as "start guarding" even if guarding is not yet active at that time (guard time = 0).

7.4 Manufacturer-specific profiles; Idx 2000 to 6FFF

Parameters	Index in object directory	Default value (factory preset)	Change saved automatically	Change effective
Config. channel 1	2000 01	0x01 (Bin IN)	adjustable	after PreOp
Config. channel 2	2000 02	0x01 (Bin IN)		
Config. channel 3	2000 03	0x01 (Bin IN)		
Config. channel 4	2000 04	0x01 (Bin IN)		
Config. channel 5	2000 05	0x03 (Ana IN absolute)		
Config. channel 6	2000 06	0x03 (Ana IN absolute)		
Config. channel 7	2000 07	0x02 (Bin OUT + read back input)		
Config. channel 8	2000 08	0x02 (Bin OUT + read back input)		
Config. channel 9	2000 09	0x01 (Bin IN)		
Config. channel 10	2000 0A	0x01 (Bin IN)		
Config. channel 11	2000 0B	0x01 (Bin IN)		
Config. channel 12	2000 0C	0x01 (Bin IN)		
Config. channel 13	2000 0D	0x03 (Ana IN absolute)		
Config. channel 14	2000 0E	0x03 (Ana IN absolute)		
Config. channel 15	2000 0F	0x02 (Bin OUT + read back input)		
Config. channel 16	2000 10	0x02 (Bin OUT + read back input)		
PWM frequency	2001 00	0x64 (100 Hz)	adjustable	after PreOp
Node ID *	20F0, 20F1	0x20 (0d32)	yes	after a reset
Baud rate *	20F2, 20F3	0x04 (125 Kbit/s)	yes	after a reset
Autostart	20F4	0x00 (Off)	adjustable	immediately

Entries in the object directory indexes 20F0/20F1 and/or 20F2/20F3 are only valid if the rotary switches for baud rate and/or node ID are in the position "F".

*) Observe rotary switch position!

Position and coding of the rotary switches (→ 8.2 Connecting, operating and display elements)

7.5 EMCY objects

The following error codes are supported according to DSP-301 and DSP-401:

EMCY code	Error reg	Additional code	Description
0x6100	0x11	0x00	"Internal Software": overflow of an Rx queue; e.g. frequency of the Rx PDOs too high only external reset via an entry in 1003 00
0x6101	0x11	0x00	"Internal Software": overflow of a Tx queue; e.g. device does not communicate with the bus only external reset via an entry in 1003 00
0x8100	0x11	0x00	"Monitoring" (guarding error) no guard object is received for "guard time" x "life time factor" reset with the next communication
0x8120	0x11	0x00	"Communication" (CAN error passive) CAN controller has passed into the CAN error passive state
0x8200	0x11	0x00	"Monitoring" (synch error) for "communication cycle" no synch object is received; only in OPERATIONAL reset with the next synch OBJ or PREOP

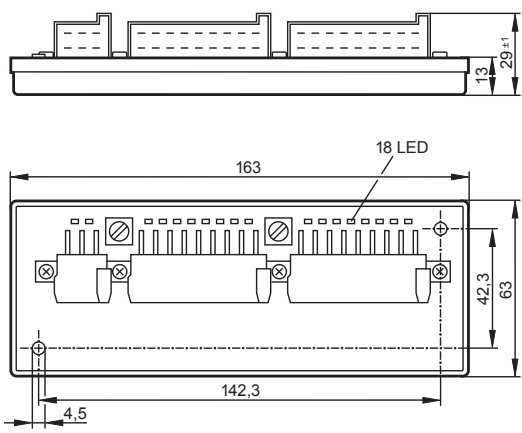
7.6 Boot-up message

The module sends a boot-up message after application of the supply voltage or after a reset, to inform a CANopen master in the network about its presence or a restart.

To ensure the compatibility with older device versions, a boot-up message is sent in accordance with CANopen specifications DS-301 V3 and V4.

8 Technical data

8.1 Dimensions, mechanics, electronics

<p>CR2012</p> <p>CabinetModule</p> <p>I/O module digital and analogue for R 360 system</p> <p>16 inputs/outputs</p> <p>CANopen interface</p> <p>10...32 V DC</p>	<p>CE</p>  <p>E1</p>
<p>Application</p>	<p>Connection of operating and display elements to CAN bus to be installed in driver's cabs, control panels or control boxes</p>
<p>Structure</p>	<p>PCB without housing (for mechanical protection potted in a potting tub)</p>
<p>Dimensions (l x w x h)</p>	<p>163 x 63 x 29 ±1 mm</p>
<p>Installation</p>	<p>via 2 transversely arranged bore holes</p>
<p>Protection</p>	<p>IP00 (PCB without housing), to EN60529</p>
<p>Possible I/O-configurations (also see wiring)</p>	<p>8 digital inputs 4 digital/analogue inputs (to be configured via CANopen) 2 digital inputs/outputs (to be configured via CANopen) 2 digital inputs/outputs, analogue outputs (to be configured via CANopen)</p>
<p>Inputs, digital</p>	<p>for positive-switching sensor signals, switches or pushbuttons</p>
<p>Inputs, analogue (to be configured via CANopen)</p>	<ul style="list-style-type: none"> • ratiometric, query of potentiometric signal transmitters (e.g. joystick) • absolute, conversion of input voltage (0...10 V) in 8-bit value
<p>Outputs</p>	<p>for triggering pilot lights etc.</p>
<p>Connections</p>	<p>AMP crimp connector, to be clipped into place and thus vibration-resistant, protected against reverse polarity</p>
<p>Inputs/outputs</p>	<p>2 plugs, 18 poles</p>
<p>Operating voltage and CAN bus</p>	<p>1 plug, 6 poles</p>
<p>Operating voltage U_B</p>	<p>10...32 V DC</p>
<p>Current consumption</p>	<p>≤ 100 mA, without load (external fuse with max. 5 A)</p>
<p>Operating/storage temperature</p>	<p>-40...+85°C / -40...+85°C</p>
<p>Controller</p>	<p>16 bits Fujitsu MB90F543</p>
<p>Interface</p>	<p>CAN interface 2.0 B, ISO 11898</p>
<p>Baud rate</p>	<p>20 Kbits/s...1 Mbit/s (default setting 125 Kbits/s) adjustable via rotary switches or CANopen object directory</p>
<p>Controller</p>	<p>16 bits Fujitsu MB90F543</p>
<p>Communication profile</p>	<p>CANopen, CiA DS 301 version 4, CiA DS 401 version 2.1</p>
<p>Programming system</p>	<p>from CoDeSys 2.3 via EDS</p>
<p>Node ID (default)</p>	<p>hex 20 (= dec 32) adjustable via rotary switch (1...14) or CANopen object directory (1...127)</p>
<p>Status LED</p>	<p>CANopen: 2 LEDs (green, red)</p>
<p>Accessories</p>	<p>Inputs/outputs: 16 LEDs (yellow)</p>
<p>Accessories (to be ordered separately)</p>	<p>Order no. EC2053 Plug set for CabinetModules, wirable, consisting of: AMP crimp housing, 1 x 6 poles, 2x18 poles incl. crimp contacts (Junior Power Timer)</p>

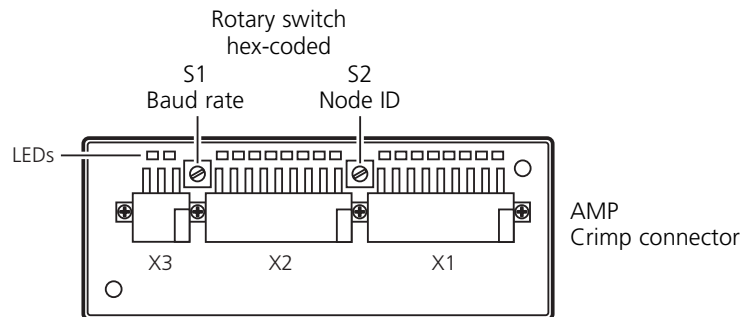
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8.2 Connecting, operating and display elements

CR2012

Operating and indicating elements
Connector

Technical data



Hex-code switch coding

Switch	Position	Description
S1 Baud rate	0	1000 Kbits/s
	1	800 kBits/s
	2	500 Kbit/s
	3	250 Kbit/s
	4	125 Kbit/s
	5	100 Kbit/s
	6	50 Kbit/s
	7	20 Kbit/s
	8...E F	not defined adjustment via object directory (default)
S2 Node-ID	0	not defined
	1...E	1...14
	F	adjustment via object directory (default)



Operating states (LEDs)

LED	State	Description
PWR (green)	OFF	no supply voltage
	ON	module in stand-by mode CANopen status: PREOPERATIONAL / PREPARED outputs = OFF
	1 x ON 2.5 Hz	module in stop mode CANopen status: STOP outputs = OFF module active CANopen status: OPERATIONAL outputs are updated
DIA (red)	OFF	communication OK
	ON	communication disturbed, CAN bus OFF
	1 x ON	communication disturbed:
	2 x ON 3 x ON	<ul style="list-style-type: none"> • CAN error warning level exceeded • node guard / heartbeat error (if node guarding / heartbeat is activated) • no synch objects (if synch monitoring is activated)
IN (yellow)	OFF	input not switched
	ON	input switched
OUT (yellow)	OFF	binary output not switched (OFF) analogue output: PWM preset value < 1% measuring range
	ON	binary output switched (ON) analogue output: PWM preset value > 2% measuring range

[illegible]

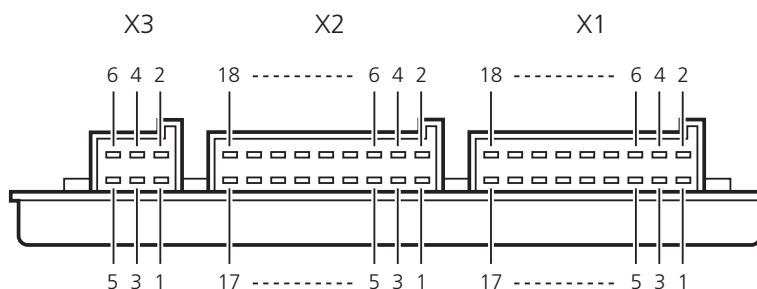
8.4 Wiring

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View of the unit

Wiring

Wiring



Plug X1

Pin	Potential	Inputs		Outputs	
1	channel 1	Bin IN 1	—	—	—
2	+U _B				
3	channel 2	Bin IN 2	—	—	—
4	+U _B				
5	channel 3	Bin IN 3	—	—	—
6	+U _B				
7	channel 4	Bin IN 4	—	—	—
8	+U _B				
9	+U _B				
10	+U _B				
11	channel 5	Bin IN 5	Ana IN 5	—	—
12	channel 6	Bin IN 6	Ana IN 6	—	—
13	GND				
14	GND				
15	channel 7	Bin IN 7	—	Bin OUT 7	
16	GND				
17	channel 8	Bin IN 8	—	Bin OUT 8	PWM 8
18	GND				

Plug X2

1	channel 9	Bin IN 9	—	—	—
2	+U _B				
3	channel 10	Bin IN 10	—	—	—
4	+U _B				
5	channel 11	Bin IN 11	—	—	—
6	+U _B				
7	channel 12	Bin IN 12	—	—	—
8	+U _B				
9	+U _B				
10	+U _B				
11	channel 13	Bin IN 13	Ana IN 13	—	—
12	channel 14	Bin IN 14	Ana IN 14	—	—
13	GND				
14	GND				
15	channel 15	Bin IN 15	—	Bin OUT 15	
16	GND				
17	channel 16	Bin IN 16	—	Bin OUT 16	PWM 16
18	GND				

Plug X3

1	+U _B	
2	GND	
3	+U _B	
4	GND	
5	CAN_L	
6	CAN_H	

9 Maintenance, repair and disposal

- ▶ Do not open the housing, as the device does not contain any components which must be maintained by the user. The device must only be repaired by the manufacturer.
- ▶ Dispose of the device in accordance with the national environmental regulations.

10 Approvals/standards

Test standards and regulations (→ 8 Technical data)

The CE Declaration of Conformity and the E1 approval are available at:
www.ifm.com → Data sheet direct → CR2012 → Approvals

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11 Anhang / Appendix

Objektverzeichnis / Object directory

11.1 Communication profiles; Idx 1000 to 1FFF

Index	S-Idx	Name	Type		Default	Description
1000	0	device type	ro	u32	0x000F0191	I/O-module profile DS401 digital/analogue inputs/outputs
1001	0	error register	ro	u8	0x00	
1003	0	pre-defined error field	rw	u8	0x00	up to 4 entries in error history supported error history can be deleted by writing '0' to this entry
	1	error history	ro	u32	0x00000000	
	2	error history	ro	u32	0x00000000	
	3	error history	ro	u32	0x00000000	
	4	error history	ro	u32	0x00000000	
1005	0	COB ID SYNC	rw	u32	0x00000080	
1006	0	communication cycle period	rw	u32	0x00000000	max. time between 2 synch objects in μ s; useful resolution = 1 ms
1008	0	device name	ro	str	CR2012	
1009	0	HW Version	ro	str	HW Vx.x	
100A	0	SW Version	ro	str	SW Vx.x	
100C	0	guard time	rw	u16	0x0000	time in ms within this time the module expects a "node guarding" of the network master 0 = node guarding deactivated
100D	0	life time factor	rw	u8	0x00	if no "node guarding" is received for "guard time" x "life time", the module generates an EMCY the result form "guard time" x "life time" must be between 0 and 65535
1010	0	number of save options	ro	u8	0x01	
	1	save parameter	rw	u32	0x00000002	0x00000000 = no save 0x00000001 = saving all parameters after the string 'save' is written to this entry 0x00000002 = auto save
1011	0	number of restore options	ro	u8	0x01	
	1	restore default parameter	rw	u32	0x00000001	restore all parameters to default value after next reset if the string 'load' is written to this entry

Index	S-Idx	Name	Type		Default	Description
1014	0	COB ID EMCY	rw	u32	0x40000080 + NodeID	module generates EMCY messages (bit 30 = 1)
1016	0	number of monitored devices	ro	u8	0x01	
	1	consumer heartbeat time	rw	u32	0x00000000	heartbeat monitoring time for node n monitoring of only one node is supported 0x0nnntttt = monitoring time [ms] 0x0nnntttt = node number (if nn or tttt = 0, no monitoring is carried out)
1017	0	producer heartbeat time	rw	u16	0x0000	time interval [ms] where the module generates a producer heartbeat
1018	0	number of identity objects	ro	u8	0x04	
	1	vendor ID	ro	u32	0x0069666D	
1400	0	highest numbered subindex Receive PDO 1	ro	u8	0x02	
	1	COB ID Receive PDO 1	rw	u32	0x00000200 + NodeID	PDO is valid (bit 31 = 0)
	2	transmission type Rec PDO 1	rw	u8	0x01	0x01...0xF0 = synch cyclic 0xFE...0xFF = asynch (immediately)
1401	0	highest numbered subindex Receive PDO 2	ro	u8	0x02	
	1	COB ID Receive PDO 2	rw	u32	0x00000300 + NodeID	PDO is valid (bit 31 = 0)
	2	transmission type Rec PDO 2	rw	u8	0x01	0x01...0xF0 = synch cyclic 0xFE...0xFF = asynch (immediately)
1600	0	number of application objects linked with Rec PDO 1	rw	u8	0x01	
	1	1st mapping object Rec PDO 1	rw	u32	0x08010062	index 6200, subindex 1, 8 bits
	2	2nd mapping object Rec PDO 1	rw	u32	0x00000000	no object
	3	3rd mapping object Rec PDO 1	rw	u32	0x00000000	no object
	4	4th mapping object Rec PDO 1	rw	u32	0x00000000	no object

Index	S-Idx	Name	Type		Default	Description
	5	5th mapping object Rec PDO 1	rw	u32	0x00000000	no object
	6	6th mapping object Rec PDO 1	rw	u32	0x00000000	no object
	7	7th mapping object Rec PDO 1	rw	u32	0x00000000	no object
	8	8th mapping object Rec PDO 1	rw	u32	0x00000000	no object
1601	0	number of application objects linked with Rec PDO 2	rw	u8	0x02	
	1	1st mapping object Rec PDO 2	rw	u32	0x10011464	index 6414 subindex 1, 16 bits
	2	2nd mapping object Rec PDO 2	rw	u32	0x10021464	index 6414 subindex 2, 16 bits
	3	3rd mapping object Rec PDO 2	rw	u32	0x00000000	no object
	4	4th mapping object Rec PDO 2	rw	u32	0x00000000	no object
	5	5th mapping object Rec PDO 2	rw	u32	0x00000000	no object
	6	6th mapping object Rec PDO 2	rw	u32	0x00000000	no object
	7	7th mapping object Rec PDO 2	rw	u32	0x00000000	no object
	8	8th mapping object Rec PDO 2	rw	u32	0x00000000	no object
1800	0	highest numbered subindex Transmit PDO 1	ro	u8	0x05	
	1	COB ID Transmit PDO 1	rw	u32	0x00000180 + NodeID	PDO is valid (bit 31 = 0)
	2	transmission type Trans PDO 1	rw	u8	0xFF	0x01...0xF0 = synch cyclic 0xFE...0xFF = asynch (immediately)
	3	inhibit timer Trans PDO 1	rw	u16	0x0000	min. interval for transmission (in 100 µs)
	5	event timer Trans PDO 1	rw	u16	0x0000	max transfer break in trans type "asynch" (0...65535 ms) when this time has elapsed the PDO is transferred even if the appl. event has not occurred
1801	0	highest numbered subindex Transmit PDO 2	ro	u8	0x05	

Index	S-Idx	Name	Type		Default	Description
	1	COB ID Transmit PDO 2	rw	u32	0x00000280 + NodeID	PDO is valid (bit 31 = 0)
	2	transmission type Trans PDO 2	rw	u8	0x01	0x01...0xF0 = synch cyclic 0xFE...0xFF = asynch (immediately)
	3	inhibit timer Trans PDO 2	rw	u16	0x0000	min. interval for transmission (in 100 µs)
	5	event timer Trans PDO 2	rw	u16	0x0000	max transfer break in trans type "asynch" (0...65535 ms) when this time has elapsed the PDO is transferred even if the appl. event has not occurred
1A00	0	number of application objects linked with Trans PDO 1	rw	u8	0x01	
	1	1st mapping object Trans PDO 1	rw	u32	0x10010061	index 6100, subindex 1, 16 bits
	2	2nd mapping object Trans PDO 1	rw	u32	0x00000000	no object
	3	3rd mapping object Trans PDO 1	rw	u32	0x00000000	no object
	4	4th mapping object Trans PDO 1	rw	u32	0x00000000	no object
	5	5th mapping object Trans PDO 1	rw	u32	0x00000000	no object
	6	6th mapping object Trans PDO 1	rw	u32	0x00000000	no object
	7	7th mapping object Trans PDO 1	rw	u32	0x00000000	no object
	8	8th mapping object Trans PDO 1	rw	u32	0x00000000	no object
1A01	0	number of application objects linked with Trans PDO 2	rw	u8	0x04	
	1	1st mapping object Trans PDO 2	rw	u32	0x10010164	index 6401, subindex 1, 16 bits
	2	2nd mapping object Trans PDO 2	rw	u32	0x10020164	index 6401, subindex 2, 16 bits
	3	3rd mapping object Trans PDO 2	rw	u32	0x10030164	index 6401, subindex 3, 16 bits
	4	4th mapping object Trans PDO 2	rw	u32	0x10040164	index 6401, subindex 4, 16 bits
	5	5th mapping object Trans PDO 2	rw	u32	0x00000000	no object

Index	S-Idx	Name	Type		Default	Description
	6	6th mapping object Trans PDO 2	rw	u32	0x00000000	no object
	7	7th mapping object Trans PDO 2	rw	u32	0x00000000	no object
	8	8th mapping object Trans PDO 2	rw	u32	0x00000000	no object

11.2 Manufacturer-specific profiles; Idx 2000 to 6FFF

Index	S-Idx	Name	Type		Default	Description
2000	0	number of IOs	ro	u8	0x10	
	1	configuration channel 1	rw	u8	0x01	0x00 = off 0x01 = binary input
	2	configuration channel 2	rw	u8	0x01	0x00 = off 0x01 = binary input
	3	configuration channel 3	rw	u8	0x01	0x00 = off 0x01 = binary input
	4	configuration channel 4	rw	u8	0x01	0x00 = off 0x01 = binary input
	5	configuration channel 5	rw	u8	0x03	0x00 = off 0x01 = binary input 0x03 = analog input absolute (voltage 0...10 V; 0x00...0xFF) 0x06 = analog input ratiometric
	6	configuration channel 6	rw	u8	0x03	0x00 = off 0x01 = binary input 0x03 = analog input absolute (voltage 0...10 V; 0x00...0xFF) 0x06 = analog input ratiometric
	7	configuration channel 7	rw	u8	0x02	0x00 = off 0x01 = binary input 0x02 = binary output + read back input
	8	configuration channel 8	rw	u8	0x02	0x00 = off 0x01 = binary input 0x02 = binary output + read back input 0x04 = analogue output (PWM 20...250 Hz)
	9	configuration channel 9	rw	u8	0x01	0x00 = off 0x01 = binary input
	A	configuration channel 10	rw	u8	0x01	0x00 = off 0x01 = binary input
	B	configuration channel 11	rw	u8	0x01	0x00 = off 0x01 = binary input
	C	configuration channel 12	rw	u8	0x01	0x00 = off 0x01 = binary input
	D	configuration channel 13	rw	u8	0x03	0x00 = off 0x01 = binary input 0x03 = analog input absolute (voltage 0...10 V; 0x00...0xFF) 0x06 = analog input ratiometric

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Index	S-Idx	Name	Type		Default	Description
	E	configuration channel 14	rw	u8	0x03	0x00 = off 0x01 = binary input 0x03 = analog input absolute (voltage 0...10 V; 0x00...0xFF) 0x06 = analog input ratiometric
	F	configuration channel 15	rw	u8	0x02	0x00 = off 0x01 = binary input 0x02 = binary output + read back input
	10	configuration channel 16	rw	u8	0x02	0x00 = off 0x01 = binary input 0x02 = binary output + read back input 0x04 = analogue output (PWM 20...250 Hz)
2001	0	PWM frequency	rw	u8	0x64	20..250 Hz PWM frequency for channel 8 and 16
20F0	0	CANopen node ID	rw	u8	0x20	1...127
20F1	0	CANopen node ID	rw	u8	0x20	The entries 20F0/20F1 must always contain identical values. The new entries are valid after a reset (switching the module off/on). Values outside the permissible ranges will be rejected.
20F2	0	CAN baud rate	rw	u8	0x03	0 = 1000 Kbaud 1 = 500 Kbaud 2 = 250 Kbaud 3 = 125 Kbaud 4 = 100 Kbaud 5 = 50 Kbaud 6 = 20 Kbaud
20F3	0	CAN baud rate	rw	u8	0x03	The entries 20F2/20F3 must always contain identical values. The new entries are valid after a reset (switching the module off/on). Values outside the permissible ranges will be rejected.
20F4	0	auto start	rw	u16	0x00	Time after reaching Preoperational State to change to Operational State. 0...5000 ms 0 = auto start deactivated
2500	0	number of 8bit user variables	ro	u8	0x0A	Idx 2500...2530 = range which can be freely used for customer-specific entries
	1	8bit user variable 1	rw	u8		
	2	8bit user variable 2	rw	u8		

Index	S-Idx	Name	Type		Default	Description
	3	8bit user variable 3	rw	u8		
	4	8bit user variable 4	rw	u8		
	5	8bit user variable 5	rw	u8		
	6	8bit user variable 6	rw	u8		
	7	8bit user variable 7	rw	u8		
	8	8bit user variable 8	rw	u8		
	9	8bit user variable 9	rw	u8		
	A	8bit user variable 10	rw	u8		
2510	0	number of 16bit user variables	ro	u8	0x0A	Idx 2500...2530 = range which can be freely used for customer-specific entries
	1	16bit user variable 1	rw	u16		
	2	16bit user variable 2	rw	u16		
	3	16bit user variable 3	rw	u16		
	4	16bit user variable 4	rw	u16		
	5	16bit user variable 5	rw	u16		
	6	16bit user variable 6	rw	u16		
	7	16bit user variable 7	rw	u16		
	8	16bit user variable 8	rw	u16		
	9	16bit user variable 9	rw	u16		
	A	16bit user variable 10	rw	u16		
2520	0	number of 32bit user variables	ro	u8	0x0A	Idx 2500...2530 = range which can be freely used for customer-specific entries
	1	32bit user variable 1	rw	u32		
	2	32bit user variable 2	rw	u32		
	3	32bit user variable 3	rw	u32		
	4	32bit user variable 4	rw	u32		
	5	32bit user variable 5	rw	u32		
	6	32bit user variable 6	rw	u32		
	7	32bit user variable 7	rw	u32		
	8	32bit user variable 8	rw	u32		
	9	32bit user variable 9	rw	u32		
	A	32bit user variable 10	rw	u32		
2530	0	number of user strings	ro	u8	0x02	Idx 2500...2530 = range which can be freely used for customer-specific entries
	1	user string 1	rw	str		16 characters

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Index	S-Idx	Name	Type		Default	Description
	2	user string 2	rw	str		16 characters
6100	0	number of binary inputs (16bit)	ro	u8	0x01	
	1	binary inputs	ro	u8	-	bits 0...15: binary inputs channel 1....16
6200	0	number of binary outputs (8bit)	ro	u8	0x01	
	1	binary outputs	wo	u8	0x00	0b0000 0001 = channel 7 0b0000 0010 = channel 8 0b0000 0100 = channel 15 0b0000 1000 = channel 16
6401	0	number of analogue inputs	ro	u8	0x04	
	1	analogue input channel 5	ro	s16	-	for configuration absolute measurement -> 0x00...0xFF for configuration ratiometric measurement -> -1000...0...+1000
	2	analogue input channel 6	ro	s16	-	(see above)
	3	analogue input channel 13	ro	s16	-	(see above)
	4	analogue input channel 14	ro	s16	-	(see above)
6414	0	number of analogue outputs (ifm specific)	ro	u8	0x02	
	1	analogue output channel 8	wo	u16	0x0000	0...1000 per mille
	2	analogue output channel 16	wo	u16	0x0000	0...1000 per mille