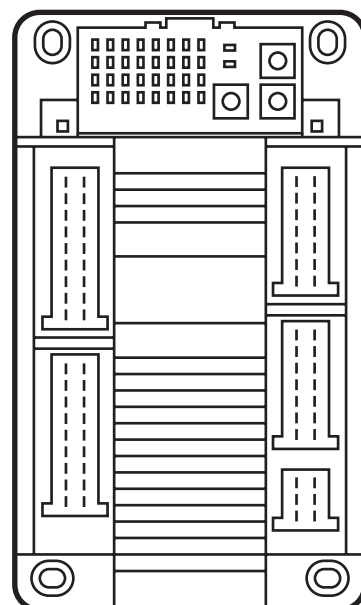


Device manual
Input/output module
CabinetModule

UK

CR2016

80269924 / 00 01 / 2018





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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.

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4 Function

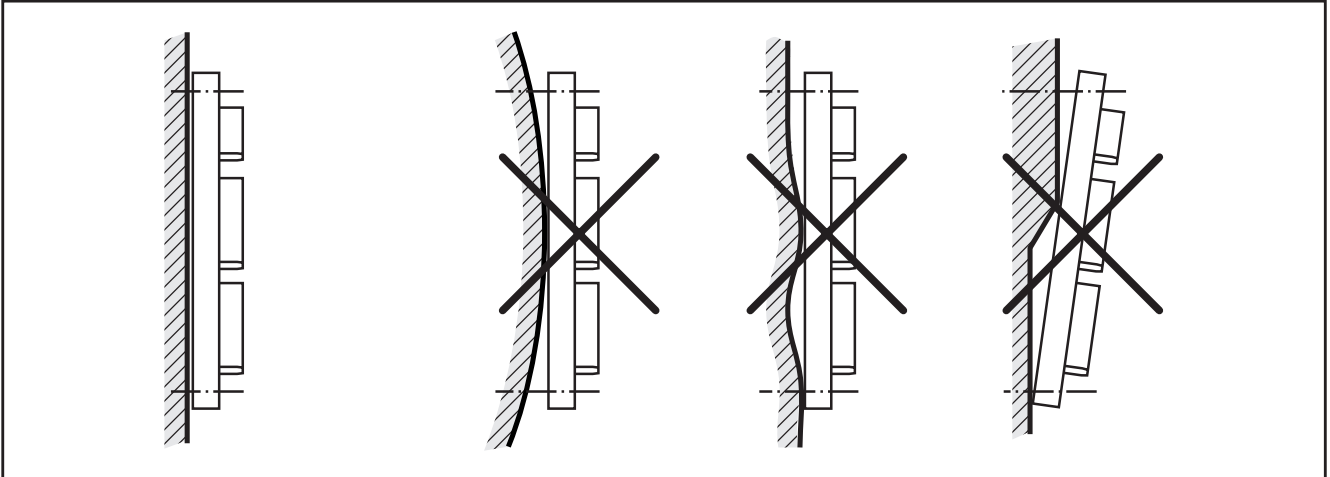
- The module supports binary/analogue inputs/outputs and is therefore classified in the device class "I/O module" to CiA DS 401.
- As regards the input/output functions, the device can be configured and it supports the following functions:
 - analogue inputs
(0...10/32 V, 0...20 mA, ratiometric, binary and binary with diagnosis)
 - binary inputs
 - frequency inputs
 - binary outputs
 - PWM outputs 0,1...2 A
- 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 (→ 8.3 Communication profiles; Idx 1000 to 1FFF) and (→ 8.4 Manufacturer-specific profiles; Idx 2000 to 5FFF)

5 Mounting

5.1 Mounting location

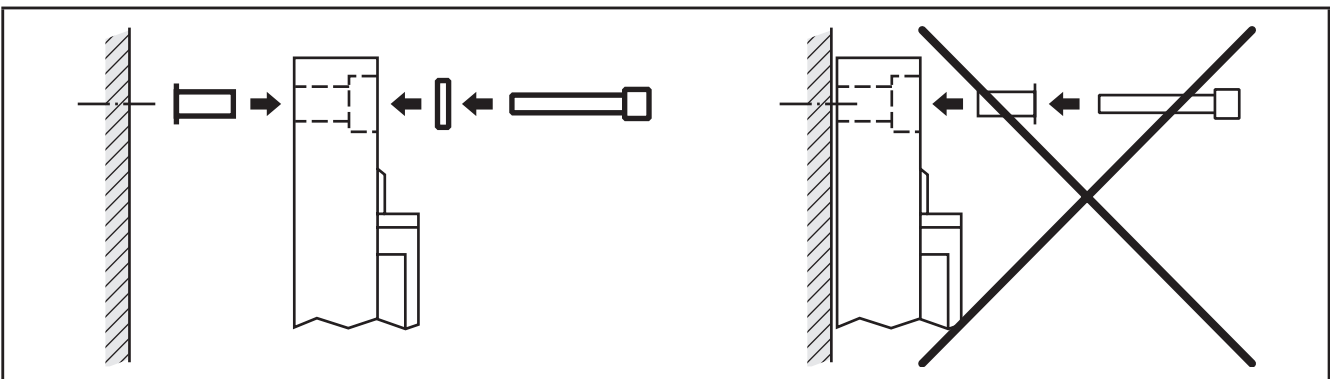
The device is to be mounted in a dry and enclosed environment (e.g. control panel of the driver's cab, separate control boxes, etc.).

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



5.2 Fixing

Insert the enclosed tubular rivets from the back of the module in the 4 fixing holes.



- ▶ Fix the module using 4 washers and screws.
- ▶ Tighten the screws alternately crosswise.

Tightening torque: 1.5 Nm

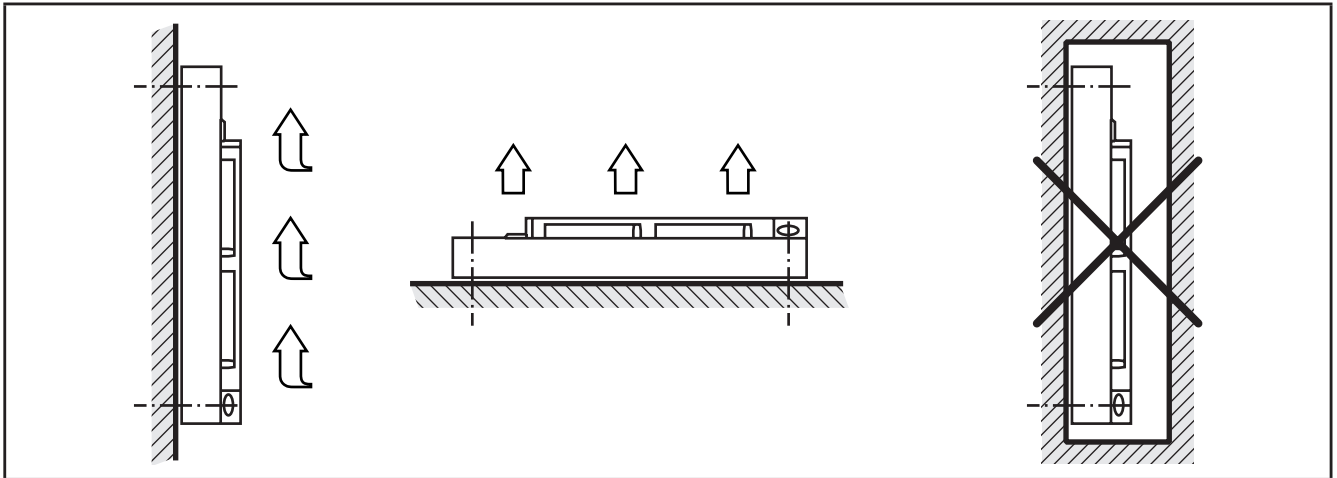
Mounting position: any

Hole dimensions: see back of the module or → 9 Technical data.

Screws to be used (M4 x L), e.g.:	Standard
Cylinder screws with hexagon socket	DIN 912
Cylinder screws with hexagon socket and low head	DIN 7984

5.3 Cooling

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



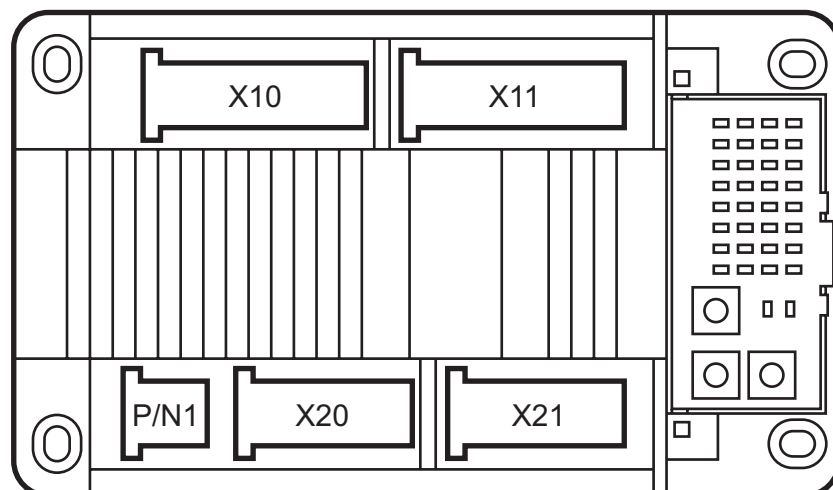
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6 Electrical connection

6.1 Connectors

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

Plug	Connection	Number of poles
P/N1	supply, CAN interfaces	6
X10	inputs 01...08 (digital)	18
X11	inputs 09...12 (digital), 01...04 (analogue)	18
X20	outputs 01...08 (digital), 01...04 (PWM)	14
X21	outputs 09...16 (digital)	14



Pin connection → 9 Technische Daten 9 Technical data

► Close unused connectors with unconnected sockets.

Information about the available connector accessories at: www.ifm.com

6.2 Fuses

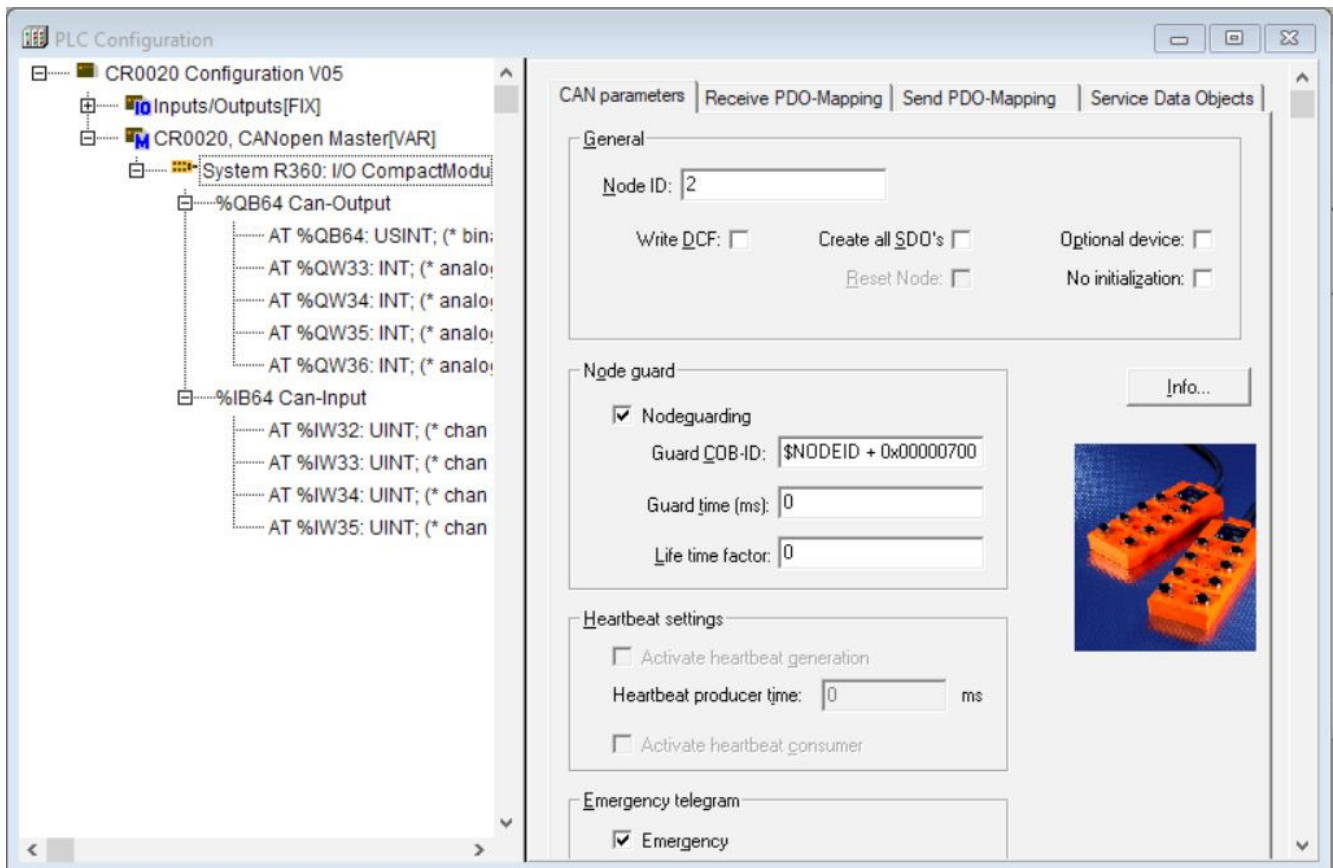
To protect the whole system (wiring and module) the individual electric circuits must be protected.

Designation	Potential	Plug:Pin	Fuse
Supply voltage module	VBB _S	P/N1:01	2 A
Supply voltage outputs (group 1)	VBB _{O 01}	X20:07	20 A
Supply voltage outputs (group 2)	VBB _{O 02}	X21:07	20 A

7 Set-up

7.1 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.



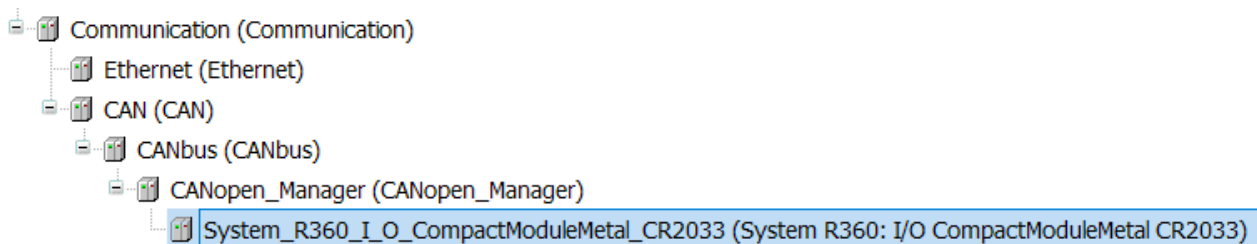
CODESYS dialogue „PLC configuration“ (example)

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

7.2 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.



The CANopen communication is configured via the CODESYS configuration editor.

7.2.1 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: SDO Channels (1/1 active)

Enable Expert Settings Optional Device

Enable Sync Producing No Initialisation Reset Node:

▲ Nodeguarding

Enable Nodeguarding Enable Heartbeat Producing

Guard Time (ms): Producer Time (ms):

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

▲ Emergency

Enable Emergency

COB-ID:

▲ TIME

Enable TIME Producing

COB-ID (Hex): 16#

Enable TIME Consuming

▲ Checks at Startup

Check Vendor ID Check Product Number Check Revision Number

7.2.2 SyncMonitoring

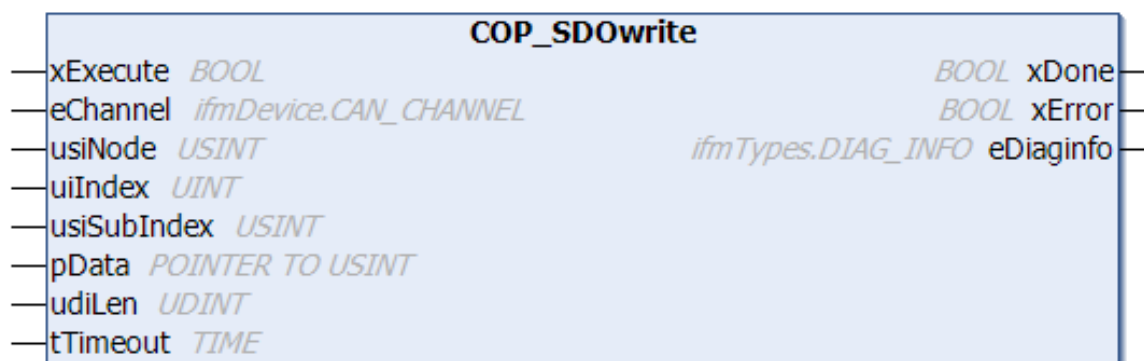
To activate the device-internal monitoring of the Sync cycle, the monitoring time has to be written into the object directory entry 0x1006. This is possible by supplementing the SDO list in the CANopen configurator or during the operating time via the function block COP_SDOwrite.

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

The screenshot shows the CANopen configurator interface. On the left, a sidebar contains menu items: General, PDOs, SDOs, CANopen I/O Mapping, Status, and Information. The main window displays a table of SDOs with columns: Line, Index:Subindex, Name, Value, Bit length, Abort if error, Jump to line if error, and Next. The table contains 22 rows, with the first row being 'Set Guardtime' at index 16#100C:16#00 with a value of 16#00000000 and a bit length of 16. A dialog box titled 'Select Item from Object Directory' is open, showing a list of objects with columns: Index:Subindex, Name, AccessType, Type, and Default. The object '16#1006:16#00' (Communication cycle period) is selected. Below the list, the 'Name' field is set to 'Unknown Object', the 'Index' is '16#1006', the 'SubIndex' is '16#0', the 'Bit length' is '8', and the 'Value' is '100000'. 'OK' and 'Cancel' buttons are at the bottom right of the dialog.

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	0	16	<input type="checkbox"/>	<input type="checkbox"/>	0
3	16#100E:16#00	Store parameters		16	<input type="checkbox"/>	<input type="checkbox"/>	0
4	16#100F:16#00	Restore default parameters		16	<input type="checkbox"/>	<input type="checkbox"/>	0
5	16#1010:16#00	COB-ID SYNC message	16#80000080	16	<input type="checkbox"/>	<input type="checkbox"/>	0
6	16#1011:16#00	Communication cycle period	0	16	<input type="checkbox"/>	<input type="checkbox"/>	0
7	16#1012:16#00	Guard time	0	16	<input type="checkbox"/>	<input type="checkbox"/>	0
8	16#1013:16#00	Life time factor	0	16	<input type="checkbox"/>	<input type="checkbox"/>	0
9	16#1014:16#00	COB-ID EMCY message	\$NODEID+16#00000080	16	<input type="checkbox"/>	<input type="checkbox"/>	0
10	16#1016:16#00	Consumer heartbeat time	0	16	<input type="checkbox"/>	<input type="checkbox"/>	0
11	16#1017:16#00	Producer heartbeat time	0	16	<input type="checkbox"/>	<input type="checkbox"/>	0
12	16#1400:16#00	1. receive PDO parameter		16	<input type="checkbox"/>	<input type="checkbox"/>	0
13	16#1401:16#00	2. receive PDO parameter		16	<input type="checkbox"/>	<input type="checkbox"/>	0
14	16#1800:16#00	1. transmit PDO parameter		16	<input type="checkbox"/>	<input type="checkbox"/>	0
15	16#1801:16#00	2. transmit PDO parameter		16	<input type="checkbox"/>	<input type="checkbox"/>	0
16	16#1006:16#00	Communication cycle period	0	16	<input type="checkbox"/>	<input type="checkbox"/>	0
17	16#1007:16#00	Guard time	0	16	<input type="checkbox"/>	<input type="checkbox"/>	0
18	16#1008:16#00	Life time factor	0	16	<input type="checkbox"/>	<input type="checkbox"/>	0
19	16#1009:16#00	Store parameters		16	<input type="checkbox"/>	<input type="checkbox"/>	0
20	16#100A:16#00	Restore default parameters		16	<input type="checkbox"/>	<input type="checkbox"/>	0
21	16#100B:16#00	COB-ID SYNC message	16#80000080	16	<input type="checkbox"/>	<input type="checkbox"/>	0
22	16#100C:16#00	Set Guardtime	16#00000000	16	<input type="checkbox"/>	<input type="checkbox"/>	0

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7.3 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.

8 Parameter setting

8.1 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.

8.2 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.

8.3 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

Parameters	Index in object directory	Default value (factory preset)	Change saved automatically	Change effective
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).

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8.4 Manufacturer-specific profiles; Idx 2000 to 5FFF

Parameters	Index in object directory	Default value (factory preset)	Change saved automatically	Change effective
I/O configuration	2000	binary: 12 IN / 16 OUT analogue:: 4 IN (0...10V)	adjustable	after PreOp
PWM frequency	2001	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

^{*)} Observe rotary switch position!

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".

(Position and coding of the rotary switches → 9 Technical data)

Explanation of the abbreviations:

0x...= hexadecimal value
0d...= decimal value

str = string
rw = read-write
ro = read only
u8 = unsigned 8 bits
u16 = unsigned 16 bits

8.5 EMCY objects

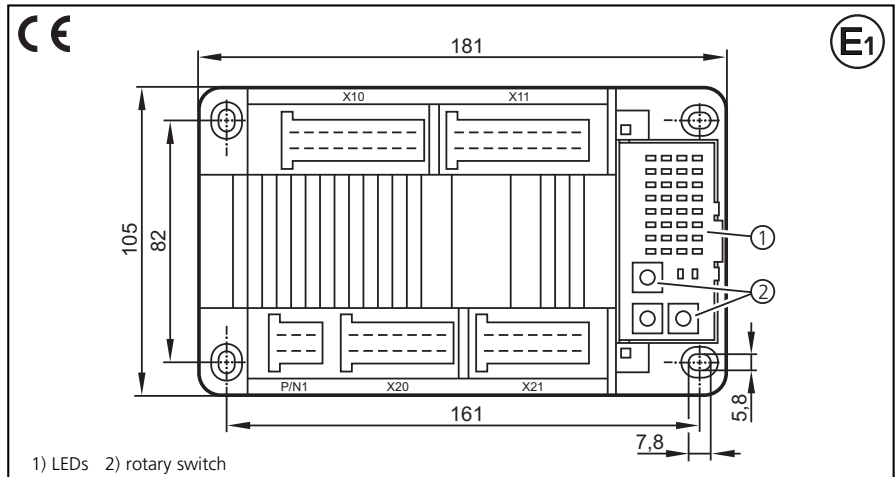
The following error codes are supported according to DSP-301 and DSP-401:

EMCY Code	Error Reg	Zusatz Code	Beschreibung
0x2110	0x03	bit-coded	"Device Specific" 0001 analogue input 1 excessive current 0010 analogue input 2 excessive current 0100 analogue input 3 excessive current 1000 analogue input 4 excessive current
0x3300	0x05	0x00	"Output Voltage" Supply voltage VBBO of the outputs is missing.
0x8000	0x11	0x00	"Monitoring" (Synch Error) For "communication cycle" no synch object is received; (only in OPERATIONAL). Reset with the next synch OBJ or PREOP.
0x8100	0x11	0x00	"Communication" (CAN error warning) Internal CAN error counter has exceeded the error warning level.
0x8110	0x11	0x00	"Communication" (CAN overflow) Overflow of an Rx queue; e.g. frequency of the Rx PDOs too high.
0x8111	0x11	0x00	"Communication" (CAN overflow) Overflow of a Tx queue; e.g. device does not communicate with the bus.
0x8120	0x11	0x00	"Communication" (CAN error passive) CAN controller has passed into the CAN error passive state.
0x8130	0x11	0x00	"Monitoring" (guarding error/heartbeat error) For "guard time" x "life time factor" no guard object is received or heartbeat object outside the expected time. Reset with the next communication.
0xFF00	0x81	bit-coded 3)	"Device Specific" 0x 0000 0001 output 1 short circuit 1)" 0x 0000 8000 output 16 short circuit 1) 0x 0001 0000 output 1 wire break 2)" 0x 8000 0000 output 16 wire break 2) 1) short circuit only if outputs in the ON state 2) wire break only if outputs in the OFF state 3) here indicated as hex value

9 Technical data

CR2016

CabinetModule
I/O module
digital and analogue
for R 360 system
32 inputs/outputs
CANopen interface
10...32V DC



Technical data

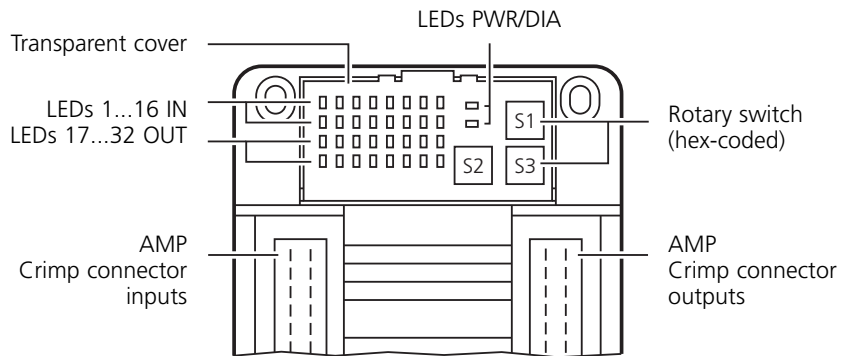
Technical data	16 inputs (12 digital / 4 analogue) 16 outputs (12 digital / 4 digital or PWM)
Housing	plastic housing (black) with transparent hinged cover for operating elements and indicators
Dimensions (HxWxD)	181 x 105 x 30 mm
Mounting	fixing by means of 4 M4 screws to DIN 912 or DIN 7984 and 4 tubular rivets to DIN 7340 (tubular rivets are enclosed)
Connections	AMP crimp connector, to be clipped into place and thus vibration-resistant, protected against reverse polarity (AMP junior timer contacts)
inputs/outputs operating voltage, CAN bus	2 x 18 pins, 2 x 14 pins 1 x 6 pins
Weight	0.38 g
Inputs	16
can be configured	8 digital, positive switching (high side), including 4 frequency inputs up to 2 kHz 4 digital positive/negative switching (high/low side) 4 analogue, 0...10/32 V, 0/4...20 mA, ratiometric or digital positive switching
sensor supply I_{max}	1000 mA
Outputs	16
can be configured	4 digital, positive switching, diagnostic capability or PWM channel (variable frequency) 12 digital, positive switching, diagnostic capability or PWM channel (fixed frequency)
switching current per output	0,1...2 A (operating temperature > 75 °C = max. 1.5 A)
total current	max 16 A/group
Operating voltage U_B	10...32 V DC
Nominal voltage	12/24 V DC
Reverse polarity/short-circuit protection	yes
Current consumption	≤ 125 mA (without external load at 24 V DC)
Operating/storage temperature	-40...85 °C
Protection	IP 20
Interface	CAN interface 2.0 B, ISO 11898
Controller	16 bits Fujitsu MB90F543
Baud rate	20 Kbits/s...1 Mbit/s (default setting 125 Kbits/s) (adjustable via rotary switches or CANopen object directory)
Communication profile	CANopen, CiA DS 301 version 4.02, CiA DS 401 version 2.1
Programming system	from CODESYS 2.3 via EDS
Node ID (default)	hex 20 (= dec 32) (adjustable via 2 rotary switches or CANopen object directory)
Displays	1 LED green (PWR) 1 LED red (diagnosis, DIA) 32 LEDs yellow (status of the inputs / outputs)

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Technical data

Operating and indicating elements



Rotary switch coding

Switch	Position	Description
S1 Baud rate	0	1000 Kbits/s
	1	800 Kbits/s
	2	500 Kbits/s
	3	250 Kbits/s
	4	125 Kbits/s
	5	100 Kbits/s
	6	50 Kbits/s
	7	20 Kbits/s
	8...E F	not defined adjustment via object directory (default)
S2 Node ID _H	0...7	high nibble, e.g. 20 hex (= 32 dec)
	F	adjustment via object directory (default)
S3 Node ID _L	0...F	low nibble, e.g. 20 hex (= 32 dec)
	F	adjustment via object directory (default)

The diagram shows a circular rotary switch with positions labeled 0 through 9 and A through F. An arrow points to the '0' position.

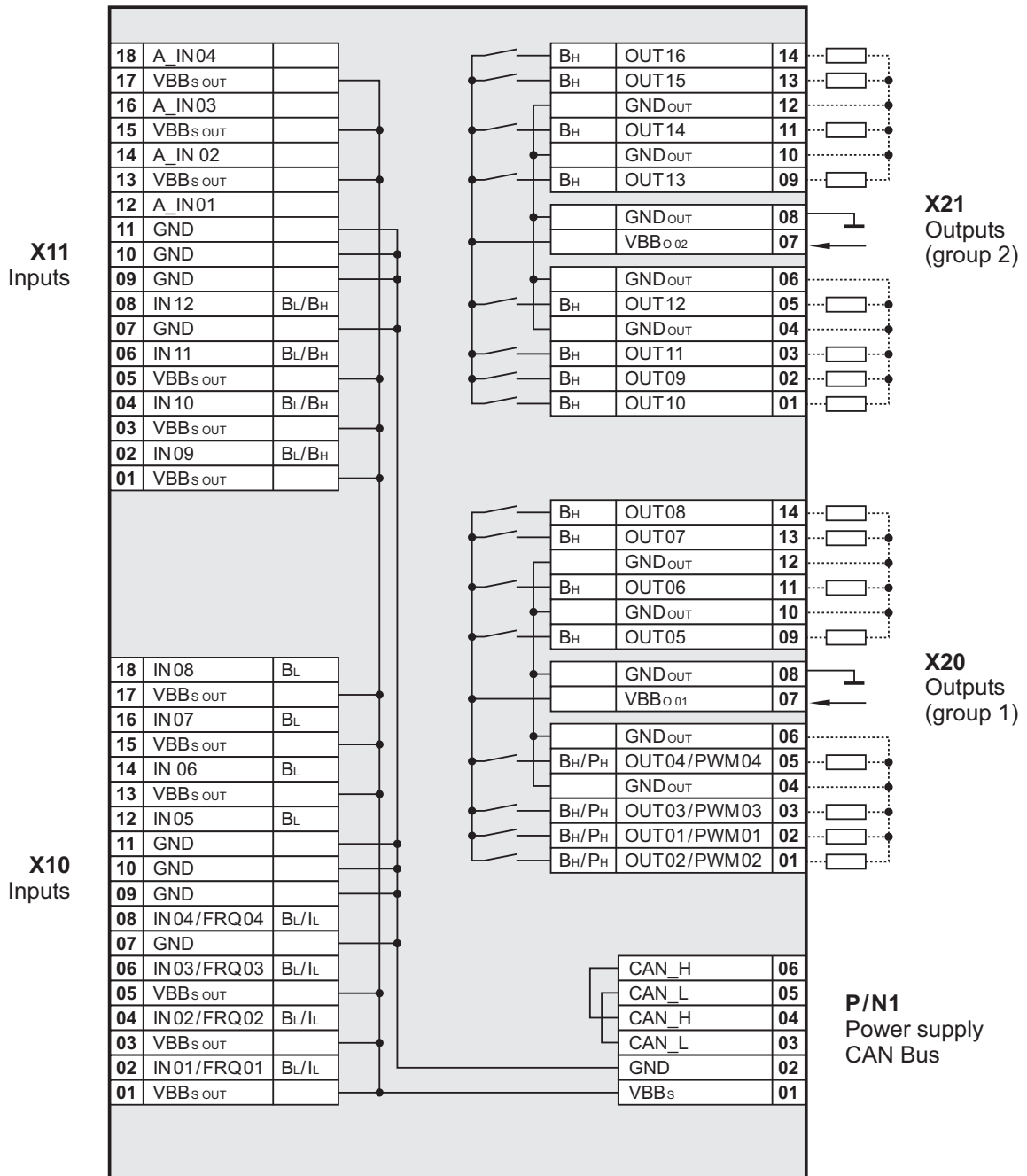
Operating states (LEDs)

LED	State	Description
PWR (green)	OFF	no supply voltage
	ON	module in stand-by mode CANopen status: PREOPERATIONAL 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) LED 1...16	OFF	input not switched
	ON	input switched
	2.0 Hz	analogue input in current mode has excessive current
OUT (yellow) LED 17...32	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

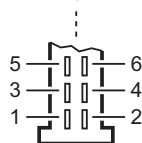
CR2016	Characteristics of the inputs										
Inputs (B_L, I_D) X10:02, 04, 06, 08 IN 01...04 can be configured as...	<ul style="list-style-type: none"> ■ Digital inputs for positive sensor signals <table border="0" style="margin-left: 20px;"> <tr><td>switch-on level</td><td>0.7 U_B</td></tr> <tr><td>switch-off level</td><td>0.3 U_B</td></tr> <tr><td>input resistance</td><td>3.25 kΩ</td></tr> <tr><td>input frequency</td><td>max. 50 Hz</td></tr> </table> 	switch-on level	0.7 U _B	switch-off level	0.3 U _B	input resistance	3.25 kΩ	input frequency	max. 50 Hz		
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switch-off level	0.3 U _B										
input resistance	3.25 kΩ										
input frequency	max. 50 Hz										
	<ul style="list-style-type: none"> ■ Frequency inputs for positive sensor signals <table border="0" style="margin-left: 20px;"> <tr><td>switch-on level</td><td>0.3...0.5 U_B</td></tr> <tr><td>switch-off level</td><td>0.2 U_B</td></tr> <tr><td>input resistance</td><td>3.25 kΩ</td></tr> <tr><td>measuring range</td><td>max. 2 kHz</td></tr> <tr><td>accuracy</td><td>± 16 μs</td></tr> </table> 	switch-on level	0.3...0.5 U _B	switch-off level	0.2 U _B	input resistance	3.25 kΩ	measuring range	max. 2 kHz	accuracy	± 16 μs
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switch-on level	0.7 U _B										
switch-off level	0.3 U _B										
input resistance	3.25 kΩ										
input frequency	max. 50 Hz										
Inputs (B_{LH}) X11:02, 04, 06, 08 IN 09...12 can be configured as...	<ul style="list-style-type: none"> ■ Digital inputs for positive/negative sensor signals <table border="0" style="margin-left: 20px;"> <tr><td>switch-on level</td><td>0.7 U_B</td></tr> <tr><td>switch-off level</td><td>0.3 U_B</td></tr> <tr><td>input resistance</td><td>3.06 kΩ</td></tr> <tr><td>input frequency</td><td>max. 50 Hz</td></tr> </table> 	switch-on level	0.7 U _B	switch-off level	0.3 U _B	input resistance	3.06 kΩ	input frequency	max. 50 Hz		
switch-on level	0.7 U _B										
switch-off level	0.3 U _B										
input resistance	3.06 kΩ										
input frequency	max. 50 Hz										
Inputs (A) X11:12, 14, 16, 18 A_IN 01...04 can be configured as...	<ul style="list-style-type: none"> ■ Voltage inputs <table border="0" style="margin-left: 20px;"> <tr><td>input voltage</td><td>0...10/32 V</td></tr> <tr><td>resolution</td><td>10 bits</td></tr> <tr><td>input resistance</td><td>70/45 kΩ</td></tr> <tr><td>input frequency</td><td>max. 50 Hz</td></tr> <tr><td>accuracy</td><td>± 1% FS</td></tr> </table> 	input voltage	0...10/32 V	resolution	10 bits	input resistance	70/45 kΩ	input frequency	max. 50 Hz	accuracy	± 1% FS
input voltage	0...10/32 V										
resolution	10 bits										
input resistance	70/45 kΩ										
input frequency	max. 50 Hz										
accuracy	± 1% FS										
	<ul style="list-style-type: none"> ■ Current inputs <table border="0" style="margin-left: 20px;"> <tr><td>input current</td><td>0/4...20 mA</td></tr> <tr><td>resolution</td><td>10 bits</td></tr> <tr><td>input resistance</td><td>400 Ω</td></tr> <tr><td>input frequency</td><td>max. 50 Hz</td></tr> <tr><td>accuracy</td><td>± 1% FS</td></tr> </table> 	input current	0/4...20 mA	resolution	10 bits	input resistance	400 Ω	input frequency	max. 50 Hz	accuracy	± 1% FS
input current	0/4...20 mA										
resolution	10 bits										
input resistance	400 Ω										
input frequency	max. 50 Hz										
accuracy	± 1% FS										
	<ul style="list-style-type: none"> ■ Ratiometric inputs for potentiometric transducers (e.g. joystick) <table border="0" style="margin-left: 20px;"> <tr><td>function</td><td>$U_{IN} \div U_B \times 1000 \text{ ‰}$</td></tr> <tr><td>value range</td><td>0...1000 ‰</td></tr> </table> 	function	$U_{IN} \div U_B \times 1000 \text{ ‰}$	value range	0...1000 ‰						
function	$U_{IN} \div U_B \times 1000 \text{ ‰}$										
value range	0...1000 ‰										
	<ul style="list-style-type: none"> ■ Digital inputs for positive sensor signals <table border="0" style="margin-left: 20px;"> <tr><td>switch-on level</td><td>0.7 U_B</td></tr> <tr><td>switch-off level</td><td>0.3 U_B</td></tr> <tr><td>input resistance</td><td>45 kΩ</td></tr> <tr><td>input frequency</td><td>max. 50 Hz</td></tr> </table> 	switch-on level	0.7 U _B	switch-off level	0.3 U _B	input resistance	45 kΩ	input frequency	max. 50 Hz		
switch-on level	0.7 U _B										
switch-off level	0.3 U _B										
input resistance	45 kΩ										
input frequency	max. 50 Hz										

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CR2016	Characteristics of the outputs
<p>Outputs (B_H, PWM) X20:01, 02, 03, 05 OUT 01...04 can be configured as ...</p>	<p>■ Solid state outputs; positive switching (high side) diagnostic capability (wire break and short circuit) short-circuit and overload protection switching voltage 10...32 V DC switching current 0,1...2 A total current max. 8 A</p> <p>■ PWM outputs (high side), variable frequency PWM frequency 20...250 Hz pulse duty factor 0...1000 ‰ resolution 1 ‰ switching current 0,1...2A (referred to the PWM value 1000 ‰) total current max. 8 A</p>
<p>Outputs (B_H) X20:09, 11, 13, 14 OUT 05...08 X21:01, 02, 03, 05, 09, 11, 13, 14 OUT 09...16 can be configured as ...</p>	<p>■ Solid state outputs; positive switching (high side) diagnostic capability (wire break and short circuit) short-circuit and overload protection switching voltage 10...32 V DC switching current 0,1...2 A total current max. 16 A</p> <p>■ PWM outputs (high side), fixed frequency PWM frequency 100 Hz pulse duty factor 0...100 % resolution 10 % switching current 0,1...2 A (referred to the PWM value 100 %) total current max. 16 A</p>
<p>Max. load resistance for a reliable wire break detection:</p>	<p>25 kOhm</p>
<p>Note</p>	<p>Free-wheeling diode for the connection of inductive loads is integrated OUT_GND is not connected with supply_GND in the unit Wiring see data sheet page 5</p>
CR2016	Test standards and regulations
<p>Climatic test</p>	<p>damp heat to EN 60068-2-30, test Db (≤ 95 % rel. air humidity, non-condensing) protection test to EN 60529</p>
<p>Mechanical resistance</p>	<p>vibration to EN 60068-2-6, test Fc shock to EN 60068-2-27, test Ea</p>
<p>Immunity to conducted interference</p>	<p>to ISO 7637-2, pulses 2, 3a, 3b, 4, severity level 4, function state A to ISO 7637-2, pulse 5, severity level 1, function state A to ISO 7637-2, pulse 1, severity level 4, function state C</p>
<p>Immunity to interfering fields</p>	<p>according to UN/ECE-R10 at 100 V/m (E1 type approval) and DIN EN 61326 (CE)</p>
<p>Interference emission</p>	<p>to directive 06/28/EC (e1 type approval) and DIN EN 61326 (CE)</p>
<p>Tests for the approval for railway applications</p>	<p>to BN 411 002 (DIN EN 50155 point10.2 and DIN EN 50121) EN 50155 clause 12.2 mechanical/climatic tests EN 50121-3-2 EMC noise emission and noise immunity additional information on request</p>



pin connection
(view from the top on the pin side)



Explanation of the abbreviations:

A = analogue
 BH = binary (high side)
 BL = binary (low side)

FRQ/CYL = frequency inputs
 IL = pulse (low side)
 PH = PWM (high side)

PWM = pulse-width modulated signals
 VBB_S = supply module/sensors
 VBB_O = supply outputs

UK

10 Maintenance, repair and disposal

As the module does not contain any components which must be maintained by the user, the housing must not be opened.

The maintenance of the module may only be carried out by the manufacturer.

The disposal must be carried out according to the corresponding national environmental regulations.

11 Declaration of conformity

For test standards and regulations → 9 Technical data.

The CE Declaration of Conformity and the E1-approval are available at: www.ifm.com.

12 Object directory

Index	S-Idx	Name	Typ		Default	Beschreibung
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 µs; useful resolution = 1ms

Index	S-Idx	Name	Typ		Default	Beschreibung
1008	0	device name	ro	str	CR2016	
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
1014	0	COB ID EMCY	rw	u32	0x00000080 + NodeID	module generates EMCY messages (bit 31 = 0)
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 0x0nntttt = monitoring time [ms] 0x0nntttt = 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	

Index	S-Idx	Name	Typ		Default	Beschreibung
	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)
1402	0	highest numbered subindex Receive PDO 3	ro	u8	0x02	
	1	COB ID Receive PDO 3	rw	u32	0x00000400 + NodeID	PDO is valid (bit 31 = 0)
	2	transmission type Rec PDO 3	rw	u8	0x01	0x01...0xF0 = synch cyclic 0xFE...0xFF = asynch (immediately)
1403	0	highest numbered subindex Receive PDO 4	ro	u8	0x02	
	1	COB ID Receive PDO 4	rw	u32	0x00000500 + NodeID	PDO is valid (bit 31 = 0)
	2	transmission type Rec PDO 4	rw	u8	0x01	0x01...0xF0 = synch cyclic 0xFE...0xFF = asynch (immediately)
1600	0	number of application objects linked with Rec PDO 1	rw	u8	0x02	
	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	0x08020062	index 6200, subindex 2, 8 bits
	3	3rd mapping object Rec PDO 1	rw	u32	0x00000000	no object
	4	4th mapping object Rec PDO 1	rw	u32	0x00000000	no object
	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	0x04	
	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	0x10031464	index 6414 subindex 3, 16 bits

Index	S-Idx	Name	Typ		Default	Beschreibung
	4	4th mapping object Rec PDO 2	rw	u32	0x10041464	index 6414 subindex 4, 16 bits
	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
1602	0	number of application objects linked with Rec PDO 3	rw	u8	0x08	
	1	1st mapping object Rec PDO 3	rw	u32	0x08051464	index 6414, subindex 5, 8 bits
	2	2nd mapping object Rec PDO 3	rw	u32	0x08061464	index 6414, subindex 6, 8 bits
	3	3rd mapping object Rec PDO 3	rw	u32	0x08071464	index 6414, subindex 7, 8 bits
	4	4th mapping object Rec PDO 3	rw	u32	0x08081464	index 6414, subindex 8, 8 bits
	5	5th mapping object Rec PDO 3	rw	u32	0x08091464	index 6414, subindex 9, 8 bits
	6	6th mapping object Rec PDO 3	rw	u32	0x080A1464	index 6414, subindex A, 8 bits
	7	7th mapping object Rec PDO 3	rw	u32	0x080B1464	index 6414, subindex B, 8 bits
	8	8th mapping object Rec PDO 3	rw	u32	0x080C1464	index 6414, subindex C, 8 bits
1603	0	number of application objects linked with Rec PDO 4	rw	u8	0x04	
	1	1st mapping object Rec PDO 4	rw	u32	0x080D1464	index 6414, subindex D, 8 bits
	2	2nd mapping object Rec PDO 4	rw	u32	0x080E1464	index 6414, subindex E, 8 bits
	3	3rd mapping object Rec PDO 4	rw	u32	0x080F1464	index 6414, subindex F, 8 bits
	4	4th mapping object Rec PDO 4	rw	u32	0x08101464	index 6414, subindex 10, 8 bits
	5	5th mapping object Rec PDO 4	rw	u32	0x00000000	no object
	6	6th mapping object Rec PDO 4	rw	u32	0x00000000	no object
	7	7th mapping object Rec PDO 4	rw	u32	0x00000000	no object

Index	S-Idx	Name	Typ		Default	Beschreibung
	8	8th mapping object Rec PDO 4	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 100µs)
	5	event timer Trans PDO 1	rw	u16	0x0000	max transfer break in trans type "asynch" (0...65535ms) 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	
	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 100µs)
	5	event timer Trans PDO 2	rw	u16	0x0000	max transfer break in trans type "asynch" (0...65535ms) when this time has elapsed the PDO is transferred even if the appl. event has not occurred
1802	0	highest numbered subindex Transmit PDO 3	ro	u8	0x05	
	1	COB ID Transmit PDO 3	rw	u32	0x00000380 + NodeID	PDO is valid (bit 31 = 0)
	2	transmission type Trans PDO 3	rw	u8	0x01	0x01...0xF0 = synch cyclic 0xFE...0xFF = asynch (immediately)
	3	inhibit timer Trans PDO 3	rw	u16	0x0000	min. interval for transmission (in 100µs)
	5	event timer Trans PDO 3	rw	u16	0x0000	max transfer break in trans type "asynch" (0...65535ms) when this time has elapsed the PDO is transferred even if the appl. event has not occurred
1803	0	highest numbered subindex Transmit PDO 4	ro	u8	0x05	
	1	COB ID Transmit PDO 4	rw	u32	0x00000480 + NodeID	PDO is valid (bit 31 = 0)
	2	transmission type Trans PDO 4	rw	u8	0x01	0x01...0xF0 = synch cyclic 0xFE...0xFF = asynch (immediately)

Index	S-Idx	Name	Typ		Default	Beschreibung
	3	inhibit timer Trans PDO 4	rw	u16	0x0000	min. interval for transmission (in 100µs)
	5	event timer Trans PDO 4	rw	u16	0x0000	max transfer break in trans type "asynch" (0...65535ms) 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	0x02	
	1	1st mapping object Trans PDO 1	rw	u32	0x08010060	index 6000, subindex 1, 8 bits
	2	2nd mapping object Trans PDO 1	rw	u32	0x08020060	index 6000, subindex 2, 8 bits
	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	0x10010464	index 6404, subindex 1, 16 bits
	2	2nd mapping object Trans PDO 2	rw	u32	0x10020464	index 6404, subindex 2, 16 bits
	3	3rd mapping object Trans PDO 2	rw	u32	0x10030464	index 6404, subindex 3, 16 bits
	4	4th mapping object Trans PDO 2	rw	u32	0x10040464	index 6404, subindex 4, 16 bits
	5	5th mapping object Trans PDO 2	rw	u32	0x00000000	no object
	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
1A02	0	number of application objects linked with Trans PDO 3	rw	u8	0x02	

Index	S-Idx	Name	Typ		Default	Beschreibung
	1	1st mapping object Trans PDO 3	rw	u32	0x20011220	index 2012, subindex 1, 32 bits
	2	2nd mapping object Trans PDO 3	rw	u32	0x20021220	index 2012, subindex 2, 32 bits
	3	3rd mapping object Trans PDO 3	rw	u32	0x00000000	no object
	4	4th mapping object Trans PDO 3	rw	u32	0x00000000	no object
	5	5th mapping object Trans PDO 3	rw	u32	0x00000000	no object
	6	6th mapping object Trans PDO 3	rw	u32	0x00000000	no object
	7	7th mapping object Trans PDO 3	rw	u32	0x00000000	no object
	8	8th mapping object Trans PDO 3	rw	u32	0x00000000	no object
1A03	0	number of application objects linked with Trans PDO 4	rw	u8	0x02	
	1	1st mapping object Trans PDO 4	rw	u32	0x20031220	index 2012, subindex 3, 32 bits
	2	2nd mapping object Trans PDO 4	rw	u32	0x20041220	index 2012, subindex 4, 32 bits
	3	3rd mapping object Trans PDO 4	rw	u32	0x00000000	no object
	4	4th mapping object Trans PDO 4	rw	u32	0x00000000	no object
	5	5th mapping object Trans PDO 4	rw	u32	0x00000000	no object
	6	6th mapping object Trans PDO 4	rw	u32	0x00000000	no object
	7	7th mapping object Trans PDO 4	rw	u32	0x00000000	no object
	8	8th mapping object Trans PDO 4	rw	u32	0x00000000	no object
2000	0	number of IOs	ro	u8	0x20	
	1	configuration binary input 1	rw	u8	0x0A	0x00 = off 0x0A = binary input 0x0B = binary input with diagnosis 0x0E = frequency input
	2	configuration binary input 2	rw	u8	0x0A	0x00 = off 0x0A = binary input 0x0B = binary input with diagnosis 0x0E = frequency input

Index	S-Idx	Name	Typ		Default	Beschreibung
	3	configuration binary input 3	rw	u8	0x0A	0x00 = off 0x0A = binary input 0x0B = binary input with diagnosis 0x0E = frequency input
	4	configuration binary input 4	rw	u8	0x0A	0x00 = off 0x0A = binary input 0x0B = binary input with diagnosis 0x0E = frequency input
	5	configuration binary input 5	rw	u8	0x0A	0x00 = off 0x0A = binary input 0x0B = binary input with diagnosis
	6	configuration binary input 6	rw	u8	0x0A	0x00 = off 0x0A = binary input 0x0B = binary input with diagnosis
	7	configuration binary input 7	rw	u8	0x0A	0x00 = off 0x0A = binary input 0x0B = binary input with diagnosis
	8	configuration binary input 8	rw	u8	0x0A	0x00 = off 0x0A = binary input 0x0B = binary input with diagnosis
	9	configuration binary input 9	rw	u8	0x0A	0x00 = off 0x0A = binary input 0x0B = binary input with diagnosis 0x0C = binary input with negative switching
	A	configuration binary input 10	rw	u8	0x0A	0x00 = off 0x0A = binary input 0x0B = binary input with diagnosis 0x0C = binary input with negative switching
	B	configuration binary input 11	rw	u8	0x0A	0x00 = off 0x0A = binary input 0x0B = binary input with diagnosis 0x0C = binary input with negative switching
	C	configuration binary input 12	rw	u8	0x0A	"x00 = off 0x0A = binary input 0x0B = binary input with diagnosis 0x0C = binary input with negative switching
	D	configuration analogue input 1	rw	u8	0x03	0x00 = off 0x03 = voltage 0...10,000 mV 0x06 = ratiometric 0...1000 per mille 0x07 = current 0...20,000 µA 0x09 = voltage 0...30,000 mV 0x0A = binary input 0x0B = binary input with diagnosis
	E	configuration analogue input 2	rw	u8	0x03	0x00 = off 0x03 = voltage 0...10,000 mV 0x06 = ratiometric 0...1000 per mille 0x07 = current 0...20,000 µA 0x09 = voltage 0...30,000 mV 0x0A = binary input 0x0B = binary input with diagnosis

Index	S-Idx	Name	Typ		Default	Beschreibung
	F	configuration analogue input 3	rw	u8	0x03	0x00 = off 0x03 = voltage 0...10,000 mV 0x06 = ratiometric 0...1000 per mille 0x07 = current 0...20,000 µA 0x09 = voltage 0...30,000 mV 0x0A = binary input 0x0B = binary input with diagnosis
	10	configuration analogue input 4	rw	u8	0x03	0x00 = off 0x03 = voltage 0...10,000 mV 0x06 = ratiometric 0...1000 per mille 0x07 = current 0...20,000 µA 0x09 = voltage 0...30,000 mV 0x0A = binary input 0x0B = binary input with diagnosis
	11	configuration binary output 1	rw	u8	0x02	0x00 = off 0x02 = binary output 0x04 = analogue output (PWM 20...250 Hz) 0x0F = binary output with diagnosis
	12	configuration binary output 2	rw	u8	0x02	0x00 = off 0x02 = binary output 0x04 = analogue output (PWM 20...250 Hz) 0x0F = binary output with diagnosis
	13	configuration binary output 3	rw	u8	0x02	0x00 = off 0x02 = binary output 0x04 = analogue output (PWM 20...250 Hz) 0x0F = binary output with diagnosis
	14	configuration binary output 4	rw	u8	0x02	0x00 = off 0x02 = binary output 0x04 = analogue output (PWM 20...250 Hz) 0x0F = binary output with diagnosis
	15	configuration binary output 5	rw	u8	0x02	0x00 = off 0x02 = binary output 0x04 = analogue output (PWM 100 Hz) 0x0F = binary output with diagnosis
	16	configuration binary output 6	rw	u8	0x02	0x00 = off 0x02 = binary output 0x04 = analogue output (PWM 100 Hz) 0x0F = binary output with diagnosis
	17	configuration binary output 7	rw	u8	0x02	0x00 = off 0x02 = binary output 0x04 = analogue output (PWM 100 Hz) 0x0F = binary output with diagnosis
	18	configuration binary output 8	rw	u8	0x02	0x00 = off 0x02 = binary output 0x04 = analogue output (PWM 100 Hz) 0x0F = binary output with diagnosis
	19	configuration binary output 9	rw	u8	0x02	0x00 = off 0x02 = binary output 0x04 = analogue output (PWM 100 Hz) 0x0F = binary output with diagnosis

Index	S-Idx	Name	Typ		Default	Beschreibung
	1A	configuration binary output 10	rw	u8	0x02	0x00 = off 0x02 = binary output 0x04 = analogue output (PWM 100 Hz) 0x0F = binary output with diagnosis
	1B	configuration binary output 11	rw	u8	0x02	0x00 = off 0x02 = binary output 0x04 = analogue output (PWM 100 Hz) 0x0F = binary output with diagnosis
	1C	configuration binary output 12	rw	u8	0x02	0x00 = off 0x02 = binary output 0x04 = analogue output (PWM 100 Hz) 0x0F = binary output with diagnosis
	1D	configuration binary output 13	rw	u8	0x02	0x00 = off 0x02 = binary output 0x04 = analogue output (PWM 100 Hz) 0x0F = binary output with diagnosis
	1E	configuration binary output 14	rw	u8	0x02	0x00 = off 0x02 = binary output 0x04 = analogue output (PWM 100 Hz)
	1F	configuration binary output 15	rw	u8	0x02	0x00 = off 0x02 = binary output 0x04 = analogue output (PWM 100 Hz) 0x0F = binary output with diagnosis
	20	configuration binary output 16	rw	u8	0x02	0x00 = off 0x02 = binary output 0x04 = analogue output (PWM 100 Hz) 0x0F = binary output with diagnosis
2001	0	PWM frequency	rw	u8	0x64	20..250 Hz PWM frequency for outputs 1...4
2010	0	number of reverse read inputs	ro	u8	0x02	
	1	binary reverse read inputs	ro	u8	-	
	2	binary reverse read inputs	ro	u8	-	
2012	0	number of frequency inputs	ro	u8	0x04	
	1	frequency input 1	ro	u32	-	periodic time (μ s)
	2	frequency input 2	ro	u32	-	periodic time (μ s)
	3	frequency input 3	ro	u32	-	periodic time (μ s)
	4	frequency input 4	ro	u32	-	periodic time (μ s)
2013	0	number of values to average the frequency input value	rw	u8	0x04	1...4
20F0	0	CANopen node ID	rw	u8	0x20	1...127

Index	S-Idx	Name	Typ		Default	Beschreibung
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	0x04	0 = 1000 Kbaud 1 = 800 Kbaud 2 = 500 Kbaud 3 = 250 Kbaud 4 = 125 Kbaud 5 = 100 Kbaud 6 = 50 Kbaud 7 = 20 Kbaud
20F3	0	CAN baud rate	rw	u8	0x04	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	
	1	8bit user variable 1	rw	u8		
	2	8bit user variable 2	rw	u8		
	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	
	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		

Index	S-Idx	Name	Typ		Default	Beschreibung
	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	
	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	
	1	user string 1	rw	str		16 characters
	2	user string 2	rw	str		16 characters
6000	0	number of binary inputs (8bit)	ro	u8	0x02	
	1	binary inputs	ro	u8	-	bits 0...7: binary inputs 1...8
	2	binary inputs	ro	u8	-	bits 0...3: binary inputs 9...12 bits 4...7: analogue inputs 1...4 ,if configured as binary input"
6200	0	number of binary outputs (8bit)	ro	u8	0x02	
	1	binary outputs	wo	u8	0x00	bits 0...7: binary outputs 1...8
	2	binary outputs	wo	u8	0x00	bits 0...7: binary outputs 9...16
6404	0	number of analogue inputs (ifm specific)	ro	u8	0x04	
	1	analogue input 1	ro	u16	-	depends on IO configuration
	2	analogue input 2	ro	u16	-	depends on IO configuration
	3	analogue input 3	ro	u16	-	depends on IO configuration
	4	analogue input 4	ro	u16	-	depends on IO configuration
6414	0	number of analogue outputs (ifm specific)	ro	u8	0x10	
	1	analogue output 1	wo	u16	0x0000	0...1000 per mille
	2	analogue output 2	wo	u16	0x0000	0...1000 per mille
	3	analogue output 3	wo	u16	0x0000	0...1000 per mille
	4	analogue output 4	wo	u16	0x0000	0...1000 per mille

Index	S-Idx	Name	Typ		Default	Beschreibung
	5	analogue output 5	wo	u8	0x00	0..10 per 10%
	6	analogue output 6	wo	u8	0x00	0..10 per 10%
	7	analogue output 7	wo	u8	0x00	0..10 per 10%
	8	analogue output 8	wo	u8	0x00	0..10 per 10%
	9	analogue output 9	wo	u8	0x00	0..10 per 10%
	A	analogue output 10	wo	u8	0x00	0..10 per 10%
	B	analogue output 11	wo	u8	0x00	0..10 per 10%
	C	analogue output 12	wo	u8	0x00	0..10 per 10%
	D	analogue output 13	wo	u8	0x00	0..10 per 10%
	E	analogue output 14	wo	u8	0x00	0..10 per 10%
	F	analogue output 15	wo	u8	0x00	0..10 per 10%
	10	analogue output 16	wo	u8	0x00	0..10 per 10%

The entries 20F0/20F1 and 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.

Observe rotary switch position!

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