ifm electronic

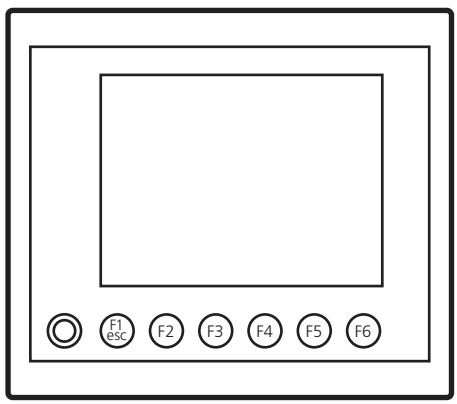
CE

Mounting and installation instructions Process- and dialogue module PDM 360

UK

ecomat100®

CR1050
CR1051
CR1060



7390564 / 00 11 / 2014

Contents

1 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 process and dialogue modules must be installed and commissioned by a skilled electrician (programmer or service technician).

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 connectors 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.

Electromagnetic compatibility

This is a class A installation. It can cause radio interference in domestic areas. In this case the operator is requested to take appropriate measures.

2 Function and features

The process and dialogue module PDM 360 is a programmable graphic display for controlling, parameter-setting and operation of mobile machines and plants.

Communication with other system components, e.g. decentralised I/O modules, is handled via a CAN interface using the CANopen protocol.

For service purposes, additional service interfaces such as Ethernet, RS-232 or a second CAN interface are available. Together with the Linux operating system they form a universal platform for networking and communication with other CAN devices, networks or PCs.

The process and dialogue module PDM 360 is not approved for safety-related tasks in the sense of the safety of persons.

2.1 Features at a glance

- 5,7" display with 6 backlit function keys and an encoder
- Closed metal housing (IP 67) suitable for panel mounting and surface mounting outside or in the cabin*
- Freely programmable in accordance with IEC 61131-3 with target visualisation
- 32-bit controller and Embedded Linux operating system
- CAN interface with CANopen protocol
- PCMCIA slot, types I and II

*) For art. no. CR1060 please observe the test standards regarding mechanical testing (→ 7.3 Technical data CR1060).

3 Programming

The application software can be easily created by the user with the programming system CoDeSys according to IEC 61131-3.

As download file (HTML file) the ifm online help CoDeSys V2.3 is available on the internet:.
www.ifm.com → Data sheet direct → CR105... → Download/Software [1)]

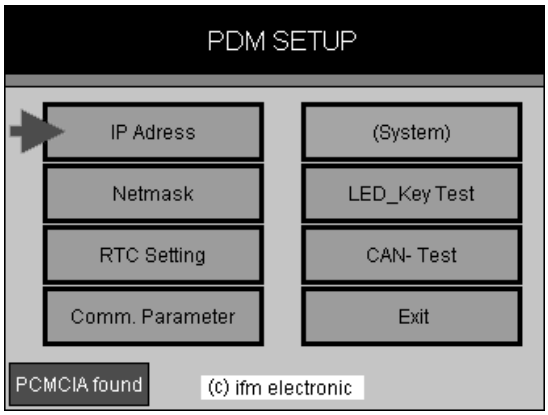
⚠ The user is responsible for the safe functioning of the application programs which he creates himself. If necessary, he must additionally obtain an approval according to the corresponding national regulations by the corresponding testing and supervisory organisations.

UK

3.1 Setup and online help

As delivered the PDM 360 is prepared for programming with CoDeSys version 2.3.3 or higher.

Shortly after switch-on of the unit the start image is shown for approx. 10 to 15 seconds. During this time booting is running in the background. After booting the PDM 360 setup program opens automatically.



The PDM 360 setup allows settings for communication and file management.
The menu items are selected by turning the encoder, pressing the encoder pushbutton the respective submenu will appear.
After leaving the setup a project can be loaded.
Libraries (.lib) are available for the use of the operating elements, interfaces and other internal functions of the device. They have to be integrated into the application program.

For more information about programming as well as demo programs and PDM 360 libraries we refer you to the CD-ROM “ecolog – Software, tools and documentation” (art. no. CP9008). In the section “PDM 360 online help system” you will find explanations of subjects such as:

- PDM 360 device setup
- Communication and programming interfaces
- Creation of new projects
- Libraries
- PDM 360 device update.

[1)] Downloads with registration

4 Mounting

4.1 Mounting accessories

The unit is supplied without mounting accessories.

Depending on the intended location and type of mounting the following mounting accessories are available:

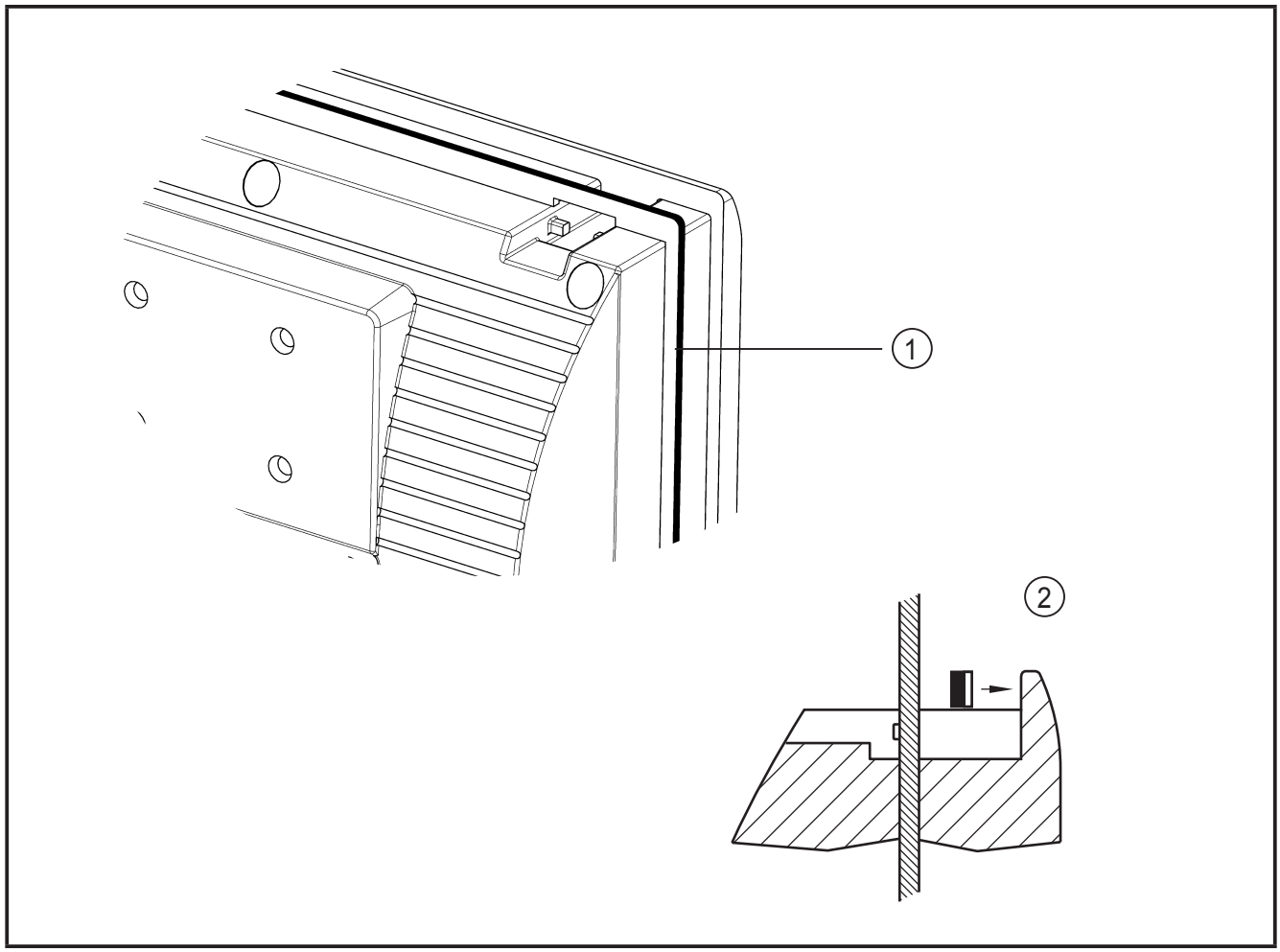
- EC1451, seal/vibration absorber for panel/control cabinet mounting
- EC1452, snap-in set for panel mounting*
- EC1453, fixing set for control cabinet mounting*
- EC1410...EC1414, RAM® mount system for surface mounting

You can find more information about the available accessories at:
www.ifm.com → Data sheet direct → e.g. CR1050 → Accessories

*) Use the snap-in set (EC1452) and the fixing set (EC1453) only in conjunction with the seal/vibration absorber (EC1451).

4.2 Seal/vibration absorber

Slide the seal/vibration absorber over the unit from the back.

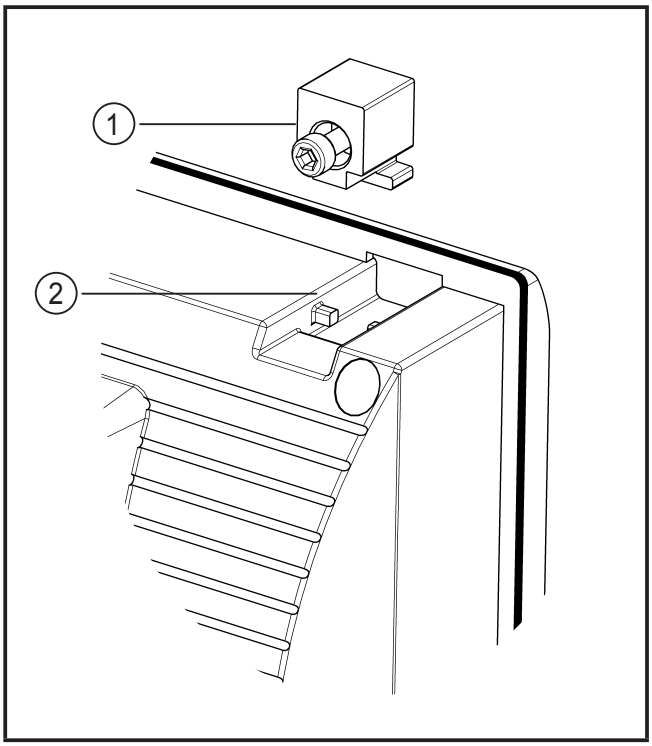


1: EC1451 seal/vibration absorber for PDM 360
2: The polyester film is on the dialogue unit

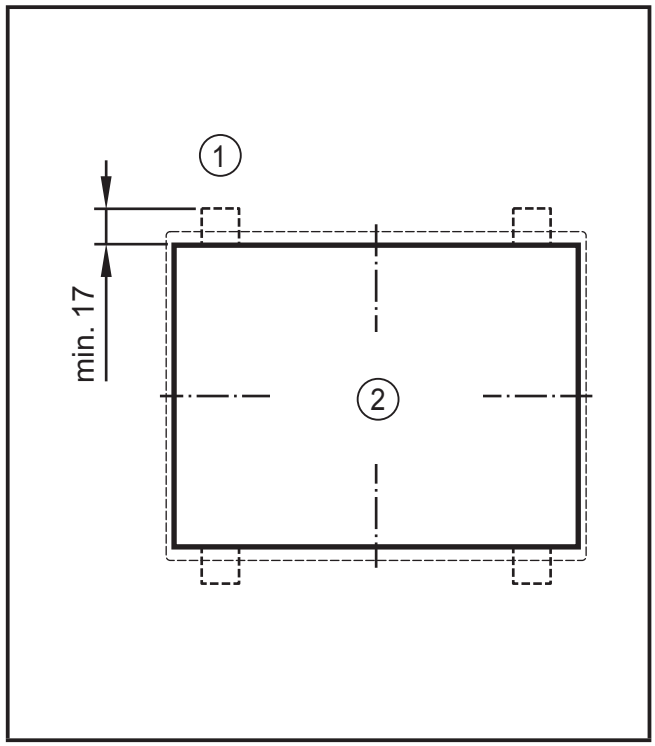
4.3 Control cabinet mounting with mounting brackets (fixing set EC1453)

The mounting brackets enable the horizontal, vertical or upside-down mounting of the dialogue module. This type of mounting is suited for materials with a thickness of max. 8 mm.

Please take into account the required clearance space for the mounting brackets!

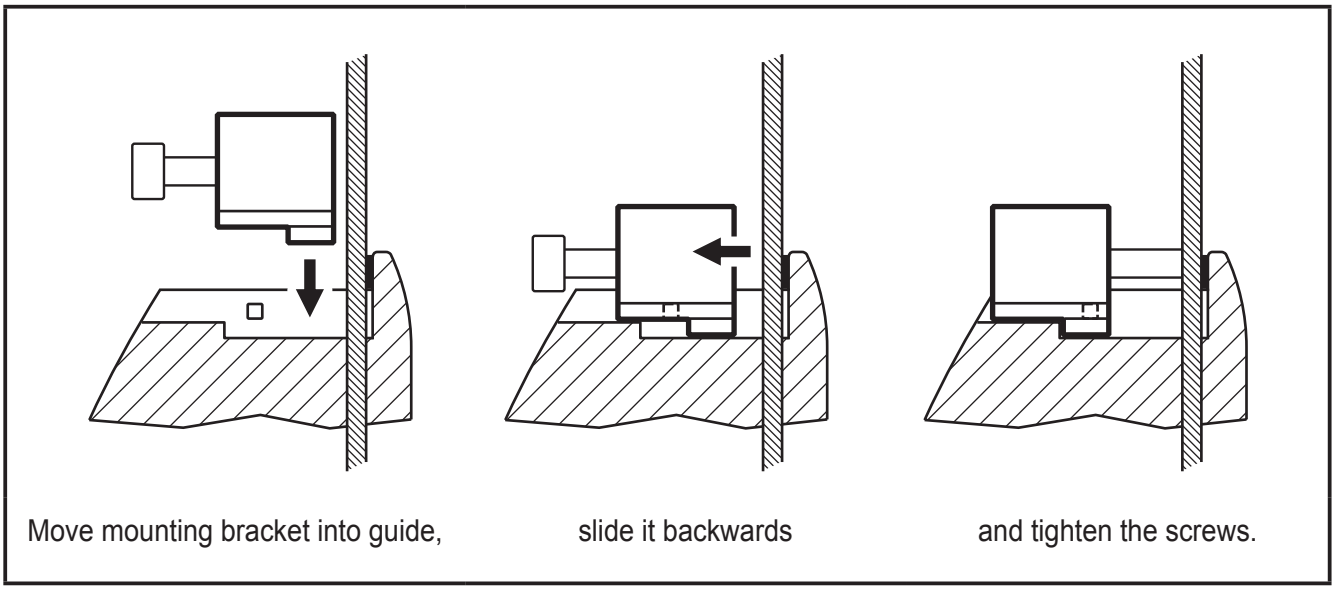


1: Mounting bracket
2: Guidance



1: Clearance space for mounting brackets
2: For the cutout dimensions see the technical data

Mounting steps



Move mounting bracket into guide, slide it backwards and tighten the screws.

4.4 Panel mounting with clips (snap-in set EC1452)

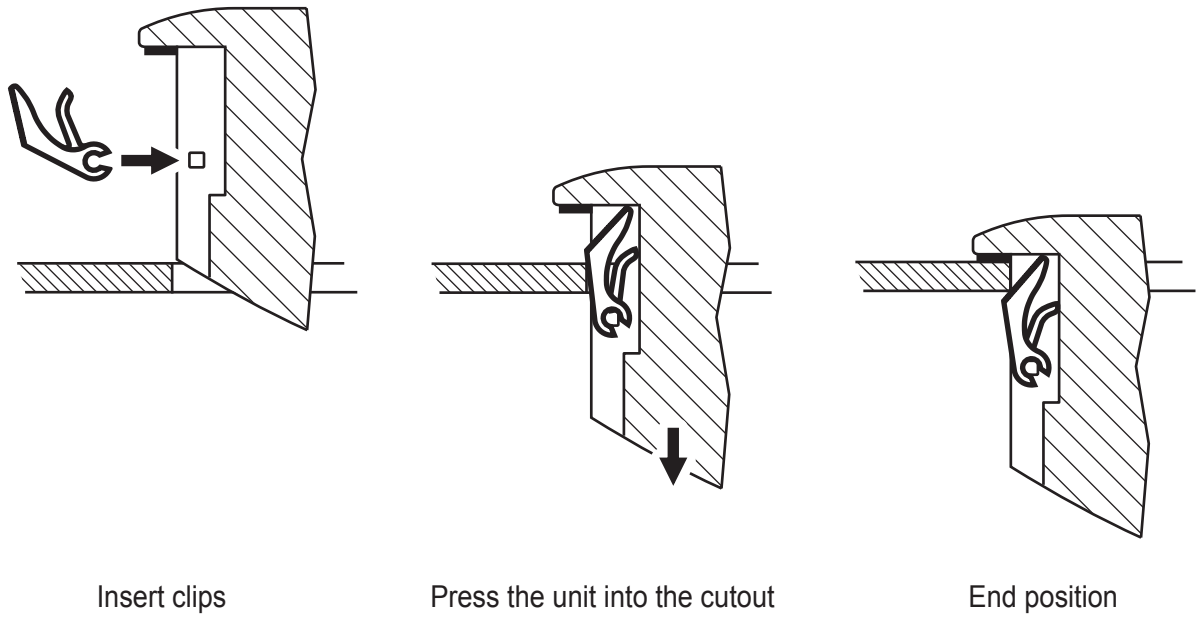
Preferably select this type of mounting when the unit is to be laid in the horizontal position as it is only held by the force of the clips.

The angle of inclination of the panel must not exceed 45°.

Note when selecting the mounting location:
To loosen the clips the back of the unit must be accessible.

This type of mounting is suited for materials with a thickness of max. 5 mm.

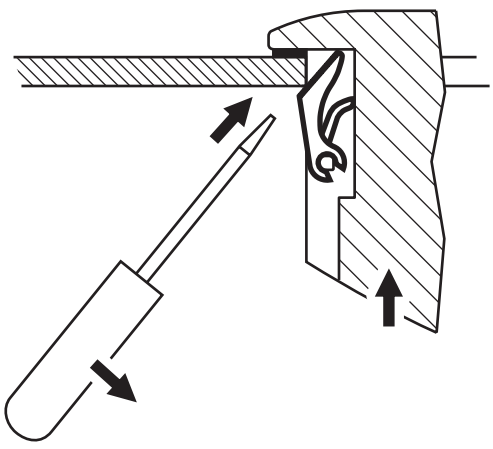
Mounting steps:



Insert clips | Press the unit into the cutout | End position

4.4.1 Removing the unit from the panel

To insert the screwdriver between the cut-out of the panel and the clip, the grooved chamfer of the clips must be fitted with a slot.



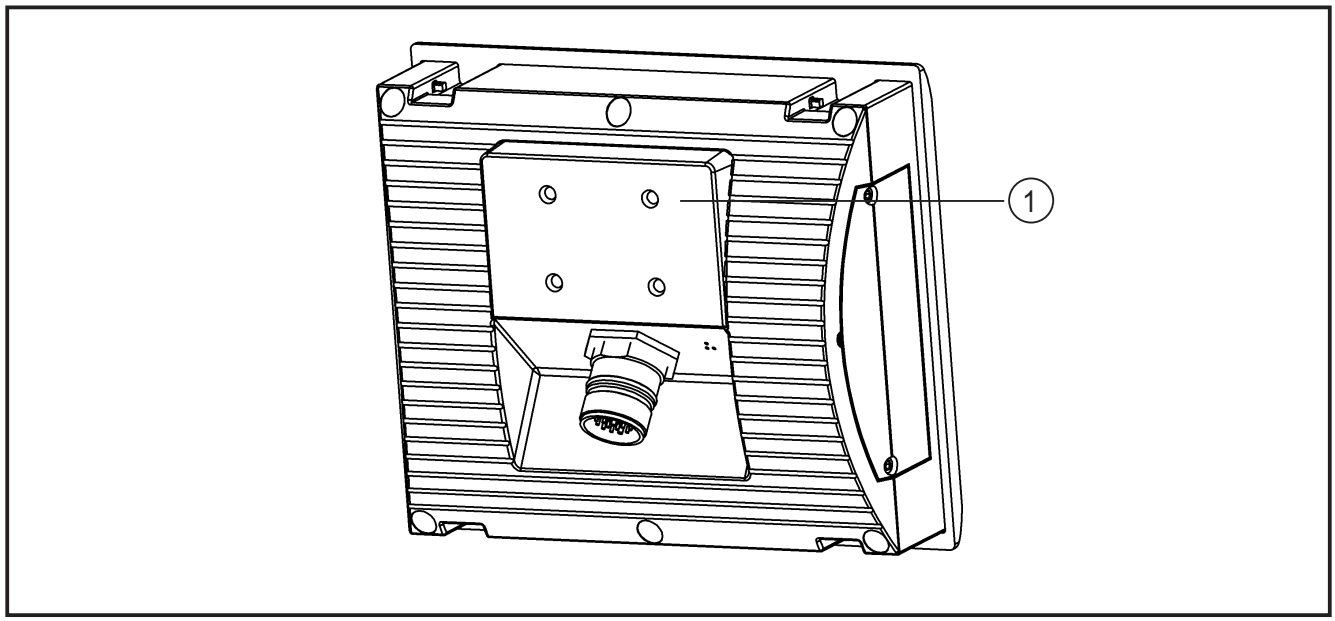
Steps for removal:

1. Insert the screwdriver into the slot of the clips on the back.
2. Angle the screwdriver and compress the springs of the clips.
3. Remove the unit from the cutout.

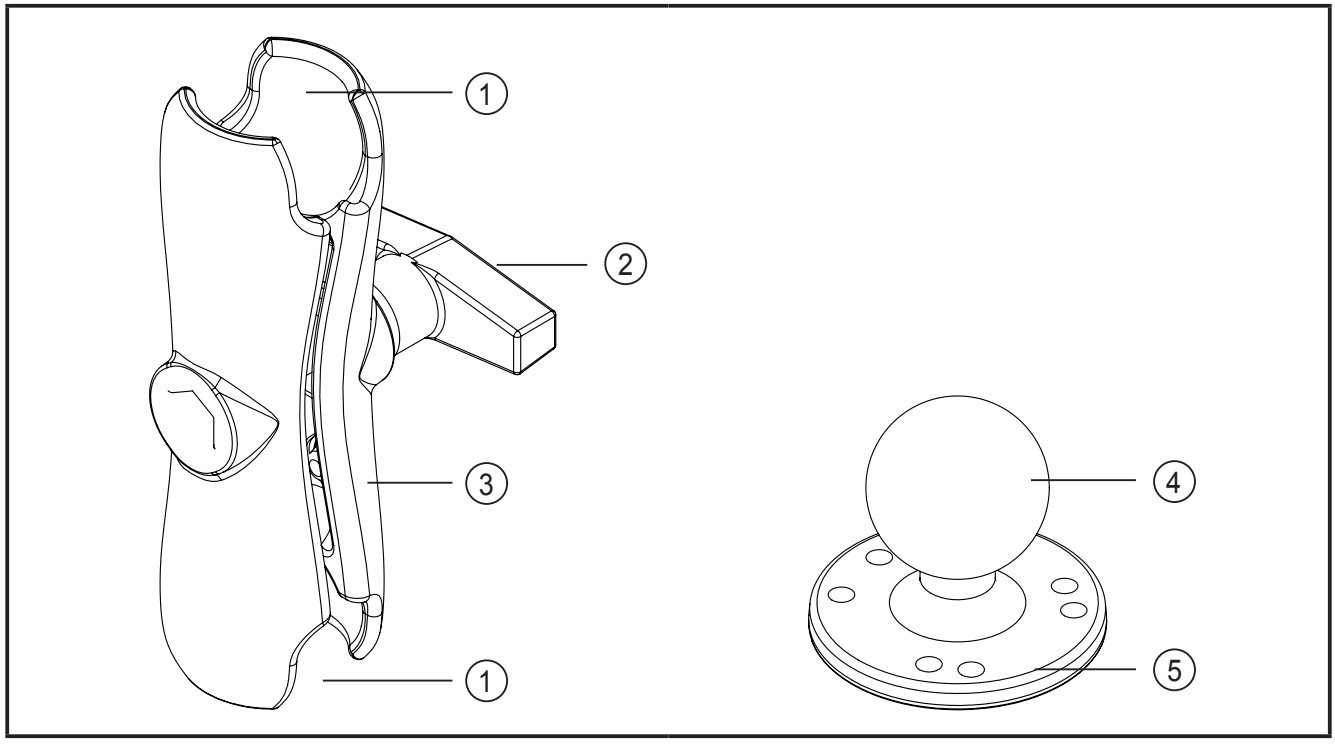
4.5 Surface mounting with RAM® mount system (EC1410...EC1414)

Using the RAM® mount components, available as accessories, the dialogue unit can be used as a firmly mounted desktop unit. Two balls allow variable orientation of the unit.

The back of the unit has been prepared for fixing the mounting plate.



1: 4 x M5 (useable thread depth: 8 mm)



RAM® mount system

1: Ball locator
2: Clamp screw
3: Mounting arm
4: Ball
5: Mounting plate

5 Electrical connection

5.1 General

Pin connections → 7 Technical data

To guarantee the electrical interference protection of the module, the housing must be connected to GND (e.g. to the ground of the vehicle).

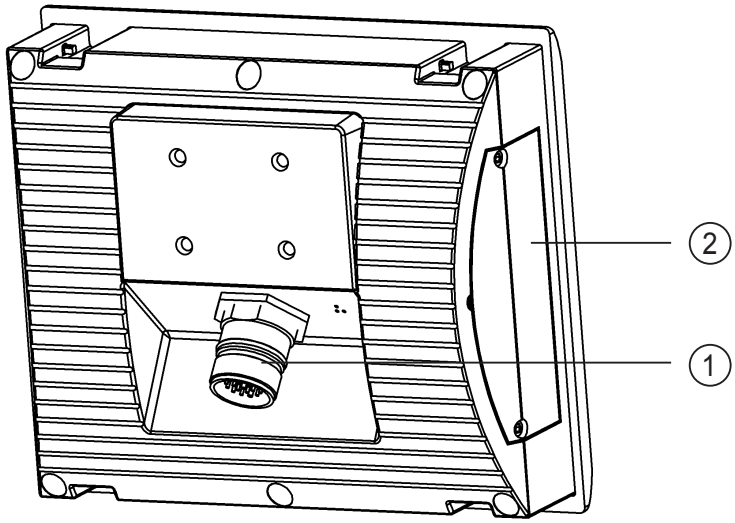
All screened wires of the connection cable must be connected to GND (e.g. to the ground of the vehicle).

To protect the whole system (wiring and module) the individual electric circuits must be protected with max. 3 A.

5.2 Ethernet

Use a shielded CAT5 cable.
STP, Shielded Twisted Pair, according to EIA/TIA-568.

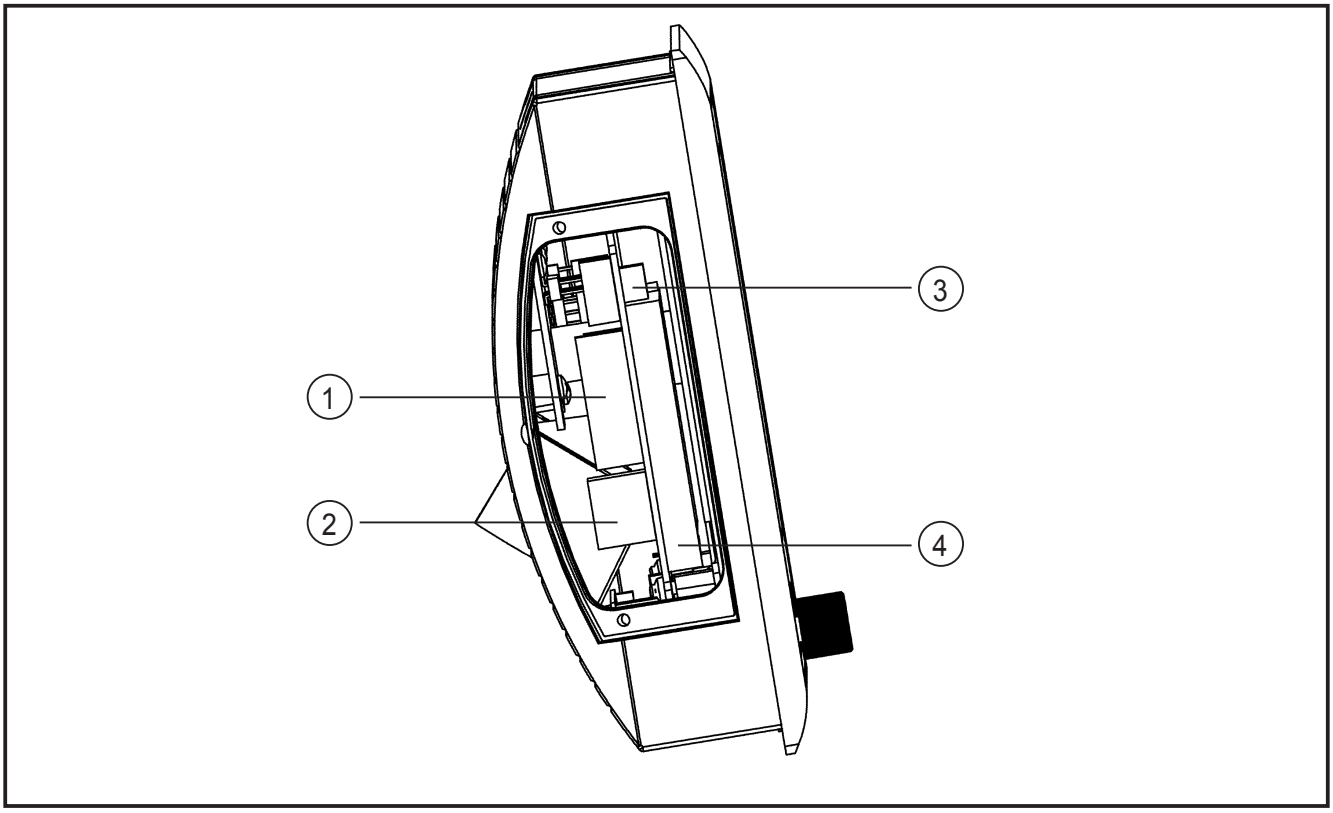
5.3 **M23 round connector** (central plug)



1: M23 round connector (central plug)
2: Service interfaces (behind side cover)

Do not connect or disconnect the M23 round connector (central plug) while live. Connecting or disconnecting the serial interface while live can lead to undefined states, causing damage to the RS-232 driver module.

5.4 **Service interfaces** (only for service operation)



1: RS 232 9-pole D-Sub plug
2: Ethernet 8-pole RJ45 plug
3: 24 V DC supply via 3,5 mm hollow plug (only optional)
4: PCMCIA slot, types I/II

⚠ Service interfaces are not intended for actual operation.
Connection must be carried out by qualified personnel and with the housing in a horizontal position.

⚠ Do not connect or disconnect the serial interface while live.
Connecting or disconnecting the serial interface while live can lead to undefined states, causing damage to the RS-232 driver module

6 Maintenance, repair and disposal

The process and dialogue module is maintenance-free and may only be repaired by the manufacturer. The unit must be disposed of in accordance with the national environmental regulations.

7 Technical data

(see following pages)

7.1 CR1050

CR1050

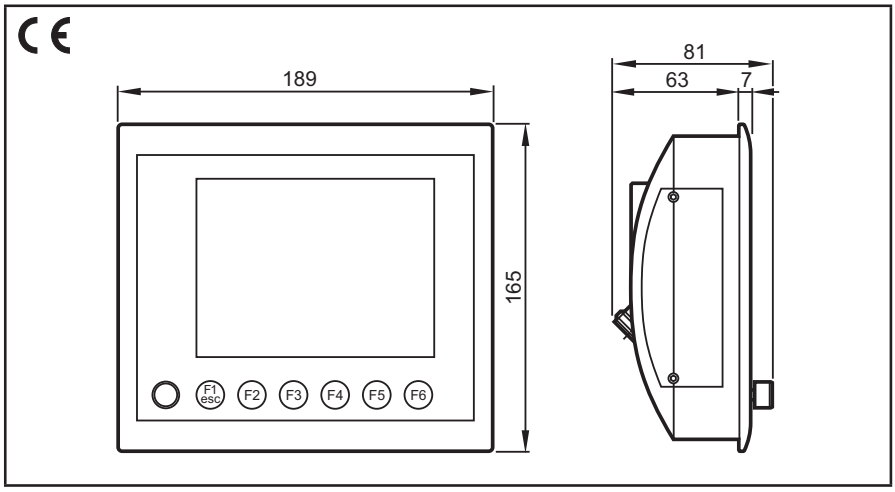
Prozess- und Dialoggerät
PDM 360

5,7" Monochrom-Display

6 frei programmierbare
hinterleuchtete
Funktionstasten

Drehgeber
mit Druckfunktion

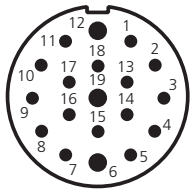
10...32 V DC



Technische Daten	Programmierbares Grafikdisplay zur Steuerung, Parametrierung und Bedienung von mobilen Maschinen und Anlagen
Anzeige	
Display	FSTN, monochrom, transflektiv, grafikfähig, 320 x 240 Pixel, 115,17 x 86,37 mm (5,7")
Hintergrundbeleuchtung	LED, 50 cd/qm (100.000 h Lebensdauer)
Helligkeit	4096-stufig per Software einstellbar
Zeichensätze	frei ladbar
Zeichenhöhe	frei skalierbar
Mechanische Daten	
Montagevarianten	• Einbaumontage Abstützung von vorne durch am Deckel umlaufenden Kragen, Befestigung durch Clips für Konsoleneinbau oder Haltewinkel für Schaltafeleinbau • Aufbaumontage durch RAM®-Mount-System (Montagezubehör nicht im Lieferumfang enthalten)
Abmessungen (B x H x T)	189 x 165 x 81 mm
Ausschnitt für Einbaumontage (B x H)	183 ± 0,5 x 154 ± 0,5 mm
Gehäusematerial	Zink-Druckguss, lackiert (RAL 9006)
Frontfolie	Polyester mit geprägten Tasten
Tasten Lebensdauer (Betätigungen)	6 Stößeltasten mit taktiler Rückmeldung, hinterleuchtet (64-stufig einstellbar), frei programmierbar (Softkey-Funktion) 1.000.000 (bei 23°C)
Drehgeber Lebensdauer (Umdrehungen)	mit mechanischer Drehdetektion, Rastung und zentralem, mechanischen Drucktaster > 100.000
Schutzart	IP 67
Betriebstemperatur	-20...+70° C
Lagertemperatur	-30...+80° C
Gewicht	2,0 kg
Elektrische Daten	
Betriebsspannung	10...32 V DC
Stromaufnahme	250 mA (bei 24 V DC)
Kurzschluss-/Verpolungsschutz	elektronisch
Prozessor	Motorola PowerPC MPC823E, 50 Mhz
Programm-/Datenspeicher	24 MByte (Flash)
Datenspeicher	32 MByte SDRAM

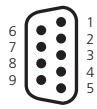
CR1050	Technische Daten
Schnittstellen	
CAN	2 Schnittstellen gem. ISO 11898 Vers. 2.0 B freies Kommunikationsprotokoll und CANopen Master/Slave Baudrate: 20 kBit/s...1MBit/s (Default 125 kBit/s) Anschluss über 19-pol. M23 Rundsteckverbinder
1. RS 232	Datenrate bis 115,2 kBaud Anschluss über 9-pol. D-Sub-Stecker hinter Seitendeckel Signale: RxD, TxD, GND
2. RS 232	Datenrate bis 19.200 Baud Anschluss über 19-pol. M23 Rundsteckverbinder Signale: RxD, TxD, GND
Ethernet	Datenrate bis 10 Mbit/s Anschluss über 8-pol. RJ 45 Stecker (IEEE 802.3, 10BASE-T) hinter Seitendeckel und über 19-pol. M23 Rundsteckverbinder
PCMCIA	PCMCIA-ATA-Schnittstelle (Standard-Header) Master-Schnittstelle, Version 2.1
Software/Programmierung	
Betriebssystem	Embedded Linux 2.4
Programmierssystem	CoDeSys Version 2.3
Grafische Funktionen	durch integrierte Target-Visualisierung
Sonstige Ausstattung	
Signalausgang	integrierter Buzzer
Temperaturüberwachung	Fühler zur Messung der Gehäuseinnentemperatur
Uhr	Realtime-Clock (Li-Batterie gepuffert, 10 Jahre Lebensdauer)
Zulassungen/Prüfungen	
CE-Zeichen	EN 61000-6-2: 2005, EN 61000-6-4: 2007, EN 61010-1: 2001
Störfestigkeit	ISO 7637-2 Impuls 1, Funktionszustand C Impuls 2, Funktionszustand C Impuls 3a, Funktionszustand A Impuls 3b, Funktionszustand A Impuls 4, Funktionszustand A Impuls 5, Funktionszustand A
Sonstige Prüfungen	EN 60068 für Klima und Mechanik

UK

CR1050	Technische Daten
Anschlussbelegung	
M23 Rundsteckverbinder Zentralstecker auf Geräterückseite	 Ansicht auf Stiftseite Typ Harting Han® R23 19-polig (16+3)

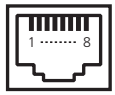
M23 Rundsteckverbinder

Pin	Potential
1	GND (Power)
2	GND (Power)
3	VBB + (Supply)
4	CAN 1 Low
5	CAN 1 High
6	n.c.
7	2. RS 232, RxD
8	2. RS 232, TxD
9	VBB + (Supply switched)
10	GND (Power)
11	GND (Power)
12	n.c.
13	CAN 2 Low
14	CAN 2 High
15	Ethernet RxD –
16	Ethernet RxD +
17	Ethernet TxD –
18	Ethernet TxD +
19	Shield

Service-Schnittstellen hinter Seitendeckel	
1. RS 232 für Nullmodem-Kabel	

RS 232

Pin	Potential
2	RxD
3	TxD
5	GND

Ethernet IEEE 802.3, 10BASE-T	

Ethernet

Pin	Potential
1	TxD +Paar 1
2	TxD – ”
3	RxD +Paar 2
6	RxD – ”

7.2 CR1051

CR1051

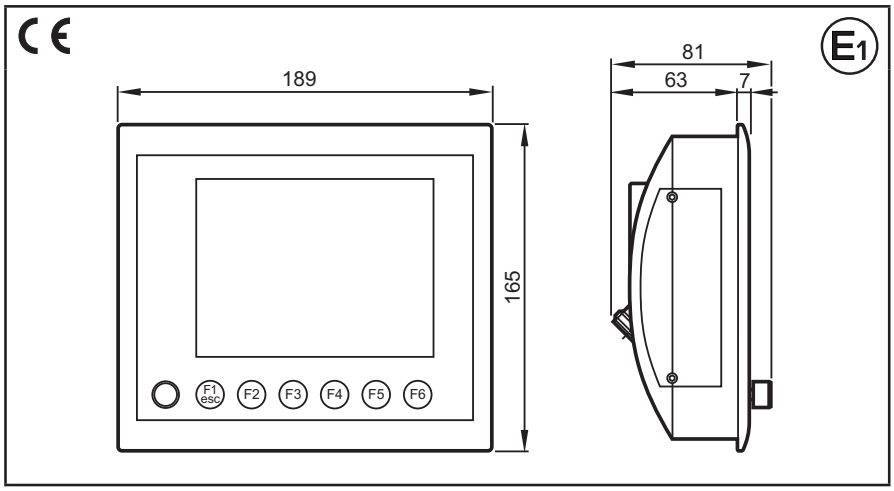
Process and dialogue module PDM 360

5,7" colour display

6 freely programmable backlit function keys

Encoder with pushbutton

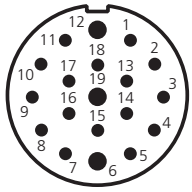
10...32 V DC



UK

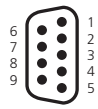
Technical data	Programmable graphic display for controlling, parameter-setting and operation of mobile machines and plants
Display	
Display	TFT, cholour, transmissive, with graphics capabilities, 320 x 240 pixels, 115.17 x 86.37 mm (5.7")
Background illumination	LED, 500 cd/m² (50.000 h lifetime)
Brightness	adjustable via software in 4096 steps
Sets of characters	can be uploaded individually
Height of characters	freely scaleable
Mechanical data	
Mounting variants	• panel mounting support from the front via lip around the cover, fixing with clips when mounted into a panel or mounting brackets when mounted into a control cabinet • surface mounting via RAM® mount system (mounting accessories not included)
Dimensions (W x H x D)	189 x 165 x 81 mm
Cutout for panel mounting (W xH)	183 ± 0,5 x 154 ± 0,5 mm
Housing material	die-cast zinc, painted (RAL 9006)
Protective film	polyester with embossed keys
Keys Lifetime (actuations)	6 short-stroke keys, with tactile feedback, behind polyester with embossed keys backlit (adjustable in 64 steps), freely programmable (softkey function) 1.000.000 (at 23°C)
Encoder Lifetime (revolutions)	with mechanical rotation detection, latching and central mechanical pushbutton > 100.000
Protection	IP 67
Operating temperature	-10...+70° C
Storage temperature	-30...+80° C
Weight	2.0 kg
Electrical data	
Operating voltage	10...32 V DC
Current consumption	300 mA (at 24 V DC)
Short-circuit / reverse polarity protection	electronic
Processor	Motorola PowerPC MPC823E, 50 MHz
Program and data memory	32 Mbytes (Flash)
Data memory	32 Mbytes SDRAM

CR1051	Technical data
Interfaces	
CAN	2 interfaces in accordance with ISO 11898 version 2.0 B individual communication protocol and CANopen master/slave baud rate: 20 Kbits/s...1 Mbit/s (default 125 Kbits/s) connection via 19-pole M23 round connector
1. RS 232	transmission rate up to 115.2 Kbaud connection via 9-pole D-Sub plug behind side cover signals: RxD, TxD, GND
2. RS 232	transmission rate up to 19,200 baud connection via 19-pole M23 round connector signals: RxD, TxD, GND
Ethernet	transmission rate up to 10 Mbits/s connection via 8-pole RJ 45 plug (IEEE 802,3, 10 BASE-T) behind side cover and via 19-pole M23 round connector
PCMCIA	PCMCIA-ATA interface (standard header) master interface, version 2.1
Software/Programming	
Operating system	embedded Linux 2.4
Programming system	CoDeSys version 2.3
Graphic functions	via integrated target visualisation
Other features	
Signal output	integrated buzzer
Temperature monitoring	sensor for measuring the temperature inside the housing
Clock	realtime clock (Li battery buffered, 10 years lifetime)
Tests/Approvals	
CE marking	EN 61000-6-2, EN 61000-6-4, EN 61010-1
E1 marking	UN/ECE-R10 (noise emission and noise immunity)
Noise immunity	ISO 7637-2 pulses 1, severity level 4, function state C pulses 2a, severity level 4, function state A pulses 2b, severity level 4, function state C pulses 3a, severity level 4, function state A pulses 3b, severity level 4, function state A pulses 4, severity level 4, function state A pulses 5a, severity level 3, function state A
Other tests	EN 60068 for climatic and mechanical testing

CR1051	Technical data
Wiring	
M23 round connector central plug on the rear of the unit	 view on pin side type Harting Han® R23 19-pole (16+3)

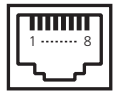
M23 round connector

Pin	Potential
1	GND (Power)
2	GND (Power)
3	VBB + (Supply)
4	CAN 1 Low
5	CAN 1 High
6	n.c.
7	2. RS 232, RxD
8	2. RS 232, TxD
9	VBB + (Supply switched)
10	GND (Power)
11	GND (Power)
12	n.c.
13	CAN 2 Low
14	CAN 2 High
15	Ethernet RxD –
16	Ethernet RxD +
17	Ethernet TxD –
18	Ethernet TxD +
19	Shield

Service interfaces behind side cover	
1. RS 232 for serial null modem cable	

RS 232

Pin	Potential
2	RxD
3	TxD
5	GND

Ethernet IEEE 802.3, 10BASE-T	

Ethernet

Pin	Potential
1	TxD + pair 1
2	TxD – ”
3	RxD + pair 2
6	RxD – ”

UK

7.3 CR1060

CR1060

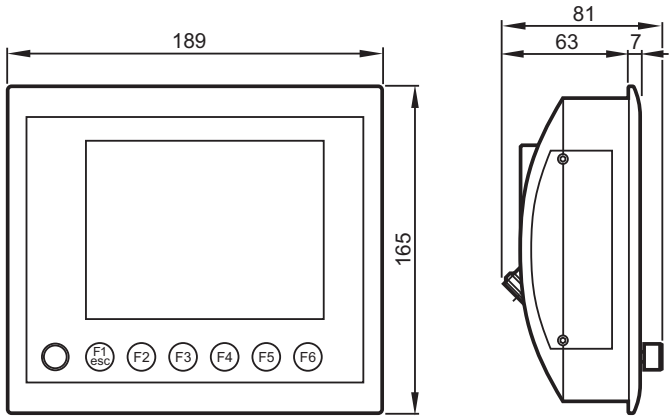
Process and dialogue module PDM 360

5,7" monochrome display

6 freely programmable backlit function keys

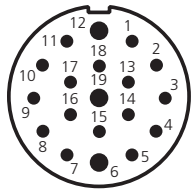
Encoder with pushbutton

10...32 V DC



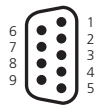
Technical data	Programmable graphic display for controlling, parameter-setting and operation of mobile machines and plants
Display	
Display	FSTN, monochrome, transflective, with graphics capabilities, 320 x 240 pixels, 115.17 x 86.37 mm (5.7")
Background illumination	CCFL, 220 cd/m² (40.000 h average lifetime)
Brightness	adjustable via software in 4096 steps
Sets of characters	can be uploaded individually
Height of characters	freely scaleable
Mechanical data	
Mounting variants	• panel mounting support from the front via lip around the cover, fixing with clips when mounted into a panel or mounting brackets when mounted into a control cabinet • surface mounting via RAM® mount system (mounting accessories not included)
Dimensions (W x H x D)	189 x 165 x 81 mm
Cutout for panel mounting (W xH)	183 ± 0,5 x 154 ± 0,5 mm
Housing material	die-cast zinc, painted (RAL 9006)
Protective film	polyester with embossed keys
Keys Lifetime (actuations)	6 short-stroke keys, with tactile feedback, backlit (adjustable in 64 steps), freely programmable (softkey function) 1.000.000 (at 23°C)
Encoder Lifetime (revolutions)	with mechanical rotation detection, latching and central mechanical pushbutton > 100.000
Protection	IP 67
Operating temperature	-10...+70° C
Storage temperature	-30...+80° C
Weight	2.0 kg
Electrical data	
Operating voltage	10...32 V DC
Current consumption	280 mA (at 24 V DC)
Short-circuit / reverse polarity protection	electronic
Processor	Motorola PowerPC MPC823E, 50 MHz
Program and data memory	24 Mbytes (Flash)
Data memory	32 Mbytes SDRAM

CR1060	Technical data
Interfaces	
CAN	2 interfaces in accordance with ISO 11898 version 2.0 B individual communication protocol and CANopen master/slave baud rate: 20 Kbits/s...1 Mbit/s (default 125 Kbits/s) connection via 19-pole M23 round connector (second interface can additionally be programmed as SAE J 1939 gateway)
1. RS 232	transmission rate up to 115.2 Kbaud connection via 9-pole D-Sub plug behind side cover signals: RxD, TxD, GND
2. RS 232	transmission rate up to 19,200 baud connection via 19-pole M23 round connector signals: RxD, TxD, GND
Ethernet	transmission rate up to 10 Mbits/s connection via 8-pole RJ 45 plug (IEEE 802,3, 10 BASE-T) behind side cover and via 19-pole M23 round connector
PCMCIA	PCMCIA-ATA interface (standard header) master interface, version 2.1
Software/Programming	
Operating system	embedded Linux 2.4
Programming system	CoDeSys version 2.3
Graphic functions	via integrated target visualisation
Other features	
Signal output	integrated buzzer
Temperature monitoring	sensor for measuring the temperature inside the housing
Clock	realtime clock (Li battery buffered, 10 years lifetime)
Tests/Approvals	
CE marking	EN 61000-6-2: 2005, EN 61000-6-4: 2007, EN 61010-1: 2001
e1 marking	RL 06/28/EG (noise emission and noise immunity)
Noise immunity	ISO 7637-2: 2004 pulses 1, severity level 4, function state C pulses 2a, severity level 4, function state A pulses 2b, severity level 4, function state C pulses 3a, severity level 4, function state A pulses 3b, severity level 4, function state A pulses 4, severity level 4, function state A pulses 5a, severity level 3, function state A
Other tests	EN 60068 (climatic testing), ISO 16750-3 (mechanical testing)

CR1060	Technical data
Wiring	
M23 round connector central plug on the rear of the unit	 view on pin side type Harting Han® R23 19-pole (16+3)

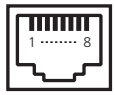
M23 round connector

Pin	Potential
1	GND (Power)
2	GND (Power)
3	VBB + (Supply)
4	CAN 1 Low
5	CAN 1 High
6	n.c.
7	2. RS 232, RxD
8	2. RS 232, TxD
9	VBB + (Supply switched)
10	GND (Power)
11	GND (Power)
12	n.c.
13	CAN 2 Low
14	CAN 2 High
15	Ethernet RxD –
16	Ethernet RxD +
17	Ethernet TxD –
18	Ethernet TxD +
19	Shield

Service interfaces behind side cover	
1. RS 232 for serial null modem cable	

RS 232

Pin	Potential
2	RxD
3	TxD
5	GND

Ethernet IEEE 802.3, 10BASE-T	

Ethernet

Pin	Potential
1	TxD + pair 1
2	TxD – ”
3	RxD + pair 2
6	RxD – ”