

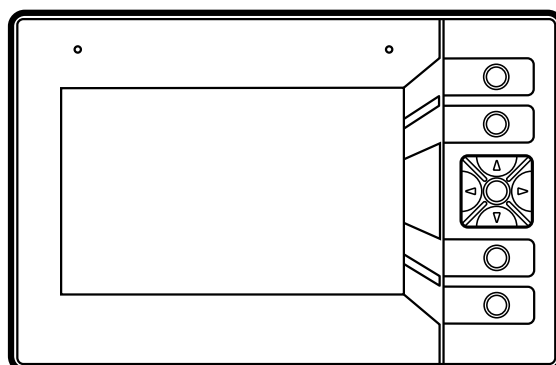


Installation instructions
Process and dialogue module
ecomatDisplay

UK

CR1058
CR1059

80289590 / 00 09 / 2020



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1 Preliminary note

Technical data, approvals, accessories and further information at www.ifm.com.

1.1 Key to the symbols

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



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

- The device described is a subcomponent for integration into a system. The manufacturer is responsible for the safety of the system. The system creator undertakes to perform a risk assessment and to create documentation in accordance with legal and normative requirements to be provided to the operator and user of the system. This documentation must contain all necessary information and safety instructions for the operator, the user and, if applicable, for any service personnel authorised by the system creator.
- Read this document before setting up the product and keep it during the entire service life.
- The product must be suitable for the corresponding applications and environmental conditions without any restrictions.
- Only use the product for its intended purpose (→ 3 Functions and features).
- If the operating instructions or the technical data are not adhered to, personal injury and/or damage to property may occur.
- In case of malfunctions, please contact the manufacturer. Tampering with the unit is not allowed.
- Installation, electrical connection, set-up, programming, configuration, operation and maintenance of the product must be carried out by personnel qualified and authorised for the respective activity.
- Protect units, connectors and cables against damage.
- Replace damaged units, since otherwise the technical data and safety will be impaired.

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2.1 Electromagnetic compatibility

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

3 Functions and features

The process and dialogue module ecomatDisplay is a programmable graphic display for controlling, parameter-setting and operation of mobile machines and plants. It is designed for use up to a height of 3,000 m above mean sea level even in difficult conditions such as increased temperature range and mechanical load, see (→ 7 Technical data) and specified standards.

Permissible use:

- in mobile machinery with supply from on-board systems (with battery) of 12 V DC or 24 V DC nominal voltage
- in industrial environments as fixed device with supply from SELV/PELV in accordance with the technical data
- also in wet environments
- also outdoors, if necessary with additional UV protection

Communication with other system components, e.g. decentralised I/O modules, is handled via CAN, Ethernet and USB interfaces. Together with the Linux operating system they form a universal platform for networking and communication with other CAN devices, networks or PCs.

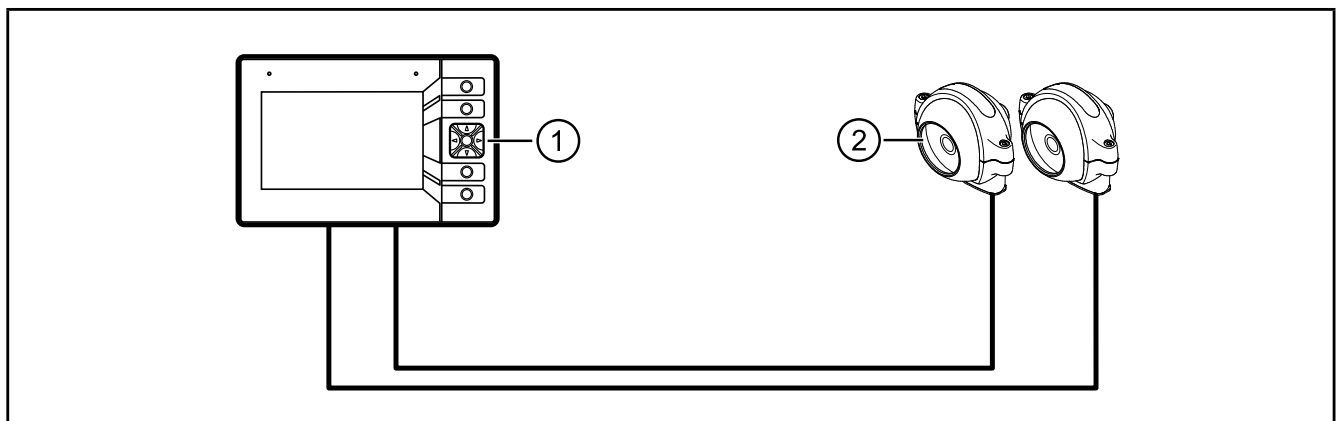


The device is not approved for safety-related tasks in the field of operator protection.



Direct connection to IT structures is not planned for this device. If this application is required, the users have to implement it (e.g. by using their own additional components).

3.1 Application example



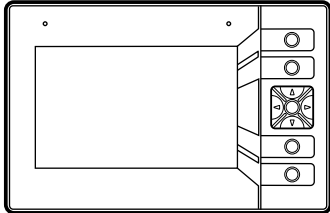
Networking of 2 analogue cameras with an ecomatDisplay

1. ecomatDisplay (e.g. CR1059)
2. analogue cameras (e.g. 2 x O2M200)

3.2 Overview of the common characteristics

- 5" colour display
- Closed metal housing suitable for panel mounting and surface mounting outside or in the cabin
- Freely programmable to IEC 61131-3 with target visualisation
- 64-bit controller and Embedded Linux operating system
- CAN interfaces with CANopen and SAE J1939 protocol
- Ethernet and USB interfaces

3.3 Distinctive features

	CR1058	CR1059	
Touch screen	–	•	
Freely programmable, backlit buttons	4	4	
Navigation keys with button	1	1	
Ethernet interfaces	1	1	
CAN interfaces	2	4	
ifm plug&play (CAN based)	–	1	
USB 2.0 interfaces	1	1	
Analogue video inputs	–	2	
Digital inputs B _L	–	2	
Digital outputs 2.5 A	–	2	
Line In	–	–	
Speaker output	1	1	
Headphone output	–	–	
Controller	Dual Core with GPU, 800 MHz	Dual Core with GPU, 800 MHz	
RAM	1 GB	1 GB	
FLASH	2 GB	4 GB	

• = available

4 Installation

4.1 Mounting accessories

The device is supplied without mounting accessories. Depending on the intended installation location and type of mounting the following mounting accessories are available:

- EC0730, installation kit for panel mounting
- EC1410...EC1414, RAM® Mount system for surface mounting

You can find more information about the available accessories at: www.ifm.com

4.2 General installation instructions



For all types of mounting the following applies:

The system creator is responsible for ensuring compliance with the requirements concerning mounting of the device in the application with regard to shock, vibration, acceleration and weight.

The unit front withstands shock up to IK07 without damage.

NOTE!

Higher shock > IK07

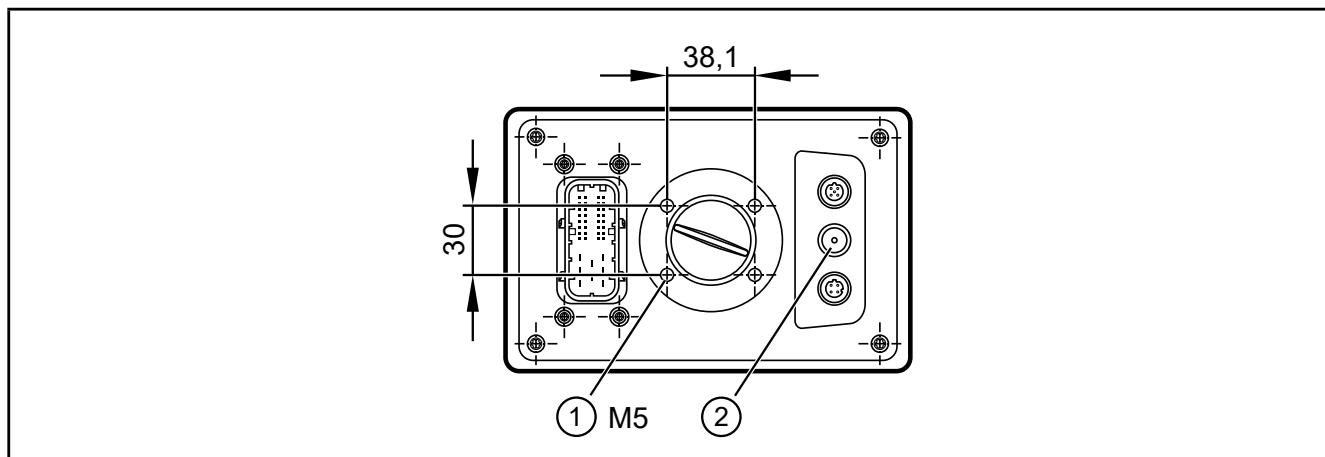
- > Damage possible
Protection rating and electrical protection may be impaired
 - ▶ The system creator has to protect the device depending on the requirements of his application, if necessary by means of external precautions.
 - ▶ Replace damaged units, since otherwise the technical data and safety will be impaired.
-



On the back, pressure compensation element, service cover and connector areas also have to be protected by the system creator by means of external precautions.

4.2.1 Locator for mounting accessories

The back of the device has been prepared for fixing the mounting accessories.



- 1: 4 x M5 threaded hole for RAM® Mount system / for the fixing profiles of the installation kit
2: pressure compensation element

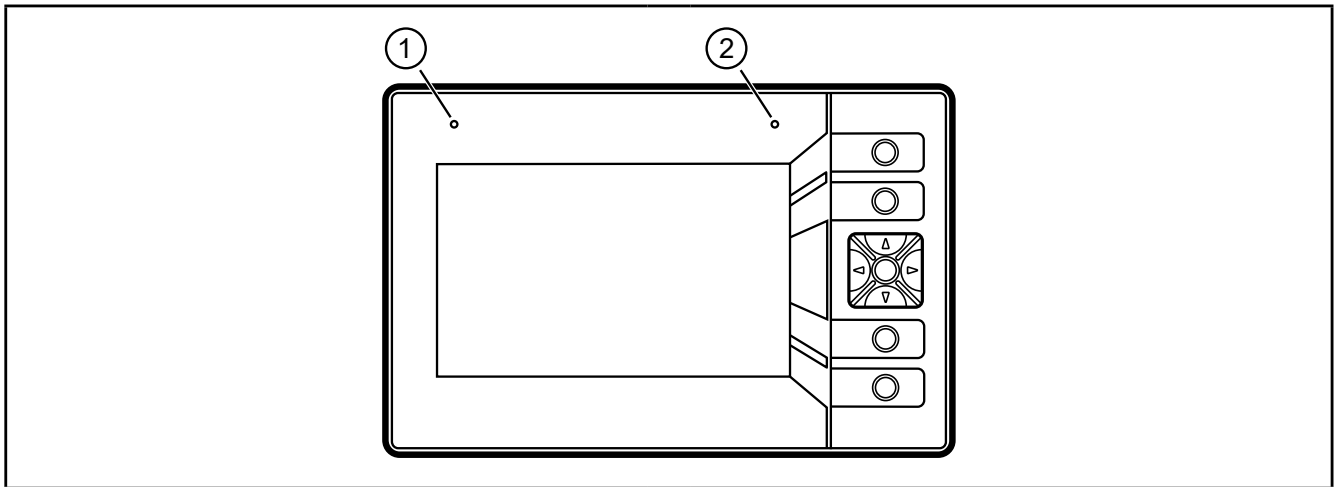
NOTE!

The device is equipped with a pressure compensation element. Use of elastic materials to seal or close the associated ventilation ducts may cause damage to the device.

- Do not use any sealing materials in the area around the pressure compensation elements.

4.2.2 Light sensor and status LED

The device is equipped with a light sensor. This sensor is used for automatic brightness adaptation of the display and the operating elements to the ambient brightness.



- 1: Light sensor
2: Status LED

► Do not cover up the light sensor by construction measures.

The status LED shows the operating states of the device.

4.3 Panel mounting / control cabinet installation

4.3.1 Safety instructions for panel mounting / control cabinet installation



The indications for the operating temperature apply equally in front of and behind the installation level.



The dimensions for the control panel cut-out are a basic prerequisite for the requirements concerning electrical protection, fire protection and protection rating of the device / system. However, this alone does not ensure compliance with the requirements. See the following safety instructions. The system creator has to take them into consideration for the risk assessment (→ 2).

**WARNING!**

The housing does not meet the requirements concerning protective earth. It can only be connected to functional ground.

- > Electric shock possible in case of dangerous active voltages in the control cabinet behind the installation level.
- ▶ The system creator has to separate dangerous active voltages / parts behind the installation level from the device housing and its circuits by means of double / reinforced insulation (air/creepage distances, solid insulation).
- ▶ Consider single error reliability (e.g. individual core detached from terminal ▶ Use cable tie).
- ▶ The responsibility for the electrical protection of the system is with the system creator.

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When installing the device in a control cabinet, the following requirements concerning fire protection apply:

When mounted in accordance with the information in chapter 4.3 the device itself meets the requirements of the IEC (or DIN EN) 61010-2-201 concerning a closed device with regard to protection against the spreading of fire.

**WARNING!**

The damping strip (installation kit) has no flammability rating and thus presents no fire obstacle.

- > Fire protection for the system may not be given or may be restricted.
- ▶ The system generator has to ensure fire protection depending on the requirements of his application, if necessary by means of external precautions.
- ▶ The responsibility for the fire protection of the system lies with the system creator.



The use of the installation kit does not ensure the protection rating of the system with the installed device. The protection rating depends on the properties of control panel / control cabinet (e.g. thickness, material, surface characteristics, torsional stiffness).



CAUTION!

The use of the installation kit does not ensure the requirements concerning the protection rating of the system with the installed device.

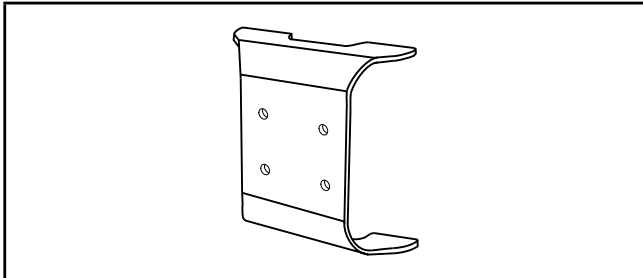
- > Protection rating and electrical protection may be impaired
- ▶ The system creator has to ensure the protection rating depending on the requirements of his application, if necessary by means of external precautions.
- ▶ The responsibility for the protection rating of the system with the installed device lies with the system creator.

4.3.2 Integration with installation kit

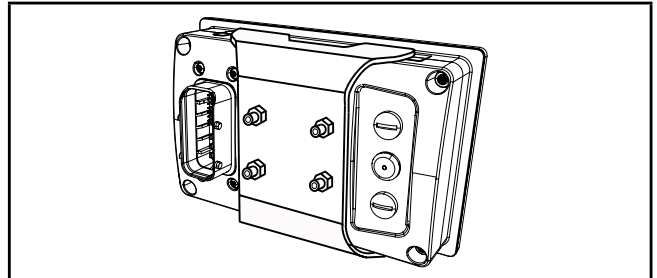
The installation kit enables horizontal, vertical or overhead mounting of the device in a panel cutout.

This type of mounting is suited for materials with a thickness from 1 to 10 mm. Longer set screws have to be used for material thicknesses >10 mm. They are not supplied with the mounting accessories.

The fixing profile, spacers, M5 hexagon nuts, washers, M5 set screws and damping strips required for mounting are supplied with the installation kit.



Fixing profile of the installation kit



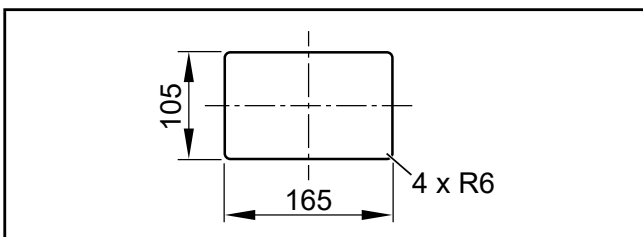
Dialogue module with mounted installation kit



Use the fixing profile of the mounting kit only together with a suitable spacer and the damping strip.

4.3.3 Panel cut-out

- ▶ Make a cut-out.

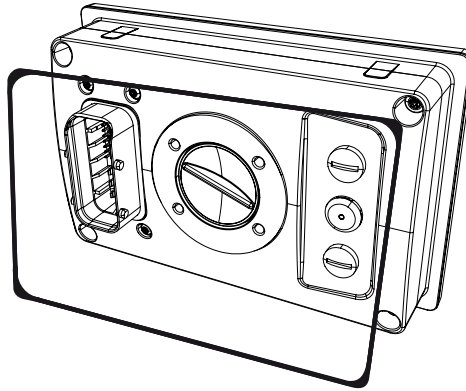


Panel cut-out

Tolerances ± 0.5 mm

4.3.4 Mounting steps

- ▶ Screw the set screws into the M5 threads on the back of the device. (→ 4.2.1 Locator for mounting accessories)
- ▶ Attach damping strip to the device.



Damping strip

- ▶ Insert the device into the cut-out.
- ▶ Insert the spacer suitable for the panel thickness.
The thickness of the spacers corresponds to the panel thickness. If necessary, use several spacers on top of each other.
- ▶ Screw the fixing profile to the back of the device.
Tightening torque of the hexagon nuts: 5 ± 0.5 Nm

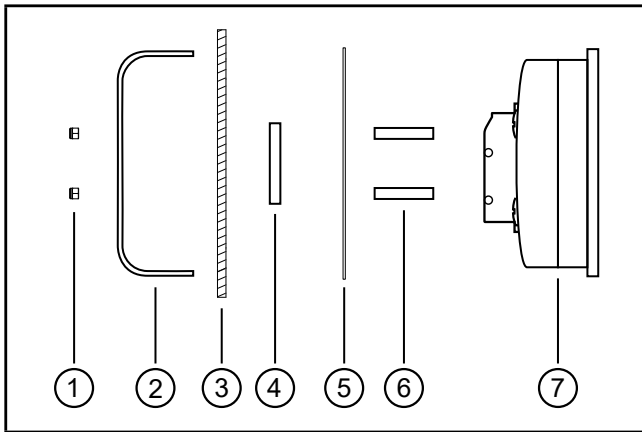
NOTE!

Contact corrosion between the mounting screws and the housing.

> Damage to the device

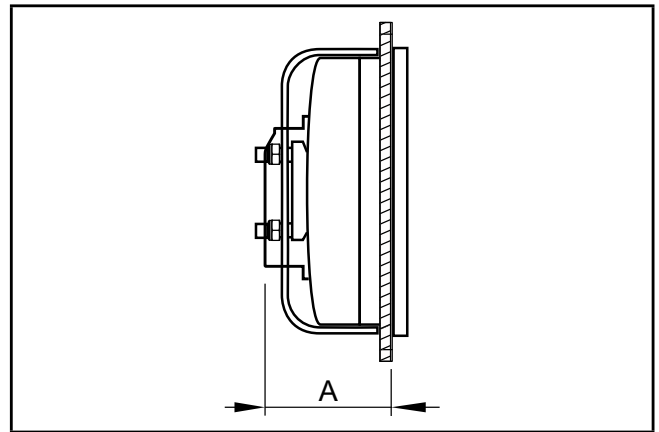
- ▶ Do not use copper or nickel-plated materials for the bolting elements.
- ▶ Use zinc-plated screws.
- ▶ In very corrosive environments such as extremely salty air, use screws with surface finishing on a zinc/nickel basis with thick-film passivation and sealing.

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Mounting principle

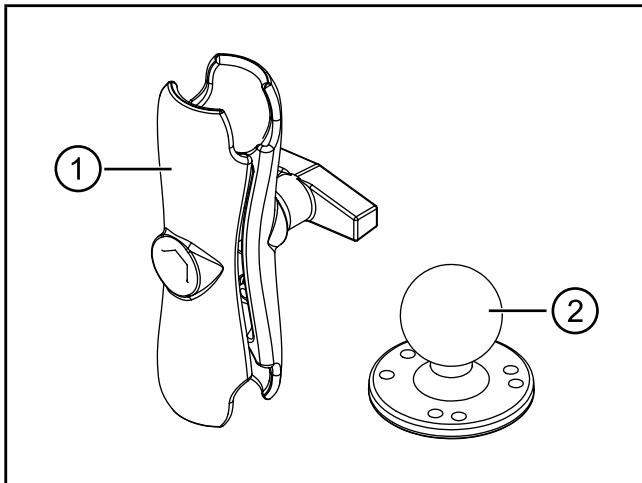
- 1: M5 hexagon nuts
- 2: Fixing profile
- 3: Panel cutout
- 4: Spacer
- 5: Damping strip
- 6: Set screws
- 7: Dialogue module



Installation depth A = device depth (approx. 48 mm)
Installation depth with the attached connector:
approx. 72 mm

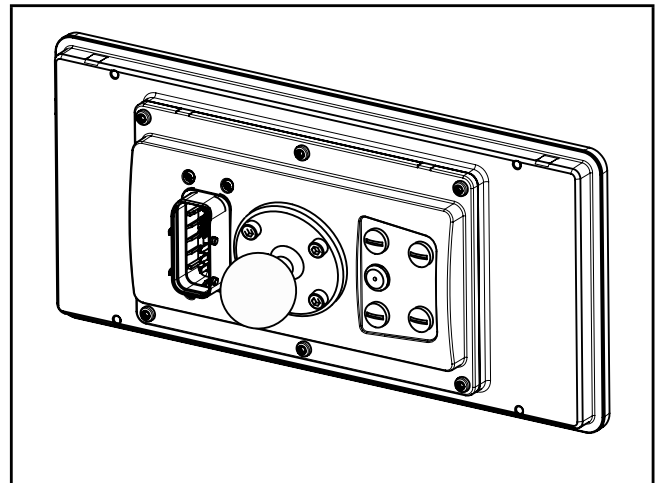
4.4 Surface mounting with RAM® Mount system

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



RAM® Mount components

- 1: Mounting arm with fastening screw
- 2: Mounting plate with ball

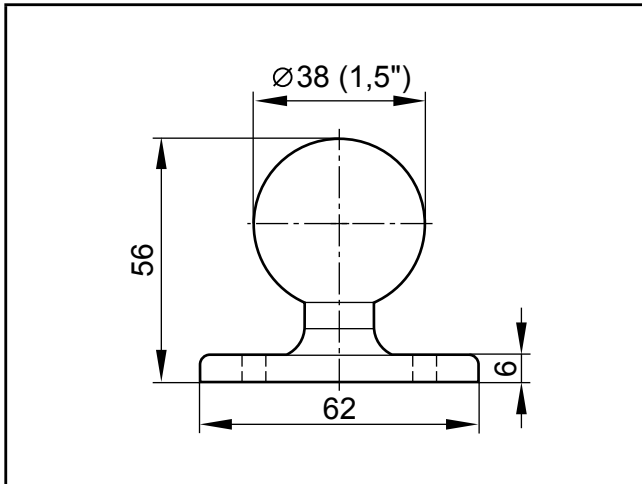


Dialogue module with mounted RAM® Mount system

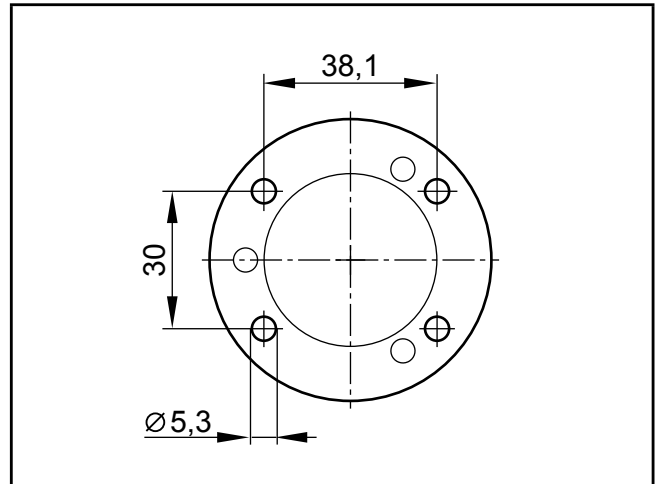
You can find more information about the available RAM® Mount components at:
www.ifm.com

4.4.1 Mounting steps

- ▶ Screw the mounting plate to the back of the device.
Usable M5 thread depth: ≤ 8 mm
Tightening torque M5: $5 \pm 0,5$ Nm
- ▶ Screw second mounting plate / ball of the selected RAM® Mount component on suitable surface according to RAM® Mount indications.



Mounting plate with ball



Hole dimensions

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Tightening torque: $5 \pm 0,5$ Nm

- ▶ Slightly loosen the fastening screw of the mounting arm.
- ▶ Place the mounting arm onto the balls and tighten the fastening screw.

4.5 Other installation types

Permissible installation types:

(→ 4.3 Panel mounting / control cabinet installation)

(→ 4.4 Surface mounting with RAM® Mount system)



All other installation types are in the sole responsibility of the system creator.

5 Electrical connection



- ▶ Disconnect the machine from the mains supply before installation; if necessary, also disconnect any independently supplied input / output load circuits. The same applies to the M12 connectors!
- ▶ Observe the national and international regulations for the installation of electrical equipment.

Accessible surfaces of the device are insulated from the circuits with basic insulation to IEC 61010-1 (secondary circuit with max. 32 V DC, supplied from the mains circuit up to 300 V of overvoltage category II).

GND of the supply is connected via EMC suppression capacitors on the shield connection (metal housing) of the device.

The external wiring has to be carried out in a way that ensures the required separation from other circuits.

5.1 Wiring

Wiring (→ 7 Technical data)



Only the signals indicated in the technical data or on the device label may be supplied to the terminals.



Unconnected connector pins need to have sealing of the individual cores.

NOTE!

Reverse polarity protection is not ensured in case of supply from the power supply SELV/PELV to VBB₃₀ and VBB₀)

Reverse polarity protection is only ensured in case of supply via the on-board system (via a battery), if the polarity of the supply is reversed as a whole (battery connected incorrectly). The basic principle of the reverse polarity protection is that the upstream fuses are quickly switched off in case of excessive current.

In case of supply via SELV/PELV, reverse polarity protection is not ensured.

> Damage to the device possible

- ▶ Ensure that the ends of the cables are properly connected to the connector before connecting the latter to the device, also in case of supply via the on-board system.
-

5.2 Connection accessories

You can find more information about the available accessories at: www.ifm.com

5.3 Connection technology



Observe all notes on connection technology.

- ▶ Note the device label.
- ▶ Use M12 connectors with gold-plated contacts.
- ▶ The M12 connection parts in the device comply with the ingress resistance requirements of the standard EN 61076-2-101. To adhere to the protection rating, only cables certified to this standard must be used. The system creators undertake to ensure ingress resistance for cables which they cut to length themselves.
- ▶ Carry out the fitting according to the indications of the cable manufacturer. A maximum of 10 Nm is permitted.
- ▶ During installation, place the M12 connector vertically so that the coupling nut will not damage the thread.
- ▶ Unused sockets are equipped with protective caps (included). Tightening torque: 1.3 ± 0.1 Nm
- ▶ Use 40-pole connector with individually sealed cores to ensure protection rating IP 67.



Only connect the connector when the supply voltage is disconnected. No "hot plugging" is permitted.

"Hot plugging" is permitted at the USB type A connector of the connected M12 adapter.



The ingress resistance of cables which the users have cut to length themselves has to be ensured.

- ▶ Use twisted-pair cables for the CAN/IFM connection.

The CAN bus is internally protected against short circuit to VBB and GND.

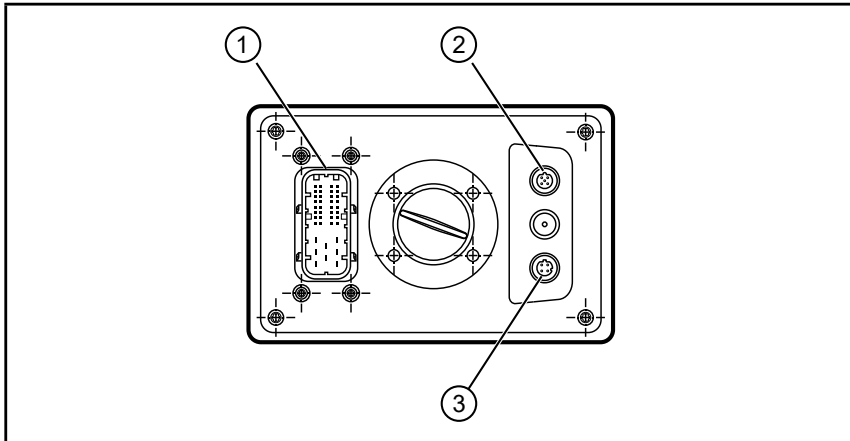


For CAN/IFM cables ≥ 30 m, ensure appropriate protection against surge (e. g. shielded cables).

- ▶ Use a min. category 5 (Cat 5) cable for the Ethernet connection.
- ▶ Audio loudspeaker output: lay twisted-pair cables with floating ground
- ▶ Video: screened, shielded twisted-pair or coaxial cable with 75 ohms impedance

5.4 General wiring information

Wiring of the connectors (→ 7 Technical data)



- 1: Supply, inputs/outputs
(CR1059 only), video
(CR1059 only), audio, CAN,
ifm (CR1059 only), service
- 2: USB0
- 3: ETH0

Connector (back of the device)

NOTE!

Wrong connection may cause damage to the device.

► Observe the safety instructions.

NOTE!

The short-circuit/reverse polarity protection of the device applies to the operating voltage connections. A short circuit between operating voltage VBB_x and USB / audio / video may cause damage to the device.

- Lay supply and signal cables away from the device using the shortest possible route.
- All connected cables must be provided with a strain relief.
- Provide all outgoing cables with a strain relief 200 mm behind the cable entry.



Maximum cable lengths:

- USB ≤ 1.8 m
- Ethernet ≤ 25 m
- video ≤ 30 m
- audio ≤ 30 m

Minimum operating quality audio / video: There may be interference to audio / video circuits close to strong HF sources. This can result in audible and visible distortion.

5.5 Operating voltage and fuses

- The individual electric circuits must be protected in order to protect the whole system. Automotive spade-type fuses are recommended.

Description	Connector 1	Operating voltage	Nominal value fuse	Required triggering characteristics
VBB ₁₅	pin 119	8...16 V DC and 16...32 V DC ignition starter switch	3 A	$T_{\text{fuse}} \leq 120 \text{ s}$ at max. 6.25 A
VBB ₃₀	pin 121	8...16 V DC	5 A	$T_{\text{fuse}} \leq 120 \text{ s}$ at max. 10 A
		16...32 V DC	3 A	$T_{\text{fuse}} \leq 120 \text{ s}$ at max. 6.25 A
VBB ₀	pin 114	8...16 V DC and 16...32 V DC	15 A	-
Digital inputs	pin 115, 116, 89, 97, 110	8...16 V DC and 16...32 V DC	3 A	$T_{\text{fuse}} \leq 120 \text{ s}$ at max. 6.25 A

Terminal designation pursuant to DIN 72552

Supply cables of the inputs can be safeguarded together with the fuse for VBB₁₅.

NOTE!

Load dump and surge without connection of VBB₀

> Destruction of the device possible

- Always connect VBB₀, even if the outputs are not used or are not available.

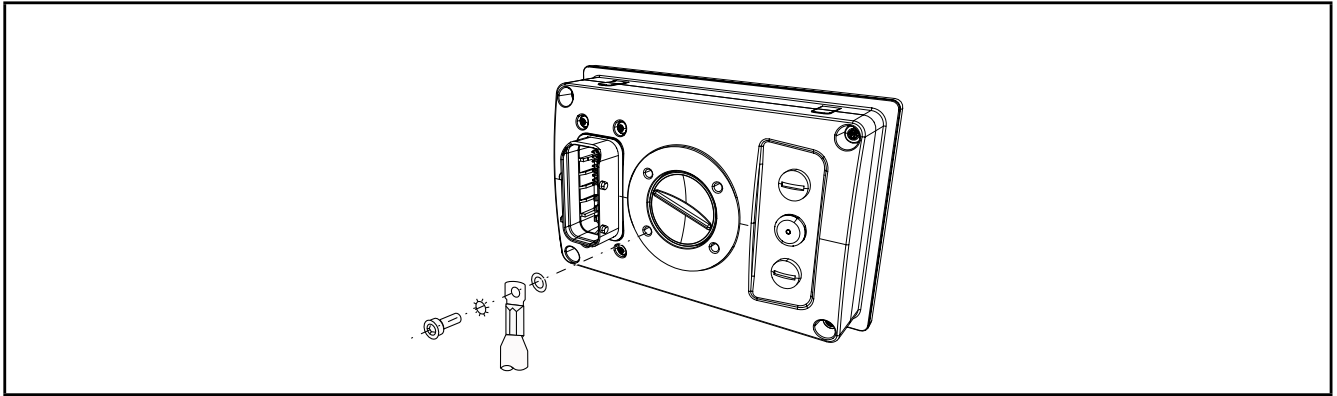
5.6 Shield connection



To ensure the protection of the device against electrical interference and to ensure the safe function of the device, the housing has to be connected to the body / GND of the supply using the shortest possible route.

- Establish the connection between the device and the ground of the vehicle using the intended screw for RAM® Mount installation. If possible, use the thread next to the 40-pole AMP connector.

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Shield connection



To avoid contact corrosion on the shield connection of the device, do not use any copper or nickel-plated materials for the bolting elements!

- ▶ In very corrosive environments such as extremely salty air, use screws with surface finishing on a zinc/nickel basis with thick-film passivation and sealing.

5.7 Ethernet interface

Communication interfaces are insulated among each other, to other circuits and to accessible surfaces of the device by means of basic insulation to IEC 60950-1 (Secondary circuit with max. operating voltage (→ 7 Technical data), supplied from the mains circuit up to 300 V of overvoltage category II).

They are construed as TNV-1 circuits.

- ▶ Use a shielded CAT5 cable. STP (Shielded Twisted Pair), to EIA/TIA-568 Length max. 25 m



The max. cable length depends for example on the bus topology, the selected operating mode (10/100 Mbits/s) or the quality of the connectors.

- ▶ Use screened connector housings and connect the screen of the Ethernet cable to the connector housing.
- ▶ Do not lay the Ethernet cable in parallel to live cables.



Interference due to external influences

Faulty or insufficient radio interference suppressors in other electrical equipment, such as inverters or generators, as well as voltage fluctuations when switching on/off high electric loads may lead to problems with the data transmission.

5.8 Analogue video inputs

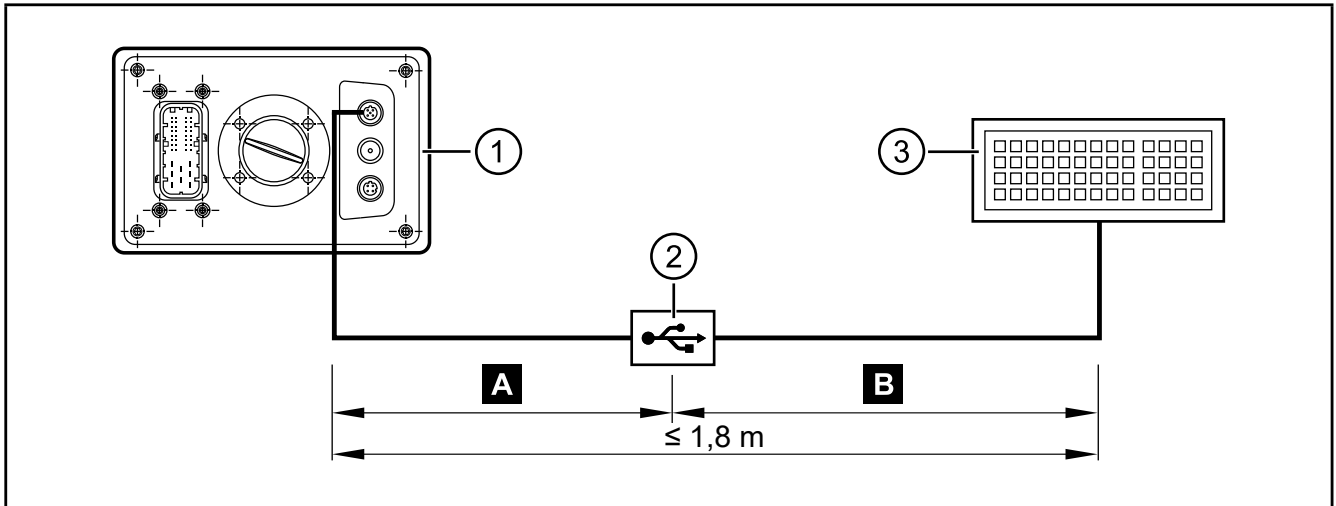
- ▶ If the analogue video inputs are used, use connection cables in STP (shielded twisted pair) or coaxial cables, versions with 75 ohms impedance.

5.9 USB interfaces

Wiring (→ 7 Technical data)

This USB interface is connected to a USB connector in the control panel or in the dashboard. It is used for the connection of USB 2.0 devices.

The supply of external USB devices via the USB interface is protected against overload. Max. continuous current: 500 mA



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USB connection via M12 connector

- 1: Dialogue module
- 2: USB connector, for example in the control panel or in the dashboard
- 3: USB device

- A** Permanent connection: Dialogue module – USB connector
 - Use prewired cable. (M12 connector, B-coded on USB socket, type A, watertight, cable length 1.5 m, wires twisted and screened)
 - Use only cables to USB 2.0 specification for individual wiring. Keep length "B" as short as possible and position the USB connector in immediate vicinity to the dialogue module. Length "B" considerably influences the quality of the USB data transmission.
- B**
 - Use a connection cable with the designation "Full Speed/High Speed" (= USB connection cable with twisted and screened cores to USB 2.0 specification).
 - Do not make a connection using several USB connection cables.

5.9.1 Short-circuit protection

NOTE!

The USB interface (M12 connector) is not protected against short circuits with a live wire outside the following voltage ranges:

+5 V DC	-0.3...6.0 V DC	(pin 1)
–Data	-0.3...3.6 V DC	(pin 2)
+Data	-0.3...3.6 V DC	(pin 3)
ID	-0.3...3.6 V DC	(pin 4)

A short circuit will destruct the USB interface.

5.10 Selection of loudspeakers

For an optimum audio output 8 Ω loudspeakers have to be used.

6 Set-up

6.1 General

The factory setting of the device shows a demo application. By means of the installed recovery app any suitable firmware version can be loaded to the device.

Factory settings:

IP adress: 192.168.82.247

Subnet mask: 255.255.255.0

Gateway IP address: 192.168.82.1



The user is responsible for the safe function of the application programs which he created himself. If necessary, an approval by corresponding supervisory and test organisations according to the national regulations must be carried out additionally.

6.2 Getting started

- ▶ Connect the device to the notebook/PC via the Ethernet interface.
- ▶ Switch on the notebook/PC; check the IP settings of the notebook/PC and change them if necessary.

Internet protocol: TCP/IP

IP address: 192.168.82.xxx (except for .247, s.a.)

Subnet mask: 255.255.255.0

Gateway IP address: 192.168.82.1

- ▶ Switch on the operating voltage of the dialogue module.
- > 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 App Launcher is opened automatically.

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6.3 Set-up

The set-up allows the setting of the device parameters directly via the local display or the web interface of the device. Local set-up is started by selecting the set-up button in the App Launcher.

While the App Launcher is shown, entering the device IP address (e.g. 192.168.82.247) via the connected web browser takes you to the web set-up.

After leaving the set-up 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.

6.4 Required documentation

In addition to the CODESYS programming system, the following documents are required for programming and set-up of the device:

- Programming manual ecomatDisplay

Manuals as well as online help CODESYS and ecomatDisplay are available for download on the internet: www.ifm.com

6.5 Use of the internal temperature sensor

The internal temperature sensor of the device can be read out with the software.

The unit primarily heats up due to the following factors:

- solar radiation
- ambient temperature
- installation conditions
- external heating
- current consumption (display illumination etc.)

Demanding operating conditions cause considerable heating up. The device temperature must not exceed the maximum permissible value (→ 7 Technical data).

The value provided by the internal temperature sensor can e.g. be used for the following actions:

- Reducing the display brightness; the self-heating will decrease.
- Warning the operator about the heating and an upcoming switch-off of the display
- Switch-off of the display

NOTE!

Internal temperature exceeds the permissible value
(→ 7 Technical data)

- > Malfunction or damage to the device possible
 - ▶ Reduce device temperature.
 - ▶ Take appropriate measures to prevent further heating up of the device.
-

7 Technical data

7.1 CR1058

CR1058

Process and dialogue module
ecomatDisplay
5" colour display
4 freely programmable backlit
function keys
Navigation keys with button
2 CAN interfaces
1 Ethernet interface
1 USB interface
1 stereo audio interface
CODESYS 3.5
64-bit dual-core processor
8...16 V DC or 16...32 V DC

Technical data

Display

Display

Format

Resolution

Orientation

Surface

Colours

Background illumination

Brightness

Contrast ratio

Character sets

Mechanical data

Mounting variants

Dimensions (W x H x D)

Cutout for panel mounting (W x H)

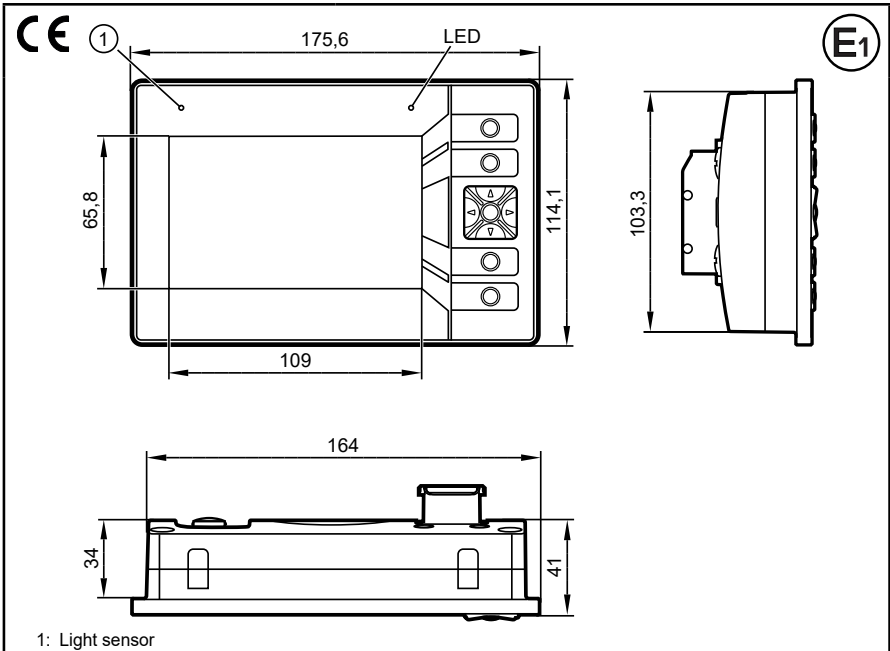
Housing material

Pushbuttons

Navigation keys

Background illumination operating
elements

Protection rating



Programmable graphic display for controlling, parameter-setting and operation of mobile machines and plants

TFT LCD colour display

16:10, 109 x 65.8 mm, 5" diagonal

800 x 480 pixels

horizontal / vertical

glass, chemically hardened and anti-reflective

262144 (18 bits)

LED (life cycle $\geq 50,000$ h)

≥ 600 cd/m²
(can be set to 0...100%, step increment 1%)

typical 500:1

can be uploaded individually and are freely scalable
preinstalled: ifm ISO fonts with vehicle-specific symbols, Arial, Courier

panel mounting (control panel / control cabinet installation) with mounting handle
surface mounting with RAM® Mount system
(mounting accessories not included)

175.6 x 114.1 x 41 mm

165 $\pm$ 0.5 x 105 $\pm$ 0.5 mm

die-cast aluminium, powder coating (RAL 9005)

4 function keys (silicone keyboard) with tactile feedback
freely programmable (softkey function)
life cycle $\geq 1,000,000$ activations

cursor function (up, down, left, right) with tactile feedback and with
central mechanical pushbutton
Life cycle $\geq 1,000,000$ activations

RGB LED, colours and states programmable by means of the application software

IP 65 / IP 67 (for inserted connectors with individually sealed cores and inserted
M12 connectors/sealing caps)

UK

CR1058	Technical data
Ambient temperature	-20...52° C (up to 2000 m above sea level) -20...47° C (up to 3000 m above sea level)
Storage temperature	-30...80° C
Max. perm. relative humidity	90 % (not condensing)
Height above sea level	max. 3000 m
Polution degree	2 (before installation and when the device is replaced)
Weight	approx. 0.8 kg
Electrical data	
Operating voltage	8...16 V DC or 16...32 V DC
Reverse polarity protection	yes, in case of supply via the on-board system (battery)
Power consumption	19 W
Current consumption VBB ₀	5 A
Processor	ARM dual core, 64 bits, 800 MHz with GPU
Memory (total)	1 GByte RAM / 2 GBytes flash, non-volatile memory: 16 kB
Interfaces	
CAN0...1	CAN interface 2.0 A/B, ISO 11898 20 Kbits/s...1 Mbit/s (default 250 Kbits/s) CANopen, CiA DS 301 version 4.2, CiA DS 401 version 1.4 or SAE J 1939 or free protocol (Raw CAN)
ETH0	transmission rate 10/100 Mbits/s protocols: TCP/IP, UDP, Modbus TCP, OPC UA Micro Embedded Device Server, EtherNet/IP scanner / adapter
USB0	USB 2.0 high speed, transmission rate up to 480 Mbits/s USB master operation output current per interface ≤ 500 mA
Software/programming	
Operating system	Embedded Linux 4.14
Programming system	CODESYS 3.5 (IEC 61131-3)
Graphic functions	via integrated target visualisation

CR1058	Technical data																					
Other features																						
Acoustic signal output	integrated audio stereo output Stereo Class D speaker output with 1 W per channel, 8 Ω, BTL																					
Temperature monitoring	1 integrated probe for measuring the main board temperature The main board temperature must not exceed 72 °C.																					
Brightness adaptation	light sensor in the front of the device to adapt the brightness of the display and the operating elements																					
Clock / battery	real-time clock (RTC), battery-buffered / CR1225 (3 V, 48 mAh)																					
Status LED	RGB LED, colours and states programmable by means of the application software																					
Operating states (factory setting)	<table><tr><th>Colour</th><th>Status</th><th>Description</th></tr><tr><td>-</td><td>off</td><td>no operating voltage</td></tr><tr><td>green</td><td>5 Hz</td><td>loading operating system</td></tr><tr><td>green</td><td>on</td><td>executing operating system</td></tr><tr><td>green</td><td>1 Hz</td><td>shutting down operating system</td></tr><tr><td>orange</td><td>5 Hz</td><td>loading recovery system</td></tr><tr><td>orange</td><td>on</td><td>executing recovery system</td></tr></table>	Colour	Status	Description	-	off	no operating voltage	green	5 Hz	loading operating system	green	on	executing operating system	green	1 Hz	shutting down operating system	orange	5 Hz	loading recovery system	orange	on	executing recovery system
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-	off	no operating voltage																				
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green	1 Hz	shutting down operating system																				
orange	5 Hz	loading recovery system																				
orange	on	executing recovery system																				
Service inputs on power on	<table><tr><th>SERVICE0</th><th>SERVICE1</th><th>Description</th></tr><tr><td>0</td><td>0</td><td>normal start</td></tr><tr><td>1</td><td>0</td><td>set-up</td></tr><tr><td>0</td><td>1</td><td>recovery app</td></tr></table> 0 = GND 1 = VBB	SERVICE0	SERVICE1	Description	0	0	normal start	1	0	set-up	0	1	recovery app									
SERVICE0	SERVICE1	Description																				
0	0	normal start																				
1	0	set-up																				
0	1	recovery app																				

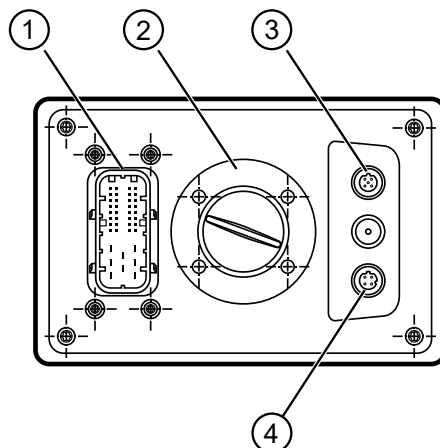
UK

CR1058	Technical data	
Test standards and regulations		
CE mark	EN 61000-6-2	Electromagnetic compatibility (EMC) Noise immunity
	EN 61000-6-4	Electromagnetic compatibility (EMC) Noise emission
E1 mark	UN/ECE-R10	Noise emission Noise immunity with 100 V/m
	ISO 7637-2	Pulse 1, severity level: IV; function state C Pulse 2a, severity level: IV; function state A Pulse 2b, severity level: IV; function state C Pulse 3a, severity level: IV; function state A Pulse 3b, severity level: IV; function state A Pulse 4, severity level: IV; function state A Pulse 5, severity level: III; function state C data valid for the 24 V system Pulse 4, severity level: IV; function state A (data valid for the 12 V system)
Additional automotive tests	ISO 10605 DIN EN ISO 13766-1	ESD (330 pF / 2000 Ω) ± 4 kV contact discharge; function state A ± 6 kV contact discharge; function state C ± 8 kV air discharge; function state C
Climatic tests	EN 60068-2-30	Damp heat, cyclic Upper temperature 55 °C, number of cycles: 6
	EN 60068-2-78	Damp heat, steady state Test temperature 40 °C / 93 % RH Test duration: 21 days
	EN 60068-2-52	Salt spray test Severity level 3 (vehicle)
Mechanical tests	ISO 16750-3	Test VII; vibration, random Mounting location: vehicle body
	EN 60068-2-6	Vibration, sinusoidal 10...500 Hz; 0.72 mm/10 g; 10 cycles/axis
	ISO 16750-3	Bump 30 g/6 ms; 24,000 shocks
Tests for railway applications	EN 50155 clause 12.2	Mechanical/climatic tests
	EN 50121-3-2	EMC emission standard and immunity
		Additional information and restrictions on request
Chemical resistance	ISO 16750-5	AA, BA, BD, CC, DB, DC, DD, ED, only one chemical permitted at a time

CR1058

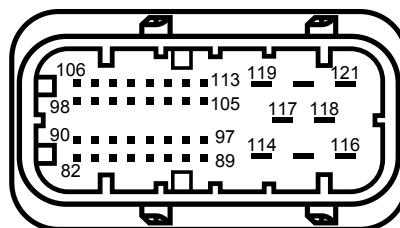
Back of the unit

Technical data



- 1: AMP connector, 40 poles
- 2: Locator for the RAM® mount system and mounting frame
- 3: M12 connector, 5 poles
- 4: M12 connector, 4 poles

AMP connector, 40 poles



M12 connector

3	4
socket , B-coded, 5 poles	socket D-coded, 4 poles

CR1058

Wiring

Technical data

(1) supply, audio, CAN, service

82	not connected
83	not connected
84	CAN0_L
85	CAN1_L
86	not connected
87	not connected
88	not connected
89	SERVICE1
90	not connected
91	not connected
92	CAN0_H
93	CAN1_H
94	not connected
95	not connected
96	not connected
97	SERVICE0

114	VBB0
115	not connected
116	not connected
117	not connected

98	not connected
99	not connected
100	not connected
101	not connected
102	not connected
103	not connected
104	AUDIO_OUT_R-
105	AUDIO_OUT_L-
106	not connected
107	not connected
108	not connected
109	not connected
110	not connected
111	not connected
112	AUDIO_OUT_R+
113	AUDIO_OUT_L+

118	not connected
119	VBB15
120	GND
121	VBB30

(3) USB0

1	+5 V DC
2	-Data
3	+Data
4	ID
5	GND
housing = screen	

(4) ETH0

1	TxD+
2	RxD+
3	TxD-
4	RxD-
housing = screen	

7.2 CR1059

CR1059

Process and dialogue module
ecomatDisplay

5" colour display, touch screen

4 freely programmable backlit
function keys

Navigation keys with button

4 CAN interfaces

1 Ethernet interface

2 analogue video inputs

2 outputs / 2 inputs

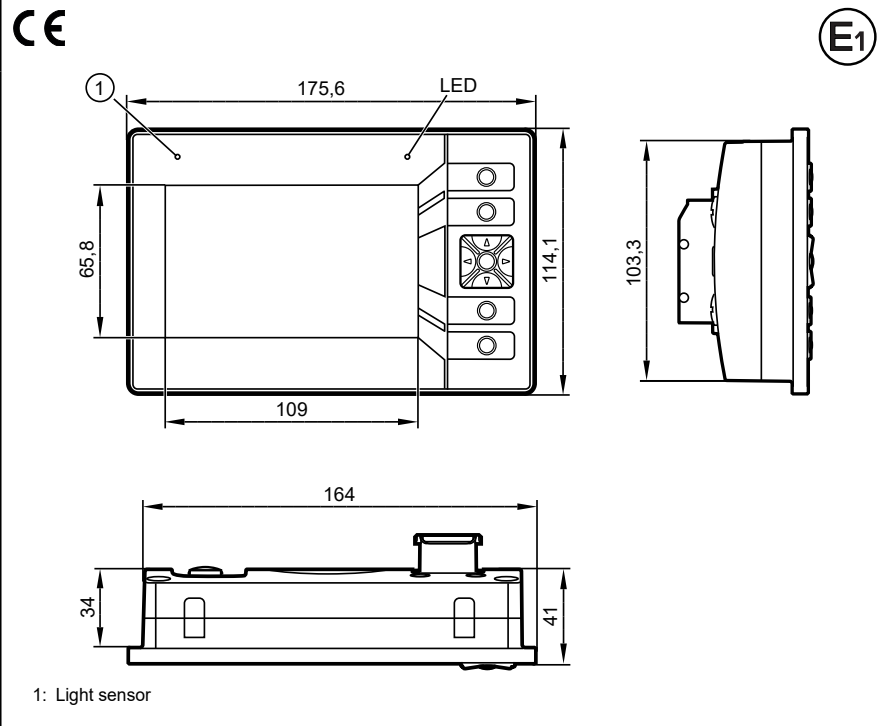
1 USB interface

1 stereo audio interface

CODESYS 3.5

64-bit dual-core processor

8...16 V DC or 16...32 V DC



Technical data

Display

Display

Format

Resolution

Orientation

Surface

Colours

Background illumination

Brightness

Contrast ratio

Character sets

Mechanical data

Mounting variants

Dimensions (W x H x D)

Cutout for panel mounting (W x H)

Housing material

Pushbuttons

Navigation keys

Background illumination operating
elements

Programmable graphic display for controlling, parameter-setting and operation of mobile machines and plants

TFT LCD colour display
touch screen: PCAP, recognition of up to 10 fingers, optimised for operation in wet conditions or with gloves

16:10, 109 x 65.8 mm, 5" diagonal

800 x 480 pixels

horizontal / vertical

glass, chemically hardened and anti-reflective

262144 (18 bits)

LED (life cycle $\geq 50,000$ h)

≥ 600 cd/m²
(can be set to 0...100%, step increment 1%)

typical 500:1

can be uploaded individually and are freely scalable
preinstalled: ifm ISO fonts with vehicle-specific symbols, Arial, Courier

panel mounting (control panel / control cabinet installation) with mounting handle
surface mounting with RAM® Mount system
(mounting accessories not included)

175.6 x 114.1 x 41 mm

165 $\pm$ 0.5 x 105 $\pm$ 0.5 mm

die-cast aluminium, powder coating (RAL 9005)

4 function keys (silicone keyboard) with tactile feedback
freely programmable (softkey function)
life cycle $\geq 1,000,000$ activations

cursor function (up, down, left, right) with tactile feedback and with
central mechanical pushbutton
life cycle $\geq$

RGB LED, colours and states programmable by means of the application software

UK

CR1059	Technical data
Protection rating	IP 65 / IP 67 (for inserted connectors with individually sealed cores and inserted M12 connectors/sealing caps)
Ambient temperature	-30...65° C (up to 2000 m above sea level) -30...60° C (up to 3000 m above sea level)
Storage temperature	-30...80° C
Max. perm. relative humidity	90 % (not condensing)
Height above sea level	max. 3000 m
Polution degree	2 (before installation and when the device is replaced)
Weight	approx. 0.8 kg
Electrical data	
Operating voltage	8...16 V DC or 16...32 V DC
Reverse polarity protection	yes, in case of supply via the on-board system (battery)
Power consumption	19 W
Current consumption VBB ₀	5 A
Processor	ARM dual core, 64 bits, 800 MHz with GPU
Memory (total)	1 GByte RAM / 4 GBytes flash, non-volatile memory: 16 kB
Interfaces	
CAN0...3	CAN interface 2.0 A/B, ISO 11898 20 Kbits/s...1 Mbit/s (default 250 Kbits/s) CANopen, CiA DS 301 version 4.2, CiA DS 401 version 1.4 or SAE J 1939 or free protocol (Raw CAN)
ETH0	transmission rate 10/100 Mbits/s protocols: TCP/IP, UDP, Modbus TCP, OPC UA Micro Embedded Device Server, EtherNet/IP scanner / adapter
USB0	USB 2.0 high speed, transmission rate up to 480 Mbits/s USB master operation output current per interface ≤ 500 mA
Analogue video input 0...1	FBAS inputs, 1 V _{pp} , 75 Ω (inputs selectable) supported video standards: PAL and NTSC cable length: ≤ 30 m
Input 0...1	digital B _L binary low side (CSI)
Output 0...1	digital B _H binary high side (CSO) supply via VBB ₀
IFM0	connection external operating units
Characteristics of the digital inputs	input resistance 10 kΩ input frequency < 20 Hz switch-on level > 0.7 VBB ₃₀ switch-off level < 0.3 VBB ₃₀
Characteristics of the digital outputs	switching voltage 8...32 V DC switching current 0.025...2.5 A output frequency < 20 Hz protective circuit for inductive loads integrated
Software/programming	
Operating system	Embedded Linux 4.14
Programming system	CODESYS 3.5 (IEC 61131-3)
Graphic functions	via integrated target visualisation

CR1059	Technical data																					
Other features																						
Acoustic signal output	integrated audio stereo output Stereo Class D speaker output with 1 W per channel, 8 Ω, BTL																					
Temperature monitoring	1 integrated probe for measuring the main board temperature The main board temperature must not exceed 85 °C.																					
Brightness adaptation	light sensor in the front of the device to adapt the brightness of the display and the operating elements																					
Clock / battery	real-time clock (RTC), battery-buffered / CR1225 (3 V, 48 mAh)																					
Status LED	RGB LED, colours and states programmable by means of the application software																					
Operating states (factory setting)	<table><tr><th>Colour</th><th>Status</th><th>Description</th></tr><tr><td>-</td><td>off</td><td>no operating voltage</td></tr><tr><td>green</td><td>5 Hz</td><td>loading operating system</td></tr><tr><td>green</td><td>on</td><td>executing operating system</td></tr><tr><td>green</td><td>1 Hz</td><td>shutting down operating system</td></tr><tr><td>orange</td><td>5 Hz</td><td>loading recovery system</td></tr><tr><td>orange</td><td>on</td><td>executing recovery system</td></tr></table>	Colour	Status	Description	-	off	no operating voltage	green	5 Hz	loading operating system	green	on	executing operating system	green	1 Hz	shutting down operating system	orange	5 Hz	loading recovery system	orange	on	executing recovery system
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SERVICE0	SERVICE1	Description																				
0	0	normal start																				
1	0	set-up																				
0	1	recovery app																				

UK

CR1059	Technical data	
Test standards and regulations		
CE mark	EN 61000-6-2	Electromagnetic compatibility (EMC) Noise immunity
	EN 61000-6-4	Electromagnetic compatibility (EMC) Noise emission
E1 mark	UN/ECE-R10	Noise emission Noise immunity with 100 V/m
	ISO 7637-2	Pulse 1, severity level: IV; function state C Pulse 2a, severity level: IV; function state A Pulse 2b, severity level: IV; function state C Pulse 3a, severity level: IV; function state A Pulse 3b, severity level: IV; function state A Pulse 4, severity level: IV; function state A Pulse 5, severity level: III; function state C data valid for the 24 V system Pulse 4, severity level: IV; function state A (data valid for the 12 V system)
Additional automotive tests	ISO 10605 DIN EN ISO 13766-1	ESD (330 pF / 2000 Ω) $\pm$ 4 kV contact discharge; function state A $\pm$ 6 kV contact discharge; function state C $\pm$ 8 kV air discharge; function state C
Climatic tests	EN 60068-2-30	Damp heat, cyclic Upper temperature 55 °C, number of cycles: 6
	EN 60068-2-78	Damp heat, steady state Test temperature 40 °C / 93 % RH Test duration: 21 days
	EN 60068-2-52	Salt spray test Severity level 3 (vehicle)
Mechanical tests	ISO 16750-3	Test VII; vibration, random Mounting location: vehicle body
	EN 60068-2-6	Vibration, sinusoidal 10...500 Hz; 0.72 mm/10 g; 10 cycles/axis
	ISO 16750-3	Bump 30 g/6 ms; 24,000 shocks
Tests for railway applications	EN 50155 clause 12.2	Mechanical/climatic tests
	EN 50121-3-2	EMC emission standard and immunity
	Additional information and restrictions on request	
Chemical resistance	ISO 16750-5	AA, BA, BD, CC, DB, DC, DD, ED, only one chemical permitted at a time

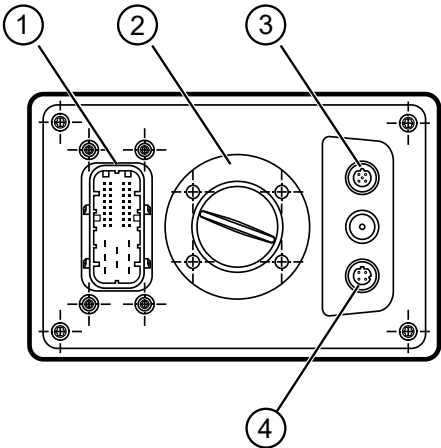
CR1059

Back of the unit

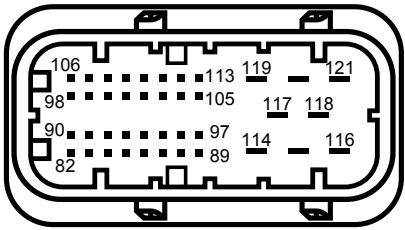
AMP connector, 40 poles

M12 connector

Technical data



- 1: AMP connector, 40 poles
- 2: Locator for the RAM® mount system and mounting frame
- 3: M12 connector, 5 poles
- 4: M12 connector, 4 poles



3	4
socket , B-coded, 5 poles	socket D-coded, 4 poles

UK

CR1059

Wiring

Technical data

(1) supply, inputs/outputs, video, audio, CAN, ifm, service

82	not connected	98	VIDEO0_GND
83	IFM0-	99	VIDEO1_GND
84	CAN0_L	100	not connected
85	CAN1_L	101	not connected
86	CAN2_L	102	not connected
87	CAN3_L	103	not connected
88	not connected	104	AUDIO_OUT_R-
89	SERVICE1	105	AUDIO_OUT_L-
90	not connected	106	VIDEO0_SIGNAL
91	IFM0+	107	VIDEO1_SIGNAL
92	CAN0_H	108	not connected
93	CAN1_H	109	not connected
94	CAN2_H	110	not connected
95	CAN3_H	111	not connected
96	not connected	112	AUDIO_OUT_R+
97	SERVICE0	113	AUDIO_OUT_L+
114	VBB0	118	OUT1
115	IN0	119	VBB15
116	IN1	120	GND
117	OUT0	121	VBB30

(3) USB0

1	+5 V DC
2	-Data
3	+Data
4	ID
5	GND
housing = screen	

(4) ETH0

1	TxD+
2	RxD+
3	TxD-
4	RxD-
housing = screen	

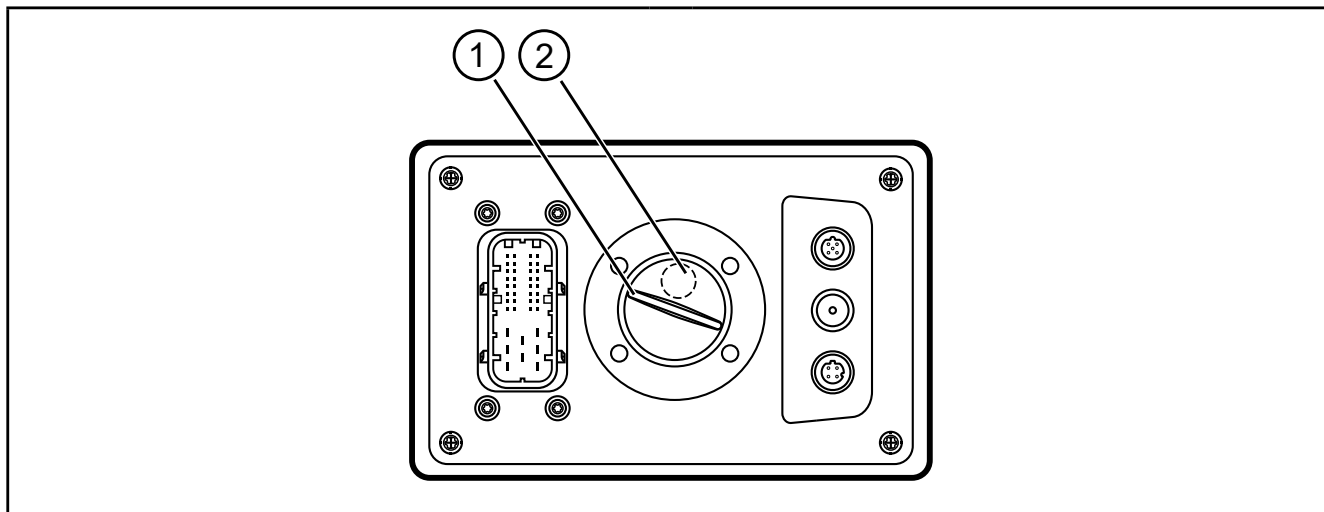
8 Maintenance, repair and disposal

8.1 Battery change



Battery change only be qualified personnel

- Before changing the battery, fully separate the device from supply voltage.



1: Service cover

2: Battery

- Replace battery when time is permanently wrong after switch-on.

UK

NOTE!

No protection rating when service cover is open and no ESD protection on accessible contacts inside

- > Damage to the device possible
- ▶ Before opening, clean the area around the service cover.
- ▶ Remove the service cover on the back of the unit.
- ▶ Protect inside of device, sealing areas and sealing of the service cover from soiling and humidity.
- ▶ When changing the battery, take ESD precautions.
- ▶ Remove the battery and replace it with a new one. Observe the polarity: positive pole on top
Battery type (→ 7 Technical data)
- ▶ Check sealing areas and sealing for soiling and clean, if necessary.
- ▶ Screw on service cover until end stop is reached to restore protection rating.
- ▶ Reset system time via device set-up or application (see programming manual ecomatDisplay).

Disposal of used batteries (→ 8.5 Disposal)

8.2 Cleaning the display surface



Unsuitable cleaning agents and chemicals can damage the display surface.

The following agents are not suited for cleaning the display:

- chemicals dissolving plastics such as methylated spirit, benzine, thinner, alcohol, acetone or ammonia
- paper towels, crepe paper etc.
- abrasive cleaners etc.
- polish or wax

- ▶ Clean the device from dirt using a soft, chemically untreated and dry cloth.
- ▶ In case of heavy dirt, use a damp cloth.



Micro-fibre cloths without chemical additives are recommended.

8.3 Cleaning the housing surface

- ▶ Disconnect the device.
- ▶ Clean the device from dirt using a soft, chemically untreated and dry cloth.
- ▶ In case of heavy dirt, use a damp cloth.

8.4 Repair

- ▶ The device must only be repaired by the manufacturer. Observe the safety instructions (→ 2 Safety instructions)

8.5 Disposal

- ▶ Dispose of used batteries in accordance with the national environmental regulations. Do not dispose of used batteries with household waste.
- ▶ Dispose of the device in accordance with the national environmental regulations.

UK

9 Approvals/standards

Test standards and regulations (→ 7 Technical data)

The EC declaration of conformity and approvals can be found at:
www.ifm.com