



Operating instructions
BasicDisplay
CR0451

GB

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1 Preliminary note

You will find instructions, technical data, approvals, accessories and further information using the QR code on the device / packaging or at documentation.ifm.com.

1.1 Symbols used

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

1.2 Warnings

Warnings indicate the possibility of personal injury and damage to property. This enables safe product handling. Warnings are graded as follows:



WARNING

Warning of serious personal injury

- ▷ If the warning is not observed, fatal and serious injuries are possible.



CAUTION

Warning of minor to moderate personal injury

- ▷ If the warning is not observed, minor to moderate injuries are possible.

ATTENTION

Warning of damage to property

- ▷ If the warning is not observed, damage to property is possible.

1.3 Safety symbol on the device



Safety symbol on the device:

- Adhere to the operating instructions for the safe operation of the unit.

2 Safety instructions

- The unit described is a subcomponent for integration into a system.
 - The system architect is responsible for the safety of the system.
 - The system architect 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 architect of the system.
- 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 (→ Intended use).
- If the operating instructions or the technical data are not adhered to, personal injury and/or damage to property may occur.
- The manufacturer assumes no liability or warranty for any consequences caused by tampering with the product or incorrect use by the operator.
- 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 and cables against damage.
- Replace damaged units, otherwise the technical data and safety will be impaired.
- Observe applicable documents.

3 Intended use

The BasicDisplay is a programmable graphic display for controlling, parameter-setting and operation of mobile machines and plants.

Communication with other system components is ensured via a CAN interface.

Application-specific extensions and adaptations are possible in conjunction with additional products of the modular ecomatmobile Basic products.

Permitted use:

- in mobile machines, with supply from on-board systems (with battery) of 12 V DC or 24 V DC nominal voltage
- in an industrial environment as a permanently installed device with supply from SELV/PELV according to the technical data
- even in wet environments
- even outdoors, if necessary with additional UV protection



The device is intended for installation in vehicle bodies, not in engines.



By default, the device is not intended for direct connection to IT systems. If this application is required, the user has to implement it (e.g. by using their own additional components).



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

3.1 Properties

- 2.8" colour screen
- 5 freely programmable backlit function keys
- Navigation key for cursor function
- CAN interface
- Freely programmable to IEC 61131-3 with target visualisation

3.2 Application examples

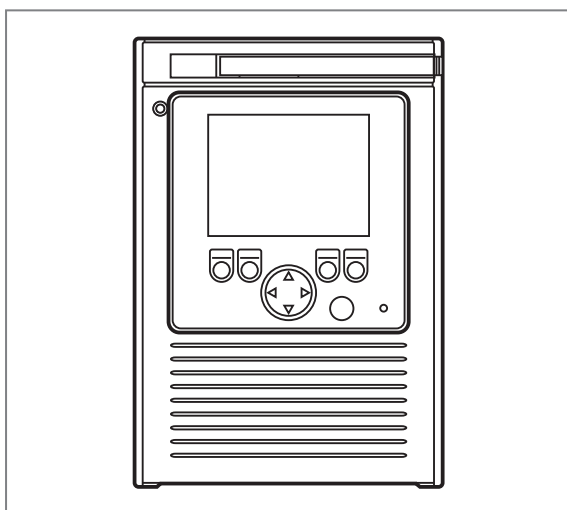


Fig. 1: Use with BasicController and cover

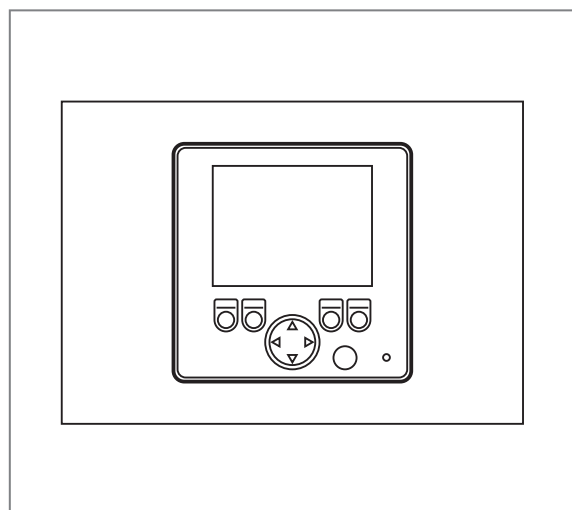


Fig. 2: Stand-alone display in panel



Information about available accessories at documentation.ifm.com.

4 Installation

4.1 General installation instructions



The following applies to all types of mounting:

The responsibility for the compliance with the requirements concerning mounting of the device in the application with regard to shock, vibration, acceleration and weight lies with the system architect.

4.1.1 Types of mounting and required accessories

Mounting type		Required accessories	Article no.
Installation	e.g. in a panel	mounting frame	EC0403
RAM® Mounts	e.g. as desktop device that can be aligned in various directions	RAM® Mounts set	EC0405
Surface mount	e.g. on a control panel	—	—
Combination	with CR040x BasicController	cover with built-in display recess	EC0402

4.1.2 Items supplied

The device is supplied with an M52 nut.

This nut is principally required for all types of mounting



Information about available accessories at documentation.ifm.com.

4.1.3 UV protection

Permanent outdoor use requires additional measures to protect the device from UV radiation (e.g. shading, UV filter) in order to fulfil the expected life. When the device is not in use, it should be covered by a sunscreen.

It is the responsibility of the system creator to check the suitability of the UV protection for the application area of the system and, if necessary, to adapt it.

4.2 Panel mounting / control cabinet installation



Suitable for wall thicknesses up to 3 mm.

4.2.1 Safety instructions for panel mounting / control cabinet installation



The specifications for the operating temperature apply in front of and behind the installation surface.



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. They must be complied with for the risk assessment by the system creator (→ Safety instructions).

**WARNING**

The housing does not meet the requirements concerning protective earth. Only functional grounding is possible.

- ▷ Risk of electrical shock in case of hazardous active voltages in the control cabinet behind the installation surface.
- ▶ The system creator must separate hazardous active voltages / parts behind the installation surface from the housing of the device and its circuits by means of double / reinforced insulation (clearance and creepage distances, solid insulation).
- ▶ Take single-fault safety into account (e.g. individual core detached from the terminal → use cable ties).
- ▶ The responsibility for the electrical protection of the system lies with the system creator.

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

If installed according to the information given in 4.3, the device itself complies with the requirements of the IEC (or DIN EN) 61010-2-201 for a closed device to prevent fire from spreading.

**WARNING**

The mounting frame has no flammability rating and thus presents no fire obstacle.

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

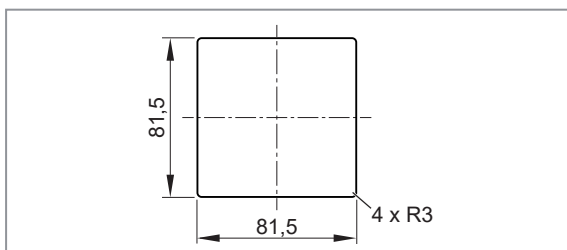
**CAUTION**

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

- ▷ Protection rating and electrical protection might be impaired
- ▶ The system creator has to ensure the protection rating depending on the requirements of his/her 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.

4.2.2 Panel cutout

- ▶ Make a cutout.



Tolerances: $\pm 0.5 \text{ mm}$

Fig. 3: Panel cutout

4.2.3 Mounting steps

- Remove the M52 nut from the device.
- Insert the device into the cutout.
- Place the mounting frame onto the device from the back.
- Screw the M52 nut onto the device and tighten by hand.

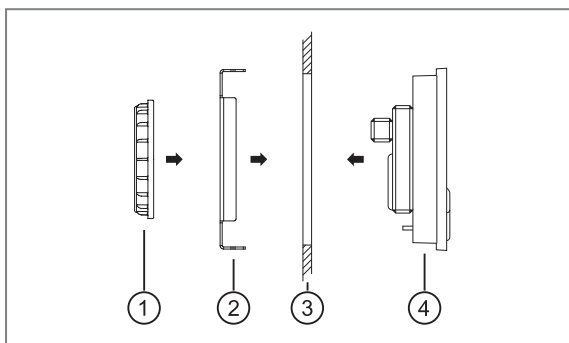


Fig. 4: Mounting principle

- 1: M52 nut
- 2: Mounting frame
- 3: Panel
- 4: BasicDisplay

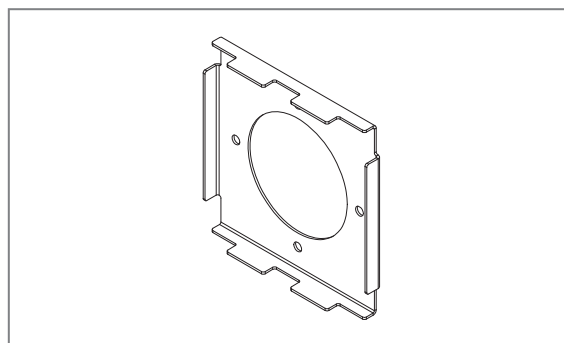


Fig. 5: Mounting frame EC0403

4.3 Surface mounting with RAM® mount system

Using the RAM® Mounts components, available as accessories, the device can be used as a firmly mounted desktop device. Two ball heads allow variable orientation of the device.

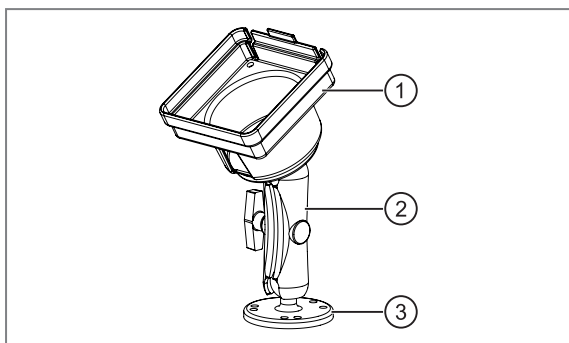


Fig. 6: RAM® Mounts set EC0405

- 1: Display carrier
- 2: Mounting arm with fastening screw
- 3: Mounting plate with ball (2 pcs)

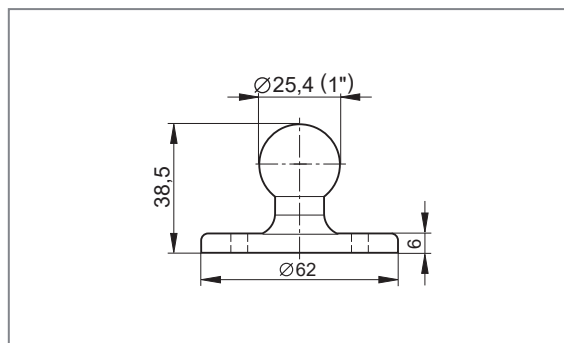


Fig. 7: Mounting plate with ball head

- Screw the first mounting plate onto an even surface.
Tightening torque: 5 ± 0.5 Nm
- Screw the second mounting plate to the display carrier.
- Slightly loosen the fastening screw of the mounting arm.
- Place the mounting arm onto the ball heads and tighten the fastening screw.

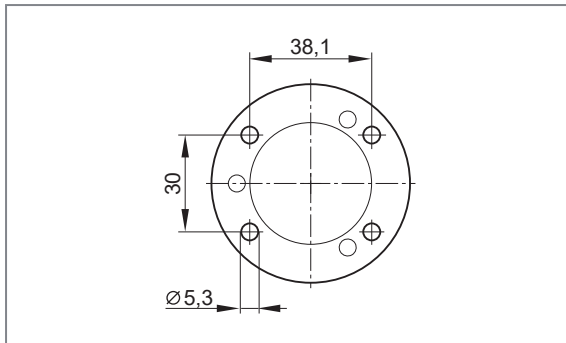


Fig. 8: Hole dimensions for mounting plate

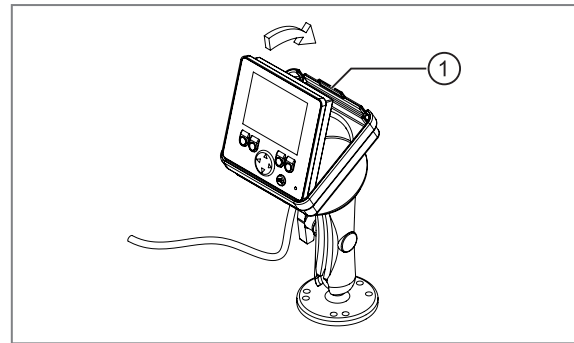


Fig. 9: Display carrier

1: Snap-in

- Place the device in the display carrier and snap it into place.
The display carrier has an opening at the bottom for the connector or cable entry.

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

4.4 Surface mounting on a control panel

Suitable for material thicknesses up to 3 mm.

- Make a round cutout and hole for the locating pins.
- Remove the M52 nut from the device.
- Insert the device into the cutout.
- Screw the M52 nut onto the device and tighten by hand.

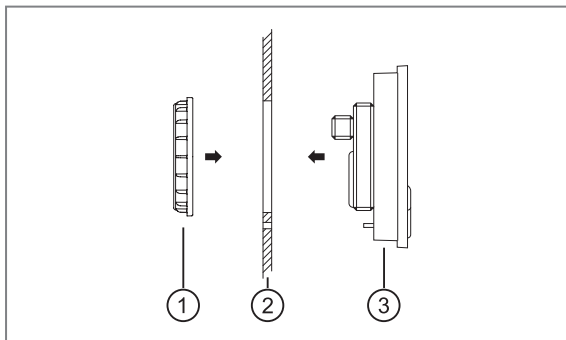


Fig. 10: Mounting principle

- 1: M52 nut
- 2: Control panel
- 3: BasicDisplay

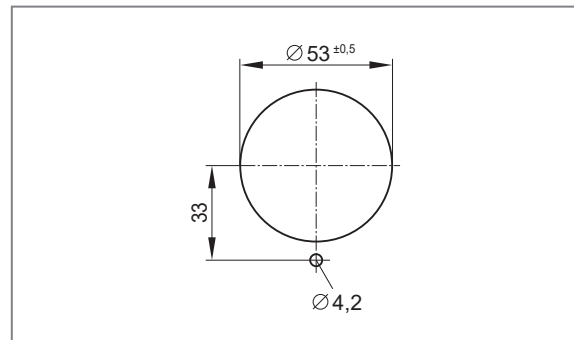


Fig. 11: Cutout and hole for locating pins

4.5 Combination with BasicController

4.5.1 Installation of the display with cover

- Remove the M52 nut from the device.
- Place the device into the cover with built-in display recess.
- Screw the M52 nut onto the device and tighten by hand.

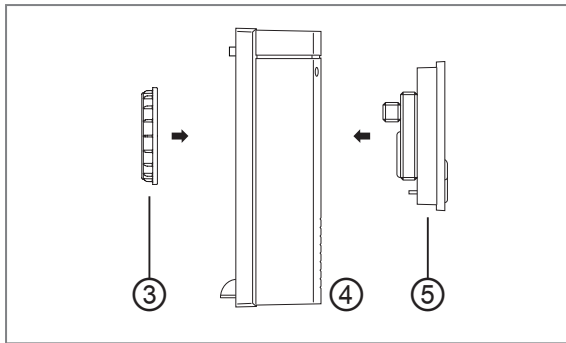


Fig. 12: Mounting principle

- 1: M52 nut
- 2: Cover
- 3: BasicDisplay

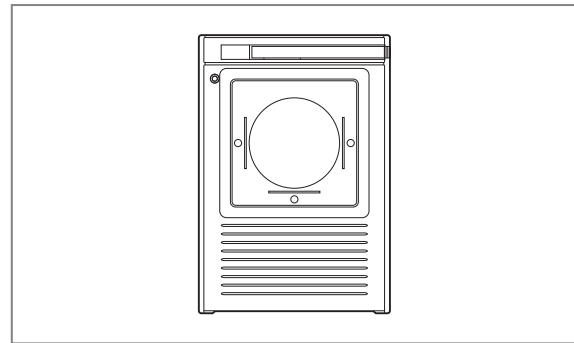


Fig. 13: Cover with built-in display recess

4.5.2 Installation of the cover

The covers of the Basic series feature a single-lever locking. Installation is done without tools.

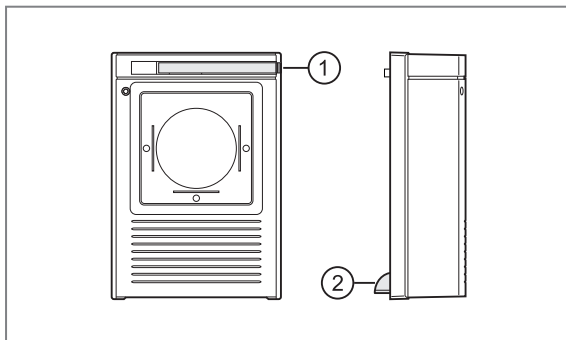


Fig. 14: Cover with built-in display recess

- 1: Locking lever
- 2: Cover guides

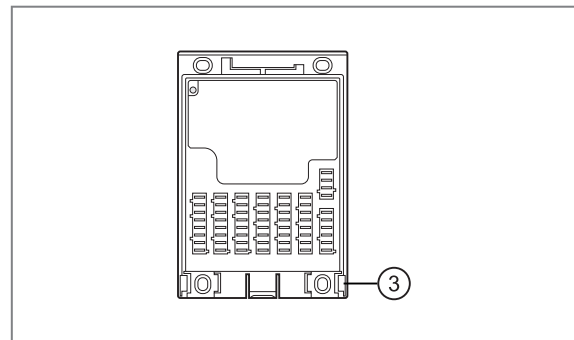


Fig. 15: BasicController

- 3: Insertion slots for cover guides

- Pull out the locking lever and rotate it towards you.
- Place the cover diagonally onto the device. Insert the 2 cover guides, found at the bottom of the cover, into the slots.
- Close the cover onto the device. The 2 guides and slots provide a pivot point.
- Move the locking lever back into its initial position.
- ▷ The cover is locked.

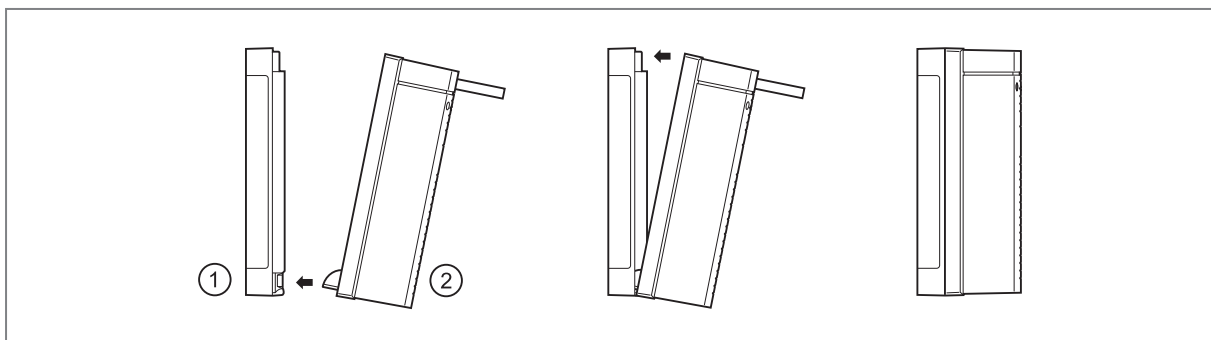


Fig. 16: Attaching the cover

- 1: BasicController
- 2: Cover with mounted BasicDisplay

4.5.3 Removing the cover

- ▶ Pull out the locking lever and rotate it towards you.
- ▷ The cover is unlocked and can be removed.

5 Electrical connection



- ▶ Disconnect the machine from the mains supply before installation; if necessary, also disconnect any independently supplied input / output load circuits.
- ▶ Observe the national and international regulations for the installation of electrical equipment.
- ▶ Observe the requirements according to EN 60204.

The circuit is insulated from device surfaces that could be touched with basic insulation according to IEC 61010-1 (secondary circuit with max. 32 V DC, supplied from the mains circuit up to 300 V of overvoltage category II).

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

5.1 Connection accessories

More information about available accessories at www.ifm.com

5.2 Connection technology



Observe all notes on connection technology.

The threaded connections in the device correspond to the M12 standard. To ensure compliance with the specified protection rating, only cables that comply with this standard may be used. In the case of self-assembled cables, the system manufacturer is responsible for the protection rating.

- ▶ Use connectors with gold-plated contacts.
- ▶ Use twisted-pair cables for CAN connections.
- ▶ During installation, place the connectors vertically so that the coupling nut will not damage the thread.
- ▶ Observe the coding of the connectors during installation.
- ▶ Tighten the cable sockets according to the torque specifications indicated by the cable vendor. Maximum permissible tightening torque: 1.8 Nm
- ▶ Provide all outgoing cables with suitable strain relief after a maximum of 300 mm. Observe the minimum bending radius of the cables (→ information from the cable manufacturer).

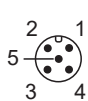
The CAN bus is internally protected against short circuit to VBB and GND.



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

5.3 General wiring information

- ▶ Disconnect power.
- ▶ Connect the unit as follows:



- 1: n.c.
- 2: 8...32 V DC
- 3: GND
- 4: CAN_H
- 5: CAN_L

Wiring of the connectors: Technical data: www.ifm.com

ATTENTION

Wrong connection may cause damage to the device.

- Observe the safety instructions.

- Lay supply and signal cables away from the device using the shortest possible route.
- Provide all outgoing cables with suitable strain relief after a maximum of 300 mm. Observe the minimum bending radius of the cables (→ information from the cable manufacturer).

5.4 Fuse

**CAUTION**

The input current of the operating voltage is not limited.

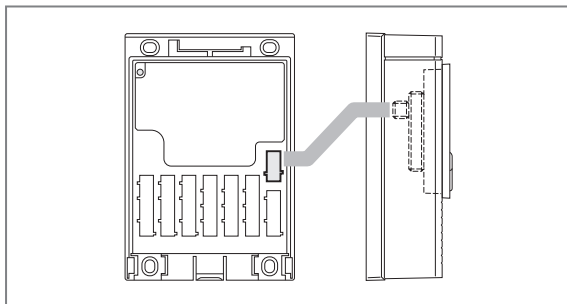
- No fire protection.
- Protect the circuit.
- Protect the sensor supply via the same fuse.

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

Potential	Designation	M12 connector pin no.	Nominal value fuse	Required triggering characteristics
VBB _s	Supply voltage	2	max. 2 A	$T_{\text{fuse}} \leq 120 \text{ s}$ at max. 6.25 A

- Alternatively supply the device via a limited energy circuit according to IEC 61010-1 or class 2 according to UL1310.

5.5 Example accessories



BasicController CR040x
Cover with built-in display recess C0402
Jumper cables EC0452

Fig. 17: Accessories and example connection

5.6 Behaviour in case of undervoltage

The device detects an undervoltage condition at a supply voltage of $\leq 7.8 \text{ V}$. In this case, the status LED flashes red at 5 Hz.

- Ensure a correct voltage supply.

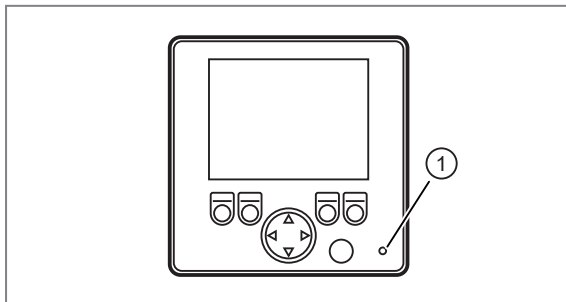
At a supply voltage of $\leq 7.0 \text{ V}$, the device is no longer operational. The status LED is off.

- Ensure a correct voltage supply.
- Carry out PowerOn reset.

Detailed information on the device status: → Programming manual

6 Operating and display elements

6.1 Status LED

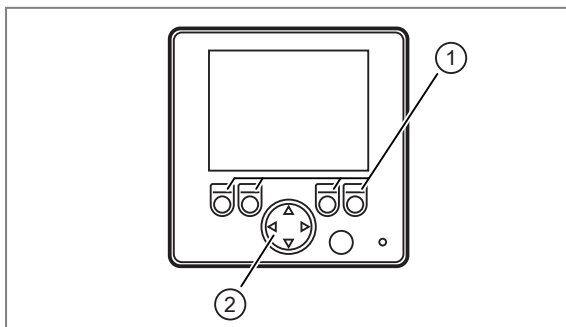


1: status LED

The status LED indicates the operating states of the device:

Colour	State	Description
-	Off	No operating voltage
Orange	1 x on	Initialisation or reset checks
Green	5 Hz	No operating system loaded
	2 Hz	Application running (RUN)
	On	Application stopped (STOP)
Red	5 Hz	Application stopped due to undervoltage
	On	System error (fatal error)

6.2 Pushbuttons



- 1: Freely programmable, simultaneously backlit pushbuttons
- 2: Navigation key for cursor function

7 Set-up

7.1 Programming

The user can easily create the application software by means of the IEC 61131-3 compliant programming system CODESYS 2.3.



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

7.2 Required documentation

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

- BasicDisplay programming manual

The manuals are available for download on the internet:
www.ifm.com

CODESYS online help: included in CODESYS installation (www.ifm.com, in the download area with registration)

7.3 Required hardware

A CAN interface for the connection to a PC or a notebook is required to load the application program to the device.

Example:

- CAN/RS232 USB interface CANfox (art. no.: EC2112)
- Adapter cable for CANfox (art. no.: EC2113)



Information about available accessories at documentation.ifm.com.

8 Maintenance, repair and disposal

The unit is maintenance-free.

8.1 Cleaning the display surface



Unsuitable cleaning agents and chemicals can damage the display surface.
The following agents are not suitable for cleaning displays:

- Chemicals dissolving plastics such as methylated spirit, benzine, thinner, alcohol, acetone or ammonia.
 - paper towels, crepe paper etc.
 - abrasive cleaners etc.
 - shine-producing cleaning agents, such as polish or wax
- Clean the device from dirt using a soft, chemically untreated and dry cloth.
- In case of severe soiling, use a damp cloth (water).



Micro-fibre cloths without chemical additives are recommended.

8.2 Cleaning the housing surface

- Disconnect the device.
- Clean the device from dirt using a soft, chemically untreated and dry cloth.
- In case of severe soiling, use a damp cloth (water).

8.3 Repair

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

8.4 Disposal

- After use, dispose of the unit in an environmentally friendly way in accordance with the applicable national regulations.