

Installation instructions BasicRelay

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1 Preliminary note

This document applies to devices of the type "BasicRelay" (art. no.: CR0421). These instructions are part of the device.

This document is intended for specialists. These specialists are people who are qualified by their appropriate training and their experience to see risks and to avoid possible hazards that may be caused during operation or maintenance of the device. The document contains information about the correct handling of the device.

Read this document before use to familiarise yourself with operating conditions, installation and operation. Keep this document during the entire duration of use of the device.

Adhere to the safety instructions.

1.1 Symbols used

- Instructions
- > Reaction, result
- [...] Designation of pushbuttons, buttons or indications
- \rightarrow Cross-reference



Important note

Non-compliance can result in malfunction or interference.



Information Supplementary note

1.2 Warning signs used

A WARNING

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

Warning of personal injury. Slight reversible injuries may result.

NOTE

Warning of damage to property.

2 Safety instructions

2.1 General

These instructions contain texts and figures concerning the correct handling of the device and must be read before installation or use.

Observe the operating instructions. Non-observance of the instructions, operation which is not in accordance with use as prescribed below, wrong installation or incorrect handling can seriously affect the safety of operators and machinery.

2.2 Target group

These instructions are intended for authorised persons according to the EMC and low-voltage directives. The device must only be installed, connected and put into operation by a qualified electrician.

2.3 Electrical connection

Disconnect the unit externally before handling it. If necessary, also disconnect any independently supplied output load circuits.

If the device 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 voltage 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 device must also comply with the SELV criteria (safety extra-low voltage, safe electrical isolation from other electric circuits).

If the supplied SELV voltage is externally grounded (SELV becomes PELV), the responsibility lies with the user and the respective national installation regulations must be complied with. All statements in this document refer to the device the SELV voltage of which is not grounded.

The connections may only be supplied with the signals indicated in the technical data and/or on the device label and only the approved accessories of ifm electronic may be connected.

2.4 Tampering with the device

In case of malfunctions or uncertainties please contact the manufacturer. Tampering with the device can seriously affect the safety of operators and machinery. It is not permitted and leads to the exclusion of any liability and warranty claims.

3 Functions and features

BasicRelay is a freely wirable carrier for use with standardised automotive relays and automotive fuses. The allocation of the contacts, the wiring and the placement are made by the user.

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

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

NOTE

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

3.1 Features at a glance

- Locations for 6 automotive relays and 10 automotive fuses
- Supply chain can be cut
- Power distributor for 6.3 mm spade terminals

3.2 Items supplied

The device is supplied without contacts and without relays and fuses.

3.3 ecomatmobile Basic (examples)

- BasicController (art. no.: CR040x) mobile controller, freely programmable to IEC 61131-3 2 CAN interfaces (incl. interface for BasicDisplay CR0451) configurable inputs/outputs
- BasicDisplay (art. no.: CR0451) programmable display with graphics capabilities with 2.8" colour display CAN interface 5 freely programmable, backlit function keys 1 scroll key for cursor function
- Cover (art. no.: EC0401) incl. cable seal to obtain IP 54 protection

For information about the available ecomatmobile Basic see: www.ifm.com \rightarrow Product line \rightarrow Systems for mobile machines or directly www.ifm.com \rightarrow Data sheet search \rightarrow e.g. CR0451

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4 Installation

4.1 General installation instructions

4.1.1 Protection rating

The achievable protection rating of the device depends on the accessories used and the mounting position.

Protection rating	Accessories	Mounting position	Art. no.	
IP 20	-	freely selectable	_	
IP 54	cover with cable seal	cable connection from the bottom	EC0401	

4.1.2 Mounting surface

NOTE

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

- ► Mount the device on a flat surface.
- ► Use compensating elements if there is no flat mounting surface available.



Mounting surface

4.2 Fixing

- Insert the enclosed tubular rivets from the back of the module in the 4 fixing holes.
- Fix the module using 4 washers and M4 screws. Tighten the screws alternately crosswise.





Use of the tubular rivets

Tightening torque: 1.5 Nm Hole dimensions (\rightarrow 9 Technical data)

Screws to be used (examples):	Standard
Cylinder screws with hexagon socket (M4 x L)	DIN EN ISO 4762: 2004-06
Cylinder screws with hexagon socket and low head (M4 x L)	DIN 7984: 2009-06

4.3 Cover and cable seal

NOTE

Protection IP 54 can only be guaranteed if the cover is used together with the cable seal.

NOTE

The cover reduces the amount of heat to be dissipated. With a cover fitted the temperature of the unit can therefore increase.

4.3.1 Overall height and base dimensions of the automotive relay

Overall height of the relay with EC0401 cover: \leq 26 mm Overall height of the relay: freely selectable



As a principle use automotive relays without mounting brackets. The mounting brackets cannot be used in conjunction with the device and would unnecessarily increase the height of the relay.



The elevated housing part above the supply and ground connections is the height reference for the automotive relay. The automotive relays must not be higher than this housing part if a cover is to be used.



1: Height reference for the automotive relay

Max. base dimensions A: 30 x 30mm



Max. base dimensions of the automotive relay

4.3.2 Installation of the cable seal

- ▶ Insert the cable seal into the locator from below.
- > The locking of the cable seal audibly clips into place.





- 1. Locator for cable seal
- 2. Locking

Mounted cable seal



The cable seal cannot be used as strain relief of the cables.(\rightarrow 5.1 General electrical connection)

4.3.3 Removing the cable seal

Press the locking at the bottom of the device and remove the cable seal from the device by pulling downwards.



- 1. Cable seal
- 2. Locking

Bottom of the device

4.3.4 Installation of the cover

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





Cover

- 1: Locking lever
- 2: Cover guides

BasicRelay

- 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 lower part. The 2 guides and slots provide a pivot point.
- ► Move the locking lever back into its initial position.
- > The cover is locked.



1: BasicRelay

2: Cover

4.3.5 Removing the cover

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

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5 Electrical connection

5.1 General electrical connection

Core cross-sections and wiring diagram (\rightarrow 9 Technical data)

- Lay supply and signal cables away from the device using the shortest possible route.
- All connected cables must be provided with a strain relief at least 100 mm behind the cable entry.

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

The user must ensure that malfunction due to bent cable connections or loose spade terminals does not impair the safety of people and equipment.

5.2 Remove the wiring carrier from the base plate

Wiring and power supply connections are made on the rear of the wiring carrier. To do so, the wiring carrier has to be removed from the base plate of the device.

- Detach the snap-in lugs between wiring carrier and the base plate of the device on one long side by applying slight pressure. Alternatively, carefully lever out the snap-in pins on one long side using a screwdriver.
- ► Remove the wiring carrier.



Front of the complete device

- 1: Base plate of the device
- 2: Wiring carrier
- 3: Snap-in lugs (2 on each long side)



Base plate of the device and wiring carrier

5.3 Supply voltage and ground

Connect the voltage and ground connections via ring terminals (M6/M8) and the threaded suspension rods (M6/M8).



Back of the wiring carrier

- 1: M6 threaded suspension rod for ground (GND)
- 2: M8 threaded suspension rod for supply voltage
- 3: Supply rail to the fuses

Tightening torque M6/M8 threaded suspension rods: 2...3 Nm

5.3.1 Cut the supply rail

The supply rail to the fuses can be mechanically cut at 2 points. The F1/2 and F3/4 or F1...4 fuse lines can be cut from the common supply voltage.

- If requested, cut off a piece at the intended point in 2 cuts using a side cutter. Width of this piece: ≥ 5 mm
- ► Supply the separated fuse lines via the allotted 6.3 mm spade terminals.
- Observe the maximum total currents (\rightarrow 9 Technical data)



- 1: Separation points in the supply rail
- 2: 6.3 mm spade terminals for separated fuse lines



Principle of wiring (example)

5.3.2 Permissible current intensities for 6.3 mm spade terminals

According to pre-standard DIN 46249-1: 1980

Core cross-section [mm ²]	Max. current intensity [A] *
2.5	16
4.0	18
6.0	22

*) at max. ambient temperature

5.3.3 Power distributor

• Connect the power distributor only to protected circuits.

UK

5.4 Automotive relays

The device is suited for automotive relays with a blade arrangement to ISO 7588-1: 1998-09.



Observe the wiring and the documentation of the relays used. The terminal designations can vary.





Blade arrangement

Connection example to DIN 72552: 1971-03 and ISO 7588-1: 1998-09

Terminal designation to DIN 72552: 1971-03 (excerpt)	Contact
Positive connection trip coil	86
Ground connection trip coil	85
Continuous positive of the battery	30
NC contact to the load	87a
NO contact to the load	87

5.4.1 Simultaneous triggering of the relays

Typically 3 relays may be triggered simultaneously.

• Observe the note on operation (\rightarrow 8 Operation).

5.5 Automotive fuses

The device is suited for automotive fuses (spade-type fuses) to DIN 72581-3: 1971-03 and ISO 8820-3: 1971-03, standard design, type C.





Dimensions

Locations for fuses

Colour coding to DIN 72581-3: 1971-03 (rated current[A])												
1	2	3	4	5	7.5	10	15	20	25	30	35	40
black	grey	violet	pink	beige	brown	red	blue	yellow	clear	green	teal	orange

NOTE

Adhere to the manufacturer's information and the nominal current derating for dimensioning the fuse.

Nominal current of the load \leq 50 % of the rated current of the fuse

5.6 Spade sockets

The device is suited for spade sockets to DIN 46340-3: 1981.

When placing the spade sockets into the contact holders, make sure that the locating lugs snap-in securely. The lugs audibly clip into place.



1: Locating spade socket

5.7 Connection accessories

You can find more information about the available accessories at: www.ifm.com \rightarrow Data sheet search \rightarrow e.g. CR0421 \rightarrow Accessories

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6 Display elements

The device does not have any indicators.



If the EC0401 cover is used as accessory, the LED lighting in the cover is without function.

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1: The LED lighting in the EC0401 cover

7 Set-up

After completing component assembly and wiring, check the function of the device at max. operating conditions in normal operation and in fault condition.

8 Operation

NOTE

The max. temperatures at the metal or plastic parts of the device must not permanently (> 10 minutes) exceed 110°C.

9 Technical data

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BasicRelay

Locations for 6 automotive relays and 10 automotive fuses

> Supply rails and power distributor

freely wirable



Wiring, relay and fuse carrier can be used with BasicController or as stand-alone device

Technical data

Mechanical data	
Housing	plastic housing (black)
Dimensions (H x W x D) without cover with EC0401 cover	163 x 112 x 63.5 mm 163 x 112 x 68 mm
Installation	fixing by means of 4 M4 screws to DIN EN ISO 4762: 2004-06 or DIN 7984: 2009-06 and 4 tubular rivets to DIN 7340 (tubular rivets are supplied)
Connection	
Relay	6 locations for automotive relays (30 x 30 x 26 mm (H x W x D), without contacts, with cover installed) contacts for each relay: 5 contact holders for spade sockets 6.3 x 0.8, DIN 46340/T3 core cross-section 0.52.5 mm ² 4 contact holders for spade sockets 2.8 x 0.8, DIN 46340/T1 core cross-section 0.51.0 mm ²
Fuses	10 locations for automotive fuses up to 30 A contacts: common supply rail and 10 contact holders for fuse contacts supply rail can be cut at 2 points; 2 x 2 fuses can therefore be supplied separately via 6.3 x 0.8 mm spade terminals core cross-section 0.53.0 mm ²
Supply rails	M8 threaded suspension rod for supply voltage to the fuses M6 threaded suspension rod for ground connection (GND) to 6 spade terminals 6.3 x 0.8 mm core cross-section 0.516.5 mm ²
Power distributor	6 common terminal groups each with 4 spade terminals 6.3 mm x 0.8 mm
Protection rating	IP 20 (with cover and cable seal IP 54)
Operating/storage temperature	-4085° C / -4085° C
Weight	0.28 kg (unpopulated)

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Electrical data Operating voltage Load currents Total currents Test standards and regulations Climatic tests Electrical data Electrical data F1F4: max. 20 A; F1F10: max. 30 A Test standards and regulations Climatic tests Electrical data Electrical data Climatic tests Electrical data Damp heat, cyclic upper temperature 40°C / 93% RH, test duration: 21 days Electrical data Electrical data ISO 16750-3: 2007 Test VII; Vibration, random mounting location: vehicle body Electrical data ISO 16750-3: 2007 Bumps 30 g/6 ms; 24,000 shocks	R0421	Technical data
Operating voltage < 32 V DC Load current per fuse Total currents F1F10: max. 30 A F1F4: max. 20 A; F1F10: max. 60 A Test standards and regulations Climatic tests EN 60068-2-30: 2006 Damp heat, cyclic upper temperature 55°C, number of cycles: 6 EN 60068-2-78: 2002 Damp heat, cyclic upper temperature 40°C / 93% RH, test duration: 21 days EN 60068-2-52: 1996 Salt spray test severity level 3 (motor vehicle) only with installed EC0401 cover Mechanical tests ISO 16750-3: 2007 Test Vil; Vibration, random mounting location: vehicle body EN 60068-2-6: 2008 Vibration, sinusoidal 10500 Hz; 0.72 mm/10 g; 10 cycles/axis ISO 16750-3: 2007 Bumps 30 g/6 ms; 24,000 shocks Wiring diagram Rear view of the wiring carrier		
Load currents F1F10: max. 30 A Total currents F1F4: max. 20 A; F1F10: max. 60 A Test standards and regulations EN 60068-2-30: 2006 Damp heat, cyclic upper temperature 55°C, number of cycles: 6 Climatic tests EN 60068-2-76: 2002 Damp heat, steady state test fumperature 40°C / 93% RH, test duration: 21 days EN 60068-2-52: 1996 Salt spray test severity level 3 (motor vehicle) only with installed EC0401 cover only with installed EC0401 cover Mechanical tests ISO 16750-3: 2007 Test VI; Vibration, sinusoidal 10500 Hz; 0.72 mm/10 g; 10 cycles/axis ISO 16750-3: 2007 Bumps 2 30 g/6 ms; 24,000 shocks Wiring diagram Rear view of the wiring carrier	erating voltage	≤ 32 V DC
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Wiring diagram Rear view of the wiring carrier		ISO 16750-3: 2007 Bumps 30 g/6 ms; 24,000 shocks
Rear view of the wiring carrier	ing diagram	
 1: M6 threaded suspension rod for GND 2: M8 threaded suspension rod for supply voltage 3: Supply rail to the fuses 4: Separation points in the supply rail 5: Locations for F110 fuses 6: Locations for K16 automotive relays 7: Common terminal groups with spade terminals 	ar view of the wiring carrier	<image/>

10 Maintenance, repair and disposal

10.1 Maintenance

The device does not contain any components that need to be maintained by the user.

10.2 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.



The following agents are not suited for cleaning the device:chemicals dissolving plastics such as methylated spirit, benzine, thinner, alcohol, acetone or ammonia.



Micro-fibre cloths without chemical additives are recommended.

10.3 Repair

The device must only be repaired by the manufacturer. Observe the safety instructions (→ 2.4 Tampering with the device)

10.4 Disposal

Dispose of the device in accordance with the national environmental regulations.

11 Approvals/standards

Test standards and regulations (\rightarrow 9 Technical data)

The EC declaration of conformity and approvals can be found at: www.ifm.com \rightarrow Data sheet search \rightarrow CR0421 \rightarrow Approvals