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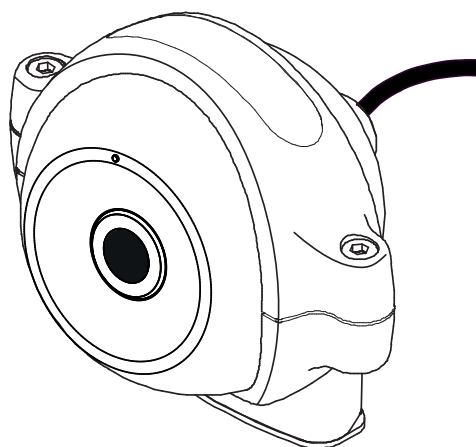


# Operating instructions Robust camera system with analogue video output

O2M20x

O2M21x

UK



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# 1 Preliminary note

Technical data, approvals, accessories and further information at [www.ifm.com](http://www.ifm.com).

## 1.1 Symbols used

- Instruction
- > Reaction, result
- [...] Designation of keys, buttons or indications
- Cross-reference



Important note

Non-compliance may result in malfunction or interference.



Information

Supplementary note

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## 1.2 Copyright and trademarks

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## 2 Safety instructions

- The device 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 (→ Functions and features).
- 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, operation and maintenance of the product must be carried out by qualified personnel authorised by the machine operator.
- Protect units and cables against damage.

### 3 Functions and features

The camera (in the following referred to as "device") allows for the monitoring of areas of poor visibility in mobile machines and utility vehicles. The connection and the visualisation of the images are made via dialogue modules with graphics capabilities or monitors with analogue input.

The device works with a PAL25 fps 720H x 576V (active 720 x 480) video signal and permanently provides images to the connected dialogue modules (e.g. CR1083) or monitors (e.g. E2M231).

Applications are for example:

- Rear area or blind spot monitoring for municipal vehicles
- Machine monitoring in construction machinery
- Rear view camera on vehicles

### 3.1 Properties

The devices differ in their angle of aperture and mirror function.

| Article no. | Angle of aperture | Angle of aperture<br>(integrated mirror function) |
|-------------|-------------------|---------------------------------------------------|
| O2M200      | 80°               | -                                                 |
| O2M201      | -                 | 80° M                                             |
| O2M202      | 118°              | -                                                 |
| O2M203      | -                 | 118° M                                            |
| O2M210      | 170°              | -                                                 |
| O2M211      | -                 | 170° M                                            |

## 4 Items supplied

- O2M2xx
- E2M210 mounting set
- 2x M6 x 20 mm screws, 2x washers, 2x M6 nuts
- Operating instructions

## 5 Accessories

The device is supplied with the E2M210 mounting set.



Available accessories: [www.ifm.com](http://www.ifm.com)

# 6 Installation

## 6.1 Mounting dimensions

The E2M210 mounting set has a borehole spacing of 25 mm. Installation is effected via the 2 supplied M6 screws.

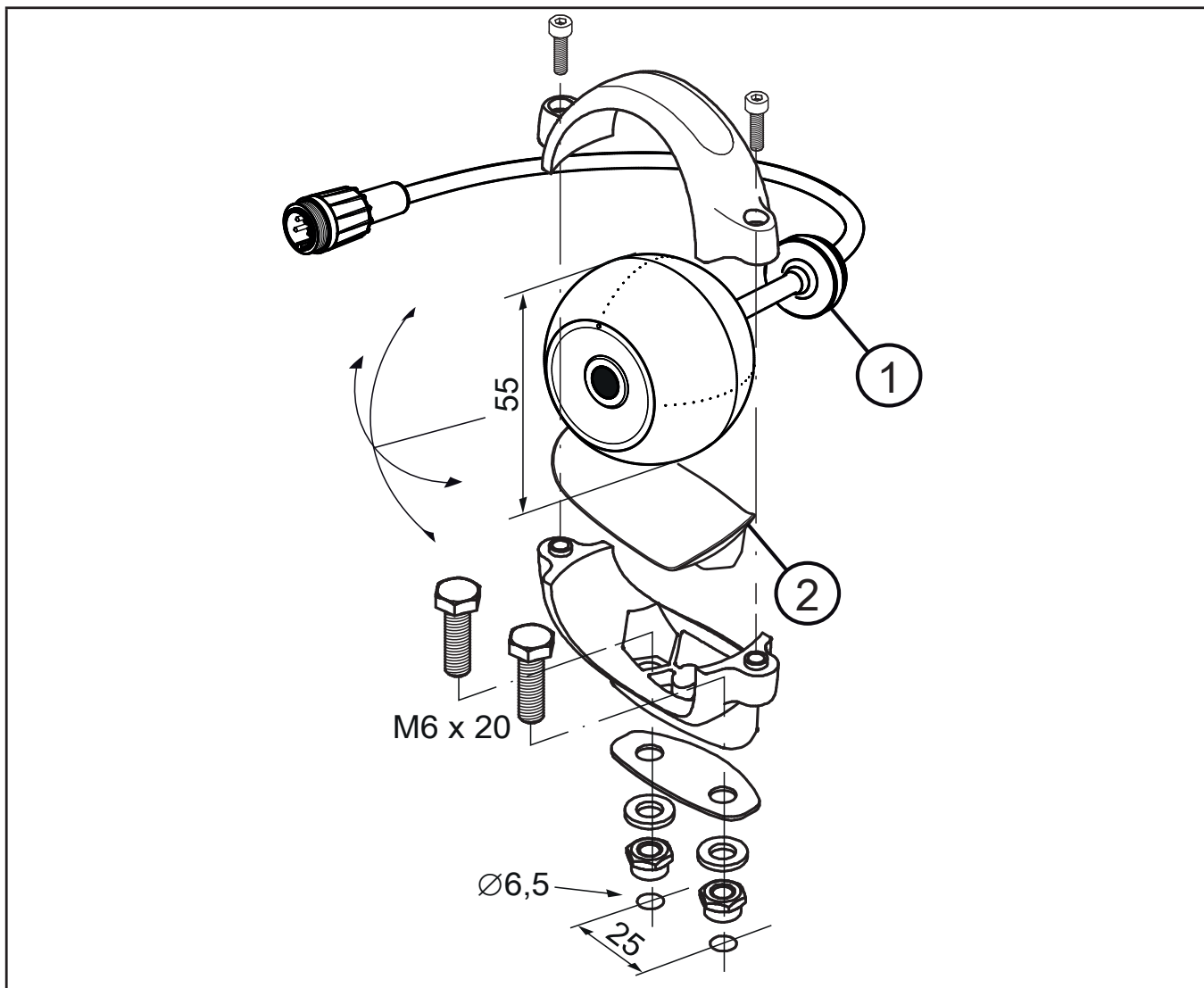


Scale drawings and technical data: [www.ifm.com](http://www.ifm.com)

## 6.2 Mounting and adjustment of the device

- ▶ Determine a suitable installation location (→ 6.3 Installation location).
- ▶ Bore the holes for the lower part of the E2M210 mounting set.
  - > Borehole spacing: 25 mm
- ▶ Fix the lower part of the mounting set with the M6 screws, washers and self-locking nuts supplied with the unit.
  - > Max. tightening torque: 11 Nm ( $\pm 1$  Nm)
- ▶ Place the anti-slide pad ② in the lower part.
- ▶ Place the device in the lower part of the mounting set. Fix the upper part with the supplied M3 socket head screws.
- ▶ Align the device to the area to be monitored.
- ▶ Fix the mounting set with a max. tightening torque of 0.8...1 Nm.
- ▶ Drill a hole of  $d = 19$  mm for the supply cable.

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1. Fig.: Mounting and adjustment of the device

- Lay the supply cable and seal the drill hole with the rubber grommet (1).



Observe the minimum bending radius of 50 mm of the supply cable.

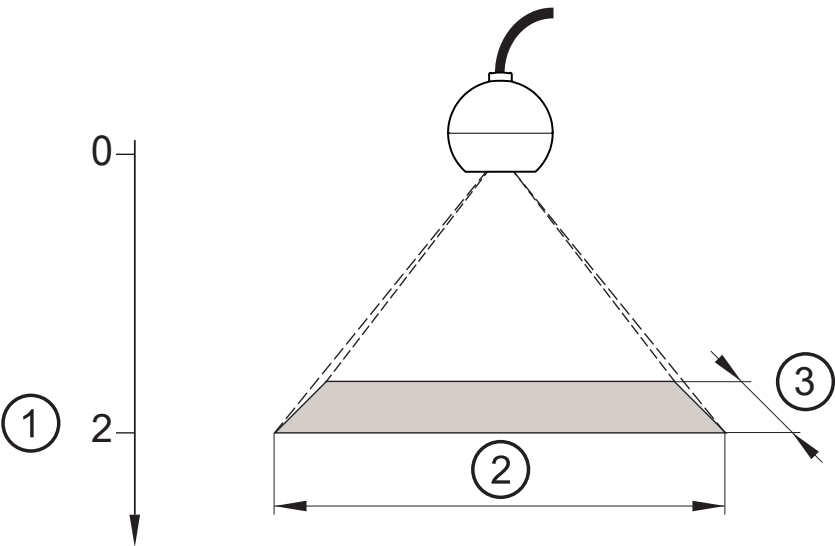
### 6.3 Installation location

- ▶ Mount the device in front of or above the area to be monitored.
- > The size of the area depends on the operating distance.



The values indicated in the figures are theoretical values and can be different in the application.

#### Field of view size (2 m operating distance) O2M200 / O2M201

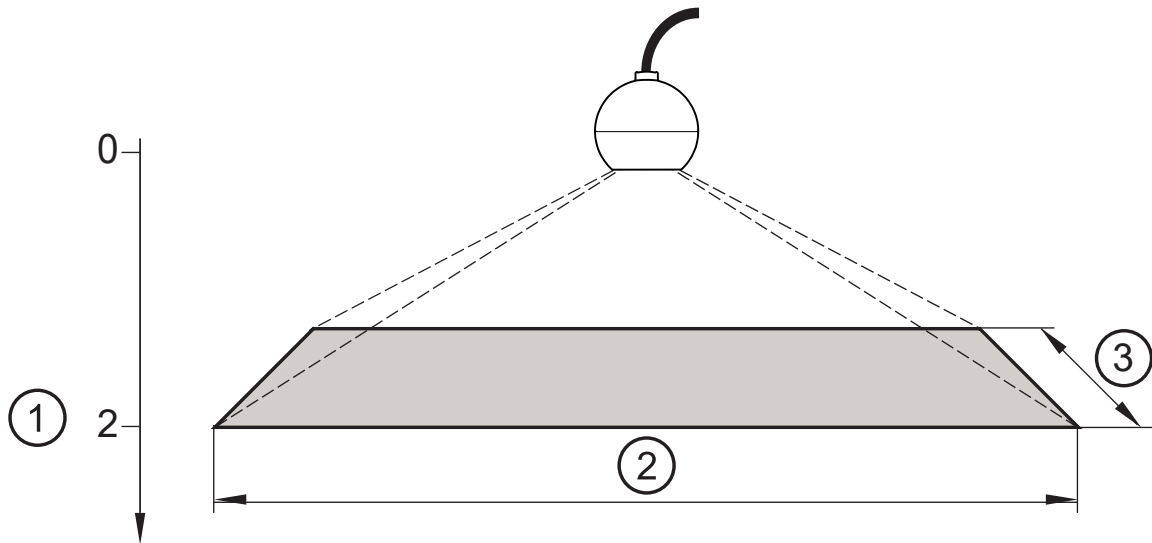


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2. Fig.: Operating distance and field of view size (80° angle of aperture)

| ① Operating distance<br>[m] | ② Width of field of view<br>[m] | ③ Height of field of<br>view [m] |
|-----------------------------|---------------------------------|----------------------------------|
| 1                           | 1.7                             | 1.1                              |
| 2                           | 3.4                             | 2.3                              |
| 5                           | 8.4                             | 5.7                              |

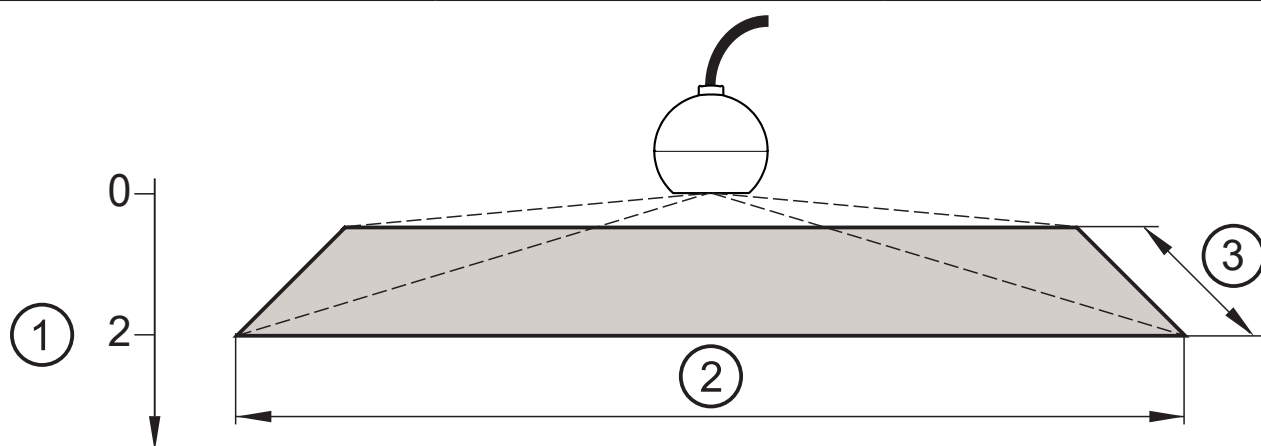
## Field of view size (2 m operating distance) O2M202 / O2M203



3. Fig.: Operating distance and field of view size (118° angle of aperture)

| ① Operating distance<br>[m] | ② Width of field of view<br>[m] | ③ Height of field of<br>view [m] |
|-----------------------------|---------------------------------|----------------------------------|
| 1                           | 3.3                             | 2                                |
| 2                           | 6.7                             | 3.9                              |
| 5                           | 16.6                            | 9.8                              |

## Field of view size (2 m operating distance) O2M210 / O2M211



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4. Fig.: Operating distance and field of view size (170° angle of aperture)

| ① Operating distance<br>[m] | ② Width of field of view<br>[m] | ③ Height of field of<br>view [m] |
|-----------------------------|---------------------------------|----------------------------------|
| 1                           | 22.9                            | 3.3                              |
| 2                           | 45.7                            | 6.5                              |
| 5                           | 114.3                           | 16.3                             |

- ▶ Do not mount the device in heavily polluting areas.
- > Splashing water, tyre abrasion etc. will have adverse effects on the image detection.
- ▶ Avoid installation in niches.
- ▶ Observe the angle of aperture of the lens.
- ▶ Avoid strong back light.
- ▶ Do not position illumination elements directly facing the camera lens.
- ▶ Mount the device with the supply cable coming from below.
- ▶ Provide all cables with a strain relief.
- ▶ Observe the minimum bending radius of 50 mm of the supply cable.

## 7 Electrical connection



The unit must be connected by a qualified electrician.  
Voltage supply according to EN 50178, SELV, PELV.

- ▶ Use a screened cable
- ▶ Use screened connector housings.
- ▶ Do not lay the cable in parallel to live cables.
- ▶ Lay supply and signal cables away from the device using the shortest possible route.

### 7.1 Device wiring

| Signal and supply voltage |   |                                |
|---------------------------|---|--------------------------------|
| M16 connector, 4 poles    |   |                                |
|                           | 1 | Coax cable core (video signal) |
|                           | 2 | Coax screen (video GND)        |
|                           | 3 | 8...32 V DC                    |
|                           | 4 | 0 V                            |

## 7.2 Device function at different voltages

| Voltage     | Video signal                                                                                                                                               | Lens heating        |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| < 6 V DC    | -                                                                                                                                                          | -                   |
| > 6 V DC    | Yes                                                                                                                                                        | -                   |
| > 7 V DC    | Yes                                                                                                                                                        | 20 % heating power  |
| > 8 V DC    | Yes                                                                                                                                                        | 40 % heating power  |
| 12..33 V DC | Yes                                                                                                                                                        | 100 % heating power |
| > 33 V DC   | The overvoltage protection switches the device and the heating element off. When 32 V DC are no longer reached, the overvoltage protection is deactivated. |                     |

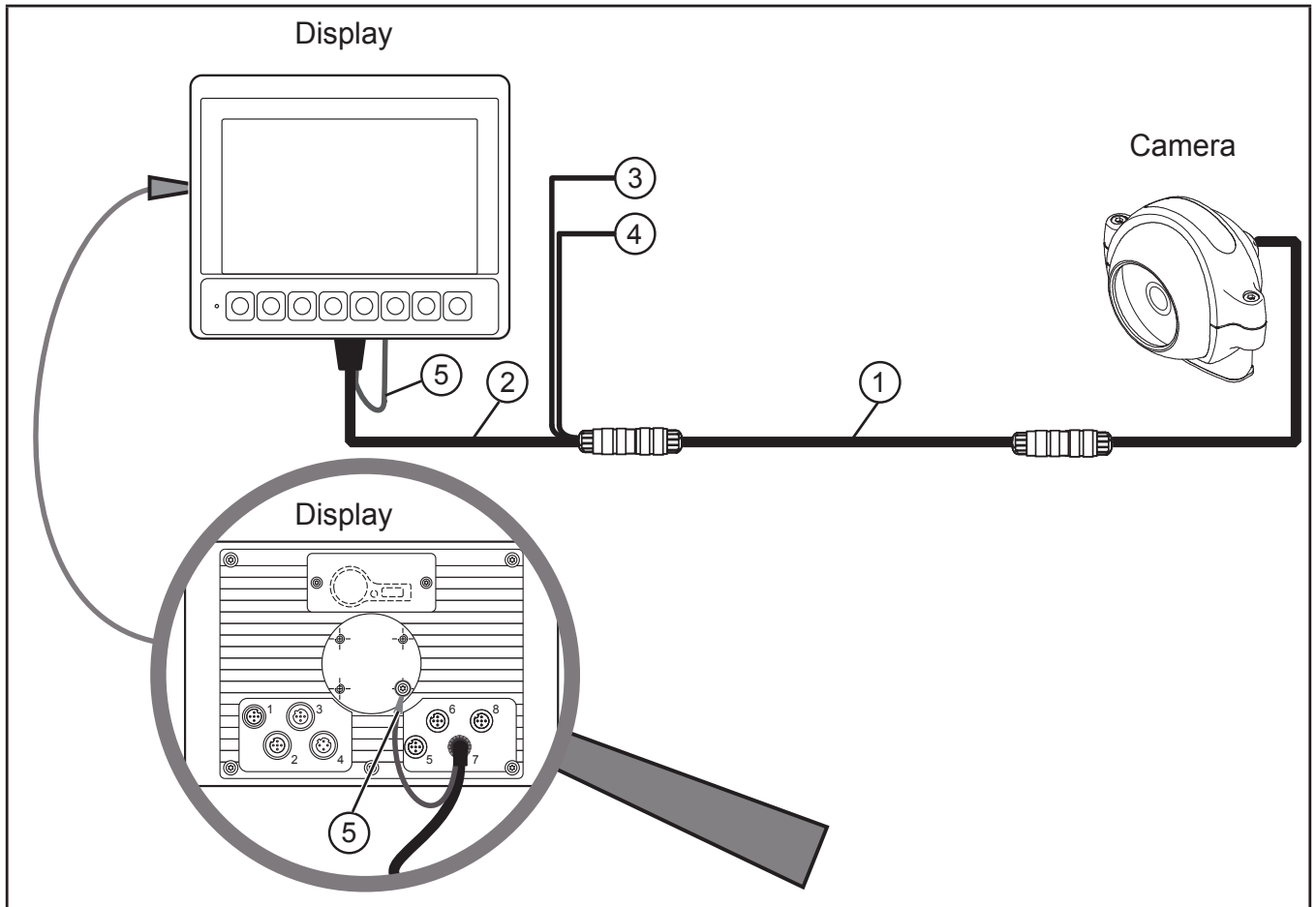
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## 7.3 Connection with a dialogue module

► Use adapter cables and, if necessary, connection cables.



The integration of the device into a CODESYS application is described in separate instructions. These instructions are available in the download area of the O2Mxx: [www.ifm.com](http://www.ifm.com)



5. Fig.: O2M2xx connected with a CR1083 dialogue module

① M16 connection cable

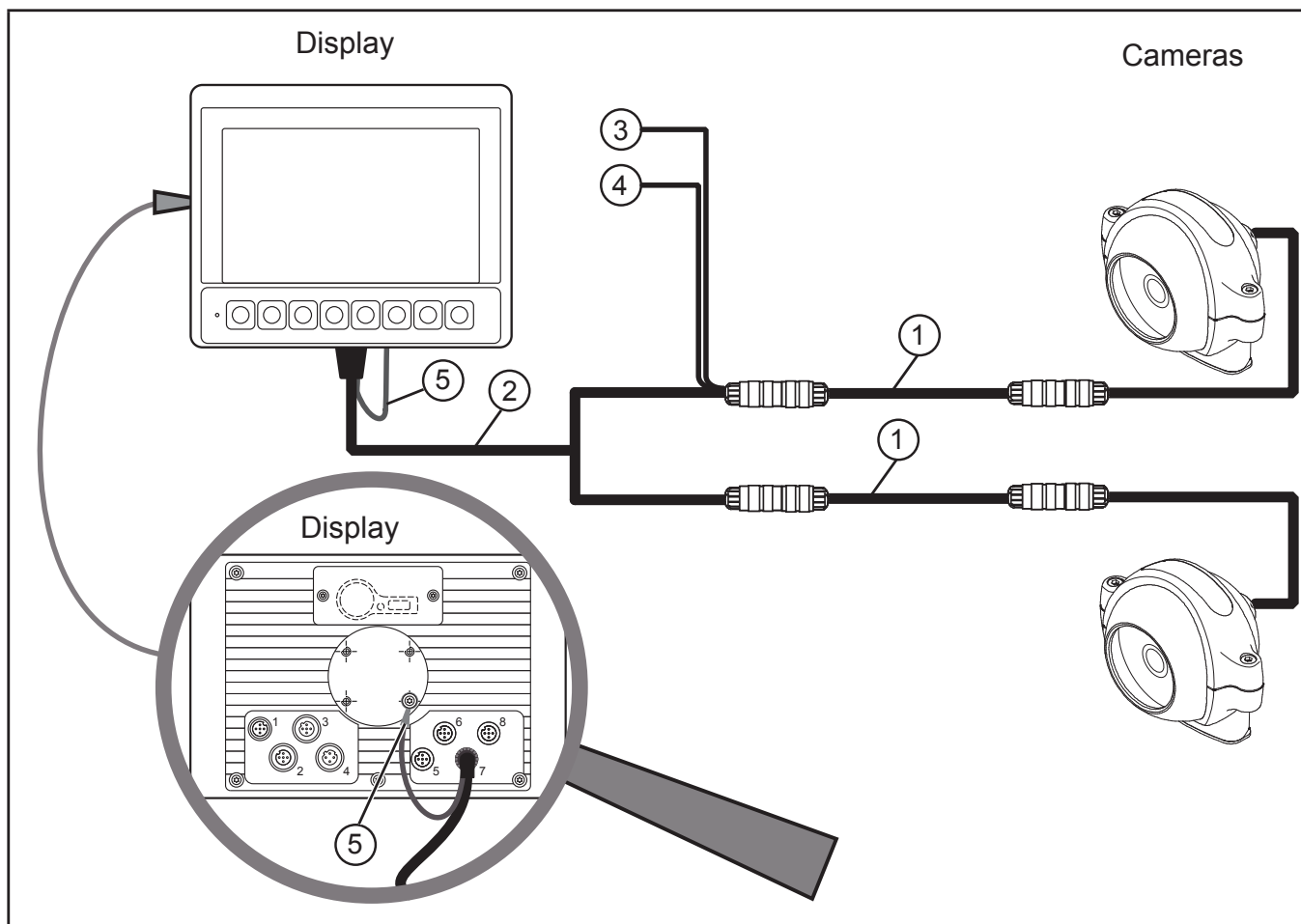
② Adapter cable M12 connector ↔ M16 coupling

③ 8...32 V \*)

④ 0 V \*)

⑤ GND (screen) \*)

\*) Core colours of ifm adapter cables: 3 = RD (red); 4 = BK (black); GND = GY (grey)



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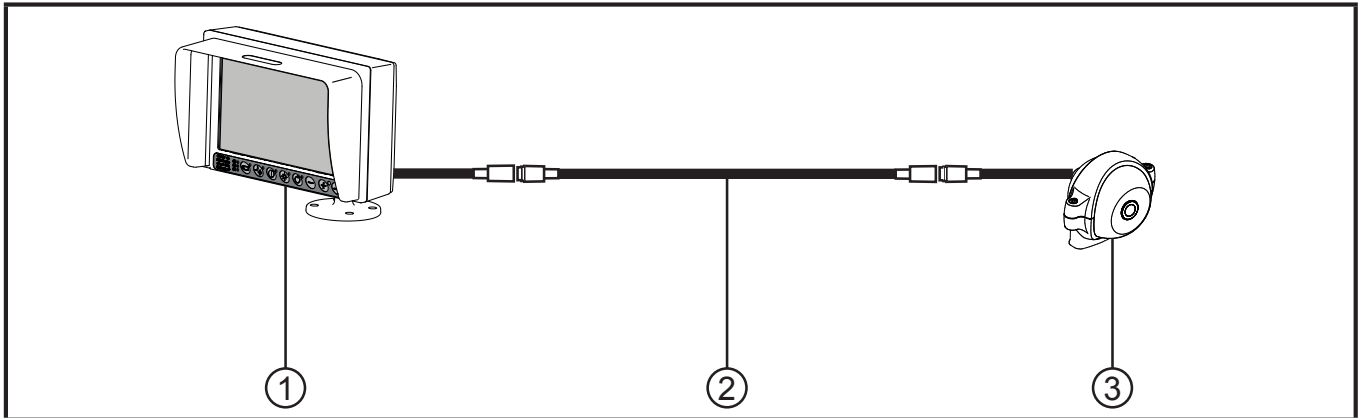
6. Fig.: 2x O2M2xx connected with a CR1083 dialogue module

- ① M16 connection cable
- ② Adapter cable M12 connector ↔ M16 coupling
- ③ 8...32 V \*)
- ④ 0 V \*)
- ⑤ GND (screen) \*)

\*) Core colours of ifm adapter cables: 3 = RD (red); 4 = BK (black); GND = GY (grey)

## 7.4 Connection with a monitor

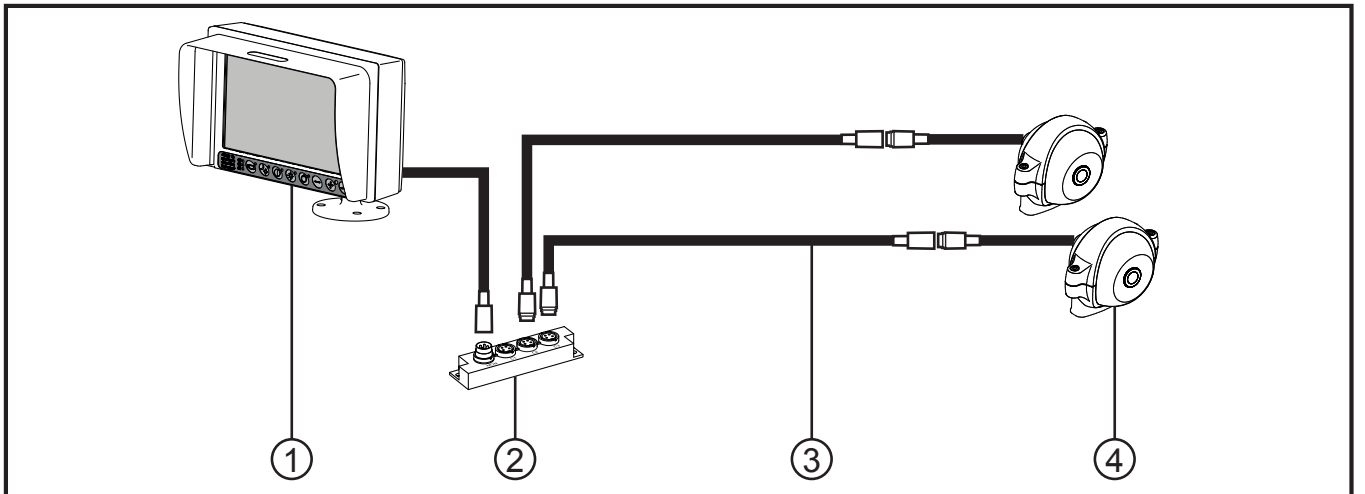
### 7.4.1 Connection of 1 camera with a monitor



Connection of 1 O2M200 analogue camera with an E2M231 monitor

- ① E3M231 monitor
- ② E2M203 connection cable, 5 m
- ③ O2M200 analogue camera

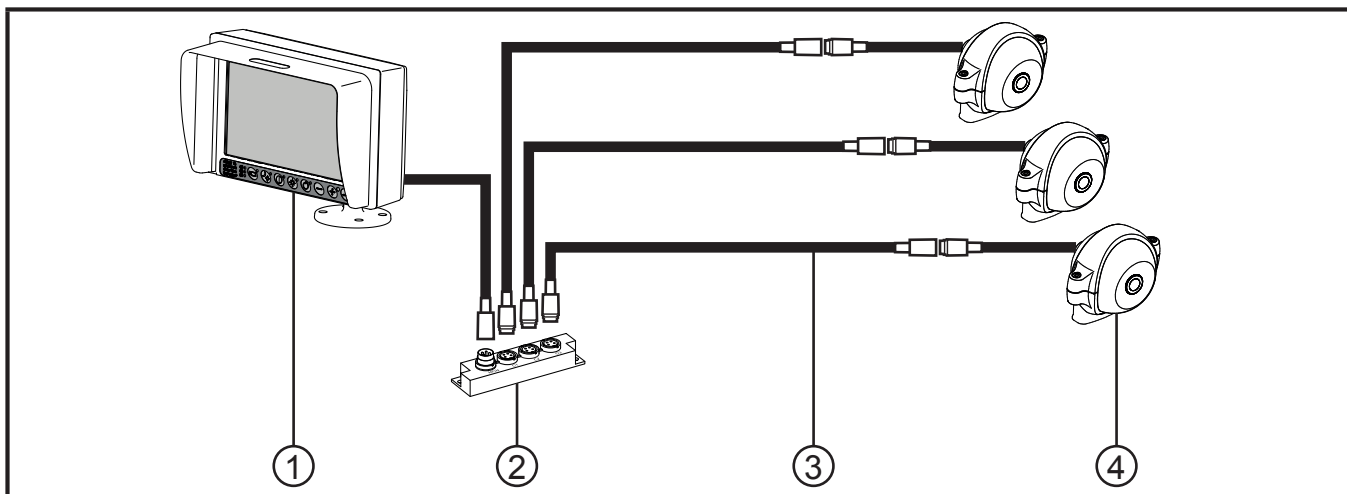
### 7.4.2 Connection of 2 cameras with a monitor



Connection of 2 O2M200 analogue cameras with an E2M231 monitor

- ① E3M231 monitor
- ② E2M235 video switcher, 3 ports
- ③ E2M203 connection cable, 5 m
- ④ O2M200 analogue camera

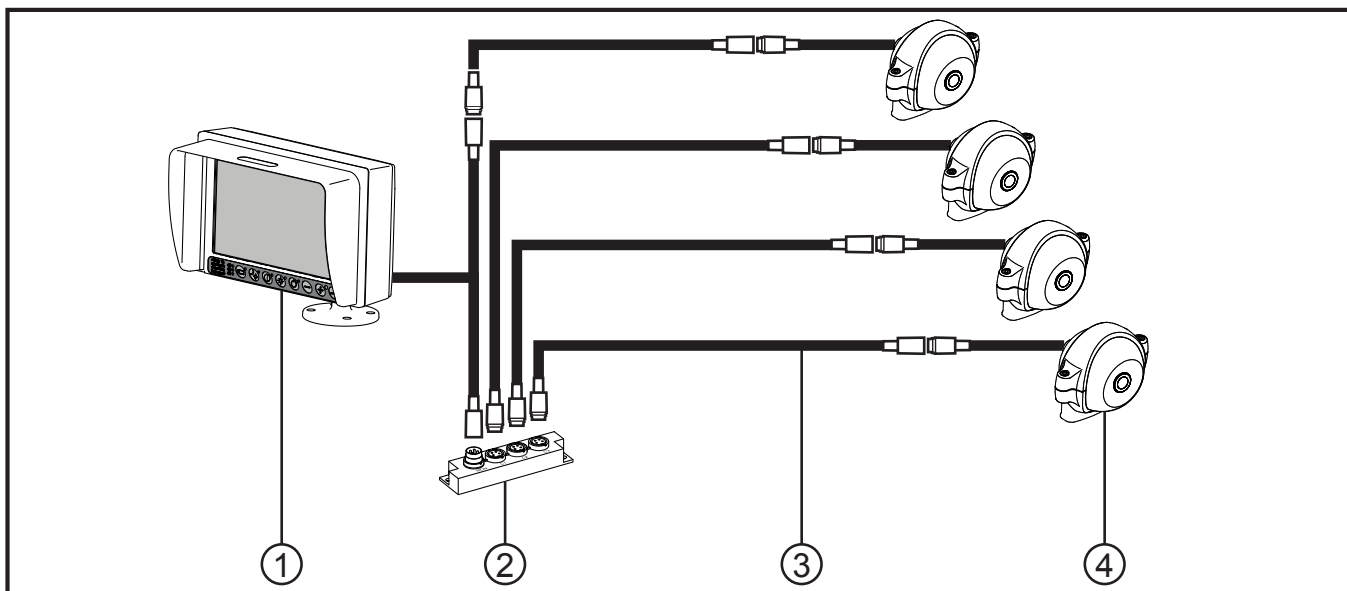
### 7.4.3 Connection of 3 cameras with a monitor



Connection of 3 O2M200 analogue cameras with an E2M231 monitor

- ① E2M231 monitor
- ② E2M235 video switcher, 3 ports
- ③ E2M203 connection cable, 5 m
- ④ O2M200 analogue camera

### 7.4.4 Connection of 4 cameras with a monitor



Connection of 4 O2M200 analogue cameras with an E2M232 monitor

- ① E2M232 monitor
- ② E2M235 video switcher, 3 ports
- ③ E2M203 connection cable, 5 m
- ④ O2M200 analogue camera

## 7.5 Interference due to external influences



Image transmission may be disturbed by

- faulty or insufficient radio interference suppressors in other electrical equipment (inverters or generators),
- voltage fluctuations when switching on/off high electrical loads.

## 8 Maintenance, repair and disposal



Keep the front lens of the device clean. Soiling may considerably affect the image quality!

- ▶ To clean the lens window, do not use any detergents or solvents which might damage the front glass.
- ▶ Do not open the housing of the device. The device does not contain any components that need to be maintained by the user. The device must only be repaired by the manufacturer.
- ▶ Dispose of the device in accordance with the national environmental regulations.

## 9 Approvals/standards

The EU Declaration of Conformity is available at [www.ifm.com](http://www.ifm.com).