



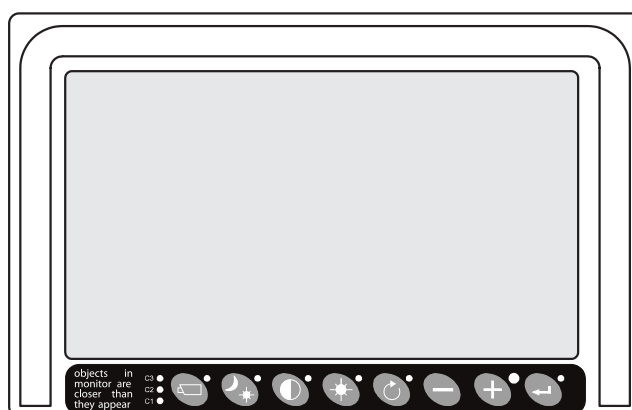
Operating instructions

Monitor for analogue cameras

E2M231
E2M232

UK

706451 / 00 02/2018



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1 Preliminary note

This document describes the operation of the E2M23x monitor for analogue cameras.

1.1 Symbols used

- Instructions
- > Reaction, result
- [...] Designation of keys and keys
- "..." Name of display text
- Cross-reference
-  Important note
Non-compliance may result in malfunction or interference.
-  Information
Supplementary note

1.2 Warnings used

NOTE

Warning of damage to property.

2 Safety instructions

2.1 General

These instructions are an integral part of the device. They 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 be installed, connected and put into operation by a qualified electrician.

2.3 Electrical connection

Disconnect the unit externally before handling it.

The connection pins may only be supplied with the signals indicated in the technical data and on the device label and only the approved accessories of ifm may be connected.

2.4 Tampering with the device

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

NOTE

The display is sensitive to pressure. Touching the display may result in permanent pixel errors.

- Do not touch the screen.

3 Functions and features

The E2M231 / E2M232 monitor processes input signals from analogue cameras and shows them on the internal display. The parameters of the device are set via integrated keys. The device is available in 2 versions:

- with 1 analogue video input (E2M231)
- with 2 analogue video inputs (E2M232)

The O2M2xx and O3M2xx cameras from ifm electronic are compatible with the device.

The device must not be operated during safety-critical operations.

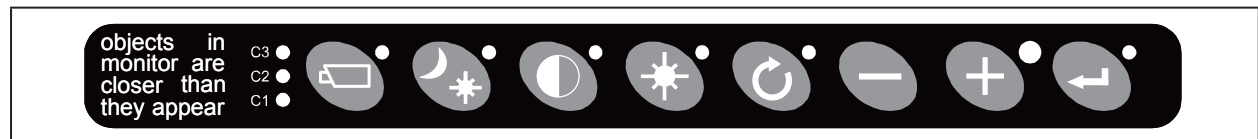
Because of the requirements for electromagnetic interference emissions, the device is intended for use in industrial environments. The device is not designed for use in domestic areas.



The device may only be used under the operating conditions specified in the data sheet.

4 Function keys

The following keys are on the front of the device:

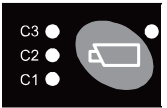


Symbol	Name	Function
	Camera switch	Select between the connected cameras. Press the [Camera switch] key to activate the manual selection of the camera. Use the [Plus / +] and [Minus / -] keys to select the connected cameras. Press the [Camera switch] key again to deactivate the manual camera selection (→ „4.1 Camera switch“).
	Day / Night setting	Select between day and night setting. Press the [Day / Night setting] key to change the brightness and colour palette of the display (→ „4.2 Day / Night setting“).
	Contrast	Set the contrast. Press the [Contrast] key to activate contrast setting. Use the [Plus / +] and [Minus / -] keys to change the contrast. Press the [Contrast] key again to deactivate contrast setting (→ „4.3 Contrast“).
	Brightness	Set the brightness. Press the [Brightness] key to activate brightness setting. Use the [Plus / +] and [Minus / -] keys to change the brightness. Press the [Brightness] key again to deactivate the brightness setting (→ „4.4 Brightness“).
	Scan / Back in menu	Display the image of the connected cameras one after the other. Go Back in menu. Press the [Scan / Back in menu] key to display the view of the connected cameras one after the other or navigate back in menu (→ „4.6 Scan / Back in menu“).
	Minus / -	Select next menu item. Navigate to the left in the menu. Press the [Minus / -] key to navigate to the next menu item or to the left.
	Plus / +	Select the previous menu item. Navigate to the right in the menu. Press the [Plus / +] key to navigate to the previous menu item or to the right.
	Enter / Standby	Display standby mode and details about the firmware. Acknowledge the menu item. Press the [Enter / Standby] key to activate the standby mode and to display the details about the firmware or to confirm the selected menu item.

4.1 Camera switch



The [Camera switch] key activates the manual camera selection. Use the [Plus / +] and [Minus / -] keys to select the connected cameras. Press the [Camera switch] key again to deactivate the manual camera selection.



The active camera is displayed with the "C1", "C2" and "C3" LEDs.

The [Camera switch] key has priority over the scan function and the automatic camera selection.



The [Camera switch] key can be set (→ „6.3.7 Camera switch“).

The [Camera switch] key can be deactivated (→ „6.3.3 Keyboard“).

4.2 Day / Night setting



The [Day / Night setting] key changes between the day and night setting of the device. The day / Night setting changes the brightness and the colour palette of the device.

Available day and night setting:

Day / Night setting	Description
ABC	Automatic setting of the brightness depending on the ambient light. The brightness sensor is above the [Plus / +] key.
ABC RED	Automatic setting of the brightness depending on the ambient light. A red colour palette is used. The brightness sensor is above the [Plus / +] key.
ABC BLUE	Automatic setting of the brightness depending on the ambient light. A blue colour palette is used. The brightness sensor is above the [Plus / +] key.
DAY 100%	Day mode. The brightness is set to 100 %. The LED above the [Day / Night setting] key is permanently on. Use the [Plus / +] and [Minus / -] keys to vary the brightness between 50 % and 100 %.
NIT 20%	Night mode. The brightness is set to 20 %. Use the [Plus / +] and [Minus / -] keys to vary the brightness between 0 % and 50 %.
RED 20%	Night mode. The brightness is set to 20 %. A red colour palette is used. Use the [Plus / +] and [Minus / -] keys to vary the brightness between 0 % and 50 %.
BLUE 20%	Night mode. The brightness is set to 20 %. A blue colour palette is used. Use the [Plus / +] and [Minus / -] keys to vary the brightness between 0 % and 50 %.



A minimum value for automatic background illumination can be set in the Service menu (→ „6.3.5 LCD backlight“).

4.3 Contrast



The [Contrast] key activates contrast setting. Use the [Plus / +] and [Minus / -] keys to set the contrast. The set contrast is permanently stored.



The contrast must be set separately for each connected camera.

4.4 Brightness



The [Brightness] key activates brightness setting. Use the [Plus / +] and [Minus / -] keys to set the brightness. The set brightness is permanently stored.



The brightness must be set separately for each connected camera.

4.5 Colour saturation



+



Press the [Contrast] and [Brightness] keys simultaneously to activate colour saturation setting. Use the [Plus / +] and [Minus / -] keys to set the colour saturation. The set colour saturation is permanently stored.



The colour saturation must be set separately for each connected camera.

4.6 Scan / Back in menu



The [Scan / Back in menu] key displays the view of the connected cameras one after the other.

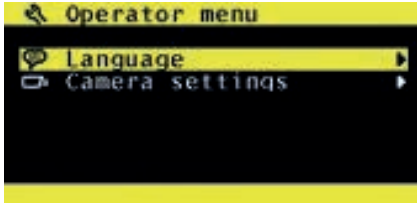
If you are in a menu, use this key to navigate Back in menu. The display time of a camera image can be set in the Service menu (→ „6.3.6 Scanning“).

5 User menu

The user menu contains the settings frequently used by the user.



Press the [Minus / -] and [Plus / +] keys simultaneously to activate the user menu.



The settings are divided:

The following settings are available in the user menu:

- Language (→ „5.1 Language“)
- Camera settings (→ „5.2 Camera settings“)



The user menu is deactivated as default and has to be activated in the Service menu (→ „6.3.3 Keyboard“).

5.1 Language



The language of the on screen display (OSD) is set in the [Language] menu. The following languages are available:

- English
- Dutch
- German
- French
- Czech
- Hungarian
- Italian
- Polish
- Portuguese
- Spanish
- Turkish
- Swedish
- Finnish
- Danish
- Norwegian

5.2 Camera settings



In the [Camera settings] menu the green marking line is superimposed on the camera image. The following settings are available:



[C1] / [C2] / [C3]: The camera settings are made separately for each connected camera.



- [Hor. marker]: Activate or deactivate horizontal marking line.
- [Marker pos.]: Set position of the horizontal marking line. With default setting the marking line is in the middle of the screen (50).



- [Vert. marker.]: Activate or deactivate vertical marking line.
- [Marker pos.]: Set position of the vertical marking line. With default setting the marking line is in the middle of the screen (50).



- [Graticule]: Activate or deactivate the point grid.

6 Service menu

The [Service menu] contains extended device settings.



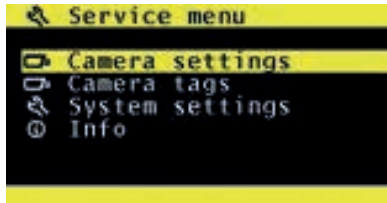
+



+



Press the [Camera selection] [Minus / -] and [Plus / +] keys simultaneously to activate the service menu.



The settings are divided:

- [Camera settings] (→ „6.1 Camera settings“)
- [Camera tags] (→ „6.2 Camera name“)
- [System settings] (→ „6.3 System settings“)
- [Info] (→ „6.4 Info“)

6.1 Camera settings



The connected cameras are set in the [Camera settings] menu. The following settings are available:



[C1] / [C2] / [C3]: The camera settings are made separately for each connected camera.

- [Mirror]: Mirror the screen on the horizontal axis.
- [Upside down]: Mirror the screen on the vertical axis.
- [Brightness]: Set the brightness of the display.
- [Contrast]: Set the contrast of the display.
- [Saturation]: Set the colour saturation of the display.
- [Switch delay]: Activate the switching delay. This setting is required if the wire is to be controlled with an uninterrupted signal (e.g. from an indicator).
- [Hor. marker]: Activate or deactivate horizontal marking line.
- [Marker pos.]: Set position of the horizontal marking line. With default setting the marking line is in the middle of the screen (50).
- [Vert. marker]: Activate or deactivate vertical marking line.
- [Marker pos.]: Set position of the vertical marking line. With default setting the marking line is in the middle of the screen (50).



- [Graticule]: Activate or deactivate the point grid.
- [Cinema mode]: Scale the camera signal to the screen area.



With scaling, the camera signal distances may be more difficult to estimate.

6.2 Camera name

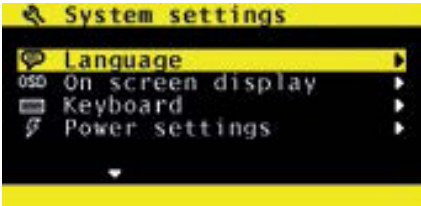


In the [Camera tags] menu the name of the connected cameras is changed. Max. 6 alphanumerical characters are available for the name.

6.3 System settings

The device is set in the [System settings] menu. The following settings are available.

6.3.1 Language



The language of the on screen display (OSD) is set in the [Language] menu. The following languages are available: English, Dutch, German, French, Czech, Hungarian, Italian, Polish, Portuguese, Spanish, Turkish, Swedish, Finnish, Danish, Norwegian.

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6.3.2 On screen display



The on screen displays are set in the [On screen display].

- [OSD timeout]: Suppress the on screen displays after the time set in seconds. The [OFF] setting permanently activates the on screen displays. The [ON] setting deactivates the on screen displays.
- [OSD Position]: Set the horizontal position of the on screen displays.
- [Info transparency]: Set the transparency of the on screen displays.
- [Menu transparency]: Set the transparency of the menu.
- [Disclaimer transp.]: Set the transparency of the disclaimer.

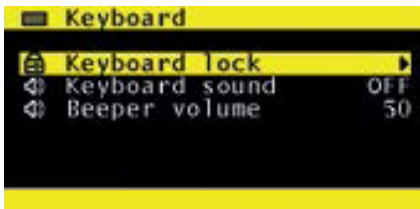


The disclaimer is displayed when the device is started.



- [OSD Menu help]: The help texts in the on screen displays are activated or deactivated. The activated help texts are displayed if no key is pressed within 10 seconds.

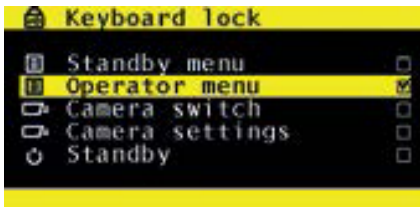
6.3.3 Keyboard



The keyboard is set in the [Keyboard] menu.

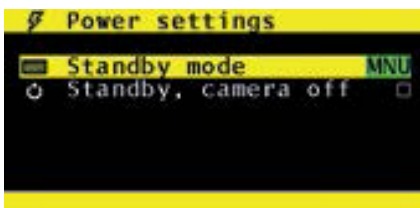


The [Keyboard sound] and [Beeper volume] settings are without any function.



- [Keyboard lock]: Lock access to certain device functions.
 - [Standby menu]: Lock access to the standby menu.
 - [Operator menu]: Lock access to the user menu.
 - [Camera switch]: Lock access to the camera switch.
 - [Camera settings]: Lock access to the camera settings.
 - [Standby]: Lock access to the standby mode.

6.3.4 Power supply settings



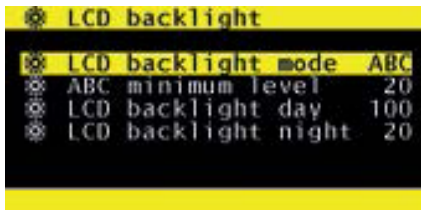
The standby mode of the device is set in the [Power settings] menu.

- [Standby mode]: Set one of the following modes for standby:
 - [MNU]: Use the [Enter / Standby] key to activate the standby menu (→ „4 Function keys“).
 - [IMM]: Use the [Enter / Standby] key to activate the standby mode directly.
 - [2 S]: Keep the [Enter / Standby] key pressed for 2 seconds to activate the standby mode.
- [Standby, camera off]: Deactivate the voltage supply of the connected cameras in the standby mode.



The standby mode is deactivated by pressing any key.

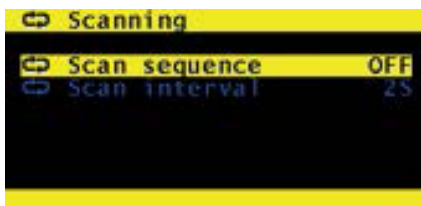
6.3.5 LCD backlight



The background illumination of the screen is set in the [LCD backlight] menu.

- [LCD backlight mode]: Set one of the following modes for the background illumination:
 - [ABC]: Automatic setting of the brightness depending on the ambient light. The brightness sensor is above the [Plus / +] key.
 - [A_R]: Automatic setting of the brightness depending on the ambient light. A red colour palette is used. The brightness sensor is above the [Plus / +] key.
 - [A_B]: Automatic setting of the brightness depending on the ambient light. A blue colour palette is used. The brightness sensor is above the [Plus / +] key.
 - [DAY]: Day mode. Set the brightness to 100 %. The LED above the [Day / Night setting] key is permanently on. Use the [Plus / +] and [Minus / -] keys to vary the brightness between 50 % and 100 %.
 - [NIT]: Night mode. The brightness is set to 20 %. Use the [Plus / +] and [Minus / -] keys to vary the brightness between 0 % and 50 %.
 - [N_R]: Night mode. The brightness is set to 20 %. A red colour palette is used. Use the [Plus / +] and [Minus / -] keys to vary the brightness between 0 % and 50 %.
 - [N_B]: Night mode. The brightness is set to 20 %. A blue colour palette is used. Use the [Plus / +] and [Minus / -] keys to vary the brightness between 0 % and 50 %.
- [ABC minimum level]: Set a minimum value for the automatic background illumination (modes [ABC], [A_R] and [A_B]).
- [LCD backlight day]: Set the brightness during the day between 50 % and 100 % ([DAY] mode).
- [LCD backlight night]: Set the brightness during the night between 0 % and 50 % ([NIT], [N_R] and [N_B] modes).

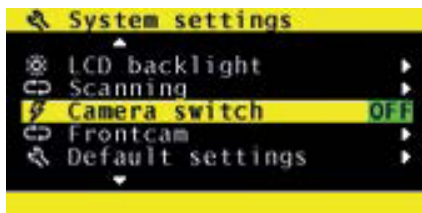
6.3.6 Scanning



The behaviour of the [Scan / Back in menu] key is set in the [Scanning] menu (→ „4 Function keys“).

- [Scan sequence]: Select the cameras to be scanned.
- [Scan interval]: Set the display time of the cameras to be scanned in seconds.

6.3.7 Camera switch



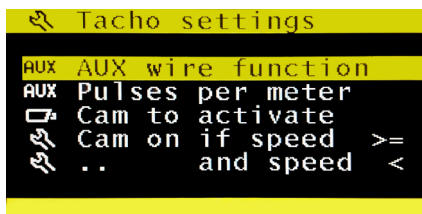
The behaviour of the [Camera switch] key is set in the [Camera switch] menu (→ „4.1 Camera switch“):

- [OFF]: Setting for 1 connected camera without video switcher. The [Camera switch] key is deactivated.
- [3C]: Setting for 3 connected cameras with video switcher.
- [2C]: Setting for 2 connected cameras with E2M232 or video switcher.
- [4C]: Setting for 4 connected cameras with E2M232 and video switcher.



The ifm video switcher is available as accessory with the article number E2M235: www.ifm.com

6.3.8 Tacho settings



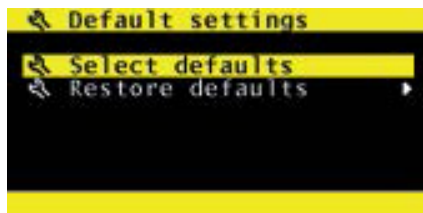
In the [Tacho settings] menu the external control of the cameras is set:

- [AUX wire function]: Set the mode of the wires. The following modes are available:
 - [OFF]: Deactivate the wires.
 - [TCH]: Control the cameras via a tachometer. Connect the grey wire to the tachometer and the yellow wire to the parking brake.
 - [KEY]: Deactivate the keyboard with the grey wire.
 - [C-+]: Select the connected cameras with the wires.
- [Pulses per meter]: Set the speed pulses per metre (resolution) in the [TCH] mode.
- [Cam to activate]: Set the camera to be activated in the [TCH] mode.
- [Cam on if speed >=]: Set the speed in km/h as from which the camera is to be active in the [TCH] mode.
- [.. and speed <]: Set the speed in km/h up to which the camera is to be active in the [TCH] mode.



Wiring and more details about the wires are indicated in the supplied installation instructions (→ Installation instructions, chapter 6.2 "Wiring").

6.3.9 Default settings



In the [Default settings] menu all settings are reset and the default settings are restored:

- [Select defaults]: Select the default settings to be restored. The preset value is "45".



As standard the value of [Select defaults] must not be changed. Contact the manufacturer for more details.

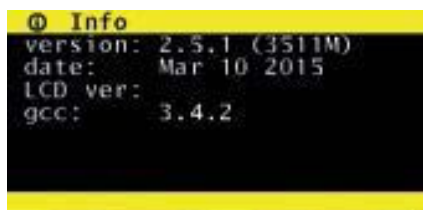
- [Restore defaults]: Reset all settings and restore the default values.



All settings are lost at once and without further enquiry! The former settings cannot be restored.

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6.4 Info



In the [Info] menu information about the hardware and software used is displayed. The displayed information is very important in the event of service.

7 Glossary

ABC	Automatic background illumination (Automatic Brightness Control)
A_R	Automatic background illumination with red colour palette
A_B	Automatic background illumination with blue colour palette
DAY	Day mode
NIT	Night mode
N_R	Night mode with red colour palette
N_B	Night mode with blue colour palette
OSD	On screen display
TCH	Tachometer

8 Error messages

8.1 Automatic camera selection

The [Scan / Back in menu] key does not function as expected: The images of the connected camera are not displayed one after the other. In addition the LED next to the [Camera switch] key flashes.

Solution: Press [Camera switch] key.

8.2 Malfunction of camera 3

Camera 3 is active and does not display an image.

Solution: Keep the [Scan / Back in menu] key pressed for 15 seconds.

8.3 Device shuts off after 2 seconds.

The device shuts off again 2 seconds after switch-on.

Solution: Press the [Enter / Standby] key.

8.4 LEDs C1 and [Enter / Standby] key flash

LEDs "C1" and the one next to the [Enter / Standby] key flash simultaneously 4x times.

Solution: The device is defective. Contact service: www.ifm.com

