

# Remote alarm indicator and test combination MK2430

Remote alarm indicator and test combination with LC display



## Product description

The universal remote alarm indicator and operator panel MK2430 is intended for visual and audible indication of operating status and alarm messages from BENDER systems such as EDS, RCMS and MEDICS. In MEDICS monitoring systems, the MK2430 meets the requirements of IEC 60364-7-710: 2002-11 in respect of test functions for IT-system monitoring and messages from switchover modules.

The IT system monitoring equipment can be tested using the programmable "TEST" button.

### Important display functions:

- Normal operation indicator (green LED)
- Insulation fault
- Overload
- Overtemperature
- Messages from insulation fault location systems (EDS) and residual current monitoring systems (RCMS)
- Supply line failure
- Interruption of the phase conductor or PE conductor of the A-ISOMETER®
- Power supply fault conditions and switchover system faults
- Device failure
- Test results
- Measured values

The LC text display makes this information easy to understand. The connection between the MKs and the switchover and monitoring modules is implemented with bus technology. During normal operation, the MK2430 indicates the readiness for operation of the system. The MK2430-11 features 12 digital inputs allowing messages from other technical equipment to be recorded and displayed on the MK2430, for example from medical gases or UPS systems.

## Device features

- Display of operating and alarm messages according to IEC 60364-7-710: 2002-11 and other standards
- Backlit clear LC text display (4 x 20 characters)
- Predefined standard texts in 20 languages
- 200 freely programmable message texts
- Bus technology for easy installation and reduced fire load
- Acoustic alarm with mute function
- Parameter setting via menu (German / English)
- Suitable for flush and surface mounting
- Easy commissioning due to predefined message texts
- 12 digital inputs (MK2430-11 only)
- Memory with real-time clock to store 250 alarm messages with date and time stamp
- MK2418 can easily be exchanged for MK2430

## Function

On its backlit LC display (4 x 20 characters), the MK2430 displays messages from all BMS bus devices assigned via alarm addresses. As well as being used as a standalone indicator, the MK2430 also supports parallel operation. In the event of an alarm message, the yellow "WARNING" LED or the red "ALARM" LED lights up and the message appears on the LC display in plain text format. At the same time there is an audible signal (acknowledgeable). If a second message is received whilst the first is still pending, the audible signal will sound again and the messages will flash up alternately on the LC display. The address of the device triggering the alarm can also be called up. The audible signal sounds again once a configurable period of time has elapsed.

Internal device parameters (alarm addresses, test addresses, ...) and the parameter setting for EDS and RCM systems can be accessed via the menu system.

As a master, the MK2430 can also be used in installations with a number of IT and EDS systems. The "TEST" button can be used to check the operation of an A-ISOMETER® 107TD47 or IRDH. A message is only output on the MK2430 on which the "TEST" button was pressed.

When wiring the bus connection, please note that a 4-wire cable (2 x BUS, 2 x US) with a suitable cross section is required when the supply voltage is incorporated in the cable.

## Display / operating elements

The backlit display features four lines of 20 characters. It supplies medical and technical personnel with information that is always clear and unambiguous, in order to help them to make decisions. Every alarm message comprises three lines which appear spontaneously and three additional lines which can be displayed at the touch of a button. The fourth line contains status information (number of messages, test procedures, menu information). Three LEDs are located above the text display. They indicate: normal operation (green), warnings (yellow) or alarms (red). Five keys are available for acknowledging alarms and warnings, and for the menu system.

## Approvals



AE25

**Programming**

Standard message texts can be activated by enabling alarm addresses. These standard message texts are available in 20 languages. Alarm addresses can be activated via the device menu system (without PC). Individual message texts, each comprising 6 lines of 20 characters, can be programmed with the MK-Set PC software. An LED (yellow or red) and an audible signal can be assigned to each message. For this purpose, the PC is connected to the USB interface or BMS bus (RS-485).

**History memory**

Warning and alarm messages are written to the history memory automatically with date and time stamp. 250 text messages can be saved; the history memory can be read out via the operating menu or the Medi-History PC software.

**MK2430-12**

The MK2430-12 is used for visual and audible indication of alarms from BENDER's EDS, RCMS and MEDICS systems and to trigger the ISOMETER® test function via the BMS bus. Furthermore, the MK2430-12 can also be used with older switchover systems in conjunction with SMI470-9 or as a parallel display in conjunction with MK2430-11 or SMI472-12. The programmed message texts are displayed on the LCD in the selected language.

**MK2430-11**

The MK2430-11 features all the functions of the MK2430-12, plus 12 digital inputs. These digital inputs (IN1...IN12) are controlled via potential-free contacts (N/C, N/O operation configurable). Any message text can be assigned to the inputs.

**MK2430P-...**

The MK2430P-... contains the programming of the standard display and the factory activation of up to 20 alarm addresses.

A line containing a note about the associated equipment can be programmed individually for each alarm address. This line appears as the first line in an alarm message, the message itself is displayed together with the standard text (line 2, 3, 5, 6, 7) (see example a). For many applications with medical IT systems, this programming scope is sufficient. A programming template in the shape of a form is available for customer-specific programming. Furthermore, up to 200 individual alarms can be programmed in the factory subject to an additional fee (see example b). This type of programming is recommended for EDS, RCMS, medical gases or UPS systems.

**Operating and display elements**



- 1 - LED "NORMAL": Normal operating mode
- 2 - LED "WARNING": Warning messages
- 3 - LED "ALARM": Alarm messages
- 4 - LCD: Display of operating and alarm messages
- 5 - "Mute" button  
In operating mode: To mute the buzzer.  
In menu mode: Esc function
- 6 - "TEST" button: To activate the test for connected and assigned insulation monitoring devices
- 7 - "Menu" button:  
In operating mode: to call up the menu mode.  
In menu mode: Enter function.
- 8 - "Additional text" button:  
In operating mode: additional text.  
In menu mode: downwards.
- 9 - "Scroll" button:  
In operating mode: to scroll messages.  
In menu mode: upwards.

**Typical alarm messages:**

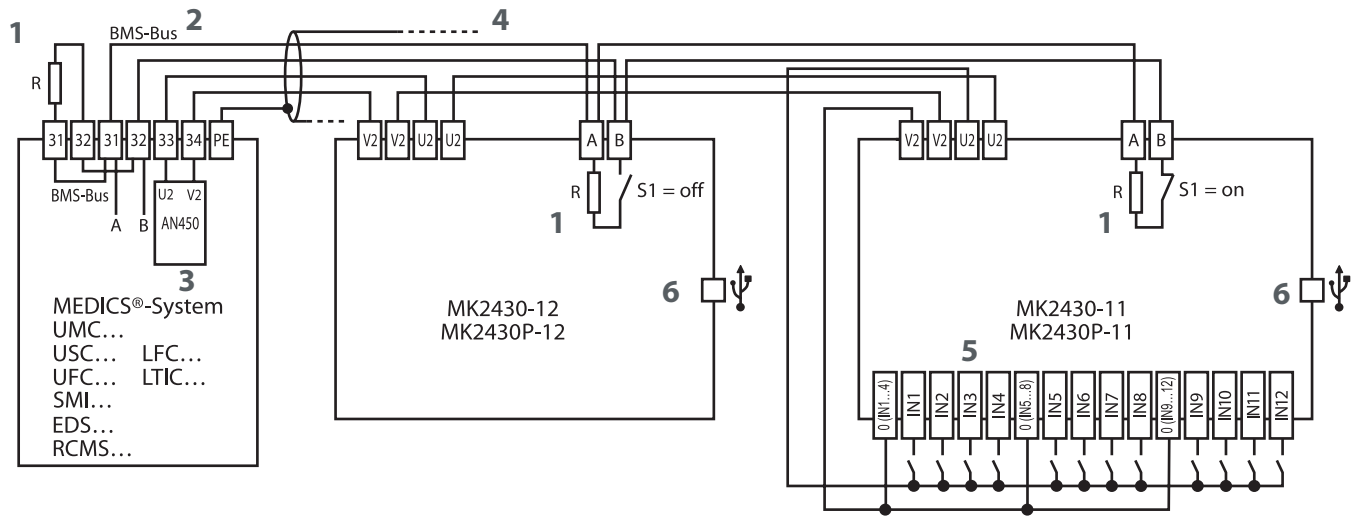
**a) Standard text**

Information about the assigned system	<b>System</b> 02
Standard Alarm text (lines 2...3)	<b>Insulation fault</b>
Status line	<b>Meas. Value</b> 30kΩ
	01/03 14:45
Standard additional text (lines 5...7)	since 11.03.05 14:36
	<b>Device</b> ISOMETER
	<b>Addr/Ch</b> 003/03
Status line	01/03 14:45

**b) Individually programmed alarm text**

Individual alarm text (lines 1...3)	<b>Intensive care unit H034</b>
	<b>Current</b> 700µA
	<b>Socket</b> IT7-F305
Status line	02/03 14:45
Individual additional text (lines 5...7)	since 11.03.05 14:37
	<b>Room:</b> E107 UV7
	<b>EDS474</b> 003/03
Status line	02/03 14:45

**Wiring diagram**



- 1 - Terminating resistor BMS bus (120 Ω)
- 2 - Connection BMS bus
- 3 - Power supply unit incorporated in the MEDICS® module, sufficient for supplying power to at least three MK2430.
- 4 - Cable between MEDICS® module and MK2430  
When the MK2430 is supplied by the AN450 power supply unit incorporated in MEDICS® modules, the permissible cable lengths and cable cross sections have to be considered.
- 5 - Digital inputs  
The digital inputs may be controlled either via potential-free contacts or via voltage signals. If you are using potential-free contacts, the voltage can be drawn from the AN450 (3).  
If the inputs are controlled via an external voltage, the common 0(-) is applied to terminal 0 and the 1(+)-signal to the relevant input IN1...IN12. In this case, the connections between the terminals 0 and V2 and the common connections and U2 are not required.
- 6 - USB connection for programming

**Ordering information**

	Digital inputs	Factory-programmed alarm texts	BMS bus interface	Enclosure	Art. No.
MK2430-11	×	--	×	for flush-mounting	B 9510 0001
MK2430A-11	×	--	×	for surface-mounting	B 9510 0005
MK2430-12	--	--	×	for flush-mounting	B 9510 0002
MK2430A-12	--	--	×	for surface-mounting	B 9510 0006
MK2430P-11	×	×	×	for flush-mounting	B 9510 0003
MK2430PA-11	×	×	×	for surface-mounting	B 9510 0007
MK2430P-12	--	×	×	for flush-mounting	B 9510 0004
MK2430PA-12	--	×	×	for surface-mounting	B 9510 0008

MK-Set (Accessories: Software for parameter setting, in the download area of the Internet)

**Accessories**

	Art. No.
MK24...-Cavity wall mounting kit	B 923 711
MK24...-Panel mounting kit	B 923 780

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**Technical data remote alarm indicator and test combination MK2430**
**Insulation coordination acc. to IEC 60664-1**

Rated insulation voltage	AC 250 V
Rated impulse voltage / pollution degree	4 kV / 3

**Supply voltage**

Supply voltage $U_s$	AC / DC 24 V
Frequency range $U_s$	DC 40...60 Hz
Operating range of $U_s$	AC 18...28 / DC 18...30 V
Power consumption	≤ 3 VA

**Displays and LEDs**

Display, characters	four lines, 4 x 20 characters
Standard message texts in	20 languages
Alarm addresses	≤ 150
Programmable text messages	200
History memory (messages)	250
Standard text message	3 x 20 characters
Additional text message (press key to access)	3 x 20 characters
Alarm LEDs (three different colours)	NORMAL (green) WARNING (yellow) ALARM (red)
Menu texts	German / English
Buttons	5 (ISOMETER test, buzzer mute, additional text, scroll, menu)

**Buzzer**

Buzzer message	can be acknowledged, with new value operation
Buzzer interval	configurable
Buzzer frequency	configurable
Buzzer repetition	configurable

**Inputs (MK2430...-11 only)**

Digital inputs	12 (IN1...IN12)
Galvanic isolation	yes
Control of digital inputs	via voltage-free contacts / extraneous voltage
Operating principle	N / O or N / C operation can be selected for each input
Factory setting	N / O operation
Voltage range (high)	AC / DC 15...30 V
Voltage range (low)	AC / DC 0...2 V

**Interface**

Interface / protocol	RS-485 / BMS
Baud rate	9.6 kbit / s
Cable length	≤ 1200 m
Recommended cable (shielded, shield on one side connected to PE)	J-Y(ST)Y min. 2 x 0.6
Terminating resistor	120 Ω (0.25 W) connectable via DIP switch
Device address, BMS bus	DIP switch 1...150
Factory setting device address	1 (Master)

**Programming**

Interfaces	RS-485 or USB
Software	MK-Set V 2.0 or higher
Password factory setting	activated

**Cable length in case of power supply of 1 / 2 / 3 MK24...**

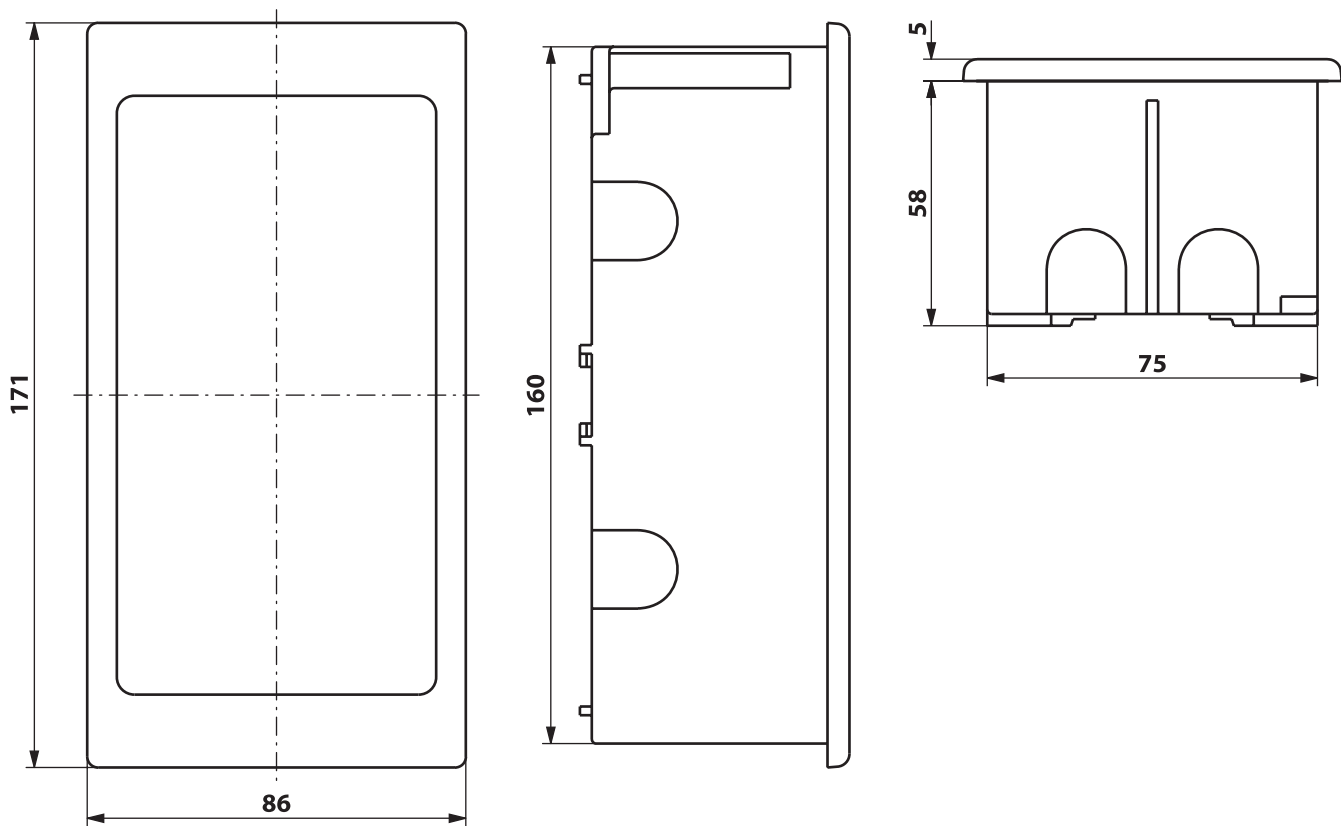
0.28 mm <sup>2</sup>	150 / 75 / 50 m
0.5 mm <sup>2</sup>	280 / 140 / 90 m
0.75 mm <sup>2</sup>	750 / 400 / 150 m
1.5 mm <sup>2</sup>	1500 / 700 / 250 m
2.5 mm <sup>2</sup>	2300 / 1200 / 400 m

**Colours**

Front foil	RAL 7035 (light grey) / RAL 7012 (basalt grey)
Marking	buttons: RAL 5002 (ultramarine blue) Text: RAL 7035 (light grey)
Front plate	RAL 7035 (light grey)

**General data**

EMC immunity	acc. to EN 61000-6-2
EMC emission	acc. to EN 61000-6-4
Classification of climatic conditions acc. to IEC 60721	Stationary use 3K5
	Transport 2K3
	Storage 1K4
Operating temperature	-5 °C...+5 °C
Classification of mechanical conditions acc. to IEC 60721	Stationary use 3M4
	Transport 2M2
	Storage 1M3
Operating mode	continuous operation
Mounting	any position
Connection	plug-type terminals
Connection properties (supply voltage, BMS bus)	
rigid / flexible / conductor sizes	0,2...2.5 / 0.2...2.5 mm <sup>2</sup> / AWG 24-12
flexible with ferrule without / with plastic sleeve	0.25...2.5 / 0.25...2.5 mm <sup>2</sup>
Connection properties (inputs)	
rigid / flexible / conductor sizes	0.08...1.5 / 0.08...1.5 mm <sup>2</sup> / AWG 28-16
flexible with ferrule without / with plastic sleeve	0.25...1.5 / 0.25...0.5 mm <sup>2</sup>
Stripping length	7 mm
Tightening torque	0.5...0.6 Nm
Degree of protection, built-in components (IEC 60529)	IP50
Degree of protection, terminals (IEC 60529)	IP20
Flammability class	UL94V-0
Standards	IEC 60364-7-710
Operating manual	TGH1389
Weight	flush-mounting type ≤ 210 g surface-mounting type ≤ 400 g

**Dimension diagram flush-mounting type** Dimensions in mm

**Dimension diagram surface-mounting type** Dimensions in mm
