

ifm electronic



Operating instructions

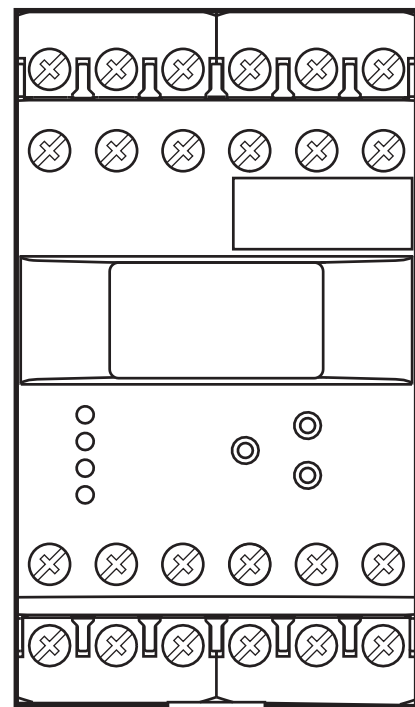
ecomat200[®]

Monitor

AL-3

UK

7390955 / 00 01 / 2013



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1 Preliminary note



This document is part of the device and contains information about the correct handling of the product.

This document is intended for specialists. These specialists are people who are qualified by their training and their experience to see risks and to avoid possible hazards that may be caused during operation or maintenance 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 warning notes and safety instructions.

1.1 Symbols used

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

1.2 Warning signs used

WARNING

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

CAUTION

Warning of personal injury.
Slight reversible injuries may result.

NOTE

Warning of damage to property.

2 Safety instructions

2.1 General

Follow 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 affect the safety of operators and machinery.

The installation and connection must comply with the applicable national and international standards. Responsibility lies with the person installing the device.

2.2 Target group

The device must only be installed, connected and put into operation by a qualified electrician.

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2.3 Electrical connection

Disconnect the unit externally before handling it. Also disconnect any independently supplied relay load circuits.

Make sure that the external voltage is generated and supplied according to the requirements for safe extra-low voltage (SELV) since this voltage is supplied without further measures near the operating elements and at the terminals for the supply of connected sensors.

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 externally supplied or internally generated SELV voltage is externally grounded, the responsibility lies with the user in accordance with the applicable national installation regulations. All statements in this manual refer to the unit the SELV voltage of which is not grounded.

It is not allowed to supply external voltage to the terminals for the pulse pick-up supply. The consumption of current which exceeds the value given in the technical data is not allowed.

An external main switch must be installed for the unit which can switch off the unit and all related circuits. This main switch must be clearly assigned to the unit.

2.4 Operation

Be careful when handling the unit once power is applied. This is only allowed by qualified personnel due to the protection rating IP 20.

The design of the unit corresponds to the protection class II except for the terminal blocks. Protection against accidental contact (finger protection to IP 20) for qualified personnel is only guaranteed if the terminal screw has been completely screwed in.

2.5 Location

For the correct operation the unit must be mounted in a housing (protection rating IP 40 or higher) which can only be opened using a tool or in a locked control cabinet.

The device has been tested for an impact energy of 1 joule according to EN61010.

2.6 Housing temperature

As described in the technical specifications below the device can be operated in a wide ambient temperature range. Because of the additional internal heating the operating elements and the housing walls can have high perceptible temperatures when touched in hot environments.

2.7 Tampering with the device

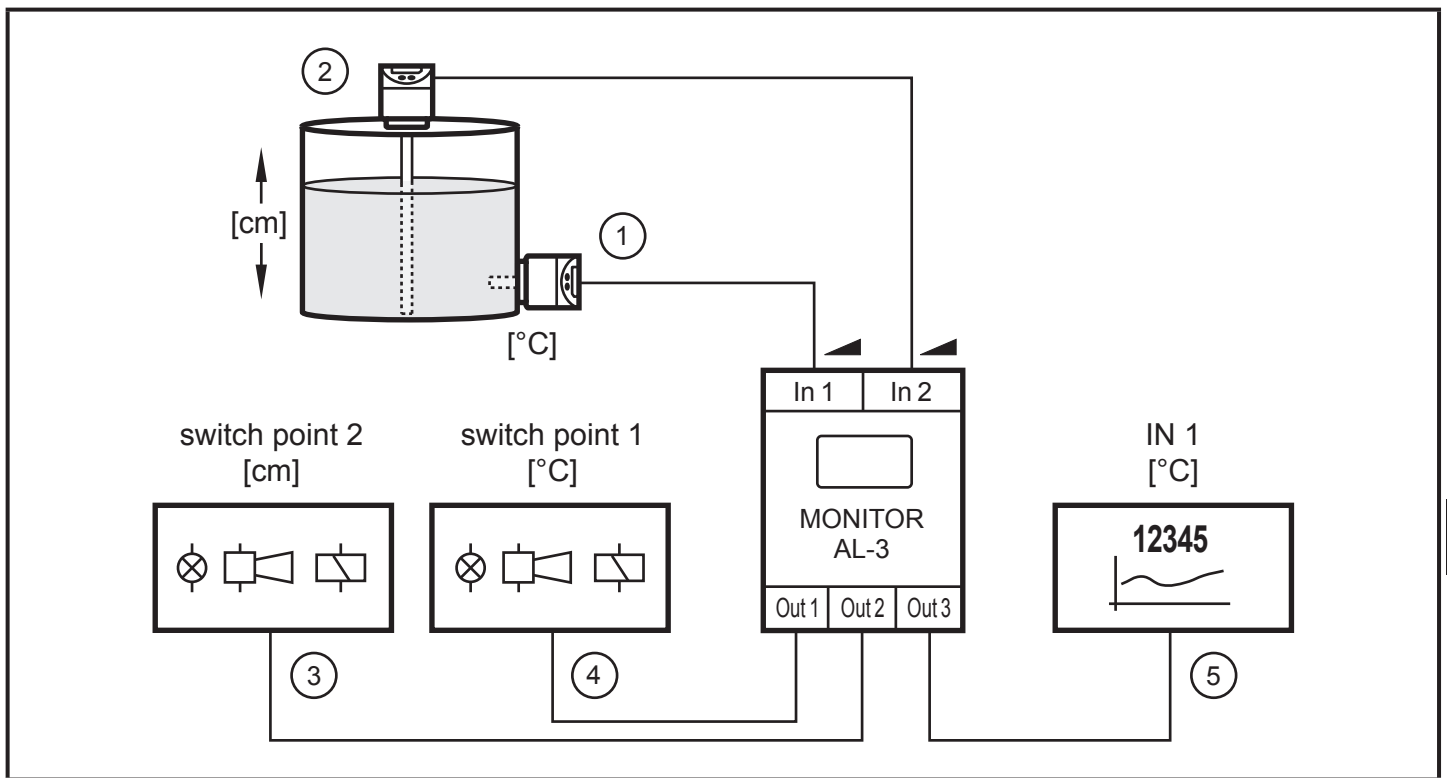
In case of malfunction of the unit or queries please contact the manufacturer. Any tampering with the device can seriously affect the safety of operators and machinery. This is not permitted and leads to the exclusion of any liability and warranty claims.

3 Functions and features

The monitor AL-3 is a programmable, analogue threshold relay for the evaluation of physical values derived from analogue standard signals. The setting possibilities of the various parameters ensure that the function of the unit is variable within a great range of values and can thus be adapted to the individual application.

Application examples

- limit value monitoring of flow, pressure, temperature or level
- monitoring of the difference between inflow and return flow
- monitoring of differential pressure



Principle 2CH mode

Limit value monitoring of 2 independent, different process values (here e.g. temperature [°C] and level [cm])

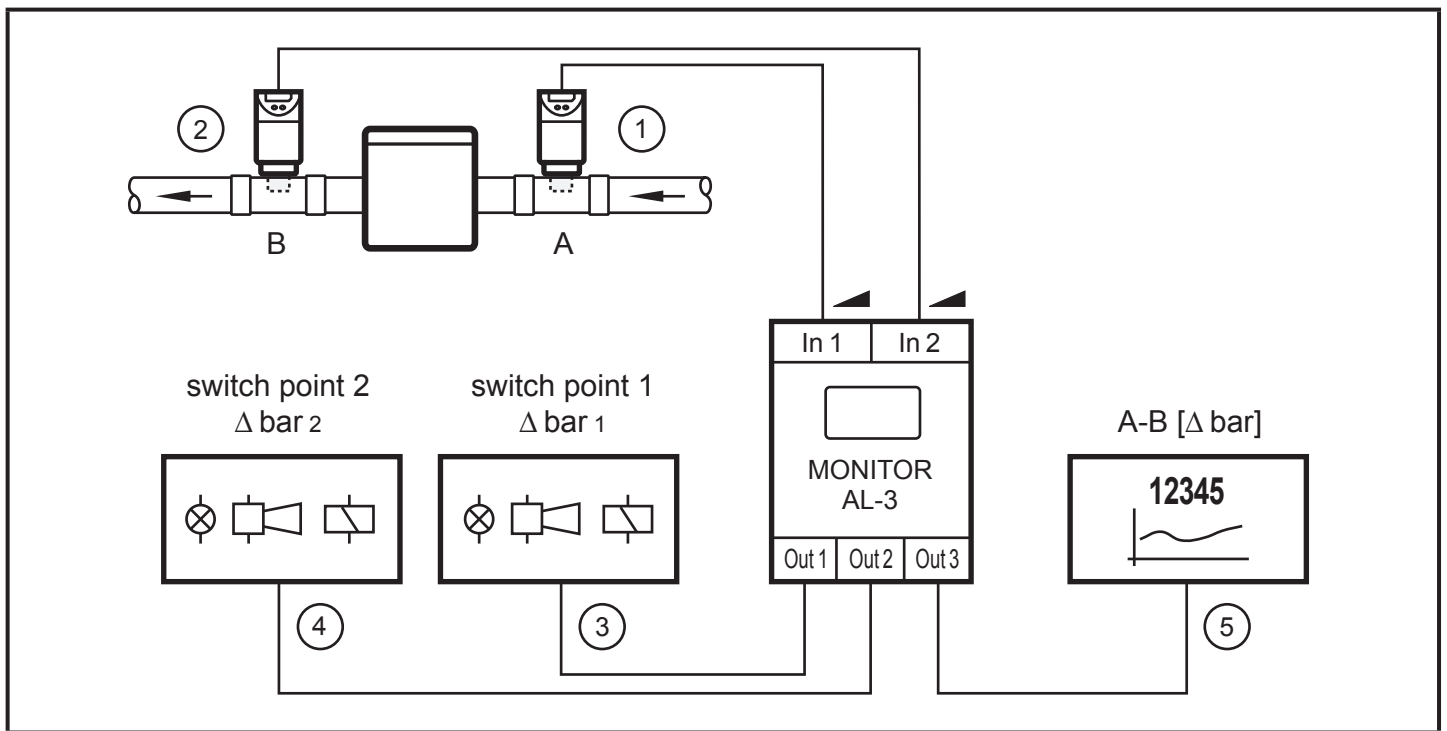
- 1: Temperature sensor [°C]
- 2: Level sensor [cm]
- 3: Switching output 2, here limit value 2 for level [cm]
- 4: Switching output 1, here limit value 1 for temperature [°C]
- 5: Analogue output for display, evaluation or recording of IN1, here [°C]

The analogue current signals at both inputs can be scaled, displayed and monitored separately. The start and end values of the current signal can be assigned any numerical value (corresponding to the measuring range of the sensor e.g. 4 ... 20 mA = 0 ... 25 [bar]).

The teach function enables the assignment of an actual signal value to a switch point and detection of the value range of the analogue output.

1CH or 2CH mode

The monitor compares the actual signal values with the set limit values and switches the assigned outputs according to the set parameter values and functions. The analogue output provides the input signal IN 1 unchanged or scaled for further use.



Principle comparator mode A-B

Limit and differential monitoring of 2 physically identical process values by means of the signal combination A-B (here e.g. pressure [bar])

- 1: Pressure sensor A
- 2: Pressure sensor B
- 3: Switching output 2, here limit value 2 for pressure difference [Δ bar2]
- 4: Switching output 1, here limit value 1 for pressure difference [Δ bar1]
- 5: Analogue output for display, evaluation or recording, here A-B [Δ bar]

Comparator mode

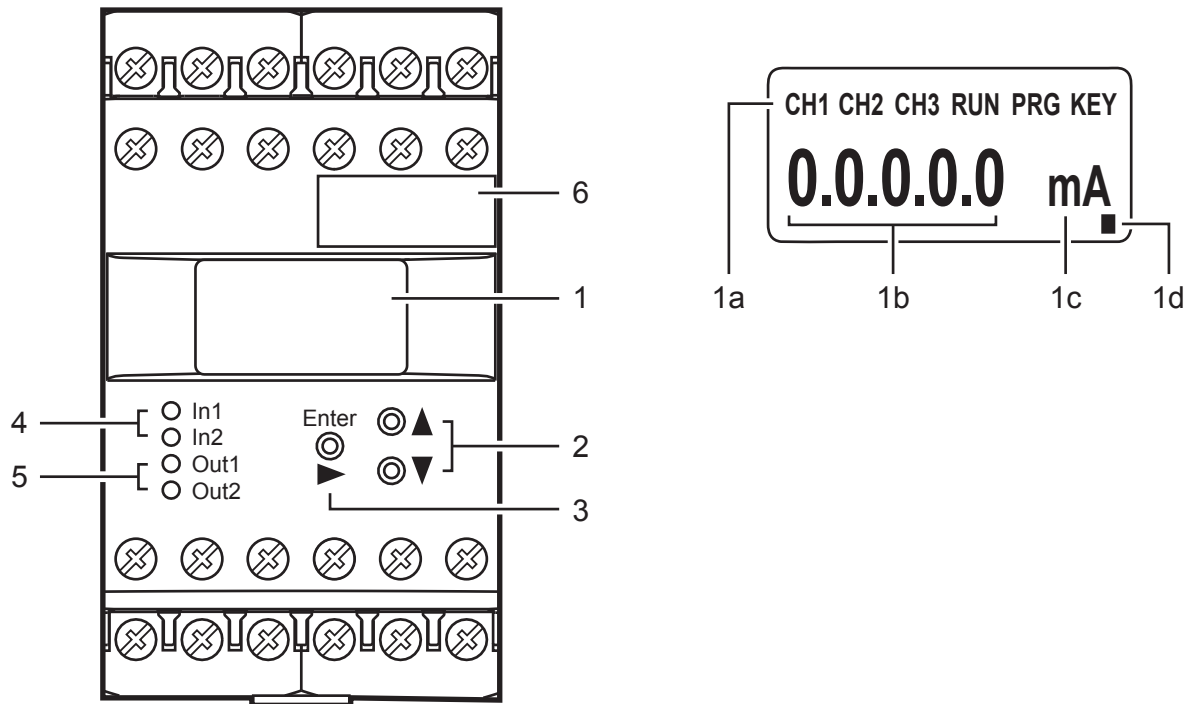
In the comparator mode the monitor AL-3 forms the difference or the total from the two input signals (IN1-IN2, IN1+IN2). The differential or the total value can be displayed, evaluated, compared with the set limit values and provided as an analogue signal. The outputs switch according to the set parameter values and functions.

⚠ WARNING

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

Using an electrical connection of the outputs from two or more units to achieve a redundant circuit, they can also be used for safety-related tasks. All applicable technical standards must be followed.

4 Operating and display elements



1	OLED display	
1a	Indicators for input channels and operating modes	
	CH...	Input channels
	RUN	Run mode (normal operating mode)
	PRG	Programming mode (setting of the parameter values)
	KEY	Locking
1b	Actual values and parameter values (5-digit, numerical)	
	Input signal	0.0...20.0 mA (max. 23.0 mA)
	Scaled values	-9999 (999.9)...+9999 (999.9)
	Outside the value ranges the display shows "----".	
1c	Parameter abbreviation and units (3-digit, alphanumeric)	
1d	Display is in stand-by mode, no values visible (→ 4.1)	
2	[▲] and [▼] buttons	
	Selection of the actual value display, parameter selection, setting of the parameter values	
3	[Enter/►] button	
	Selection of the operating mode, acknowledgement of the parameter value, front reset	

4	LEDs In1/2 (yellow)	Input signals	
	Off	Signal < 0.1 mA	
	On	Signal in the operating range	(→ 6.3.5)
	Flashing quickly	Signal in the error range	
	Flashing slowly	Signal in the warning range	
5	LEDs Out1/2 (green)	Switching status of the outputs 1 and 2	
	Off	Output is not switched. (relay de-energised, transistor blocked)	
	On	Output is switched. (relay energised, transistor switched)	
	Flashing quickly	Output is kept latched. (parameter SOx, Store Output)	
	Flashing slowly	The delay time has an effect on the output. The output switches when the delay time has elapsed and the trigger event is still present (parameter DTx, Delay Time).	
6	Panel for labelling		

4.1 Display stand-by mode

If no button is pressed for more than 10 minutes, the device changes to the stand-by mode. Values and units are no longer visible.

The stand-by mode can be identified by a flashing rectangle.



Even if no values and units are visible, the device continues its monitoring function on the basis of the set parameters and switches the relay and transistor outputs accordingly.

Press any button to switch the display on again.

5 Installation

5.1 Installation of the device

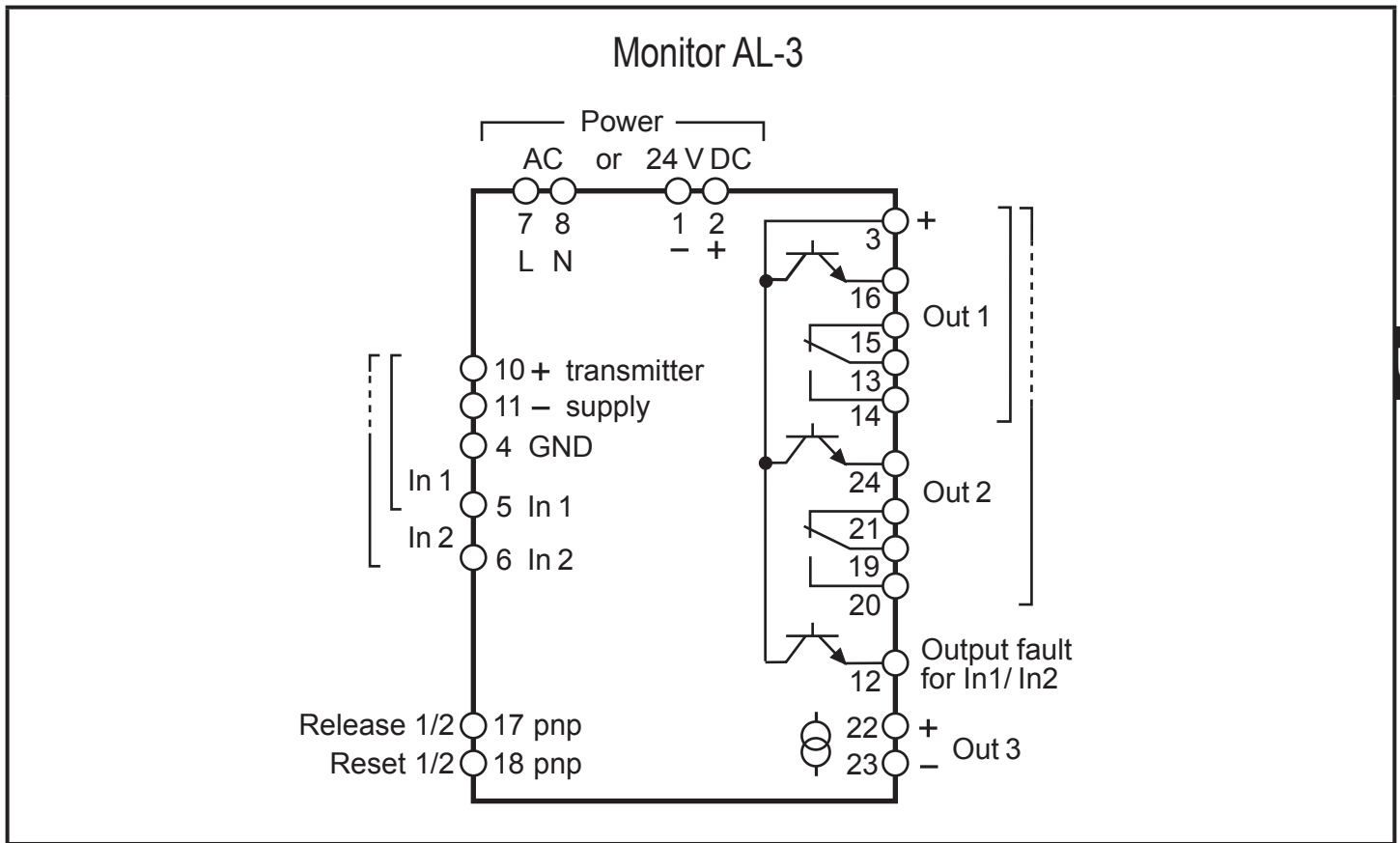
- ▶ Install the device on a 35 mm DIN rail.
- ▶ Leave enough space between the unit and the top and bottom of the control cabinet to enable air circulation and to avoid excessive heating.
- ▶ Take into account the internal heating of all units when mounting several units side by side. The environmental conditions must be observed for every unit.

5.2 Mounting of the sensors

- ▶ Follow the manufacturer's installation instructions.

6 Electrical connection

6.1 Terminal connection



Terminal connection

⚠ WARNING

Do not use unconnected terminals such as terminal 9 as support point terminal.

6.2 Voltage supply (power)

- ▶ Voltage supply see type label.
- ▶ The device may only be operated using one of the possible voltage connections, i.e. either terminals 7/8 (AC) or terminals 1/2 (24 V DC).
- ▶ All supply and signal cables must be laid separately. Use a screened cable if required in the application.

6.2.1 AC supply

- ▶ The AC supply cable must be protected according to the cross-section used (max. 16 A).

If the unit is supplied on AC, the low voltage provided for the sensor supply meets the SELV criteria according to EN 61010, overvoltage category II, soiling degree 2.

6.2.2 DC supply

- ▶ The SELV criteria (safety extra-low voltage) must be met for the DC supply.
- ▶ The DC supply cable L+ (terminal 2) must be protected externally with a 315 mA T fuse (5 x 20 mm or similar).

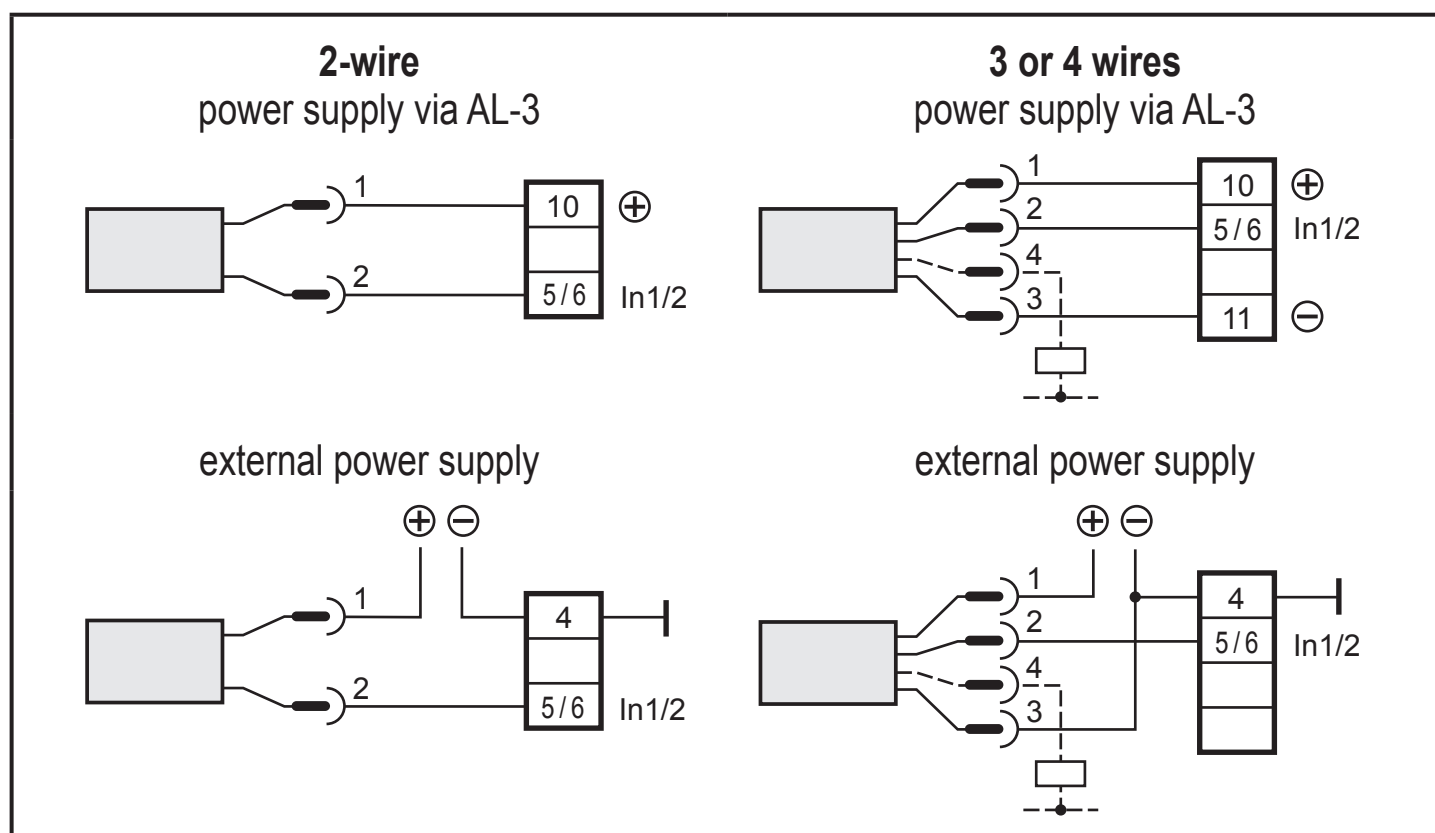
The DC supply terminals are directly connected to the sensor supply terminals.



An electrical separation between monitor and transmitter supply only exists for AC monitor supply (terminals 7/8).

6.3 Inputs

6.3.1 Connection of the sensors and transmitters (In1, 2)



The examples refer to ifm sensors!
Observe the manufacturer's instructions.

6.3.2 Release input (release 1 and 2)

By means of the release input (terminal 17), a preset start-up delay can be started.

- ▶ The internal +24 V DC voltage (terminal 10) or an external +24 V DC voltage is connected with terminal 17 via a closing contact.
- ▶ If an external voltage is used, the negative reference point of this voltage must be connected to terminal 1 of the monitor.

When the contact is opened (+24 V DC no longer applied), the set start-up delay starts for both outputs.



In case of a stored fault the +24 V DC signal on terminal 17 is only effective after a reset has been made. **UK**

A +24 V DC continuous signal on terminal 17 keeps outputs 1 and 2 in the same state as with the active start-up delay.

6.3.3 Reset input (reset 1 and 2)

A saved error can be reset via the reset input (terminal 18).

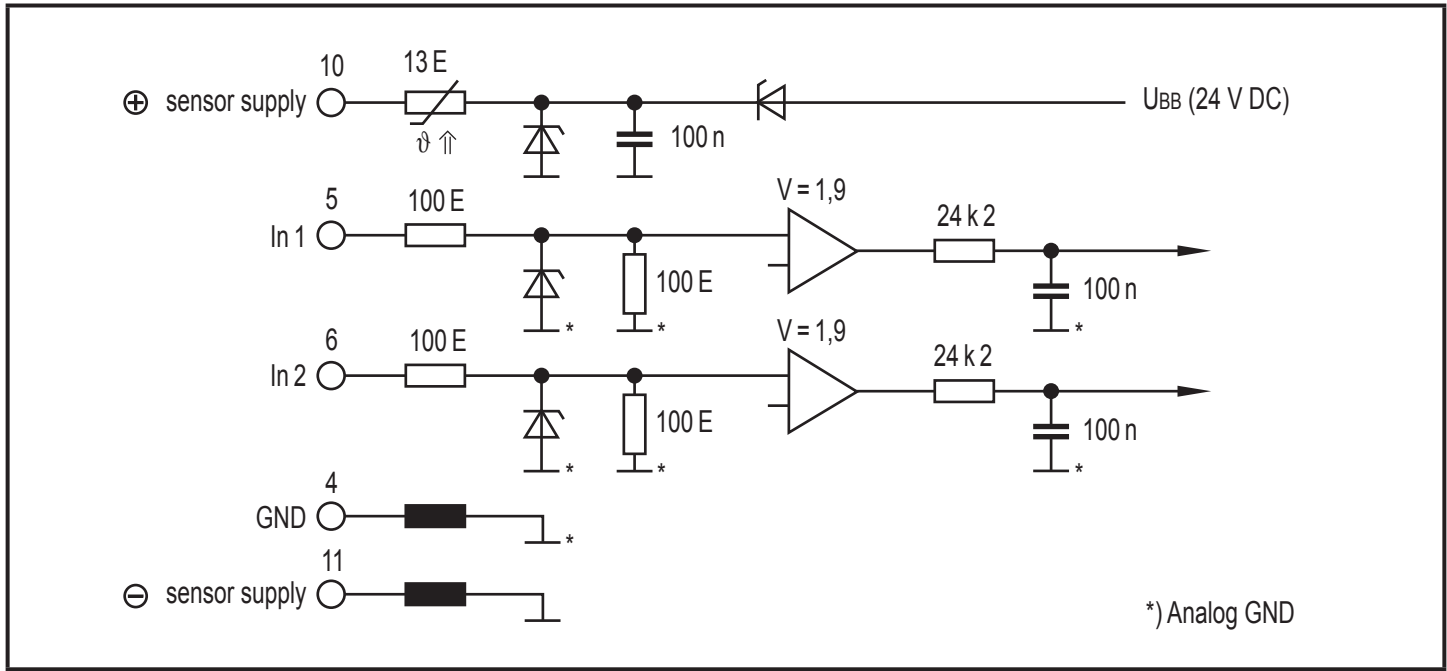
- ▶ The internal +24 V DC voltage (terminal 10) or an external +24 V DC voltage is connected with terminal 18 via a closing contact.
Reset for output 1 and 2 = terminal 18
- ▶ If an external voltage is used, the negative reference point of this voltage must be connected to terminal 1 of the monitor.

When the contact is opened (+24 V DC no longer applied), the memory of both outputs is reset.



A +24 V DC continuous signal has no effect on the monitoring function.

6.3.4 Typical input circuit



Input circuit AL-3

6.3.5 Signal monitoring inputs (In1, 2)

The measuring ranges of the input signals are divided into operating, warning and fault ranges. For signal monitoring it is useful to connect a sensor/transmitter with a 4 ... 20 mA output signal.

If an input signal is in the warning or fault range, this is indicated by flashing of the yellow input LED In1 or In2. The transistor output "output fault" (terminal 12) is blocked as soon as a signal is in the fault range.

0	3.6	4	20	22	mA
Error	Warning	Operating area	Warning	Error	
Wire break					

Measuring ranges of the input signals

A hysteresis is defined for the transitions between fault and warning ranges (< 3.6 mA and > 3.7 mA / > 22 mA and < 21.9 mA).

A delay time of 500 ms is defined for the transitions between operating and warning ranges (< 4 mA und > 20 mA).

6.4 Outputs

6.4.1 Relay outputs (Out1, 2)

- ▶ To prevent excessive wear and to comply with the EMC standards, interference suppression of the contacts is required for switching inductive loads.

WARNING

If the device is operated on an AC supply (terminals 7/8) this must use the same supply cable as the voltage supply to switch an AC voltage via the relay outputs.



If the relay outputs are used for switching very small currents (e.g. PLC inputs), considerable contact resistance can arise. In this case use the transistor outputs.

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6.4.2 Transistor outputs (Out1, 2)

- ▶ The transistor outputs need an external voltage of +24 V DC on terminal 3. This voltage can be taken from the unit via terminal 10.
- ▶ Connect the reference point (GND) of the external power supply to terminal 1 of the monitor. Otherwise no switching operation is possible.
- ▶ The SELV criteria (safety extra-low voltage) must be met for the DC supply of the transistor outputs.
- ▶ The DC supply cable L+ (terminal 3) must be protected externally with a 315 mA T fuse (5 x 20 mm or similar).

6.4.3 Analogue output (Out 3)

The analogue output is not electrically separated from the pulse pick-up supply and the 24 V DC supply voltage.

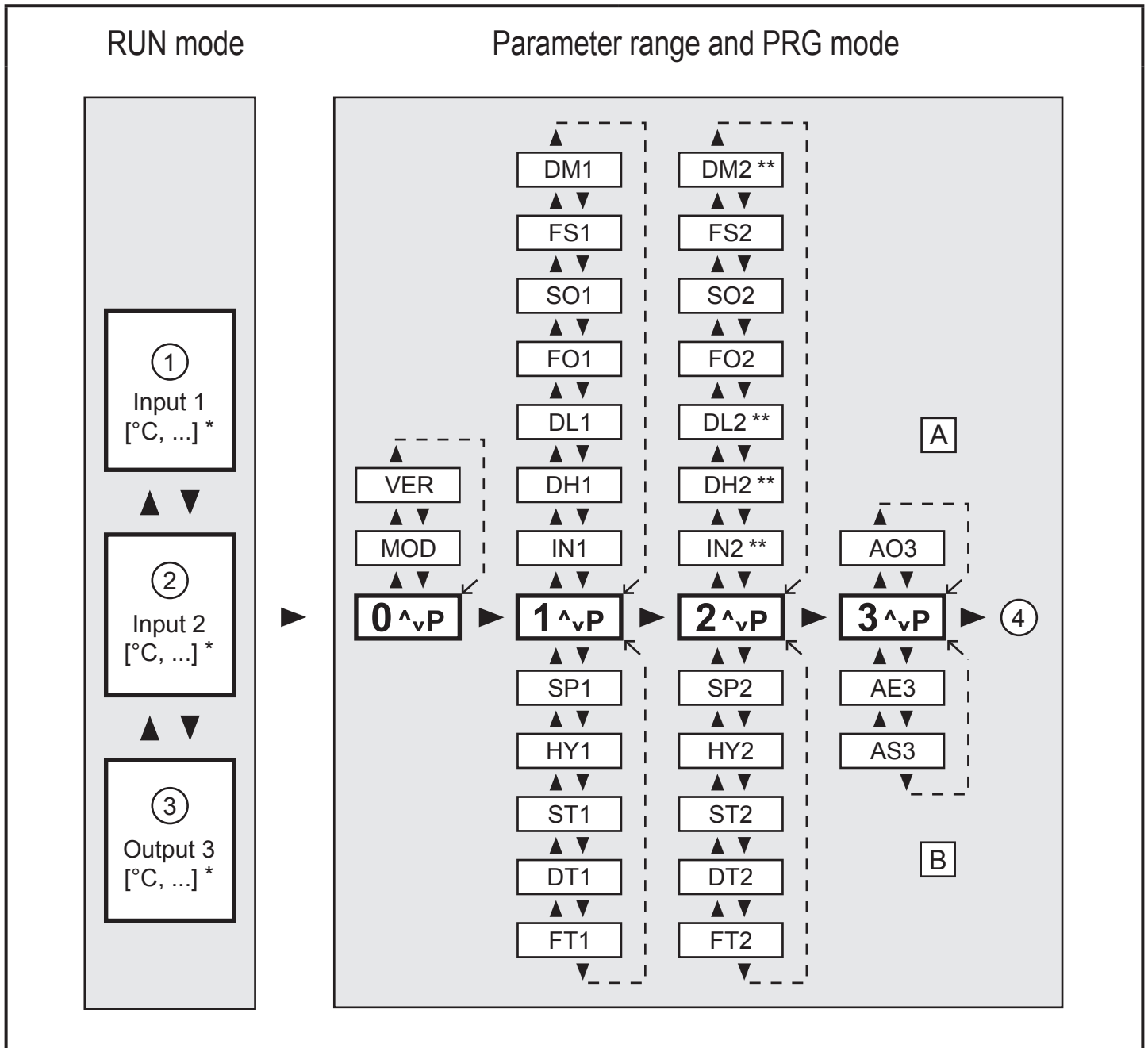
No dangerous contact circuits must be connected to the analogue output.

7 Navigation and parameter overview

The pushbuttons [▲] / [▼] and [Enter/▶] are used for the navigation, entry of values and acknowledgement within the parameters arranged in columns.

Two modes with different system parameters are available.

- 1CH and 2CH mode to detect, display and monitor 1 or 2 independent and possibly different process values.



1CH and 2CH mode

- 1: Display: actual value input 1
- 2: Display: actual value input 2
- 3: Display: actual value output 3
- 4: Back to the RUN mode

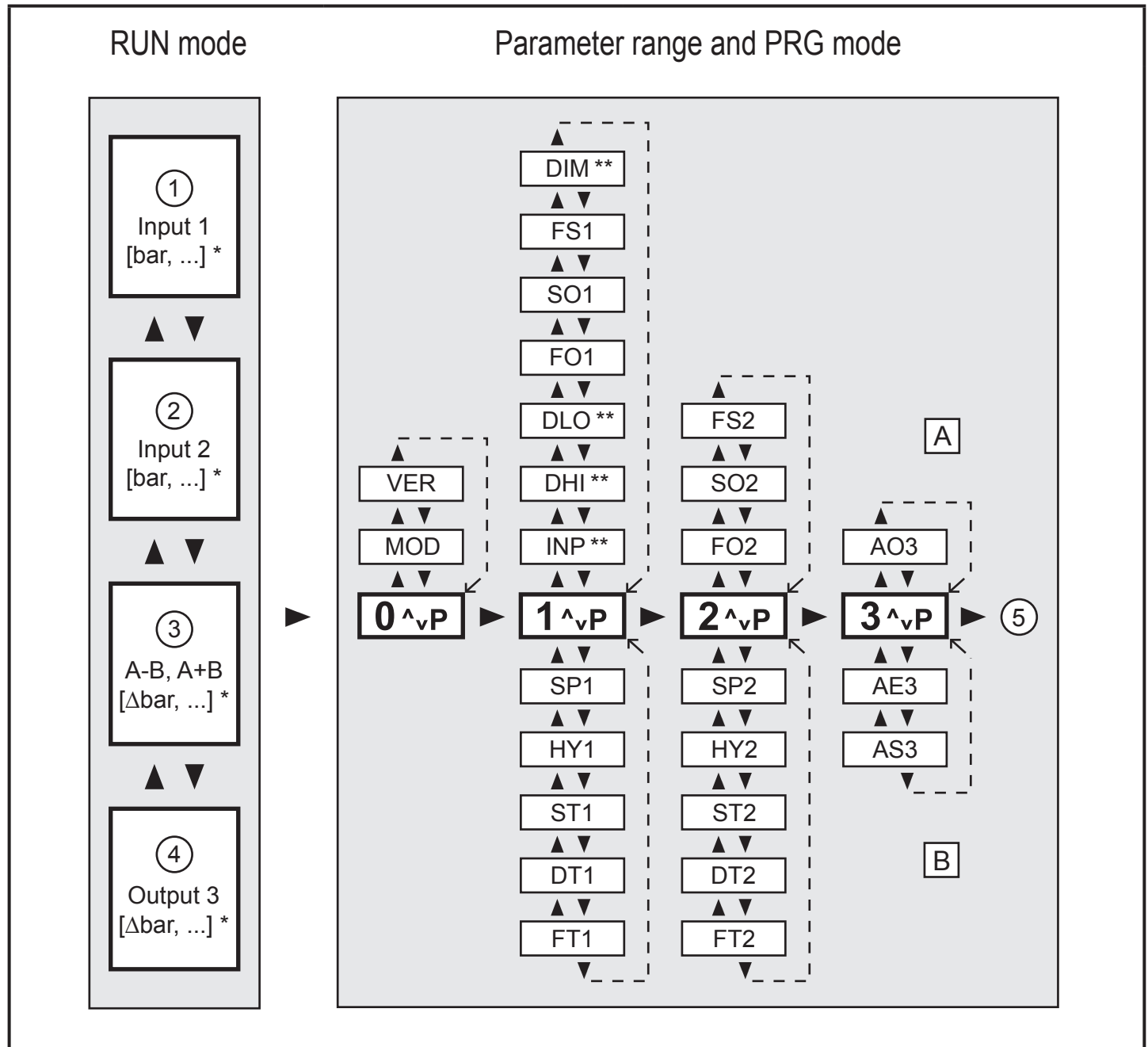
A: System parameters

B: Application parameters

*) unit adjustable

***) only visible in the 2CH mode

2. Comparator mode for differential monitoring or formation of the total of 2 physically identical process values.



Comparator mode (A-B, A+B)

- 1: Display: actual value input 1
- 2: Display: actual value input 2
- 3: Display: difference or total
- 4: Display: actual value output 3
- 5: Back to the RUN mode

- A: System parameters
 B: Application parameters
 *) unit adjustable
 **) valid for both inputs

7.1 System parameters

7.1.1 MOD

Operating mode

1CH	Single channel Monitors an analogue signal at input 1 with 2 limit values (outputs 1 and 2).
2CH	Dual channel Simultaneously monitors two different analogue signals at inputs 1 and 2 with one limit value each. Assignment: In1 = output 1; In2 = output 2. The analogue output reacts to the signal at input 1.
A-B	Comparator (subtraction mode In1-In2) Forms the difference of 2 analogue signals and monitors the differential value with 2 limit values (outputs 1 and 2). The analogue output reacts to the differential signal.
AuB	Comparator (addition mode In1+In2) Forms the total of 2 analogue signals and monitors these with 2 limit values (outputs 1 and 2). The analogue output reacts to the signal of the total.
Note	For the comparator modes A-B and AuB, the measuring ranges and output signals of the sensors/transmitters have to be identical!
Values	1CH, 2CH, A-B, Aub
Default value	1CH

7.1.2 VER

Software version

The installed software version is displayed (5-digit number with abbreviation VCO).

7.1.3 INx, INP

Input (input signal)

Selection of the input signal in the 1CH/2CH or A-B/A+B mode	
Values	4 - 20 [mA], 0 - 20 [mA]
Default values	4 - 20 [mA]

7.1.4 DHx, DHI

Display High (end value of the measuring range)

Corresponds to the actual measuring value at 20 mA	
Values	1CH/2CH mode: -9999.0...9999.0
	A-B/A+B mode: -4999.0...4999.0
Default values	20.0

7.1.5 DLx, DLO


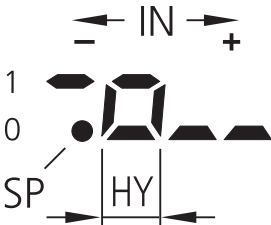





Display Low (start value of the measuring range)

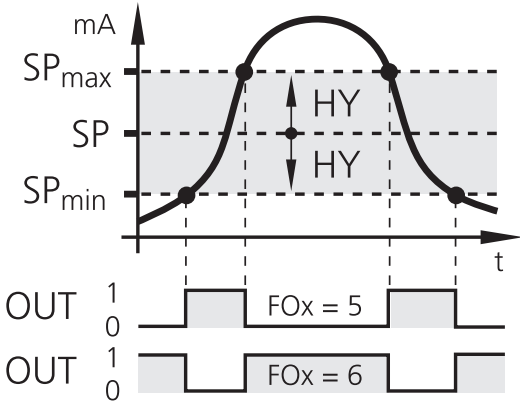
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Corresponds to the actual measuring value at 0 or 4 mA	
Values	1CH/2CH mode: -9999.0...9999.0
	A-B/A+B mode: -4999.0...4999.0
Default values	4.0

7.1.6 FOx

Function Output (switching function of the outputs)

 (1)	Relay energises (transistor output switched) when the current value is below the switch point SPx. Switches back at SP + HY.	<p>Display principle</p> 
 (2)	Relay de-energises (transistor output blocked) when the current value is below the switch point SPx. Switches back at SP + HY.	
 (3)	Relay energises (transistor output switched) when the current value is above the switch point SPx. Switches back at SP - HY.	
 (4)	Relay de-energises (transistor output blocked) when the current value is above the switch point SPx. Switches back at SP - HY.	
 (5)	Relay is energised (transistor output switched) within a frequency range (acceptable range).	
 (6)	Relay is de-energised (transistor output blocked) within the frequency range.	

Note	<p>With the functions 5 and 6 a measuring range above and below the switch point SPx is defined in connection with the parameter HYx (hysteresis).</p> $SP_x = (f_{\max} + f_{\min}) \div 2$ $HY = ((SP - SP_{\min}) \div SP) \times 100 [\%]$ 
Values	<code>..0.. ..0.. ..0.. ..0.. ..0.. ..0.. </code>
Default values	<code>FO1 = ..0.. (2)</code> <code>FO2 = ..0.. (3)</code>

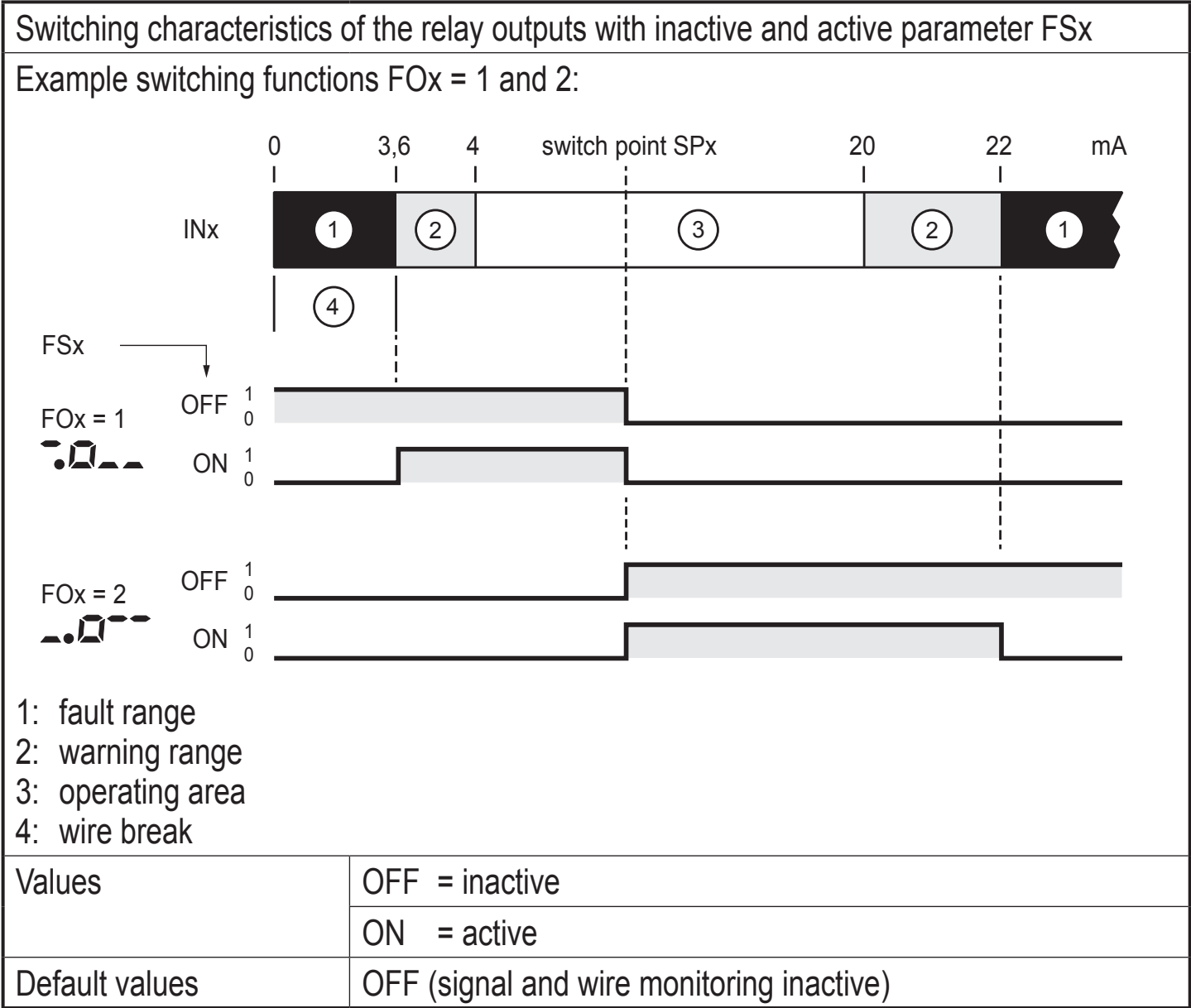
7.1.7 SOx

Store Output (latching function outputs 1/2)

When this parameter is active, the respective output does not switch back automatically but must be reset.	
Values	OFF = inactive Front = front reset ([Enter/►] > 3 s) FuE = front reset and external reset
Default values	OFF (inactive)

7.1.8 FSx

Function Signal Evaluation (signal and wire monitoring)



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7.1.9 DMx, DIM

Dimension (unit)

Values	°C, bar, lit, mA, no unit
Default value	mA

7.1.10 AO3

Analogue Out3 (analogue output)

Current range of the analogue signal	
Values	4 - 20 [mA], 0 - 20 [mA]
Default values	0 - 20 [mA]

7.2 Application parameters

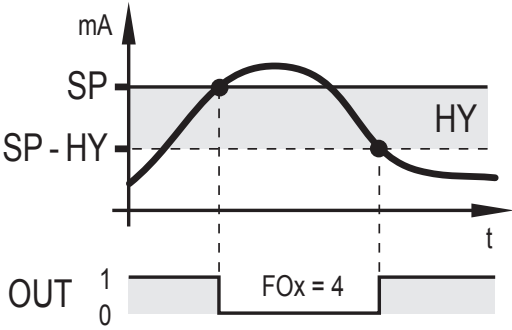
7.2.1 SPx

Switch Point (outputs 1/2)

Value at which output 1/2 changes its switching state according to the switching function FOx.	
Note	Teach function (→ 8.3)
Values	-9999 (-999.9)....9999 (999.9)
Default values	SP1 = 6.0
	SP2 = 18.0

7.2.2 HYx

Hysteresis (for switch points SP1/SP2)

<p>The hysteresis value determines the distance between the switch-off point and the switch point SPx. Prevents a possible chattering of the switching output. In combination with the switching functions 5 and 6 (FOx) an acceptable range or an error range can be defined.</p> 	
Values	0.1...100.0 % of the value for SPx
Default value	10

7.2.3 STx

Start-Up Delay Time (for outputs 1/2)

Enables the suppression of error messages when a plant is started. When the device is switched on or when the 24 V signal is removed from the reset input, the respective output for the time set here is in the "good" state (= no fault).	
Values	0.0...1000.0 s
Default value	0.0 (no start-up delay)

7.2.4 DTx

Delay Time (for outputs 1/2)

Enables a delayed switching of the outputs 1/2. The respective output switches only if the current value is above or below the switch point for more than the time set here.	
Values	0.0...1000.0 s
Default value	0.0 (no delay time)

7.2.5 FTx

Fleeting Time (for outputs 1/2)

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If an event occurs, the output changes its state during the set time and then switches back to the initial state.	
Values	0.0...1000.0 s
Default value	0.0 (fleeting time not active)

7.2.6 AE3

Analogue End (end value analogue output)


Numerical value at which the output signal is to be 20 mA.	
Note	Teach function (→ 8.3)
Value range	-9999 (-999.9)....9999 (999.9)
Default value	20.0

7.2.7 AS3


Analogue Start (start value analogue output)

Numerical value at which the output signal is to be 0 or 4 mA.	
Note	Teach function (→ 8.3)
Value range	-9999 (-999.9)....9999 (999.9)
Default value	0.0

8 Programming

**WARNING**

If programming takes place during operation, dangerous contact voltage may occur. Therefore ensure that programming is done by a qualified electrician.


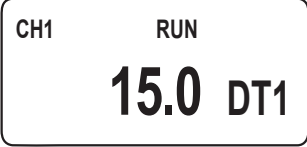
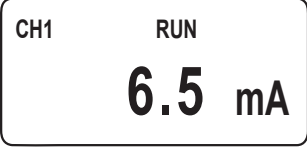


Parameter changes during operation, especially changes to the switching function and the switch points can lead to malfunction in the plant.
Therefore disconnect it during the change and then check the function.

Programming consists of 6 steps:	
1. Change from the RUN mode to the parameter range 1 or 2 or 3	[Enter/▶]
2. Selection of the requested parameter (FOx, SOx, NCx, etc.)	[▲] / [▼]
3. Change to the PRG mode	[Enter/▶]
4. Setting or changing the parameter value	[▲] / [▼]
5. Acknowledgement of the set parameter value	[Enter/▶] > 3 s
6. Return to the RUN mode	[Enter/▶] > 3 s

8.1 Programming example DT1 (Delay Time, output 1)

Operation	Display
Change from the RUN mode to the parameter range (here 1)	
▶ Briefly press [Enter/▶] once. > The 1st parameter range is displayed.	<div>CH1 RUN 1 ^vP</div>
Selection of the requested parameter (here DT1)	
▶ Press the [▼] button until the parameter DT1 is displayed with the currently set value (here default value 0.0).	<div>CH1 RUN 0.0 DT1</div>
Change to the PRG mode	
▶ Briefly press [Enter/▶] once. > The unit is in the programming mode. > PRG indicator visible, parameter abbreviation flashes.	<div>CH1 RUN PRG 0.0 DT1</div>

Setting or changing the parameter value	
<ul style="list-style-type: none"> ▶ Press [▲] / [▼] until the requested parameter value is displayed (→ 8.2.3 Numerical entries). 	
Acknowledgement of the set parameter value	
<ul style="list-style-type: none"> ▶ Press [Enter/▶] until the parameter abbreviation no longer flashes and the indicator PRG has disappeared. > The new parameter value is indicated and effective. 	
Return to the RUN mode	
<ul style="list-style-type: none"> ▶ Press [Enter/▶] for about 3 s or wait for the time-out function (approx. 15 s). > The unit is again in the RUN mode, the current value is indicated. 	

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8.2 Notes on programming

8.2.1 RUN mode



During programming the unit internally remains in the RUN mode (RUN indicator visible).

This means that until a new value is acknowledged with [Enter/▶], the unit carries out its monitoring function on the basis of the previously set parameters and switches the relay and transistor outputs accordingly.



The monitoring function of the monitor is deactivated by continuously pressing [Enter/▶] in the RUN mode. The deactivation is effective as long as the button is pressed.

8.2.2 Time Out function

If during programming no pushbutton is pressed for approx. 15 s, this is seen as a cancellation.

Parameter changes which are not acknowledged with [Enter/▶] are rejected. The previously set parameter value is restored and remains effective for the monitoring functions.

8.2.3 Numerical entries

► Press [▲] or [▼] and hold it.

The smallest decade becomes active and is counted up or down depending on the selected pushbutton (e.g. 1, 2, 3,...0). Then comes the next decade, etc.

As soon as the pushbutton is released, the active decade flashes. It is set by pressing [▲] or [▼] several times. The preceding decade then flashes and can be set.

8.2.4 Factory Reset

The factory default values can be restored by pressing [▲] and [▼] simultaneously during power on. All previously entered parameter values are lost.

8.2.5 KEY function (locking)

The unit can be locked to prevent incorrect entries.

After locking, only the actual value indication can be switched with the [▲] and [▼] buttons. Parameter range and PRG mode can no longer be selected.

Locking	Unlocking
<ul style="list-style-type: none">► Press [▲] and [▼] simultaneously and hold them pressed.> The KEY indicator flashes.► Release the pushbuttons when the KEY indicator is continuously indicated.	<ul style="list-style-type: none">► Press [▲] and [▼] simultaneously and hold them pressed.> The KEY indicator flashes.► Release the pushbuttons when the KEY indicator is no longer indicated.

8.3 Teach function

In addition to the numerical entry 4 parameters can also be set via the teach function. In the programming mode this function enables to measure and display the current input signal and to assign the selected parameter to it.

- SP1 Switch Point Output 1 (switch point of output 1)
- SP2 Switch Point Output 2 (switch point of output 2)
- AE3 Analogue End Output 3 (end value analogue output)
- AS3 Analogue Start Output 3 (start value analogue output)

To teach the current measured value the same programming steps as for "normal" programming are carried out.

Programming with teach function	
1. Change from the RUN mode to the parameter range 1 or 2	[Enter/►]
2. Selection of the requested parameter (SP1, SP2, AE3, AS3)	[▲] / [▼]
3. Change to the PRG mode	[Enter/►]
4. Display and set the current input frequency*	[▲] and [▼] > 3 s
5. Assign the displayed and possibly changed value	[Enter/►] > 3 s
6. Return to the RUN mode	[Enter/►] > 3 s

*) The displayed value can be changed with [▲] / [▼], if necessary.

UK

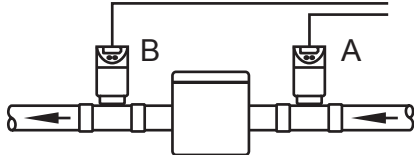
8.4 Setting example

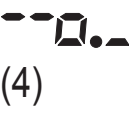
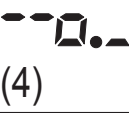
8.4.1 Monitoring of limit values and differential pressure

Comparator mode principle (→ 3 Functions and features)

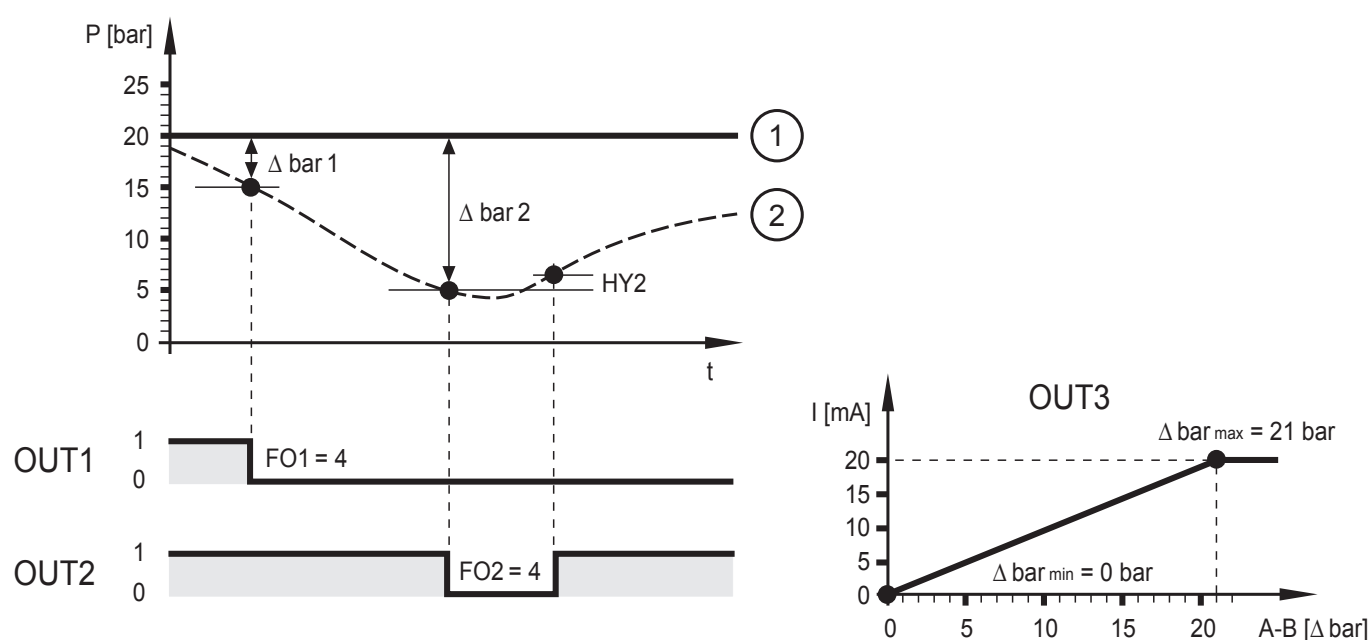
Task

Monitoring of a filter system by recording the measured pressure values before and behind the filter.

System parameters			
Max. system pressure		21 bar	 <p>filter system</p>
Operating pressure (nominal pressure)		20 bar	
Min. permissible operating pressure		5 bar	
Measuring range of the sensors/transmitters		0...25 bar	
Analogue output of the sensors/transmitters		4...20 mA	
Parameter values			
MOD	Mode	A-B	Differential monitoring [Δ bar]
INx	Input (type)	4-20	Analogue outputs of the sensors/transmitters
DHI	Display High	25	Max. measured value of the sensor/transmitter
DLO	Display Low	0	Min. measured value of the sensor/transmitter

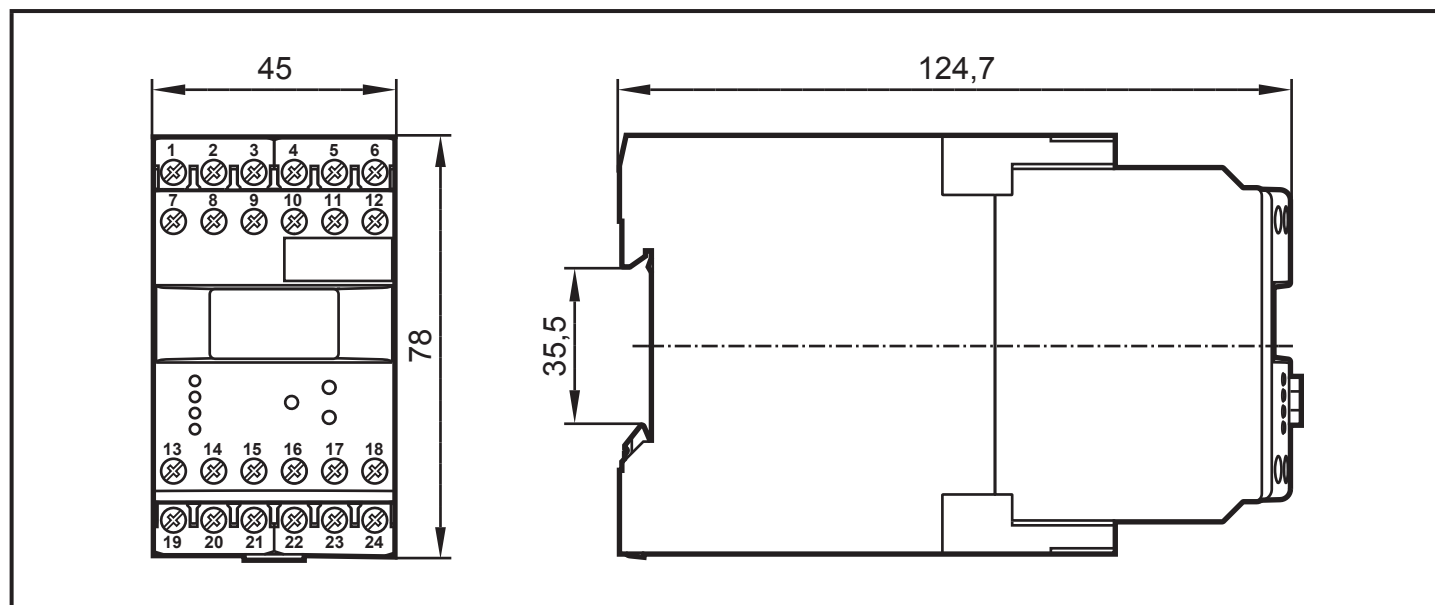
FO1	Function Output 1	 (4)	Relay 1 de-energises when current value is above SP1 (switches back at SP1-HY1)
FO2	Function Output 2	 (4)	Relay 2 de-energises when current value is above SP2 (switches back at SP2-HY2)
SP1	Switch Point Output 1	5	Differential pressure Δ bar 1 (limit value 1)
SP2	Switch Point Output 2	15	Differential pressure Δ bar 2 (limit value 2)
HYx	Hysteresis for SP1 / 2	10	Reset point [% of SPx]
AO3	Analogue Output 3 (type)	0-20	0...20 mA signal for Δ bar evaluation
AE3	Analogue End Output 3	21	Max. possible differential pressure (Δ bar _{max})
AS3	Analogue Start Output 3	0	Min. possible differential pressure (Δ bar _{min})

Output characteristics (OUT1...3)



- 1: measured value A (e.g. constant)
2: measured value B (e.g. variable)

9 Scale drawing



10 Technical data

10.1 Overview

Art. no.	DL2503
Monitor type	AL-3
Supply voltage	see type label
Frequency range	
Power consumption	
Analogue inputs	2 x 0/4...20 mA for sensors or transmitters
Measuring range	0...22.5 mA
Accuracy	± 0.25 %
Resolution	12 bit
Internal resistance	200 ohms
Sampling rate	2 ms
Input frequency	≤ 200 Hz
Auxiliary voltage	24 V DC, 150 mA, short-circuit proof
Relay outputs	2 changeover contacts; potential free
Switching current	≤ 6 A
Switching voltage	≤ 250 V AC; B300, R300
Transistor outputs	PNP switched; externally supplied
Switching current	≤ 15 mA; short-circuit proof
Switching voltage	24 V DC (± 20 %)

Art. no.	DL2503
Analogue output	0/4...20 mA, short-circuit proof, no feedback
Load	≤ 500 ohms
Protection housing / terminals	IP 50 / IP 20
Ambient temperature	-40...60 °C
Storage temperature	-40...85 °C
Max. relative air humidity	80 % (31 °C) linearly decreasing to 50 % (40 °C)
Maximum operating altitude	2000 m above sea level
Connection	23 dual-chamber terminals; 2 x 2.5 mm ² (AWG 14)

Data sheets can be found at:

www.ifm.com → Data sheet search → Article number

10.2 Approvals / standards

EC declarations of conformity, approvals etc. can be downloaded at:

www.ifm.com → Data sheet search → Article number → More information

11 Maintenance, repair, disposal

The device is maintenance-free.

- ▶ Do not open the housing as the device does not contain any components which can be repaired by the user. The device must only be repaired by the manufacturer.
- ▶ Dispose of the device in accordance with the national environmental regulations.

