OBSOLETE

Operating Instructions

Digital Indicator Model A-RB-1

WIKA

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Preface

Many thanks for buying our digital indicator Model A-RB-1.

This operating manual includes instructions for the operation of the digital indicator and information on its functionality. Read these operating instructions thoroughly prior to starting up the digital indicator. In order to avoid any damage or injuries that might be caused by any non-observance of the appropriate regulations, please ensure that the person operating this digital indicator receives these operating instructions.

Safety Instructions

The appropriate national safety regulations (e.g. VDE 0100) must be observed when mounting, starting up and operating these displays. Serious injuries and/or damage can occur should the appropriate regulations not be observed. Only appropriately qualified persons should work on these instruments.

1. General

The digital indicators A-RB-1 are precision instruments for the measurement of current and voltage signals of pressure or other transmitters. The instruments are normally DIN-Size panel mounting (96 x 48 x 190 mm) per IEC 61 554.

Indication is made via a 3 1/2 -digit LED display, covering a range from -1999 to +1999 digits. The actual span to be indicated can be easily programmed anywhere within this range. The same applies to decimal point, signal input, analogue output damping and baud rate of the data interface. All programming can be made while the instrument is operative.

This versatility is achieved by means of a powerful microprocessor, which also controls all other functions.

An inbuilt isolated transformer provides power supply of DC 24 V max. 30 mA to energise transmitters connected.

Analogue output of 0 … 10 V, 0 … 20 or 4 … 20 mA, adjustable damping, as well as HOLD memory and MIN and MAX memory are serial standard.

Optionally available are 2 alarm contacts and also a serial RS-232 interface.

2. Layout of front panel

The position of the operation and connection elements is shown in appendix C.

2.1 LED display 'A'

By means of the MODE key (see section 2.2), the display can be set to optionally read the REAL value measured, or either one of the values stored in the HOLD, MIN or MAX memory.

2.2 MODE key 'H'

The MODE key is found at the right-hand side next to the display, indicated by REAL, HOLD, MIN and MAX. Hitting changes the modes in consecutive order. A red LED indicates the active mode.

2.2.1 REAL mode 'h'

Indicates the current value measured.

2.2.2 HOLD mode 'h'

Hold the value indicated at the very moment the key is pressed. Measurement continues in the background, meaning that the memories of Minimum and Maximum as well as the alarm contacts continue to operate. HOLD discontinues upon further hitting of the MODE key or hitting of the RESET key (see 2.7).

2.2.3 MIN mode (minimum memory) 'h'

The lowest value indicated since last hitting of the RESET key is memorised and will be displayed in this mode. Measurement continues in the background, meaning that the memories of MIN and MAX as well as the alarm contacts continue to operate. MIN discontinues upon further hitting of the MODE key. Hitting of the RESET key erases the memory (see 2.7).

2.2.4 MAX mode (maximum memory) 'h'

The highest value indicated since last hitting of the RESET key is memorised and will be displayed in this mode. Measurement continues in the background, meaning, that the memories of MIN and MAX as well as the alarm contacts continue to operate. MAX discontinues upon further hitting of the MODE key. Hitting of the RESET key erases the memory (see 2.7).

2.3 Set key descending value (▼) 'B'

Selects the next lower value or individual parameter during programming.

2.4 Set key ascending value (▲) 'C'

Selects the next higher value or individual parameter during programming.

2.5 Programming key PROG 'F'

Hitting of this key actuates the programming mode, at which all operative parameters can be set and verified.

2.5.1 Programming the indication (see also appendix A)

All programming is made in consecutive order by initially holding the PROG key pressed for approx. 5 seconds, until the message SCL (for scaling) appears instead of PRO for programming.

Press PROG once more: -A-appears, standing for "Low end of scale". Press PROG once more: The "MIN" LED flashes and the corresponding value is displayed. Change this value as desired by hitting the (▲) and (▼) keys. Press PROG once more: The new value will be memorised. This is indicated by 3 dashes "---" appearing for a few seconds.

The "MIN" LED extinguishes and -E-appears, standing for "High end of scale". Press PROG once more: The "MAX" LED flashes and the corresponding value is displayed. Change this value as desired by hitting the (▲) and (▼) keys. Press PROG once more: The new value will be memorised. This is indicated by 3 dashes "---" appearing for a few seconds.

The "MAX" LED extinguishes and dP appears, standing for "Decimal point". Change the decimal point as desired by hitting the (▲) and (▼) keys. Press PROG once more: The new position of the decimal point will be memorised. This is indicated by 3 dashes "---" appearing for a few seconds after which InX appears, standing for "Signal input X", where "X" stands for figures 1 to 3 as explained below.
Change this value as desired by hitting the (▲) and (▼) keys.

X = 1: *In1* = Input signal voltage 0 ... 10 V
X = 2: *In2* = Input signal current 0 ... 20 mA
X = 3: *In3* = Input signal current 4 ... 20 mA

Press PROG once more: The new value will be memorised.

This is indicated by 3 dashes "---" appearing for a few seconds after which OuX appears, standing for "Output signal X", where "X" stands for figures 1 to 3 as explained below. Change this value as desired by hitting the (▲) and (▼) keys.

X = 1: *Ou1* = Output signal voltage 0 ... 10 V
X = 2: *Ou2* = Output signal current 0 ... 20 mA
X = 3: *Ou3* = Output signal current 4 ... 20 mA

Press PROG once more: The new value will be memorised .This is indicated by 3 dashes "---" appearing for a few seconds.

Subsequently "-d- (damping)" appears automatically. After hitting the key once more the current setting of the damping is displayed. The damping can be set within a range of 0.1 s ... 50.0 s. The damping can be changed in 0.1 s steps using the (▲) and (▼) keys.
The damping is adapted from the behaviour of a capacitor. After the set time (=t) has passed, approx. 63% of the changed value is applied. After 5 x t has passed, approx. 97% of the changed value is applied.

Press PROG once more: The new damping value will be memorised. This is indicated by 3 dashes "---" appearing for a few seconds.

Then dXX (reference of damping) is displayed. XX stands for the selected setting. The damping can be activated for the display, the analogue output signal, the alarm contacts and the MIN / MAX memory in any combination as specified in the following table:

Setting d XX	Display	Analogue output	Alarm contacts	MIN / MAX memory
d01	1	0	0	0
d02	0	1	0	0
d03	1	1	0	0
d04	0	0	1	0
d05	1	0	1	0
d06	0	1	1	0
d07	1	1	1	0
d08	0	0	0	1
d09	1	0	0	1
d10	0	1	0	1
d11	1	1	0	1
d12	0	0	1	1
d13	1	0	1	1
d14	0	1	1	1
d15	1	1	1	1

(0: Damping deactivated, 1: Damping activated)

The value for dXX can be changed using the (▲) and (▼) keys. Press PROG once more: The new value will be memorised. This is indicated by 3 dashes "---" appearing for a few seconds.

With instruments not featuring the serial data interface, programming is now complete and standard operating mode will be automatically selected.

With instruments featuring the serial data interface, -b- appears. After hitting the key once more the current setting of the Baud rate of the serial interface (RS 232) is indicated. Change this value as desired by hitting the (▲) and (▼) keys.

Display	Baud rate
01.2	1200 Baud
02.4	2400 Baud
04.8	4800 Baud
09.6	9600 Baud
19.2	19200 Baud
38.4	38400 Baud

Press PROG once more: The new value will be memorised. This is indicated by 3 dashes "---" appearing for a few seconds. Programming is now complete and standard operating mode will be automatically selected.

Programming can be terminated at any time by hitting the RESET key. In this instance, only such changes are accepted that have been acknowledged by appearance of "---". Otherwise, previously set values remain in effect.

2.5.2 Verification of programmed settings

(see also appendix A)

Short hitting of the PROG key initiates "Pro" to appear at the display, followed by all current settings in consecutive order, where:

-A-	Low end of scale
-E-	High end of scale
dP	Decimal point
InX	Input signal
OuX	Output signal
-d-	Damping
dxx	Reference of damping
-b-	At digital interface: baud rate setting

Indication can be terminated at any time by hitting the RESET key. (see also 2.7)

2.5.3 Compensation of zero offset

Despite careful calibration, the instrument may indicate a zero offset in operation. This may be caused by a static head acting on the transmitter or other process conditions. Preferably this should be compensated by shifting the zero signal of the transmitter. If this cannot be accomplished, true indication can be achieved by means of shifting low end and high end indication correspondingly as per examples below.

Example 1:
Scaling: 0 … 400 bar
Zero offset: 4 bar
Corrective: -4 … 396 bar

Example 2:
Scaling: 0 … 400 bar
Zero offset: -7 bar
Corrective: 7 … 407 bar

However, it is more favourable to compensate the offset by adjustment the connected transmitter.

2.6 Model A-RB-1-D with 2 alarms

(see also appendix B)

The keys SET 1 (alarm 1) and SET 2 (alarm 2) actuate the programming mode to enter and verify the settings of the alarms. The max. loading capacity of the alarms is AC 250 V / 8 A.

2.6.1 Setting of alarm 1

(see also appendix B)

Programming of alarm 1 is made by initially holding the SET 1 key pressed until SP1 (Set point 1) disappears and the message SE (Set point makE) appears.

Press SET 1 once more: The red LED in the upper left hand corner of the SET 1 key flashes and the corresponding value is displayed. Change this value as desired by hitting the (▲) and (▼) keys.

Press SET 1 once more: The new value will be memorised. This is indicated by 3 dashes "---" appearing for a few seconds.
The LED extinguishes and SA appears, standing for "Set point breAk".

Press SET 1 once more: The red LED in the upper right corner of the SET 1 key flashes and the corresponding value is displayed. Change this value as desired by hitting the (▲) and (▼) keys.

Press SET 1 once more: The new value will be memorised. This is indicated by 3 dashes "---" appearing for a few seconds and the LED extinguishes.

Contact function can be selected to HIGH ALARM (meaning make on rising value), or LOW ALARM (meaning make on falling value). This is easily achieved by programming the make (SE) value either above or below the corresponding break (SA) value.

Setting (SE) above (SA) means HIGH ALARM. (SE) will energise the alarm circuit, which will remain energised until the display figure decreases to reach the value of (SA).

Setting (SE) below (SA) means LOW ALARM. (SE) will energise the alarm circuit, which will remain energised until the display figure increases to reach the value of (SA).

The difference between (SE) and (SA) represents the hysteresis across make and break points of the contact. (This must not be confused with any hysteresis across approach of the set points with rising and falling values. This sort of mechanical delay is not apparent with a digital instrument).

Both values can be programmed without limitations, as the case demands. Setting both, (SE) and (SA) at the same values, will automatically create HIGH ALARM function.

The LED's in the upper corners of the SET keys are intended to indicate the alarm configuration together with the relay status. The left LED, when lit, indicates energised alarm circuit at HIGH ALARM programmed. The right LED, when lit, indicates energised alarm circuit at LOW ALARM programmed.

SET 1 key corresponds to alarm 1, SET 2 key corresponds to alarm 2.

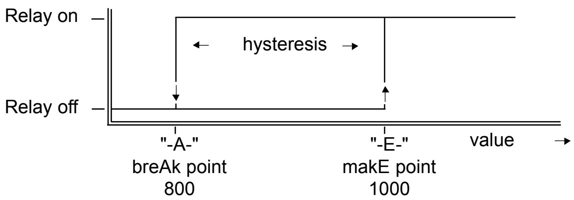
Programming of alarm contacts can be terminated at any time by hitting the RESET key. In this instance, only such changes are accepted that have been acknowledged by appearance of "---". Otherwise, previously set values remain in effect.

Examples:

a) HIGH ALARM (make at 1000, break at 800)

The circuit relay is energised once the display value rises to 1000. It remains energised until the display value falls to 800.

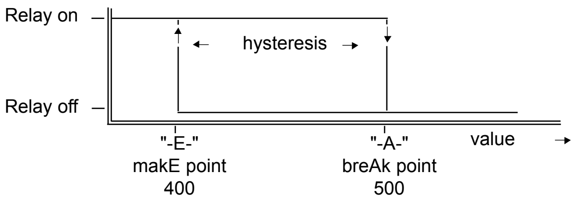
The left hand LED at the SET 1 key comes on at 1000 and is turned off at 800.



b) LOW ALARM (make at 400, break at 500)

The circuit relay is energised once the display value falls to 400. It remains energised until the display value rises to 500.

The right hand LED at the SET 1 key comes on at 400 and is turned off at 500.



2.6.2 Setting of alarm 2
(see also appendix B)

Programming of the alarm 2 contact is initiated by hitting key SET 2, otherwise fully identically to the programming of no. 1.

2.6.3 Verification of set points of alarm 1
(see also appendix B)

Short hitting of the SET 1 key initiates "SP1" to appear at the display, followed by the current settings of (SE) and (SA) of alarm contact no. 1

Indication can be terminated at any time by hitting the RESET key. (see also 2.7)

2.6.4 Verification of set points of alarm 2
(see also appendix B)

Verification of the alarm 2 contact is initiated by hitting key SET 2, otherwise fully identical to the verification of no. 1.

2.7 RESET key 'G'

The RESET key enables to - erase memories - exit programming mode - exit verification mode.

2.7.1 Erase data memory

Hitting the RESET key while the instrument is operative erases the data memories as explained below:

- When pressed in REAL mode (indication of value measured), the MIN and MAX memories will be erased.

- When pressed in HOLD mode, this will reset the instrument into REAL mode.

- When pressed in MIN mode, only the MIN memory will be erased.

- When pressed in MAX mode, only the MAX memory will be erased.

2.7.2 Exit programming mode
(see also 2.5.1, 2.6.1 and 2.6.2)

Programming can be terminated at any time by hitting the RESET key. In this instance, only such changes are accepted, that have been acknowledged by appearance of "---". Otherwise, previously set values remain in effect.

2.7.3 Exit verification mode
(see also 2.5.2, 2.6.3 and 2.6.4)

The verification mode proceeds automatically and can be terminated at any time by hitting the RESET key.

3. Layout of back panel terminals
(see illustration of appendix D)

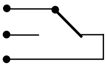
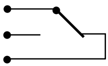
The back panel features the 15-pin plug 'J', containing the terminals for power supply and both alarm contacts, and the 9-pin plug 'K', containing the terminals of input signal, transmitter supply and analogue output.

Both racks are of the plug-terminal type for ease of wiring.

Every 2nd pin of the 15-pin plug remains blank to enable safe wiring of the line voltage.

Instruments incorporating the serial interface will additionally feature a 9-pin Sub-D plug 'L'.

3.1 Layout of 15-pin plug 'J'

Pin	Designation
1 3 5	 Alarm 1 contact max. AC 250 V / 8 A
7 9 11	 Alarm 2 contact max. AC 250 V / 8 A
13 15	AC 230 V ± 10 % or AC 115 V ± 10 %, 50 / 60 Hz

Internal jumpers provide adaption to line voltage AC 230 V ± 10 %, 50 / 60 Hz or AC 115 V ± 10 %, 50 / 60 Hz. To adjust, open the enclosure and arrange jumpers next to the fuse as indicated in the drawing. A replacement of the fuse is not required.

3.1.1 Opening the case

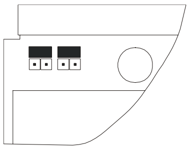
Remember to disconnect the power supply prior to opening the enclosure!

First strip the terminal blocks from the digital indicator. Then remove the retaining screw in the centre of the case back and loosen the electronic rack from the locking device by exerting a constant pressure on the 9-pin female plug towards the front. Now you can pull the rack out of the case.

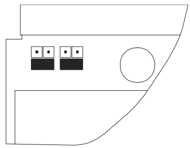
For assembly please carry out these steps in reverse order.

3.1.2 Scheme of line power settings

Power setting 230 VAC ± 10 %:



Power setting 115 VAC ± 10 %:

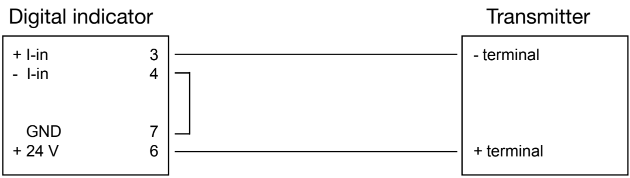


3.2 Layout of 9-pin plug 'K'

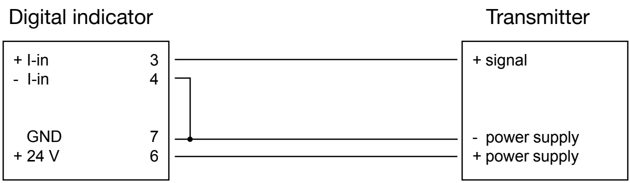
Pin	Designation	
1	$+U_{in}$	Voltage signal input
2	$-U_{in}$	
3	$+I_{in}$	Current signal input
4	$-I_{in}$	
5	-out	Common minus of current and voltage output signal (pins 8 and 9)
6	+24 V	Transmitter supply
7	-GND	
8	$+U_{out}$	Analogue output signal voltage
9	$+I_{out}$	Analogue output signal current

3.3 Wiring examples:

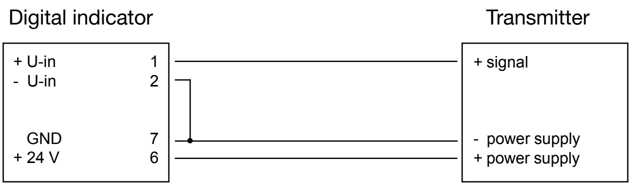
a) 2-wire, 4 ... 20 mA transmitter signal



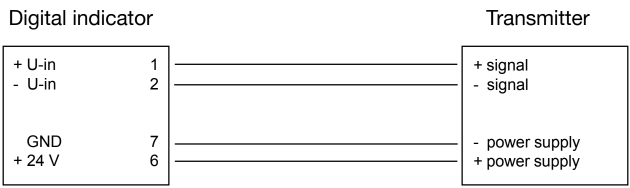
b) 3-wire, 0 ... 20 mA transmitter signal



c) 3-wire, 0 ... 10 V transmitter signal



d) 4-wire, 0 ... 10 transmitter signal



3.4 Layout of 9-pin Sub-D plug 'L'

Layout of the serial interface is identical to that of commonly found Personal Computers. This simplifies data input into these widely used machines.

Pin	Designation
2	TX DATA
3	RX DATA
5	GROUND

4. Option serial interface RS-232

The instrument can be optionally equipped with a serial RS-232 data interface. The interface transmits data measured as well as enabling programming of the instrument.
Data transmission and programming follows the same rule in principle. Data reading requires a 5-byte command. The instrument responds by acknowledging the command together with the respective data.
Programming requires a 5-byte command followed by a word of 1 to 6 bytes length. All commands transmitted and received are followed by <CR>, Dec 13, (↵) (carriage Return).

4.1 Transfer of data and parameters

Command	Response No. of byte Example	Meaning
RREAL	Value 5 + 6 byte + ↵ RREAL+12.34	active value measrued incl. sign and decimal point
RMODE	1 = REAL mode 2 = HOLD mode 3 = MIN mode 4 = MAX mode 5 + 1 byte + ↵ RMODE1	status message, indicating current mode of instrument
RMINM	Min value 5 + 6 byte + ↵ RMINM+01.23	contents of MIN memory incl. sign and decimal point
RMAXM	Max value 5 + 6 byte + ↵ RMAXM+14.56	contents of MAX memory incl. sign and decimal point
RST1E	SE of alarm 1 5 + 6 byte + ↵ RST1E+10.00	starting point alarm 1, incl. sign and decimal point
RST1A	SA of alarm 1 5 + 6 byte + ↵ RST1A+09.50	end point alarm 1, incl. sign and decimal point
RST2E	SE of alarm 2 5 + 6 byte + ↵ RST2E+08.00	starting point alarm 2, incl. sign and decimal point
RST2A	SA of alarm 2 5 + 6 byte + ↵ RST2A+08.50	end point alarm 2, incl. sign and decimal point

Command	Response No. of byte Example	Meaning
RSCLA	Low scale 5 + 6 byte + ↵ RSCLA+00.00	low end of scale value incl. sign and decimal point
RSCLE	High scale 5 + 6 byte + ↵ RSCLE+16.00	high end of scale value incl. sign and decimal point
RINPX	1 = 0 ... 10 V 2 = 0 ... 20 mA 3 = 4 ... 20 mA 5 + 1 byte + ↵ RINPX3	input signal selected
ROUTX	1 = 0 ... 10 V 2 = 0 ... 20 mA 3 = 4 ... 20 mA 5 + 1 byte + ↵ ROUTX3	output signal selected
RDAEM	Damping 5 + 4 byte + ↵ RDAEM00.1	set value of damping in seconds
RDBEZ	Damping reference 5 + 2 byte + ↵ RDBEZ01	set reference of damping

All commands transmitter to the instrument must terminate with <CR> Dec. 13 (↵). All date received from the instrument will terminate with <CR> Dec. 13 (↵).

4.2 Programming of parameters

Command	Response No. of byte Example	Meaning
PMODE	1 = REAL mode 2 = HOLD mode 3 = MIN mode 4 = MAX mode 5 + 1 byte + ↲ PMODE1	signal to set mode of instrument
PMINM	0 = Reset 5 + 1 byte + ↲ PMINM0	erase MIN memory
PMAXM	0 = Reset 5 + 1 byte + ↲ PMAXM0	erase MAX memory
PST1E	SE of alarm 1 5 + 6 byte + ↲ PST1E+10.00	set switch-on value alarm 1, incl. sign and decimal point
PST1A	SA of alarm 1 5 + 6 byte + ↲ PST1A+09.50	set switch-off value alarm 1, incl. sign and decimal point
PST2E	SE of alarm 2 5 + 6 byte + ↲ PST2E+08.00	set switch-on value alarm 2, incl. sign and decimal point
PST2A	SA of alarm 2 5 + 6 byte + ↲ PST2A+08.50	set switch-off value alarm 2, incl. sign and decimal point
PSCLA	Low scale 5 + 6 byte + ↲ PSCLA+00.00	set low end of scale value incl. sign and decimal point

Com- mand	Response No. of byte Example	Meaning
PSCLE	High scale 5 + 6 byte + ↵ PSCLE+16.00	set high end of scale value incl. sign and decimal point
PINPX	1 = 0 ... 10 V 2 = 0 ... 20 mA 3 = 4 ... 20 mA 5 + 1 byte + ↵ PINPX3	set input signal at instrument
POUTX	1 = 0 ... 10 V 2 = 0 ... 20 mA 3 = 4 ... 20 mA 5 + 1 byte + ↵ POUTX3	set output signal (analogue output) at instrument
PDAEM	Damping 5 + 4 byte + ↵ PDAEM00.1	set value in seconds for damping
PDBEZ	Damping reference 5 + 2 byte + ↵ PDBEZ01	set reference of damping

All commands transmitted to the instrument must terminate with <CR> Dec. 13 (↵). The decimal point must be entered with both, low end and high end scale values, where the last value entered will determine the actual decimal point, irrespective of this being the low or high end value. Note correct decimal point when entering the alarm contact settings.

5. Error messages

Altogether 6 different error messages may be displayed:

5.1 Error messages E1/-E1

The error messages E1/-E1 will appear, if the actual input signal exceeds the programmed maximum signal value (10 V or 20 mA) by more than 9% or if it falls below the minimum signal value (0 V, 0 mA or 4 mA) by more than 9 % of the maximum signal value, because the inbuilt A/D converter is overloaded. E1 indicates a too high signal, -E1 indicates a too low signal. Below table indicates the actual values at which this error message will appear:

Message	Set input signal	Actual signal
E1	0 ... 10 V	> 10.9 V
	0 ... 20 mA	> 21.8 mA
	4 ... 20 mA	> 21.8 mA
-E1	0 ... 10 V	< -0.9 V
	0 ... 20 mA	< -1.8 mA
	4 ... 20 mA	< 2.2 mA

5.2 Error messages E2/-E2

E2 appears if the input value exceeds the corresponding indication of +1999 digits. -E2 appears if the input value exceeds the corresponding indication of -1999 digits.

5.3 Error messages E3/-E3

5.3.1 Error message E3

E3 will appear, if the actual input signal exceeds the maximum signal value (10 V or 20 mA) by more than 6 %. This is still within the capacity of the inbuilt A/D converter (see also 5.1).
If the value to display is still within the capacity of the indicator, the value and the respective error message will flash intermittently. If the value exceeds ±1999, E3 will be displayed permanently.

Below table indicates the actual values at which this error message will appear:

Message	Set input signal	Actual signal
E3 flashes intermittently with measured value	0 ... 10 V 0 ... 20 mA 4 ... 20 mA	> 10.6 V and < 10.9 V > 21.2 mA and < 21.8 mA > 21.2 mA and < 21.8 mA
E3	0 ... 10 V	> 10.6 V and < 10.9 V and display > +1999 or < -1999
	0 ... 20 mA	> 21.2 mA and < 21.8 mA and display > +1999 or < -1999
	4 ... 20 mA	> -21.2 mA and < 21.8 mA display > +1999 or < -1999

5.3.2 Error message -E3

-E3 will appear, if the actual input signal is below the minimum signal value (0 V, 0 mA or 4 mA) by more than 6 % of the maximum signal value. This is still within the capacity of the inbuilt A/D converter (see also 5.1). If the value to display is still within the capacity of the indicator, the value and the respective error message will flash intermittently. If the value exceeds ±1999, -E3 will be displayed permanently.

Below table indicates the actual values at which this error message will appear:

Message	Set input signal	Actual signal
-E3 flashes intermittently with measured value	0 ... 10 V 0 ... 20 mA 4 ... 20 mA	< -0.6 V and > -0.9 V < -1.2 mA and > -1.8 mA < 2.8 mA and > 2.2 mA
-E3	0 ... 10 V	< -0.6 V and > -0.9 V and display > +1999 or < -1999
	0 ... 20 mA	< -1.2 mA and > -1.8 mA and display > +1999 or < -1999
	4 ... 20 mA	< 2.8 mA and > 2.2 mA and display > +1999 or < -1999

6. Preparing for installation

The instrument is designed to fit panels of 40 mm maximum thickness. Panel cut out per IEC 61 554, 92 +0.8 mm wide and 45 + 0.6 mm high. Panel clamps are supplied with the instrument.

7. Environment

The front panel of the instrument is protected against moisture and dust (IP65) by means of a sealed foil. Full ingress protection may be achieved by fitting an appropriate gasket between panel and instrument.

The ambient operating temperature should be maintained within the range 0 to 50 °C. When the permissible ambient temperature is exceeded make sure that there is sufficient ventilation.

8. Setting of physical unit

The instrument is supplied with a variety of labels to suit most commonly used units of pressure and temperature. A number of blank labels may be used to indicate customised units.

The pocket 'I' above the MODE key is intended to accept the unit label. To insert the label, pry the pocket open with a tipped instrument. Take care not to loosen or damage the protective foil.

9. Maintenance

No subject to wear and tear parts or components requiring any regular maintenance are contained in the instrument. In case of obvious malfunction, it is recommended that you return the instrument to an authorised WIKA service for repair.

The front foil may be cleaned using a moist cloth and some non abrasive household detergent.

10. Specifications

Specification	Model A-RB-1
Display	
- Design	7-Segment-LED, red, 3 1/2 -digit
- Size of digits	14.56 mm
- Indication range	-1999 ... +1999
Accuracy	± 0.05 % of span ± 2 digit
Measuring rate	10 measurements/s, damping selectable in 100 ms steps up to max. 50.0 s
Error messages	E1: A/D converter overflow
	E2: Display overflow (measured value exceeds maximum possible display value)
	E3: Input signal is below the minimum signal value or exceeds the maximum signal value
Scaling adjustment	Menu driven, initial value and final value free adjustable between -1999 and +1999; Adjustable decimal point
Signal input	Selectable as:
	0 ... 20 mA, 4 ... 20 mA
	0 ... 10 V
Analogue output	Selectable as:
	0 ... 20 mA, 4 ... 20 mA
	0 ... 10 V
Response time (10 ... 90 %)	100 ms
{Serial interface}	RS-232
Transmitter supply	DC 24 V ± 5 %, max. 30 mA, galvanically isolated, short-circuit proof (for approx. 8 minutes)
{Alarm contacts}	
- Number	2, independently settable
- Function	MAX/MIN-alarm adjustable by setting of the switch-on and switch-off value
- Switching point	Adjustable over the complete indication range
- Hysteresis	Adjustable over the complete indication range
- Accuracy	True value by means of digital control
- Contacts	1 potential-free relay change over contact for each alarm contact
- Load	AC 250 V 8 A with resistive load;
	AC 250 V 1 A with cos $\varphi = 0.1$
HOLD memory	Displayed value is fix, measurement and control of MIN and MAX values as well as alarm contacts goes on in the background.
MIN/MAX memory	Two separately working memories for MIN and MAX values;
	Individual or common reset enabled by pressing the RESET key;
	Unlimited data storage by digital memory
Power supply	AC 230 V, 50/60 Hz, ± 10 % or
	AC 115 V, 50/60 Hz, ± 10 %, changeable by means of internal jumper
Electrical connection	Detachable screw terminals
-Max. cable diameter	2.5 mm²
Permissible ambient temperature	0 °C ... 50 °C
CE Conformity	Conformity in accordance with 89/336/EWG
	Interference emission per EN 60 000-6-4
	Interference compatibility per EN 61 000-6-2
	For cable lengths of > 30 m, shielded cables are to be used
Case	According to IEC 61 554
- Material	PC, ABS-Blend, black
- Ingress protection	Front: IP65; Back: IP00 (according to IEC 60 529 / EN 60 529)
- Mass	Approx. 530 g
- Mounting	Removable screw elements for a wall thickness up to 40 mm

{ } Items in curved brackets are optional extras for additional price.

Appendix A Schematic description of settings and data transmission

Initial status: REAL mode

Press PROG and hold down

Pro appears at display and will change to
SCL indication programming mode.

Press PROG

- A- appears at display

Press PROG

current low scale value is displayed and MIN-LED flashs

Adjust value using (▲) and (▼) keys

low scale value is changing.

Press PROG

- - - appears, indicating acceptance of new lower scale value
-E- appears at display

Press PROG

current high scale value is displayed and MAX-LED flashs

Adjust value using (▲) and (▼) keys

high scale value changes

Press PROG

- - - appears, indicating acceptance of new upper scale value
dP. appears and current position of decimal point is displayed

Adjust value using (▲) and (▼) keys

decimal point changes

Press PROG

- - - appears, indicating acceptance of new decimal position

InX appears and current index of input signal is displayed

Adjust value using (▲) and (▼) keys

X index figure changes

Press PROG

- - - appears, indicating acceptance of new input signal

OuX appears at display

Adjust value using (▲) and (▼) keys

X index figure changes

Press PROG

- - - appears, indicating acceptance of new output signal

- d - appears at display

Press PROG

set value for damping in seconds appears

Adjust value using (▲) and (▼) keys

set time for damping is changed

Press PROG

- - - appears, indicating acceptance of the time of damping

dXX appears automatically with the current reference of damping

Adjust value using (▲) and (▼) keys

reference of damping changes

Press PROG

- - - acceptance of the reference of damping

with RS232

- b - appears at display

Press PROG

set baud rate appears (values in kBaud).

Adjust value using (▲) and (▼) keys

stored value for the baud rate is changed.

Press PROG

- - - appears, indicating acceptance of new baud rate

Hitting RESET immediately terminates the programming mode at any time. In this instance, the instrument resumes REAL mode.

Only such changes that have been acknowledged by appearance of "---" will become effective. Otherwise, previously set values remain valid.

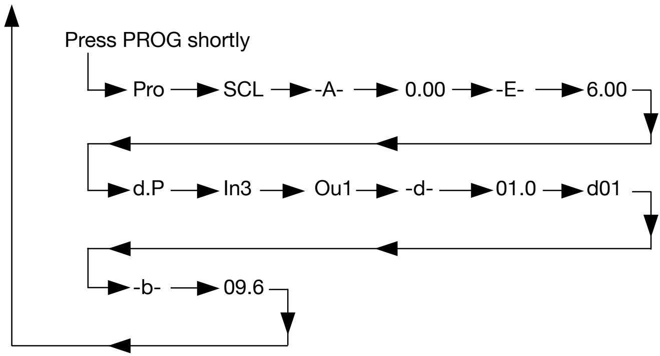
Short hitting of the PROG key, while the instrument is in REAL mode, initiates “PRO“ to appear at the display, followed by all current settings in consecutive order.

Below flow diagram explains appearance of key words and values, presuming settings of:

Examples:

Scale expansion:	0 ... 6.00 bar
Input signal:	4 ... 20 mA
Signal output:	0 ... 10 V
Damping:	1.0 s
Reference of damping:	Display
Baud rate	9600 baud

Initial status: REAL mode



Hitting RESET immediately terminates verification mode at any time. In this instance, the instrument resumes REAL mode.

Appendix B Schematic description of alarm settings and verification

Initial status: REAL mode

↓

Press SET 1 and hold down

SP1 appears at display and will change to
SE indicating programming mode

↓

Press SET 1

current Set point make value no. 1 appears and the
▲ - LED of alarm 1 flashs

↓

Adjust value using (▲) and (▼) keys

make value changes

↓

Press SET 1

- - - appears, indicating acceptance of new Set point make value
SA of alarm 1 appears at display

↓

Press SET 1

current Set point break value no. 1 appears and the
▲ - LED of alarm 1 flashs

↓

Adjust value using (▲) and (▼) keys

break value changes

↓

Press SET 1

- - - appears, indicating acceptance of new Set point break value

Hitting RESET immediately terminates the programming mode at any time. In this instance, the instrument resumes REAL mode.

Only such changes that have been acknowledged by appearance of "---" will become effective. Otherwise, previously set values remain valid.

Set points of alarm 2 are entered in the same manner.

Short hitting of the SET 1 (SET 2, respectively) key, while the instrument is in REAL mode, initiates verification of the current settings of alarm 1 (2, respectively).

Example:

Set point make (SE): 4.00
Set point break (SA): 3.80

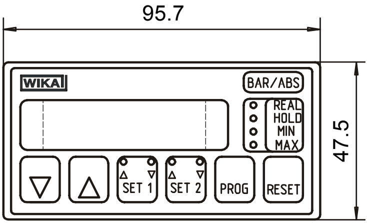
Initial status: REAL mode

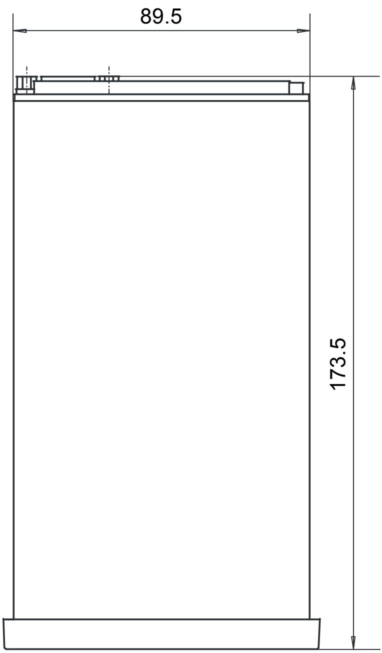
Hitting RESET immediately terminates verification mode at any time. In this instance, the instrument resumes REAL mode.

Set points or alarm 2 are verified in the same manner.

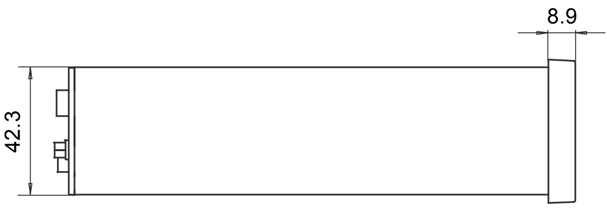
Appendix C Dimensions

Dimensions in mm

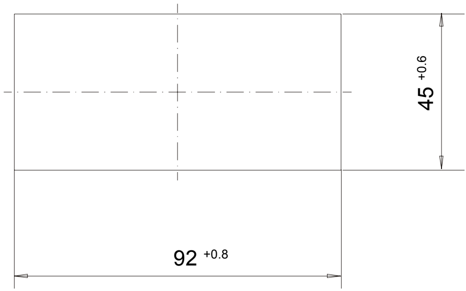




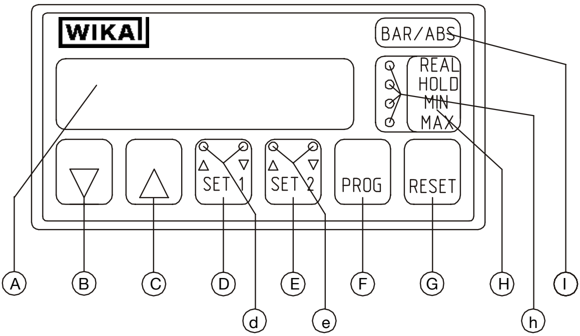
Dimensions in mm

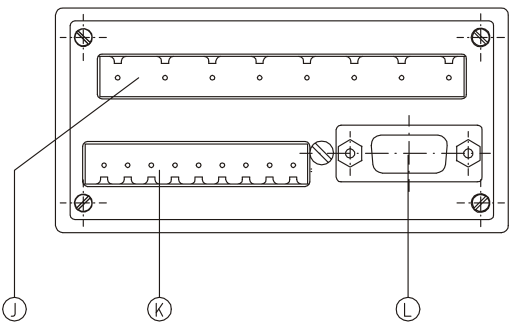


Panel cutout in mm



Appendix D Layout of front and back panel





A	LED-display
B	Decrease value key
C	Increase value key
D	Check / set contacts no. 1
d	Δ - LED = MAX value; ∇ - LED = MIN value
E	Check / set contacts no. 2
e	Δ - LED = MAX value; ∇ - LED = MIN value
F	Select programming mode. Continue with programming
G	RESET memories, CANCEL programming
H	Select display mode (toggle between LED's)
h	REAL = display true value
	HOLD = hold value displayed
	MIN = contents of minimum memory displayed
	MAX = contents of maximum memory displayed
I	Pocket window holding unit label
J	Terminal block power supply and contacts output
K	Terminal block signal input, signal output and transmitter supply
L	Sub-D serial port (optional)

For your notes

For your notes

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