

Panel mounting indicator ITU 402 / 412



INSTRUCTIONS MANUAL

BAMO MESURES

22, Rue de la Voie des Bains - Z.I. de la Gare - 95100 ARGENTEUIL

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MES

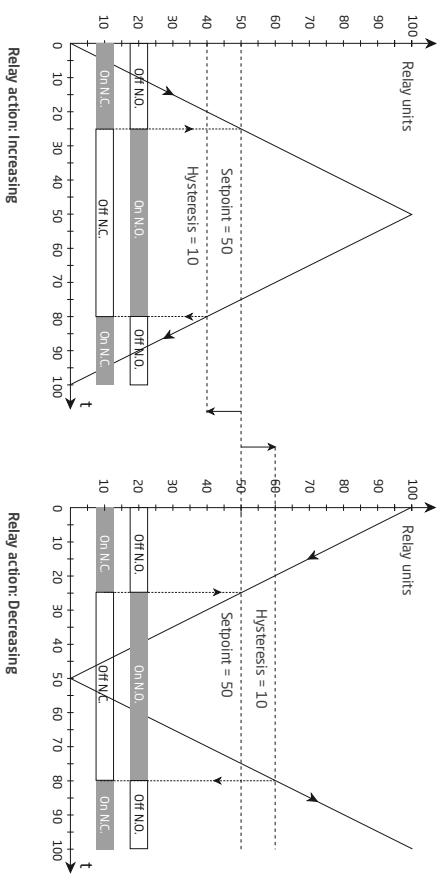
222-03/1

Panel mounting indicator
ITU 402 / 412

02-06-2015

222-M1-03 B

Graphic depiction of the relay function setpoint



CONFIGURATION / OPERATING THE FUNCTION KEYS

Documentation for routing diagram.

In general:

When configuring the display you are guided through all parameters, you can choose the settings which fit the application. For each menu there is a scrolling help text which is automatically shown in the display, this starts after 5 seconds if no key has been activated.

Configuration is carried out by using the 3 function keys.

- ⏪ will increase the numerical value or choose the next parameter.
- ⏩ will decrease the numerical value or choose the previous parameter.
- OK will accept the chosen value and end the menu.

If a function does not exist in the display all parameters are skipped to make the configuration as simple as possible.

Once the configuration has been entered the display will show “----”.

Pressing and holding OK will return to the previous menu or return to the default state (1.0) without saving the changed values or parameters.

If no key is activated for 2 minutes, the display will return to the default state (1.0) without saving the changed values or parameters.

Further explanations:

Fast setpoint adjustment and relay test: These menus allow you to change the set point quickly and to check the operation of the relays.

Pressing ⏪ and ⏩ at the same time will change the state of the relay – this change is indicated by the diodes on the display. Pressing OK will save the set point change.

Holding down OK for more than 0.5 seconds will return the unit to the default state without changing the set point.

Password protection:

Using a password will stop access to the menu and parameters. There are two levels of password protection. Passwords between 0000...4999 allow access to the fast set point adjustment and relay test. (Using this password stops access to all other parts of the menu). Passwords between 5000...9999 stop access to all parts of the menu, fast set point and relay test. (Current set point is still shown). By using the master password 2008, all configuration menus are available.

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GENERAL

This module is designed for connection to hazardous electric voltages. Ignoring this warning can result in severe personal injury or mechanical damage. To avoid the risk of electric shock and fire, the safety instructions of this manual must be observed and the guidelines followed. The specifications must not be exceeded, and the module must only be applied as described in the following. Prior to the commissioning of the module, this manual must be examined carefully. Only qualified personnel (technicians) should install this module.

If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

WARNING!



HAZARDOUS VOLTAGE



Until the module is fixed, do not connect hazardous voltages to the module.

The following operations should only be carried out on a disconnected module and under ESD safe conditions:
Troubleshooting the module.

Repair of the module must be done by the manufacturer.

WARNING!

SYMBOL IDENTIFICATION



Triangle with an exclamation mark: Warning / demand. Potentially lethal situations.



The CE mark proves the compliance of the module with the essential requirements of the directives.

REL1	SET	-->	ENTER RELAY 1 SETUP
	SKIP	-->	SKIP RELAY 1 SETUP
	OFF	-->	RELAY 1 DISABLED
SETP	xxxx	-->	RELAY SETPOINT
ACT1	INCR	-->	ACTIVATE AT INCREASING SIGNAL
	DECR	-->	ACTIVATE AT DECREASING SIGNAL
HVS1	xxxx	-->	RELAY HYSTERESIS
ERR1	HOLD	-->	HOLD RELAY AT ERROR
	ACTI	-->	ACTIVATE RELAY AT ERROR
	DEAC	-->	DEACTIVATE RELAY AT ERROR
	NONE	-->	UNDEFINED STATUS AT ERROR
ONLDE	xxxx	-->	RELAY ON-DELAY IN SECONDS
OFFDE	xxxx	-->	RELAY OFF-DELAY IN SECONDS
A.OUT	0-20	-->	OUTPUT RANGE IN mA
	4-20	-->	OUTPUT RANGE IN mA
	20-0	-->	OUTPUT RANGE IN mA
	20-4	-->	OUTPUT RANGE IN mA
O.LO	xxxx	-->	DISPLAY VALUE FOR OUTPUT LOW
O.HI	xxxx	-->	DISPLAY VALUE FOR OUTPUT HIGH
O.ERR	2.3 mA	-->	NAMUR NE43 UPSCALE AT ERROR
	3.5 mA	-->	NAMUR NE43 DOWNSCALE AT ERROR
	OMA	-->	DOWNSCALE AT ERROR
	NONE	-->	UNDEFINED OUTPUT AT ERROR
RESP	xxxx	-->	ANALOGUE OUTPUT RESPONSE TIME IN SECONDS
E.PAS	NO	-->	ENABLE PASSWORD PROTECTION
	YES	-->	
N.PAS	xxxx	-->	SELECT NEW PASSWORD
ADV MENU:	LANG	-->	ENTER LANGUAGE SETUP
	DISP	-->	ENTER DISPLAY SETUP
	CAL	-->	PERFORM PROCESS CALIBRATION
HELP:	DE	-->	DE - WAERLE DEUTSCHEN HILFETEXT
	DK	-->	DK - VAELG DANSK HJAELPETEKST
	ES	-->	ES - SELECCIONAR TEXTO DE AYUDA EN ESPANOL
	FR	-->	FR - SELECTION TEXTE D'AIDE EN FRANCAIS
	IT	-->	IT - SELEZIONARE TESTI DI AIUTO ITALIANI
	SE	-->	SE - VALI SVENSK HJALPTEXT
	UK	-->	UK - SELECT ENGLISH HELPTEXT
	CZ	-->	CZ - VYBER CESKOU NAPRAVEDU
LIGH	xxxx	-->	ADJUST DISPLAY LIGHT INTENSITY
CALO	YES	-->	CALIBRATE INPUT LOW TO PROCESS VALUE?
	NO	-->	
CAHI	YES	-->	CALIBRATE INPUT HIGH TO PROCESS VALUE?
	NO	-->	
VAL L	xxxx	-->	SET VALUE FOR LOW CALIBRATION POINT
VAL H	xxxx	-->	SET VALUE FOR HIGH CALIBRATION POINT
USEC	YES	-->	USE PROCESS CALIBRATED VALUES?
	NO	-->	

SCROLLING HELP TEXT

Display in default state xxxx hardware error:	REL.U	-->	SET RELAY IN PERCENTAGE
SEBR --> SENSOR WIRE BREAKAGE	PERC	-->	SET RELAY IN DISPLAY UNITS
SE.SH --> SENSOR SHORT CIRCUIT	DISP	-->	
IN.HI --> INPUT OVERRANGE	TYPE		
IN.LO --> INPUT UNDERRANGE	CU	-->	SELECT CU SENSOR TYPE
9.9.9.9 --> DISPLAY OVERRANGE	PT	-->	SELECT PT SENSOR TYPE
-1.9.9.9 --> DISPLAY UNDERRANGE	NI	-->	SELECT NI SENSOR TYPE
H.W.E.R --> HARDWARE ERROR	TC	-->	SELECT TC SENSOR TYPE
E.E.E.R --> EEPROM ERROR			
	CU.TY		
RA.L.E.R --> RAM MEMORY ERROR	10	-->	SELECT CU SENSOR TYPE
CJ.E.R --> CJC SENSOR ERROR	20	-->	SELECT CU SENSOR TYPE
	50	-->	SELECT CU SENSOR TYPE
	100	-->	SELECT CU SENSOR TYPE
Fastset (Enabled):	PT.TY		
F.SET --> FAST SET MENU -	10	-->	SELECT PT SENSOR TYPE
REL1 --> SELECT RELAY	20	-->	SELECT PT SENSOR TYPE
REL2 --> SELECT RELAY	50	-->	SELECT PT SENSOR TYPE
	100	-->	SELECT PT SENSOR TYPE
	200	-->	SELECT PT SENSOR TYPE
	250	-->	SELECT PT SENSOR TYPE
	300	-->	SELECT PT SENSOR TYPE
	400	-->	SELECT PT SENSOR TYPE
	500	-->	SELECT PT SENSOR TYPE
	1000	-->	SELECT PT SENSOR TYPE
SETP	NI.TY		
xxxx --> RELAY SETPOINT - PRESS OK TO SAVE	50	-->	SELECT NI SENSOR TYPE
	100	-->	SELECT NI SENSOR TYPE
	120	-->	SELECT NI SENSOR TYPE
	1000	-->	SELECT NI SENSOR TYPE
Fastset (Disabled):	CONN		
SETP	2W	-->	When Cu, Pt and Ni sensor is selected
xxxx --> RELAY SETPOINT - READ ONLY	3W	-->	SELECT 2-WIRE SENSOR CONNECTION
	4W	-->	SELECT 3-WIRE SENSOR CONNECTION
			SELECT 4-WIRE SENSOR CONNECTION
Configuration menus:	TC.TY		
ADV YES --> ENTER ADVANCED SETUP MENU?	TC.B	-->	SELECT TC SENSOR TYPE
NO	TC.E	-->	SELECT TC SENSOR TYPE
	TC.J	-->	SELECT TC SENSOR TYPE
	TC.K	-->	SELECT TC SENSOR TYPE
	TC.L	-->	SELECT TC SENSOR TYPE
	TC.N	-->	SELECT TC SENSOR TYPE
	TC.R	-->	SELECT TC SENSOR TYPE
	TC.S	-->	SELECT TC SENSOR TYPE
	TC.T	-->	SELECT TC SENSOR TYPE
	TC.U	-->	SELECT TC SENSOR TYPE
	TC.W3	-->	SELECT TC SENSOR TYPE
	TC.W5	-->	SELECT TC SENSOR TYPE
	TC.LR	-->	SELECT TC SENSOR TYPE
	DEC.P		
0-20 --> When current selected:	11.11	-->	When temperature selected
4-20 --> INPUT RANGE IN mA	11.11	-->	DECIMAL POINT POSITION
	1.1.11	-->	DECIMAL POINT POSITION
	1.1.11	-->	DECIMAL POINT POSITION
	1.1.11	-->	DECIMAL POINT POSITION
	LR.LO		
xxxx --> SET RESISTANCE VALUE LOW	xxxx	-->	SET RESISTANCE VALUE LOW
	LR.HI		
xxxx --> SET RESISTANCE VALUE HIGH	xxxx	-->	SET RESISTANCE VALUE HIGH
	D.I.LO		
xxxx --> DISPLAY READOUT LOW	xxxx	-->	DISPLAY READOUT LOW
	D.I.HI		
xxxx --> DISPLAY READOUT HIGH	xxxx	-->	DISPLAY READOUT HIGH

SAFETY INSTRUCTIONS

DEFINITIONS:

Hazardous voltages have been defined as the ranges: 75 to 1500 Volt DC, and 50 to 1000 Volt AC.

Technicians are qualified persons educated or trained to mount, operate, and also troubleshoot technically correct and in accordance with safety regulations. Operators, being familiar with the contents of this manual, adjust and operate the knobs or potentiometers during normal operation.

RECEIPT AND UNPACKING:

Unpack the device without damaging it. The packing should always follow the device until this has been permanently mounted. Check at the receipt of the device whether the type corresponds to the one ordered.

ENVIRONMENT:

Avoid direct sunlight, dust, high temperatures, mechanical vibrations and shock, as well as rain and heavy moisture. If necessary, heating in excess of the stated limits for ambient temperatures should be avoided by way of ventilation.

All modules fall under Installation Category II, Pollution Degree 1, and Insulation Class II.

MOUNTING:

Only technicians who are familiar with the technical terms, warnings, and instructions in the manual and who are able to follow these should connect the module.

Should there be any doubt as to the correct handling of the module, please contact us.

Mounting and connection of the module should comply with national legislation for mounting of electric materials, i.e. wire cross section, protective fuse, and location. Descriptions of Input / Output and supply connections are shown in the block diagram and side label.

The following apply to fixed hazardous voltages-connected devices:
 The max. size of the protective fuse is 10 A and, together with a power switch, it should be easily accessible and close to the device. The power switch should be marked with a label telling it will switch off the voltage to the device.

UL INSTALLATION REQUIREMENTS:

For use on a flat surface of a type 1 enclosure
 Use 60/75°C copper conductors only
 Enclosure rating (face only)..... Type 4X, UL50E
 Max. ambient temperature 60°C
 Max. wire size, pins 41...46 AWG 30-16
 Max. wire size, others AWG 30-12
 UL file number E248256

CALIBRATION AND ADJUSTMENT:

During calibration and adjustment, the measuring and connection of external voltages must be carried out according to the specifications of this manual. The technician must use tools and instruments that are safe to use.

NORMAL OPERATION:

Operators are only allowed to adjust and operate devices that are safely fixed in panels, etc., thus avoiding the danger of personal injury and damage. This means there is no electrical shock hazard, and the device is easily accessible.

CLEANING:

When disconnected, the device may be cleaned with a cloth moistened with distilled water.

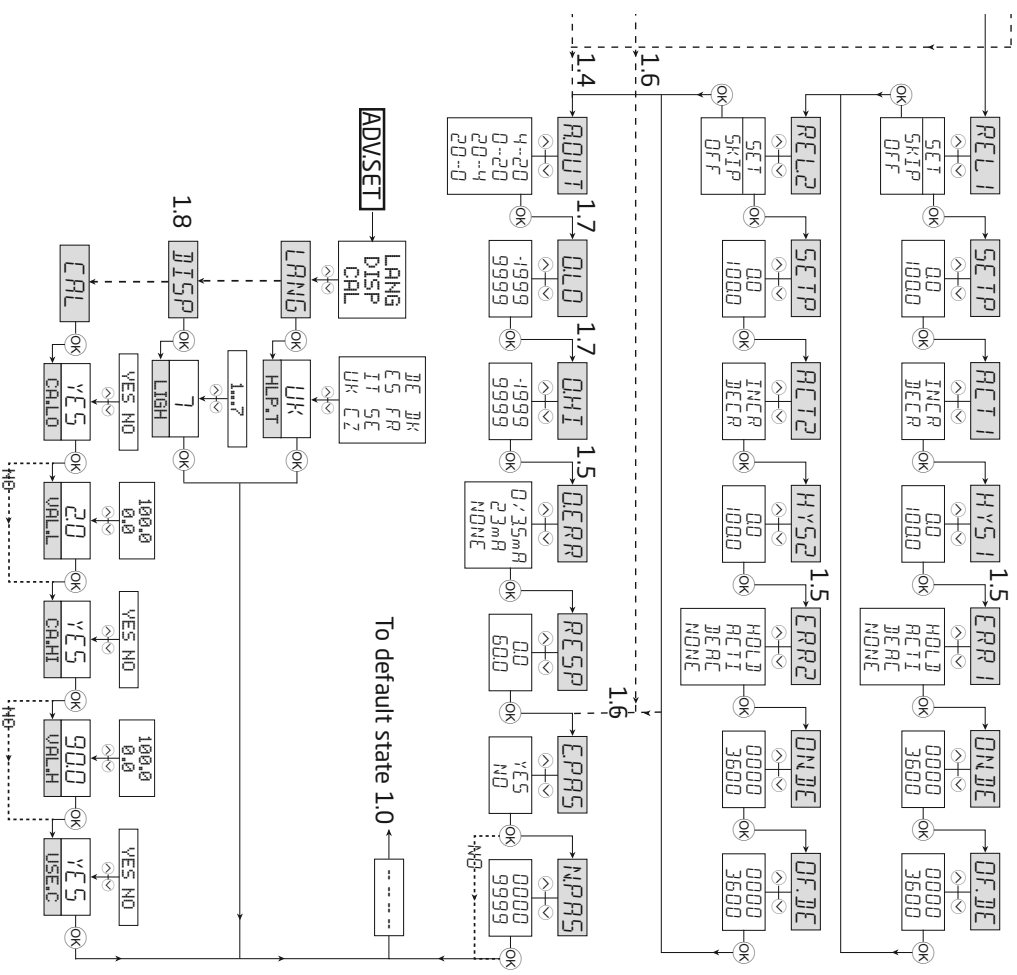
LIABILITY:

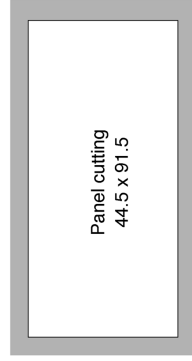
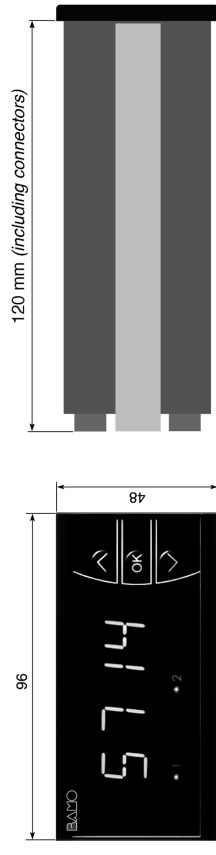
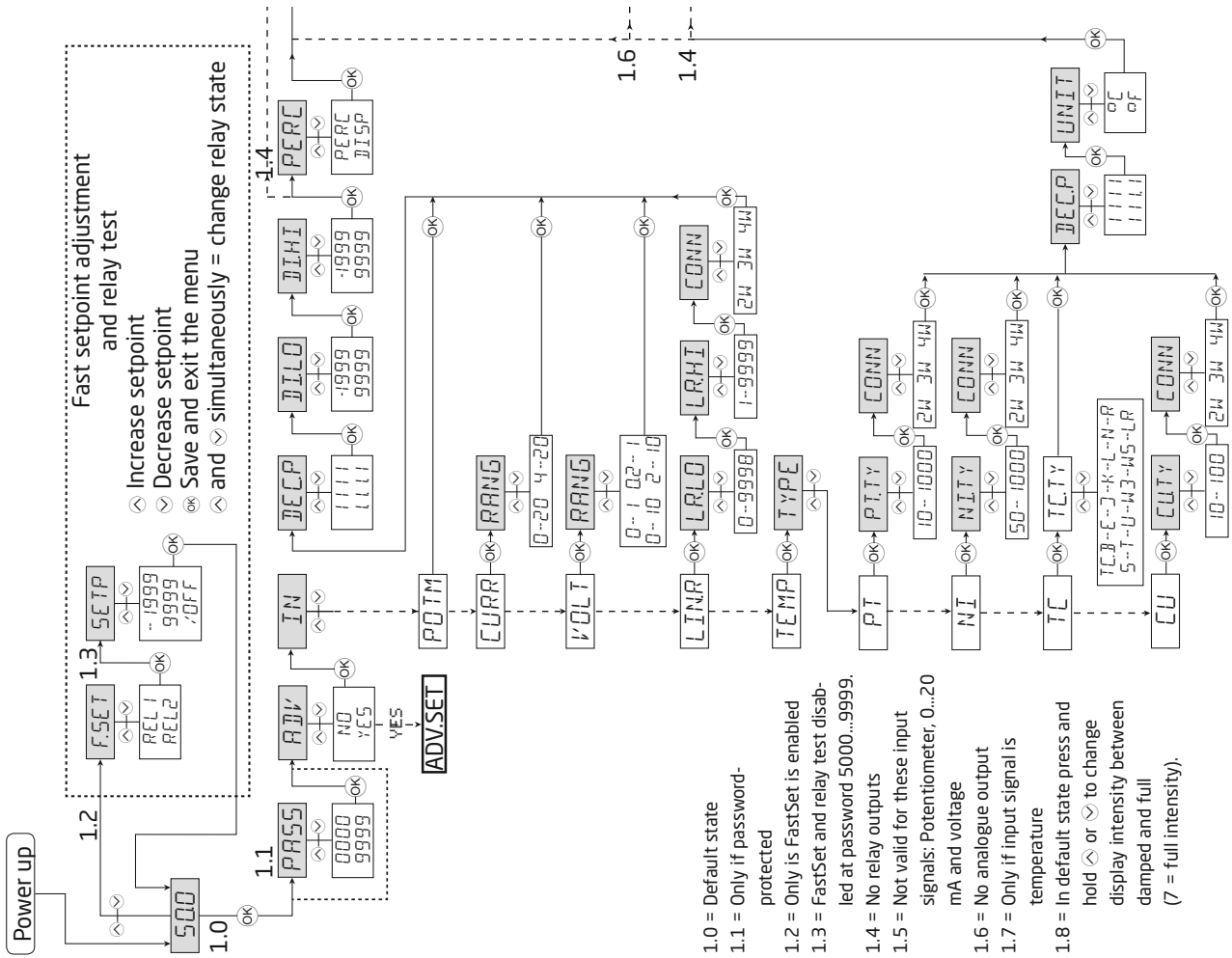
To the extent the instructions in this manual are not strictly observed, the customer cannot advance a demand against PR electronics AS that would otherwise exist according to the concluded sales agreement.

ROUTING DIAGRAM

If no keys are activated for 2 minutes the display returns to default state 1.0 without saving configuration changes.

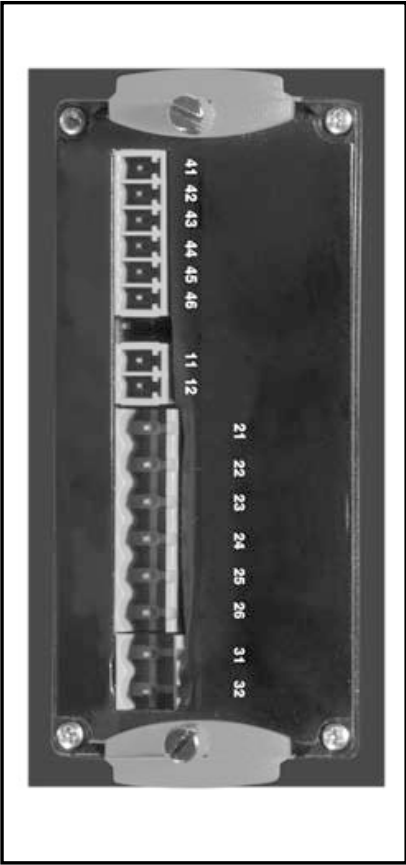
- ⊖ Increase value / choose next parameter
- ⊕ Decrease value / choose previous parameter
- ⊗ Accept the chosen parameter and go to the next menu
- Hold ⊗ Back to previous menu / return to menu 1.0 without saving



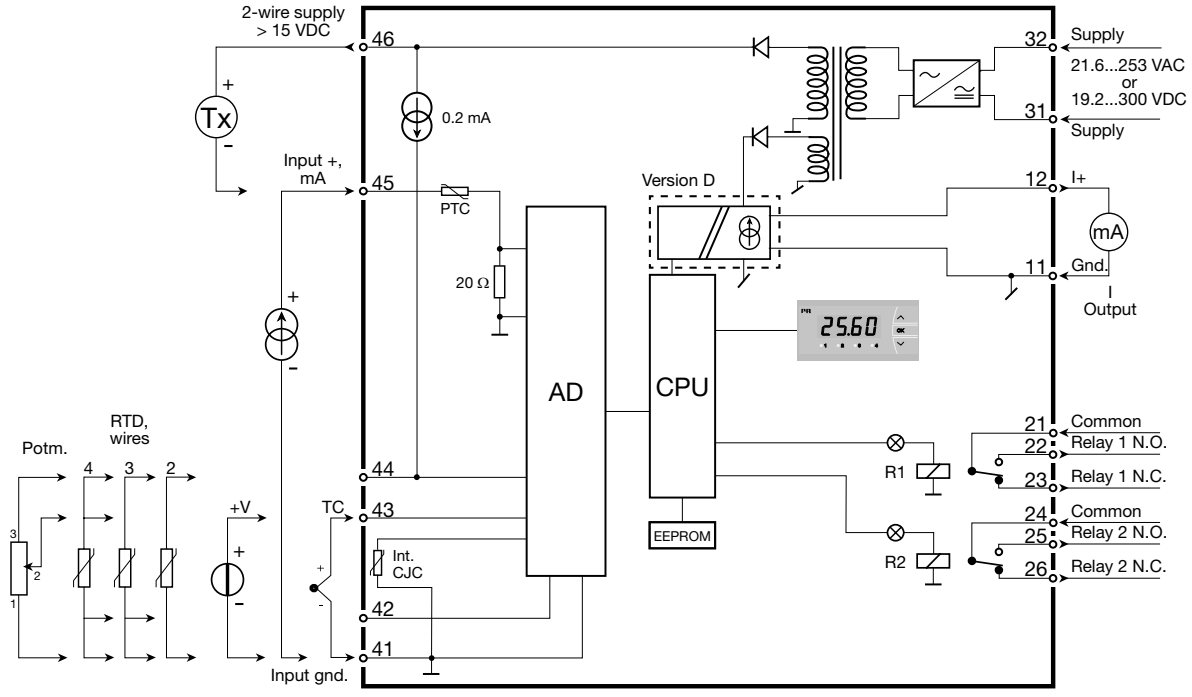




Picture 1: Front



Picture 2: Back

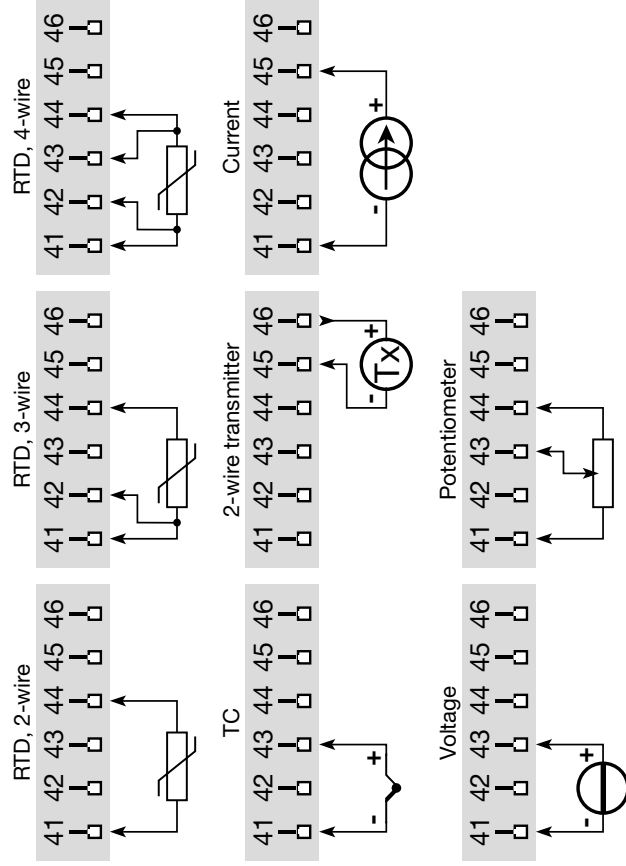


Readout at hardware error		
Error search	Readout	Error cause
Test of internal communication uC / ADC	H.W.E.R	Permanent error in ADC
Test of internal CJC sensor	C.J.E.R	CJC sensor defect
Check-sum test of the configuration in RAM	R.A.E.R	Error in RAM
Check-sum test of the configuration in EEPROM	E.E.E.R	Error in EEPROM

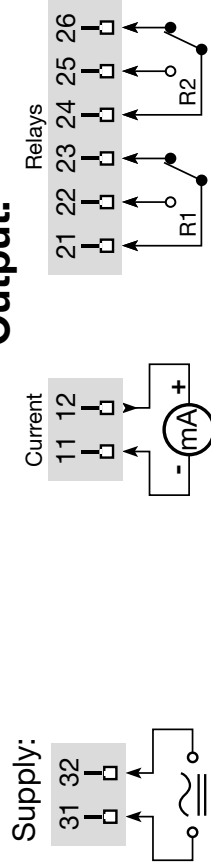
! Error indications in the display blink once a second. The help text explains the error.

CONNECTIONS

Inputs:



Output:



- 4-digit 14-segment LED indicator
- Input for mA, V, potentiometer, RTD and TC
- 2 relays and analogue output
- Universal voltage supply
- Front key programmable

Application:

- Display for digital readout of current, voltage, temperature or potentiometer signals.
- Process control with 2 pairs of potential-free relays and / or analogue output.
- For local readout in extremely wet atmospheres with a specially designed splash-proof cover.

Technical characteristics:

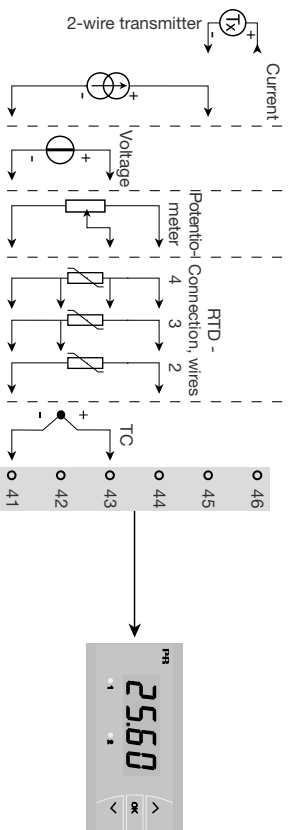
- 4-digit LED indicator with 13.8 mm 14-segment characters. Max. display readout -1999...9999 with programmable decimal point, relay ON / OFF indication.
- All operational parameters can be adjusted to any application by use of the front keys.
- The device is available fully-configured acc. to specifications ready for process control and visualisation.
- Help texts in eight languages can be selected via a menu item.
- In versions with relay outputs the user can minimise the installation test time by activating / deactivating each relay independently of the input signal.

Mounting:

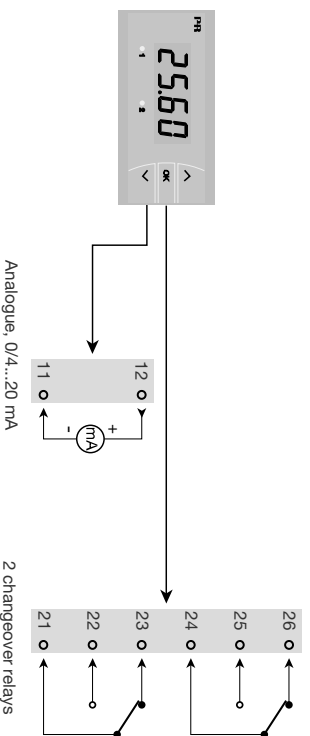
- To be mounted in front panel. The included rubber packing must be mounted between the panel cutout hole and the display front to obtain IP65 (NEMA 4) tightness. For extra protection in extreme environments, the device can be delivered with a specially designed splash-proof cover as accessory.

Applications

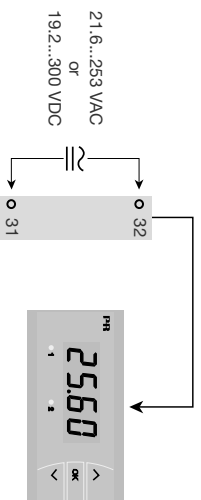
Input signals:



Output signals:



Supply:



Sensor error detection / sensor error detection outside range:

Variant:	Sensor error check in 5714 variants	Configuration	Sensor error detection:
ITU 402	ERR1=NONE, ERR2=NONE:	else:	OFF ON
ITU 412	ERR1=NONE, ERR2=NONE, O.ERR=NONE:	else:	OFF ON

Input	Range	Readout	Limit
Outside range readout (IN.LO, IN.HI): If the valid range of the A/D converter or the polynomial is exceeded			
VOLT	0.1 V / 0.2..1 V	IN.LO IN.HI	< -25 mV > 1.2 V
	0..10 V / 2..10 V	IN.LO IN.HI	< -25 mV > 12 V
CURR	0..20 mA / 4..20 mA	IN.LO IN.HI	< -1.05 mA > 25.05 mA
POTM	-	IN.LO IN.HI	< -0.5% > 100.5%
TEMP	TC / RTD	IN.LO IN.HI	< temperature range > temperature range

Input	Range	Readout	Limit
Sensor error detection (SE.BR, SE.SH):			
CURR	Loop break (4..20mA)	SE.BR	<= 3.6 mA; >= 21 mA
	TC	SE.BR	> ca. 750 kohm / (1.25V)
	Pt100 2-wire	SE.BR	> ca. 15 kohm
	No SE.SH for Pt10, Pt20 and Pt50	SE.SH	< ca. 15 ohm
	Pt100 3-wire	SE.SH	< ca. 15 kohm
	No SE.SH for Pt10, Pt20 and Pt50	SE.SH	< ca. 15 ohm
	Pt100 4-wire	SE.BR	> ca. 15 kohm
	No SE.SH for Pt10, Pt20 and Pt50	SE.BR	> ca. 15 kohm
		SE.SH	< ca. 15 ohm

Input	Range	Readout	Limit
Display readout below min. / above max. (-1.9.9.9, 9.9.9.9):			
CURR	All	-1.9.9.9	Display readout <-1999
	All	9.9.9.9	Display readout >9999
VOLT	All	-1.9.9.9	Display readout <-1999
	All	9.9.9.9	Display readout >9999
POTM	-	-1.9.9.9	Display readout <-1999
	-	9.9.9.9	Display readout >9999

Voltage input:
 Measurement range..... 0...12 VDC
 Programmable measurement ranges..... 0...1 / 0.2...1 / 0...10 / 2...10 VDC
 Input resistance..... Nom. 10 MΩ

Outputs:

Display:
 Display readout..... -1999...9999 (4 digits)
 Decimal point..... Programmable
 Digit height..... 13.8 mm
 Display updating..... 2.2 times / s
 Input outside input range is indicated by..... Explanatory text

Current output:
 Signal range (span)..... 0...20 mA
 Programmable signal ranges..... 0...20 / 4...20 / 20...0 / 20...4 mA
 Load (max.)..... 20 mA / 800 Ω / 16 VDC
 Load stability..... ≤ 0.01% of span / 100 Ω
 Sensor error detection..... 0 / 3.5 / 23 mA / none & NAMUR NE 43 up / downscale
 Output limitation:..... 23 mA / 3.5 mA
 on 4...20 and 20...4 mA signals..... 3.8...20.5 mA
 on 0...20 and 20...0 mA signals..... 0...20.5 mA
 Current limit..... ≤ 28 mA

Relay outputs:
 Relay function..... Setpoint
 Hysteresis..... 0...100%
 On and Off delay..... 0...3600 s
 Sensor error detection..... Make / Break / Hold
 Max. voltage..... 250 VRMS
 Max. current..... 2 A / AC
 Max. AC power..... 500 VA
 Max. current at 24 VDC..... 1 A

Marine approval:
 Det Norske Veritas, Ships & Offshore Standard for Certification No. 2.4
Observed authority requirements:
 EMC 2004/108/EC..... Standard:
 EN 61326-1
 LVD 2006/95/EC..... EN 61010-1
 UL, Standard for Safety..... UL 508
 EAC TR-CU 020/2011..... EN 61326-1

Electrical specifications:

Specifications range:
 -20°C to +60°C

Common specifications:
 Supply voltage, universal 21.6...253 VAC, 50...60 Hz or 19.2...300 VDC

Consumption

Type	Internal consumption	Max. consumption
ITU 402	2.7 W	3.0 W
ITU 412	3.2 W	3.5W

Isolation voltage, test / operation 2.3 kVAC / 250 VAC
 Signal- / noise ratio Min. 60 dB (0...100 kHz)
 Response time (0...90 %, 100...10 %), programmable:
 Temperature input..... 1...60 s
 Current / voltage input..... 0.4...60 s
 Calibration temperature..... 20...28°C
 Accuracy, the greater of general and basic values:

General values		
Input type	Absolute accuracy	Temperature coefficient
All	≤ ±0.1% of reading	≤ ±0.01% of reading / °C

Basic values		
Input type	Basic accuracy	Temperature coefficient
mA	$\leq \pm 4 \mu\text{A}$	$\leq \pm 0.4 \mu\text{A} / ^\circ\text{C}$
Volt	$\leq \pm 20 \mu\text{V}$	$\leq \pm 2 \mu\text{V} / ^\circ\text{C}$
Potentiometer	$\leq \pm 0.1 \Omega$	$\leq \pm 0.01 \Omega / ^\circ\text{C}$
Pt100	$\leq \pm 0.2^\circ\text{C}$	$\leq \pm 0.02^\circ\text{C} / ^\circ\text{C}$
Ni100	$\leq \pm 0.3^\circ\text{C}$	$\leq \pm 0.03^\circ\text{C} / ^\circ\text{C}$
TC type: E, J, K, L, N, T, U	$\leq \pm 1^\circ\text{C}$	$\leq \pm 0.05^\circ\text{C} / ^\circ\text{C}$
TC type: R, S, W3, W5, LR	$\leq \pm 2^\circ\text{C}$	$\leq \pm 0.2^\circ\text{C} / ^\circ\text{C}$
TC type: B 85...400°C	$\leq \pm 4.5^\circ\text{C}$	$\leq \pm 0.45^\circ\text{C} / ^\circ\text{C}$
TC type: B 400...1820°C	$\leq \pm 2^\circ\text{C}$	$\leq \pm 0.2^\circ\text{C} / ^\circ\text{C}$

EMC immunity influence $< \pm 0.5\%$ of reading

Auxiliary supplies:

2 wire supply (pin 46...45) 25...15 VDC / 0...20 mA
 Wire size, pin 41...46 (max.) 1 x 1.5 mm² stranded wire
 Wire size, others (max.) 1 x 2.5 mm² stranded wire
 Relative humidity $< 95\%$ RH (non cond.)
 Dimensions (HxWxD) 48 x 96 x 120 mm
 Cutout dimensions 44.5 x 91.5 mm
 Protection degree (mounted in panel) IP65
 Weight 230 g

RTD and potentiometer input:

Input type	Min. value	Max. value	Standard
Pt100 Ni100	-200°C -60°C	+850°C +250°C	IEC60751 DIN 43760
Potentiometer	10 Ω	100 kΩ	-

Input for RTD types:

Pt10, Pt20, Pt50, Pt100, Pt200, Pt250, Pt300, Pt400, Pt500, Pt1000
 Ni50, Ni100, Ni120, Ni1000
 Cable resistance pr. wire, RTD (max.) 50 Ω

Sensor current, RTD Nom. 0.2 mA
 Effect of sensor cable resistance (3- / 4-wire), RTD $< 0.002 \Omega / \Omega$
 Sensor error detection, RTD Yes
 Short circuit detection, RTD $< 15 \Omega$

TC input:

Type	Min. value	Max. value	Standard
B	0°C	+1820°C	IEC 60584-1
E	-100°C	+1000°C	IEC 60584-1
J	-100°C	+1200°C	IEC 60584-1
K	-180°C	+1372°C	IEC 60584-1
L	-200°C	+900°C	DIN 43710
N	-180°C	+1300°C	IEC 60584-1
R	-50°C	+1760°C	IEC 60584-1
S	-50°C	+1760°C	IEC 60584-1
T	-200°C	+400°C	IEC 60584-1
U	-200°C	+600°C	DIN 43710
W3	0°C	+2300°C	ASTM E988-90
W5	0°C	+2300°C	ASTM E988-90
LR	-200°C	+800°C	GOST 3044-84

NB.: TC input type B can be measured and configured down to 0°C, but the basic accuracy is only valid in the range 85...1820°C

Cold junction compensation (CJC)

via internally mounted sensor $< \pm 2.0^\circ\text{C} \pm 0.2^\circ\text{C} / ^\circ\text{C}$
 Sensor error detection, all TC types Yes
 Sensor error detection Yes
 Sensor error current: when detecting Nom. 2 μA
 else 0 μA

Current input:

Measurement range 0...20 mA
 Programmable measurement ranges 0...20 and 4...20 mA
 Input resistance Nom. 20 Ω + PTC 25 Ω
 Sensor error detection: loop break 4...20 mA Yes

Voltage input:

Measurement range 0...12 VDC
 Programmable measurement ranges 0...1 / 0.2...1 / 0...10 / 2...10 VDC
 Input resistance Nom. 10 MΩ