Displays Programmable displays with a wide selection of inputs and outputs for display of temperature, volume and weight, etc. Feature linearisation, scaling, and difference measurement functions for programming via PReset software.

Ex interfaces Interfaces for analogue and digital signals as well as HART ® signals between sensors / I/P converters / frequency signals and control systems in Ex zone 0, 1 & 2 and for some modules in zone 20, 21 & 22.

Isolation Galvanic isolators for analogue and digital signals as well as HART ® signals. A wide product range with both loop-powered and universal isolators featuring linearisation, inversion, and scaling of output signals.

Temperature A wide selection of transmitters for DIN form B mounting and DIN rail modules with analogue and digital bus communication ranging from application-specific to universal transmitters.

Universal PC or front programmable modules with universal options for input, output and supply. This range offers a number of advanced features such as process calibration, linearisation and auto-diagnosis.

PR electronics

4 1 3 1

Universal
Trip Amplifier

No. 4131V102-IN (0903)
From ser. no. 060101001

SIGNALS THE BEST

3N KFT.

Delta-3N Kft.
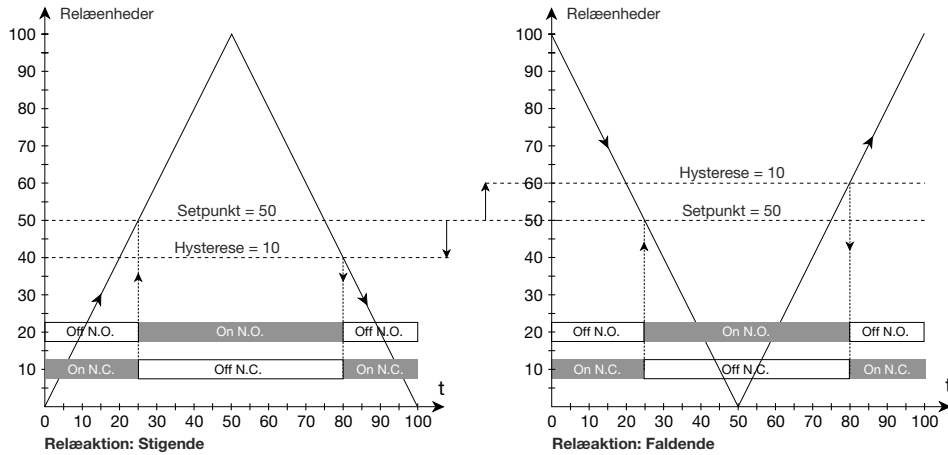
7030 Paks, Jedlik Á. u. 2
Tel.: +36 75 510 115
Fax: +36 75 510 114
drnagyi@delta3n.hu
www.delta3n.hu

RE200 SERIES MANUAL
MNX10035 REV. 0
1/23/09

Grafisk afbildning af relæfunktionen setpunkt:

Relæaktion: Stigende

Relæaktion: Faldende

Grafisk afbildning af relæfunktionen vindue:

Relæfunktion: Vindue (vist for stigende signal)
Kontakt: Lukket inden for vindue = ①
Kontakt: Åben inden for vindue = ②

Relæfunktion: Vindue (vist for faldende signal)
Kontakt: Lukket inden for vindue = ①
Kontakt: Åben inden for vindue = ②
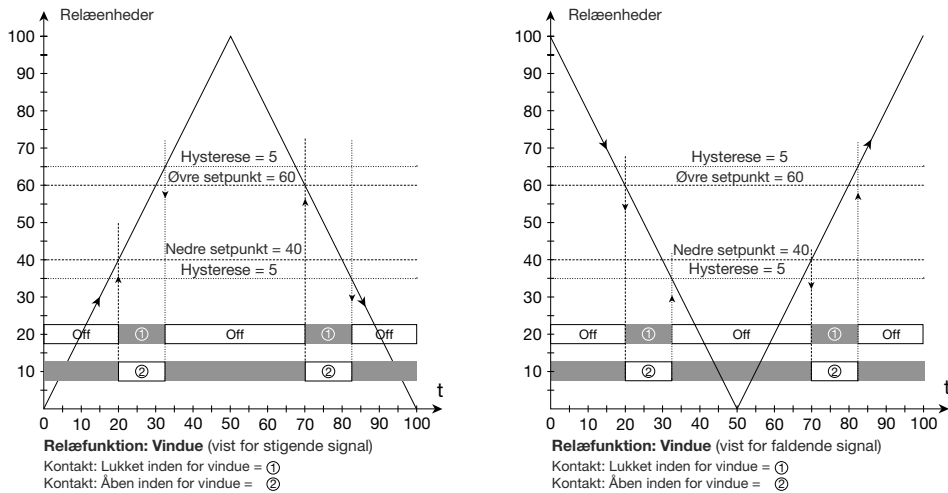
UNIVERSAL TRIP AMPLIFIER

PReasy 4131

CONTENTS

WARNING!

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.

GENERAL

WARNING!

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:
    General mounting, connection and disconnection of wires.
    Troubleshooting the module.

Repair of the module and replacement of circuit breakers must be done by PR electronics A/S only.

HAZARD-OUS VOLTAGE

WARNING

To keep the safety distances, the relay contacts on the module must not be connected to both hazardous and non-hazardous voltages at the same time.
SYSTEM 4000 must be mounted on a DIN rail according to DIN 46277.

INSTAL-LATION

WARNING

Do not open the front plate of the module as this will cause damage to the connector for the display / programming front PR 4501. This module contains no DIP-switches or jumpers.

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.

The double insulation symbol shows that the module is protected by double or reinforced insulation.

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 module without damaging it and make sure that the manual always follows the module and is always available. The packing should always follow the module until this has been permanently mounted.
Check at the receipt of the module 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 your local distributor or, alternatively,

PR electronics A/S, Lerbakken 10, DK-8410 Rønde, Denmark, tel: +45 86 37 26 77.

Mounting and connection of the module should comply with national legislation for mounting of electric materials, i.a. 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 modules:
  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 module. The power switch should be marked with a label indicating that it will switch off the voltage to the module.

Year of manufacture can be taken from the first two digits in the serial number.

UL INSTALLATION REQUIREMENTS:
Use 60/75°C copper conducters only
For use only in pollution degree 2 or better
Max. ambient temperature..................... 60°C
Max. wire size.. AWG 26-14
UL file number....................................... E231911

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 modules 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 module is easily accessible.

CLEANING:
When disconnected, the module may be cleaned with a cloth moistened with distilled water.

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

DECLARATION OF CONFORMITY

As manufacturer

PR electronics A/S

Lerbakken 10

DK-8410 Rønde

hereby declares that the following product:

Type: 4131

Name: Universal trip amplifier

is in conformity with the following directives and standards:

The EMC Directive 2004/108/EC and later amendments

EN 61326-1

For specification of the acceptable EMC performance level, refer to the electrical specifications for the module.

The Low Voltage Directive 2006/95/EC and later amendments

EN 61010-1

Rønde, 14 January 2009

Peter Rasmussen
Manufacturer's signature

HOW TO DISMANTLE SYSTEM 4000

First, remember to demount the connectors with hazardous voltages.

Picture 1:
Detach the module from the DIN rail by lifting the bottom lock.

UNIVERSAL TRIP AMPLIFIER
PReasy 4131

- *Input for RTD, TC, Ohm, potentiometer, mA and V*
- *2 adjustable alarm limits*
- *FM-approved for installation in Div. 2*
- *2 relay outputs*
- *Universal AC or DC supply*

Advanced features:

• Programmable via detachable display front (4501), process calibration, relay simulation, password protection, error diagnostics and selection of help text in several languages.

Application:

• Process control with 2 pairs of potential-free relay contacts which can be configured to suit any application.

• Trip amplifier with window fonction allowing the relay to change state within a high and a low setpoint on the input span.

• Sophisticated sensor error surveillance, where one relay holds the state immediately prior to the sensor error, thus allowing the process to continue. The other relay can be set for sensor error alarm so that the defect sensor can be replaced immediately.

Technical characteristics:

• When 4131 is used in combination with the 4501 display / programming front, all operational parameters can be modified to suit any application. As the 4131 is designed with electronic hardware switches, it is not necessary to open the module for setting of DIP-switches.

• A green front LED indicates normal operation and malfunction. A yellow LED is ON for each active output relay.

• Continuous check of vital stored data for safety reasons.

• 3-port 2.3 kVAC galvanic isolation.

PR 4501 DISPLAY / PROGRAMMING FRONT

Functionality.

The simple and easily understandable PReasy menu structure and the explanatory help texts guide you effortlessly and automatically through the configuration steps, thus making the product very easy to use. Functions and configuration options are described in the section "Configuration / operating the function keys".

Application:

• Communications interface for modification of operational parameters in 4131.

• Can be moved from one 4131 module to another and download the configuration of the first transmitter to subsequent transmitters.

• Fixed display for readout of process data and status.

Technical characteristics:

• LCD display with 4 lines; Line 1 (H=5.57 mm) shows input signal, line 2 (H=3.33 mm) shows units, line 3 (H=3.33 mm) shows tag no. and line 4 shows communication and relay status.

• Programming access can be blocked by assigning a password. The password is saved in the transmitter in order to ensure a high degree of protection against unauthorised modifications to the configuration.

Mounting / installation:

• Click 4501 onto the front of 4131.

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Applications

Input signals:
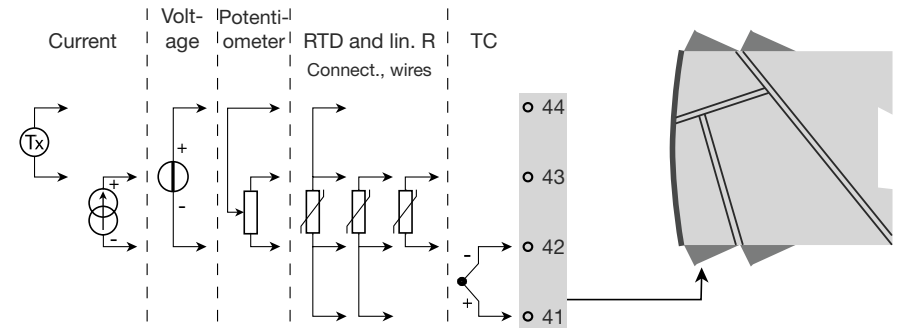
Output signals:

Supply:

35
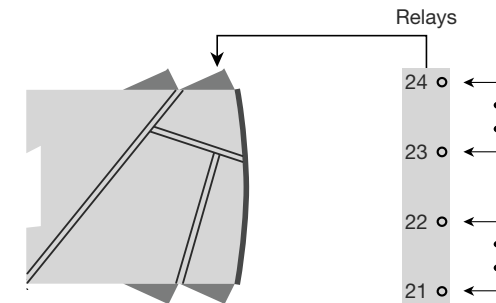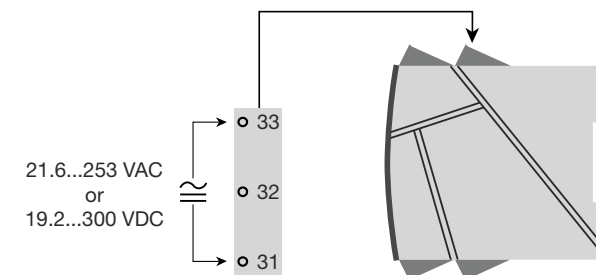
Order codes:

4131 = Universal trip amplifier
4501 = Display / programming front

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
Max. consumption .... ≤ 2.0 W
Fuse.. 400 mA SB / 250 VAC
Isolation voltage, test / operation .... 2.3 kVAC / 250 VAC
Communications interface .... Programming front 4501
Signal / noise ratio .... Min. 60 dB (0...100 kHz)
Response time (0...90%, 100...10%):
    Temperature input.................................. ≤ 1 s
    mA / V input... ≤ 400 ms
Calibration temperature .... 20...28°C
Accuracy, the greater of the general and basic values:

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

Basic values		
Input type	Basic accuracy	Temperature coefficient
mA	≤ ±4 µA	≤ ±0.4 µA / °C
Volt	≤ ±20 µV	≤ ±2 µV / °C
Pt100	≤ ±0.2°C	≤ ±0.01°C / °C
Lin. R	≤ ±0.1 Ω	≤ ±0.01 Ω / °C
Potentiometer	≤ ±0.1 Ω	≤ ±0.01 Ω / °C
TC type: E, J, K, L, N, T, U	≤ ±1°C	≤ ±0.05°C / °C
TC type: B, R, S, W3, W5, LR	≤ ±2°C	≤ ±0.2°C / °C

EMC immunity influence .... < ±0.5% of span
Extended EMC immunity:
NAMUR NE 21, A criterion, burst .... < ±1% of span

Auxiliary supplies:
2-wire supply (terminal 44...43)................... 25...16 VDC / 0...20 mA
Max. wire size... 1 x 2.5 mm^2 stranded wire
Screw terminal torque .... 0.5 Nm
Relative humidity .... < 95% RH (non-cond.)
Dimensions, without display front (HxBxD).. 109 x 23.5 x 104 mm
Dimensions, with display front (HxBxD)...... 109 x 23.5 x 116 mm
Protection degree.. IP20
Weight .... 170 g / 185 g with 4501

RTD, linear resistance and potentiometer input:

Input type	Min. value	Max. value	Standard
Pt100	-200°C	+850°C	IEC60751
Ni100	-60°C	+250°C	DIN 43760
Lin. R	0 Ω	10000 Ω	-
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 per wire (max.), RTD........ 50 Ω
Sensor current, RTD.................................... Nom. 0.2 mA

Effect of sensor cable resistance
(3- / 4-wire), RTD.. < 0.002 Ω / Ω
Sensor error detection, RTD .... Yes
Short circuit detection, RTD........................ < 15 Ω

TC input:

Type	Min. value	Max. value	Standard
B	+400°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

Cold junction compensation (CJC)
   via internally mounted sensor................. < ±1.0 °C
Sensor error detection, all TC types .... Yes
Sensor error current:
   when detecting .... Nom. 2 µA
   else.. 0 µA

Current input:

Measurement range .... -1...25 mA
Programmable measurement ranges.......... 0...20 and 4...20 mA
Input resistance.. Nom. 20 Ω + PTC 50 Ω
Sensor error detection:
   Loop break 4...20 mA .... Yes

Voltage input:

Measurement range .... -20 mV...12 VDC
Programmable measurement ranges.......... 0...1 / 0.2...1 / 0...5 / 1...5 /
                                                                       0...10 and 2...10 VDC
Input resistance.. Nom. 10 MΩ

Relay outputs:
Relay functions... Setpoint, Window, Sensor error,
                                                                       Power and Off
Hysteresis, in % / display counts .... 0,1...25% / 1...2999
On and Off delay .... 0...3600 s
Sensor error detection .... Break / Make / Hold
Max. voltage.. 250 VRMS
Max. current .... 2 A / AC or 1 A / DC
Max. AC power .... 500 VA

Ex / I.S. approval:
FM, applicable in.. Class I, Div. 2, Group A, B, C, D
                                                                       Class I, Div. 2, Group IIC
                                                                       Zone 2
Max. ambient temperature for T5 .... 60°C

Marine approval:
Det Norske Veritas, Ships & Offshore .... Standard for Certification No. 2.4

GOST R approval:
VNIIM, Cert. no.. See www.prelectronics.com

Observed authority requirements:	**Standard:**
EMC 2004/108/EC	EN 61326-1
LVD 2006/95/EC..	EN 61010-1
FM	3600, 3611, 3810 and ISA 82.02.01
UL, Standard for Safety	UL 508

of span = of the currently selected measurement range

Visualisation in the 4501 of sensor error detection and input signal outside range:

Module:	Configuration	Sensor error detection:
4131	R1, ERR.ACT=NONE - R2, ERR.ACT=NONE, OUT.ERR=NONE.	OFF
	Else:	ON

Outside range readout (IN.LO, IN.HI): If the valid range of the A/D converter or the polynomial is exceeded			
Input	Range	Readout	Limit
VOLT	0...1 V / 0.2...1 V	IN.LO	< -25 mV
		IN.HI	> 1.2 V
	0...10 V / 2...10 V	IN.LO	< -25 mV
		IN.HI	> 12 V
CURR	0...20 mA / 4...20 mA	IN.LO	< -1.05 mA
		IN.HI	> 25.05 mA
LIN.R	0...800 Ω	IN.LO	< 0 Ω
		IN.HI	> 1075 Ω
	0...10 kΩ	IN.LO	< 0 Ω
		IN.HI	< 110 kΩ
POTM	-	IN.LO	< -0.5 %
		IN.HI	> 100.5 %
TEMP	TC / RTD	IN.LO	< temperature range -2°C
		IN.HI	> temperature range +2°C

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

Sensor error detection limits:

Sensor error detection (SE.BR, SE.SH):			
Input	Range	Readout	Limit
CURR	Loop break (4..20 mA)	SE.BR	<= 3.6 mA; > = 21 mA
POTM	All, SE.BR on all 3-wire	SE.BR	> ca. 126 kΩ
LIN.R	0...800 Ω	SE.BR	> ca. 875 Ω
	0...10 kΩ	SE.BR	> ca. 11 kΩ
TEMP	TC	SE.BR	> ca. 750 kΩ / (1.25 V)
	RTD, 2-, 3-, and 4-wire	SE.BR	> ca. 15 kΩ
	No SE.SH for Pt10, Pt20 and Pt50	SE.SH	< ca. 15 Ω

Error indications:

Readout at hardware error		
Error search	Readout	Error cause
Test of internal CJC sensor	CJ.ER	CJC sensor defect or temperature outside range
Checksum test of the configuration in FLASH	FL.ER	Error in FLASH
Communications test 4501 / 4131	NO.CO	Connection error
Check that input signal matches input configuration	IN.ER	1) Error levels on input
Check that saved configuration in 4501 matches module	TY.ER	Configuration is not 4131

! Error indications in the display flash once per second. The help text explains the error.
1) The error is reset by switching off and then switching on the supply voltage to the module.

CONNECTIONS

Supply:
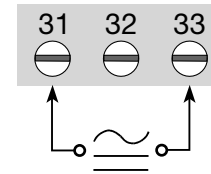
Inputs:

Output:

BLOCK DIAGRAM

4131

2-wire transmitter
Current
Voltage
Potentiometer
RTD and lin. R, Connection, wires — 4 3 2
TC
41 42 43 44
CJC
10 Ω
PTC
MUX
0.2 mA
Vloop
Green
A/D
EEPROM
CPU
Yellow
Yellow
Relay 1 Relay 1 Relay 2 Relay 2
21 22 23 24
31 33
Supply
21.6...253 VAC or 19.2...300 VDC
Supply

50.0
1 / min
VALUE 5

CONFIGURATION / OPERATING THE FUNCTION KEYS

Documentation for routing diagram.

In general:

When configuring the 4131, you will be guided through all parameters and you can choose the settings which fit the application. For each menu there is a scrolling help text which is automatically shown in line 3 on the display.

Configuration is carried out by using the 3 function keys:
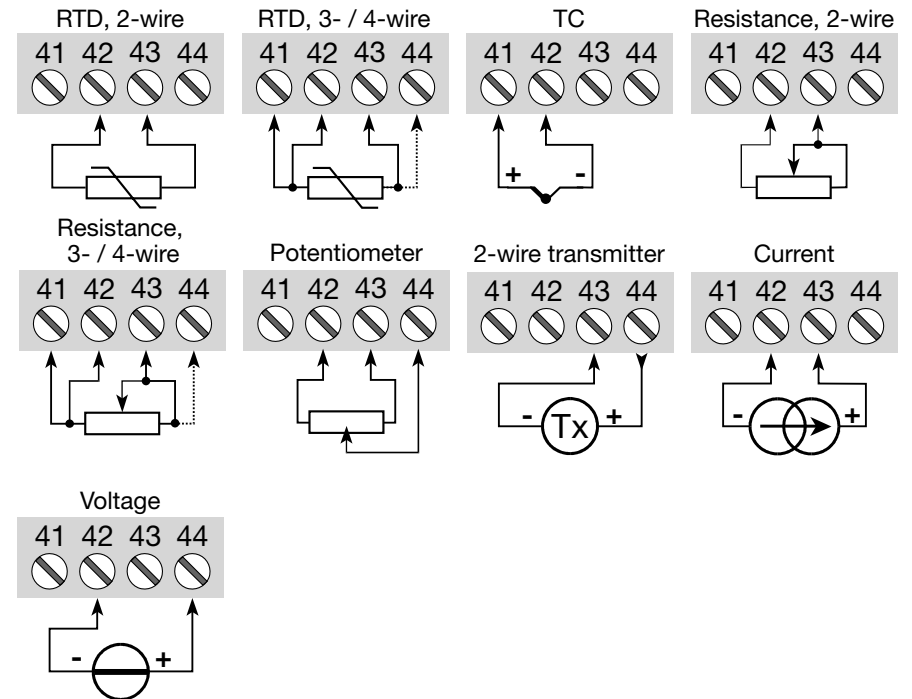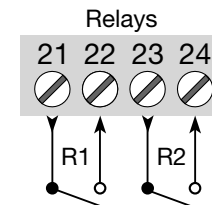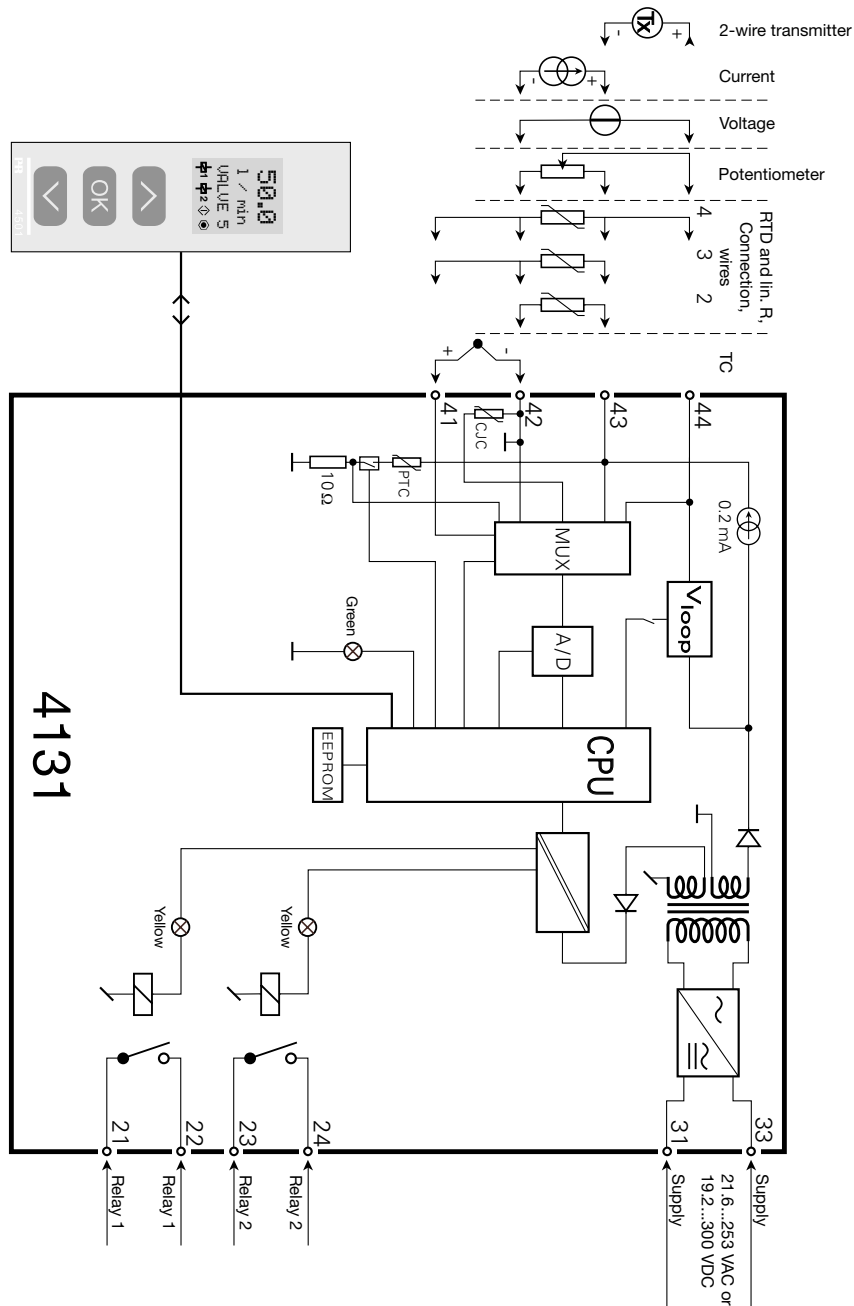
- $\wedge$ will increase the numerical value or choose the next parameter
- $\vee$ will decrease the numerical value or choose the previous parameter
- OK will save the chosen value and proceed to the next menu

When configuration is completed, the dispaly will return to the default state 1.0.

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 1 minute, 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 make a quick setpoint change and relay test when the FastSet menu is activated. This function can only be activated when the relays are set for setpoint function and are controlled by a setpoint.

Pressing $\wedge$ and $\vee$ simultaneously will activate a relay test and change the state of the relay.

Pressing OK will save the setpoint change.

Holding down OK for more than 1 second will return the unit to the default state without saving the setpoint change.

Password protection: Programming access can be blocked by assigning a password. The password is saved in the transmitter in order to ensure a high degree of protection against unauthorised modifications to the configuration. Default password 2008 allows acces to all configuration menus.

Signal and sensor error info via display front 4501

Sensor error (see limits in the table) is displayed as SE.BR (sensor break) or
SE.SH (sensor short). Signals outside the selected range (not sensor error,
see table for limits) are displayed as IN.LO indicating low input signal or
IN.HI indicating high input signal. The error indication is displayed in line 2
as text and at the same time the backlight flashes. Line 4 of the display is a
status line which displays status of relay 1 and relay 2, COM (flashing bullet)
indicating correct functioning of 4501 and arrow up/down which indicates
tendency readout of the input signal. If the figure 1 or figure 2 flashes, the
unit has detected that the setpoint has been exceeded and that the relay is in
"delay" mode. When the delay time has passed and the relay makes/breakes,
the relay sign is either shown or disappears.

Signal and sensor error indication without display front

Status of the unit can also be read from the green LED in the front of the module.
Green flashing LED 13 Hz indicates normal operation.
Green flashing LED 1 Hz indicates sensor error.
Steady green LED indicates internal error.

Relay functions

5 different relay function settings can be selected.

Setpoint: The unit works as a single trip amplifier
Window: The relay has a window that is defined by a low and a high
           setpoint. On both sides of the window the relay has the
           same status.
Error function: The relay is activated by sensor error.
Power: The relay is activated as long as the power is on.
Off: The relay is deactivated.

Increasing/decreasing: The relays can be set to activate at increasing or
decreasing input signal.

Delay: Both an ON and an OFF delay can be set on both relays in the range
0...3600 s.

Hysteresis: A hysteresis can be set at 0.1...25% of the span or between
1 and 2999 counts.

Advanced functions

The unit gives access to a number of advanced functions which can be reached
by answering "Yes" to the point "adv.set".

Display setup: Here you can adjust the brightness contrast and the backlight.

Setup of TAG numbers with 6 alphanumerics. Line 3 of the display shows
TAG number.

Two-point process calibration: The unit can be process-calibrated in 2 points
to fit a given input signal . A low input signal (not necessarily 0%) is applied
and the actual value is entered. Then a high signal (not necessarily 100%) is
applied and the actual value is entered. If you accept to use the calibration,
the unit will work according to this new adjustment. If you later reject this
menu point or choose another type of input signal the unit will return to
factory calibration.

Process simulation function: If you say "yes" to the point "EN.SIM" it is
possible to simulate an input signal by means of the arrow keys and thus test
the function of the relays. When you finalise the point with ⊗, the unit returns
to normal mode. The point REL.SIM allows you to activate relay 1 and relay 2
by means of the arrow-keys up/down. You must exit the menu by pressing ⊗
(no time-out).

Password: Here you can choose a password between 0000 and 9999 in order
to protect the unit against unauthorised modifications to the configuration.
You can also choose whether the menu "fast setpoint adjustment" of the
relays shall be accessible regardsless of password protection. The unit
is delivered default without password. If you have locked the unit with a
password by mistake, you can always open the menu by using the master
password 2008.

Language: In the menu "lang.setup" you can choose between 7 different
language versions of help texts that will appear in the menu. You can choose
between UK, DE, FR, IT, ES, SE and DK.

Auto diagnosis

The unit performs an advanced auto diagnosis of the internal circuits.
The following possible errors can be displayed in the front unit 4501.
CJ.ER - CJC sensor defect or CJC temperature outside range
FL.ER - Flash error
NO.CO - Connection error
IN.ER - Error levels on input
TY.ER - Configuration in 4501 does not match this product type

Selection of units

After choosing the input signal type you can choose the process units which
will be shown in text line 2 (see table). By selection of temperature input the
process value is always displayed in Celsius or Fahrenheit. This is selected in
the menu point after selection of temperature input.
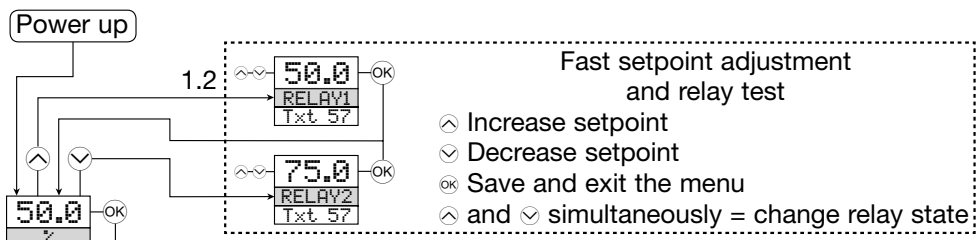
ROUTING DIAGRAM

Power up

Fast setpoint adjustment and relay test

- ⌃ Increase setpoint
- ⌄ Decrease setpoint
- ⊛ Save and exit the menu
- ⌃ and ⌄ simultaneously = change relay state

If no key is activated for 1 minute, the display will return to the default state 1.0 without saving configuration changes.
- ⌃ Increase value / choose next parameter
- ⌄ Decrease value / choose previous parameter
- ⊛ Save the chosen value and proceed to the next menu
- Hold ⊛ Back to previous menu / return to menu 1.0 without saving

1.2

```
50.0    OK
RELAY1
Txt 57
```

```
75.0    OK
RELAY2
Txt 57
```

```
50.0    OK
  %
VALVE 5
⊞1 ⊞2 ◊ ◉
```
1.0

1.1

1.0 = Default state
Line 1 shows input signal.
Line 2 shows UNIT.
Line 3 shows TAG.
Line 4 shows relay and communication status.
1.1 = Only if password-protected.
1.2 = Only if FastSet is activated and the relay function is setpoint.
1.3 = Not valid for these input signals: 0...20 mA and voltage.

```
0000
9999
⌃⌄
0000    OK
PASSW.
Txt 1
```

```
NO
YES
⌃⌄
NO      OK
ADV.SET
Txt 2
```

```
VOLT
CURR
LIN.R
POTM
TEMP
⌃⌄
VOLT    OK
IN TYPE
Txt 3
```

```
2-10
0-10
1-5
0-5
0.2-1
0-1
⌃⌄
2-10    OK
V.RANGE
Txt 4
```

```
°C
mA
rPm
(69 units)
⌃⌄
UNIT    OK
  %
Txt 11
```

```
1111
111.1
11.11
1.111
⌃⌄
111.1   OK
DEC.P
Txt 12
```

```
999.9
-199.9
⌃⌄
0.0
DISP.LO
Txt 13
```

```
999.9
-199.9
⌃⌄
100.0   OK
DISP.HI
Txt 14
```

```
DISP
PERC
⌃⌄
DISP    OK
REL.UN
Txt 15
```

```
SETP
WIND
ERR
POW
OFF
⌃⌄
SETP    OK
R1.FUNC
Txt 19
```

```
N.O.
N.C.
⌃⌄
N.O.    OK
R1.CONT
Txt 20
```

```
9999
-1999
⌃⌄
50.0    OK
R1.SETP
Txt 21
```

```
INCR
DECR
⌃⌄
INCR    OK
ACT.DIR
Txt 22
```

```
250.0
0.1
⌃⌄
1.0     OK
R1.HYST
Txt 23
```

```
0-20
4-20
⌃⌄
CURR    OK    4-20    OK
IN TYPE       I.RANGE
Txt 3         Txt 5
```

```
4W
3W
2W
⌃⌄
LIN.R   OK    3W      OK
IN TYPE       CONNEC.
Txt 3         Txt 6
```

```
0000
9999
⌃⌄
0       OK
R 0%
Txt 7
```

```
0000
9999
⌃⌄
2500    OK
R 100%
Txt 8
```

```
POTM    OK
IN TYPE
Txt 3
```

```
Pt
NI
TC
⌃⌄
TEMP    OK    Pt      OK
IN TYPE       SENSOR
Txt 3         Txt 10
```
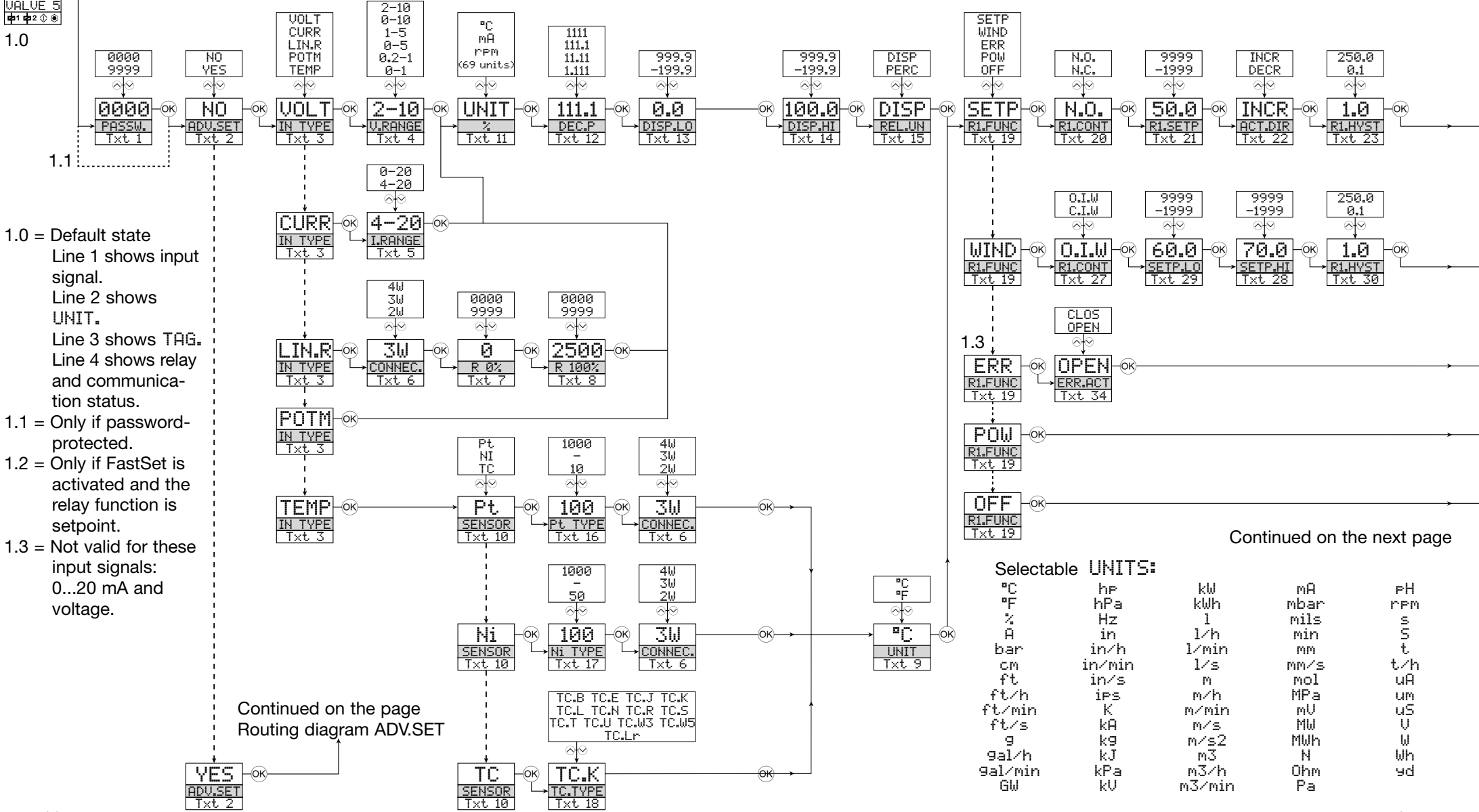
```
1000
–
10
⌃⌄
100     OK
Pt.TYPE
Txt 16
```

```
4W
3W
2W
⌃⌄
3W      OK
CONNEC.
Txt 6
```

```
1000
–
50
⌃⌄
Ni      OK    100     OK
SENSOR        Ni TYPE
Txt 10        Txt 17
```

```
4W
3W
2W
⌃⌄
3W      OK
CONNEC.
Txt 6
```

```
TC.B TC.E TC.J TC.K
TC.L TC.N TC.R TC.S
TC.T TC.U TC.W3 TC.W5
TC.Lr
⌃⌄
TC      OK    TC.K    OK
SENSOR        TC.TYPE
Txt 10        Txt 18
```

```
°C
°F
⌃⌄
°C      OK
UNIT
Txt 9
```

```
WIND    OK    O.I.W   OK    60.0    OK    70.0    OK    1.0     OK
R1.FUNC       R1.CONT       SETP.LO       SETP.HI       R1.HYST
Txt 19        Txt 27        Txt 29        Txt 28        Txt 30
```

```
O.I.W
C.I.W
⌃⌄
```

```
9999
-1999
⌃⌄
```

```
9999
-1999
⌃⌄
```

```
250.0
0.1
⌃⌄
```

1.3

```
CLOS
OPEN
⌃⌄
ERR     OK    OPEN    OK
R1.FUNC       ERR.ACT
Txt 19        Txt 34
```

```
POW     OK
R1.FUNC
Txt 19
```

```
OFF     OK
R1.FUNC
Txt 19
```

```
YES     OK
ADV.SET
Txt 2
```

Selectable UNITS:

°C	hP	kW	mA	pH
°F	hPa	kWh	mbar	rPm
%	Hz	l	mils	s
A	in	l/h	min	S
bar	in/h	l/min	mm	t
cm	in/min	l/s	mm/s	t/h
ft	in/s	m	mol	uA
ft/h	ips	m/h	MPa	um
ft/min	K	m/min	mV	uS
ft/s	kA	m/s	MW	V
g	kg	m/s2	MWh	W
gal/h	kJ	m3	N	Wh
gal/min	kPa	m3/h	Ohm	yd
GW	kV	m3/min	Pa	

HOLD / CLOS / OPEN / NONE → NONE — ERR.ACT — Txt 24 — 1.3
3600 / 0000 → 0 — ON.DEL — Txt 25
3600 / 0000 → 0 — OFF.DEL — Txt 26
SETP / WIND / ERR / POW / OFF → SETP — R2.FUNC — Txt 19
N.O. / N.C. → N.O. — R2.CONT — Txt 20
9999 / -1999 → 50.0 — R2.SETP — Txt 21
INCR / DECR → INCR — ACT.DIR — Txt 22
250.0 / 0.1 → 1.0 — R2.HYST — Txt 23
HOLD / CLOS / OPEN / NONE → NONE — ERR.ACT — Txt 24 — 1.3
3600 / 0000 → 0 — ON.DEL — Txt 25
3600 / 0000 → 0 — OFF.DEL — Txt 26
To default state 1.0

HOLD / CLOS / OPEN / NONE → NONE — ERR.ACT — Txt 31 — 1.3
3600 / 0000 → 0 — ON.DEL — Txt 32
3600 / 0000 → 0 — OFF.DEL — Txt 33
WIND — R2.FUNC — Txt 19
O.I.W / C.I.W → O.I.W — R2.CONT — Txt 27
9999 / -1999 → 60.0 — SETP.LO — Txt 29
9999 / -1999 → 70.0 — SETP.HI — Txt 28
250.0 / 0.1 → 1.0 — R2.HYST — Txt 30
HOLD / CLOS / OPEN / NONE → NONE — ERR.ACT — Txt 31 — 1.3
3600 / 0000 → 0 — ON.DEL — Txt 32
3600 / 0000 → 0 — OFF.DEL — Txt 33

1.3
ERR — R2.FUNC — Txt 19
CLOS / OPEN → OPEN — ERR.ACT — Txt 34

POW — R2.FUNC — Txt 19

OFF — R2.FUNC — Txt 19

48

49

ROUTING DIAGRAM

Advanced settings (ADV.SET)

2.0 In the submenu simulation (SIM) you must press ⊛ to return to the default state 1.0.

```
MEM
DISP
CAL
SIM
PASS
LANG
⌃⌄
```

MEM
SETUP
Txt 43

```
SAVE
LOAD
⌃⌄
```

SAVE
MEMORY
Txt 44

DISP
SETUP
Txt 43

```
9
0
⌃⌄
```

3
CONTRA
Txt 45

```
9
0
⌃⌄
```

9
LIGHT
Txt 46

```
9
A
⌃⌄
```

9
VALVE 5
Txt 47

CAL
SETUP
Txt 43

```
YES
NO
⌃⌄
```

YES
CAL.LO
Txt 49

```
100.0
0.0
⌃⌄
```

2.0
%
Txt 61

···NO····

```
YES
NO
⌃⌄
```

YES
CAL.HI
Txt 50

```
100.0
0.0
⌃⌄
```

90.0
%
Txt 62

···NO····

```
YES
NO
⌃⌄
```

YES
USE.CAL
Txt 60

```
To default state 1.0
```

SIM
SETUP
Txt 43

```
YES
NO
⌃⌄
```

YES
EN.SIM
Txt 51

2.0

```
25.0
%
⌃⌄
```

25.0
%
Txt 52

···NO····

REL.SIM
Txt 53

PASS
SETUP
Txt 43

```
YES
NO
⌃⌄
```

YES
EN.PASS
Txt 54

```
9999
0000
⌃⌄
```

0000
NEW.PAS
Txt 55

···NO····

```
YES
NO
⌃⌄
```

YES
EN.FAST
Txt 56

LANG
SETUP
Txt 43

```
DE, DK,
ES, FR,
IT, SE,
UK
⌃⌄
```
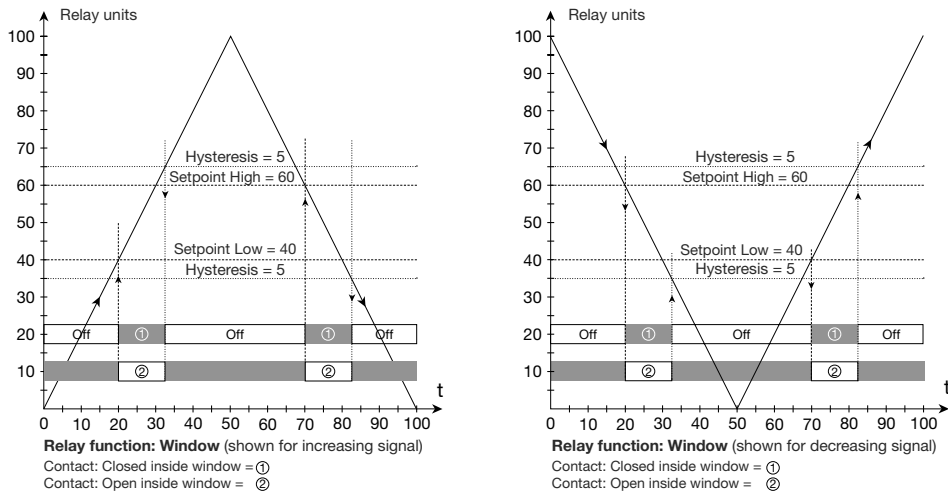
UK
LANGUA
Txt 59

SCROLLING HELP TEXT IN DISPLAY LINE 3

[01] Set correct password
[02] Enter advanced setup menu?
[03] Select temperature input
Select potentiometer input
Select linear resistance input
Select current input
Select voltage input
[04] Select 0.0-1 V input range
Select 0.2-1 V input range
Select 0-5 V input range
Select 1-5 V input range
Select 0-10 V input range
Select 2-10 V input range
[05] Select 0-20 mA input range
Select 4-20 mA input range
[06] Select 2-wire sensor connection
Select 3-wire sensor connection
Select 4-wire sensor connection
[07] Set resistance value low
[08] Set resistance value high
[09] Select Celsius as temperature unit
Select Fahrenheit as temperature unit
[10] Select TC sensor type
Select Ni sensor type
Select Pt sensor type
[11] Select display unit
[12] Select decimal point position
[13] Set display range low
[14] Set display range high
[15] Set relays in % of input range
Set relays in display units
[16] Select Pt10 as sensor type
Select Pt20 as sensor type
Select Pt50 as sensor type
Select Pt100 as sensor type
Select Pt200 as sensor type
Select Pt250 as sensor type
Select Pt300 as sensor type
Select Pt400 as sensor type
Select Pt500 as sensor type
Select Pt1000 as sensor type
[17] Select Ni50 as sensor type
Select Ni100 as sensor type
Select Ni120 as sensor type
Select Ni1000 as sensor type
[18] Select TC-B as sensor type
Select TC-E as sensor type
Select TC-J as sensor type
Select TC-K as sensor type
Select TC-L as sensor type
Select TC-N as sensor type
Select TC-R as sensor type
Select TC-S as sensor type
Select TC-T as sensor type
Select TC-U as sensor type
Select TC-W3 as sensor type
Select TC-W5 as sensor type
Select TC-Lr as sensor type
[19] Select OFF function - relay is permanently off
Select POWER function - relay indicates power status OK
Select ERROR function - relay indicates sensor error only
Select WINDOW function - relay controlled by 2 setpoints
Select SETPOINT function - relay controlled by 1 setpoint
[20] Select Normally Closed contact
Select Normally Open contact
[21] Set relay setpoint
[22] Activate relay on decreasing signal
Activate relay on increasing signal
[23] Set relay hysteresis
[24] No error action - undefined status at error
Open relay contact at error
Close relay contact at error
Hold relay status at error
[25] Set relay ON delay in seconds
[26] Set relay OFF delay in seconds
[27] Relay contact is Closed Inside Window
Relay contact is Open Inside Window
[28] Set relay window setpoint high
[29] Set relay window setpoint low
[30] Set relay window hysteresis
[31] No error action - undefined status at error
Open relay contact at error
Close relay contact at error
Hold relay status at error
[32] Set relay ON delay in seconds
[33] Set relay OFF delay in seconds
[34] Open relay contact at error
Close relay contact at error
[43] Enter password setup
Enter simulation mode
Perform process calibration
Enter display setup
Perform memory operations
[44] Load saved configuration into 4131
Save 4131 configuration in 4501
[45] Adjust LCD contrast
[46] Adjust LCD backlight
[47] Write a 6-character device TAG
[49] Calibrate input low to process value?
[50] Calibrate input high to process value?
[51] Enable simulation mode?
[52] Set the input simulation value
[53] Relay simulation - use ⌃ and ⌄ to toggle relay 1 and 2
[54] Enable password protection?
[55] Set new password
[56] Enable Fastset functionality?
[57] Relay setpoint - press ⊛ to save
[58] Relay setpoint - Read only
[59] Select language
[60] Use process calibration values?
[61] Set value for low calibration point
[62] Set value for high calibration point

Graphic depiction of relay action Setpoint:

Relay units (left chart)
100, 90, 80, 70, 60, 50, 40, 30, 20, 10

Setpoint = 50
Hysteresis = 10
Off N.O. — On N.O. — Off N.O.
On N.C. — Off N.C. — On N.C.
0 10 20 30 40 50 60 70 80 90 100   t
Relay action: Increasing

Relay units (right chart)
100, 90, 80, 70, 60, 50, 40, 30, 20, 10

Hysteresis = 10
Setpoint = 50
Off N.O. — On N.O. — Off N.O.
On N.C. — Off N.C. — On N.C.
0 10 20 30 40 50 60 70 80 90 100   t
Relay action: Decreasing
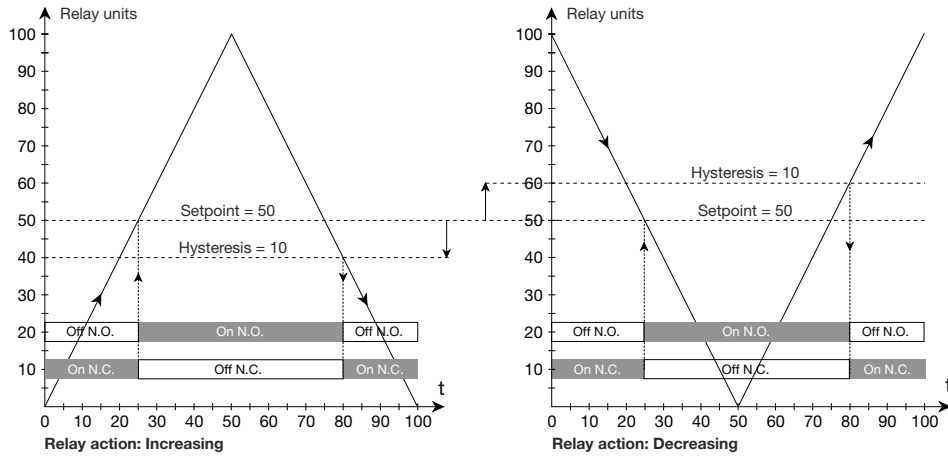
Graphic depiction of relay action Window:

Relay units (left chart)
100, 90, 80, 70, 60, 50, 40, 30, 20, 10

Hysteresis = 5
Setpoint High = 60
Setpoint Low = 40
Hysteresis = 5
Off — ① — Off — ① — Off
② — ②
0 10 20 30 40 50 60 70 80 90 100   t
Relay function: Window (shown for increasing signal)
Contact: Closed inside window = ①
Contact: Open inside window = ②

Relay units (right chart)
100, 90, 80, 70, 60, 50, 40, 30, 20, 10

Hysteresis = 5
Setpoint High = 60
Setpoint Low = 40
Hysteresis = 5
Off — ① — Off — ① — Off
② — ②
0 10 20 30 40 50 60 70 80 90 100   t
Relay function: Window (shown for decreasing signal)
Contact: Closed inside window = ①
Contact: Open inside window = ②

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SOMMAIRE