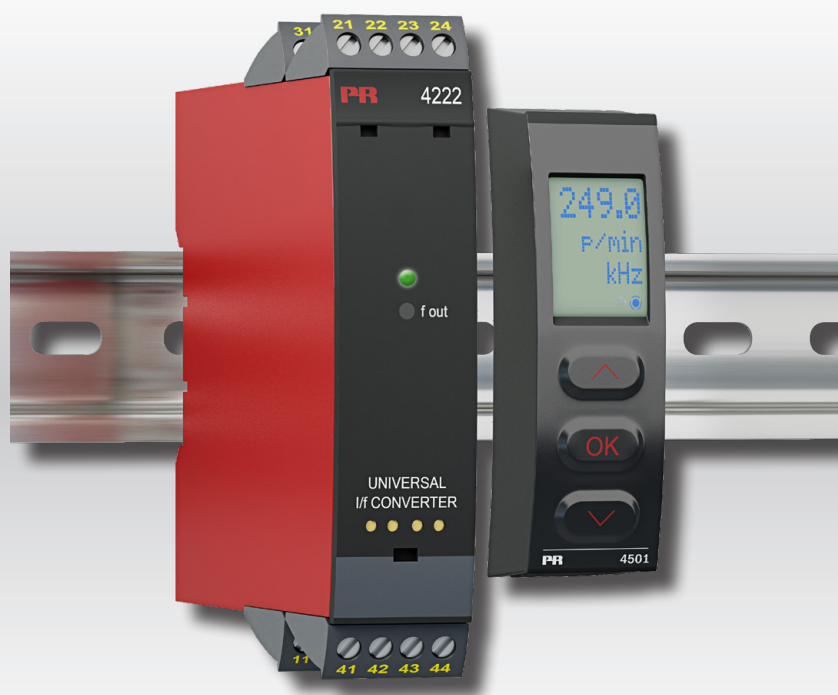


PERFORMANCE  
MADE  
SMARTER

Product manual

**4222**

***Universal I/f converter***



TEMPERATURE | I.S. INTERFACES | COMMUNICATION INTERFACES | MULTIFUNCTIONAL | ISOLATION | DISPLAY

No. 4222V101-UK  
From serial no.: 060867001

**PR**  
electronics

# 6 Product Pillars

## *to meet your every need*

### Individually outstanding, unrivalled in combination

With our innovative, patented technologies, we make signal conditioning smarter and simpler. Our portfolio is composed of six product areas, where we offer a wide range of analog and digital devices covering over a thousand applications in industrial and factory automation. All our products comply with or surpass the highest industry standards, ensuring reliability in even the harshest of environments and have a 5-year warranty for greater peace of mind.



Temperature

Our range of temperature transmitters and sensors provides the highest level of signal integrity from the measurement point to your control system. You can convert industrial process temperature signals to analog, bus or digital communications using a highly reliable point-to-point solution with a fast response time, automatic self-calibration, sensor error detection, low drift, and top EMC performance in any environment.



I.S. Interface

We deliver the safest signals by validating our products against the toughest safety standards. Through our commitment to innovation, we have made pioneering achievements in developing I.S. interfaces with SIL 2 Full Assessment that are both efficient and cost-effective. Our comprehensive range of analog and digital intrinsically safe isolation barriers offers multifunctional inputs and outputs, making PR an easy-to-implement site standard. Our backplanes further simplify large installations and provide seamless integration to standard DCS systems.



Communication

We provide inexpensive, easy-to-use, future-ready communication interfaces that can access your PR installed base of products. All the interfaces are detachable, have a built-in display for readout of process values and diagnostics, and can be configured via push-buttons. Product specific functionality includes communication via Modbus and Bluetooth and remote access using our PR Process Supervisor (PPS) application, available for iOS and Android.



Multifunction

Our unique range of single devices covering multiple applications is easily deployable as your site standard. Having one variant that applies to a broad range of applications can reduce your installation time and training, and greatly simplify spare parts management at your facilities. Our devices are designed for long-term signal accuracy, low power consumption, immunity to electrical noise and simple programming.



Isolation

Our compact, fast, high-quality 6 mm isolators are based on microprocessor technology to provide exceptional performance and EMC-immunity for dedicated applications at a very low total cost of ownership. They can be stacked both vertically and horizontally with no air gap separation between units required.



Display

Our display range is characterized by its flexibility and stability. The devices meet nearly every demand for display readout of process signals, and have universal input and power supply capabilities. They provide a real-time measurement of your process value no matter the industry, and are engineered to provide a user-friendly and reliable relay of information, even in demanding environments.

# Universal I/f converter 4222

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## Warning



**GENERAL**

This device 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 guide must be observed and the guidelines followed. The specifications must not be exceeded, and the device must only be applied as described in the following.

Prior to the commissioning of the device, this installation guide must be examined carefully.

Only qualified personnel (technicians) should install this device. If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.



**HAZARD-  
OUS  
VOLTAGE**

## Warning

Until the device is fixed, do not connect hazardous voltages to the device. The following operations should only be carried out on a disconnected device and under ESD safe conditions:

General mounting, connection and disconnection of wires.

Troubleshooting the device.

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



**CAUTION**

## Warning

Do not open the front plate of the device as this will cause damage to the connector for the display / programming front PR 4500.

This device contains no DIP-switches or jumpers.

SYSTEM 4000 must be mounted on a DIN rail according to DIN EN 60715.



**INSTAL-  
LATION**

## Symbol identification



**Triangle with an exclamation mark:** Warning / demand. Potentially lethal situations. Read the manual before installation and commissioning of the device in order to avoid incidents that could lead to personal injury or mechanical damage.



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



**The double insulation symbol** shows that the device 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 trouble-shoot 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 and check whether the device type corresponds to the one ordered. The packing should always follow the device until this has been permanently mounted.

## Environment

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

The device must be installed in pollution degree 2 or better.

## 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 device. Should there be any doubt as to the correct handling of the device, please contact your local distributor or, alternatively,

**PR electronics A/S**  
**[www.prelectronics.com](http://www.prelectronics.com)**

Mounting and connection of the device 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 indicating that it will switch off the voltage to the device.

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

## UL installation requirements

Use 60/75°C copper conductors 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 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

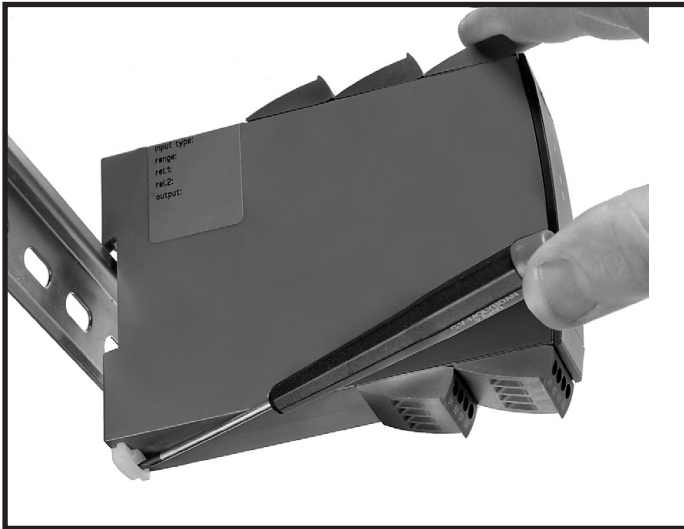
When disconnected, the device may be cleaned with a cloth moistened with distilled water.

## Liability

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

## How to demount system 4000

First, remember to demount the connectors with hazardous voltages.



**Picture 1:**

The device is detached from the DIN rail by moving the bottom lock down.

# Universal I/f converter

## 4222

- Input for RTD, TC, Ohm, potentiometer, mA and V
- Frequency output NPN, PNP and TTL
- Generates frequencies from 0...25000 Hz
- 2-wire supply > 16 V
- Universal AC or DC supply

### Application

- Linearized, electronic temperature measurement with RTD or TC sensor.
- Conversion of linear resistance variation to a frequency signal, e.g. from solenoids and butterfly valves or linear movements with attached potentiometer.
- Power supply and signal isolator for 2-wire transmitters.
- Process control by way of a frequency signal transmitted to e.g. a PLC or a process computer.
- Galvanic separation and conversion of analogue signals to frequency signals.

### Technical characteristics

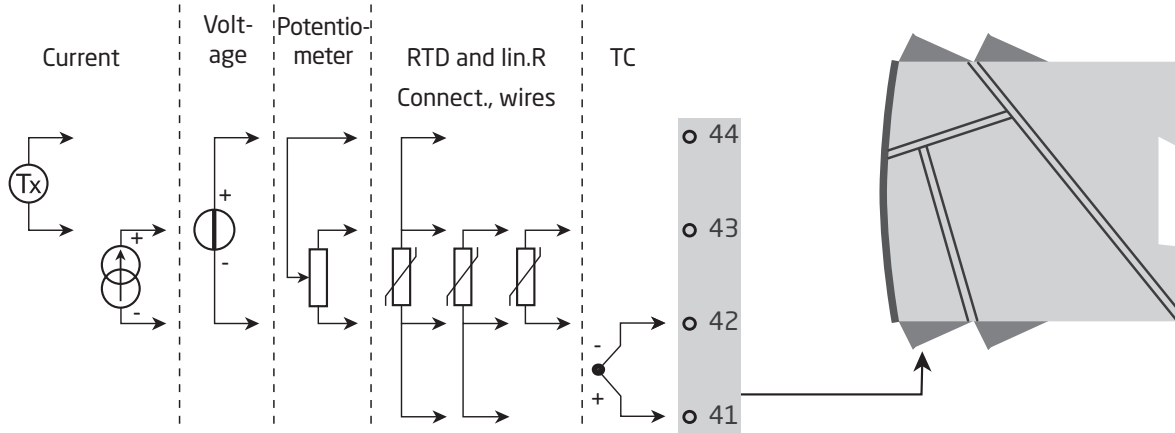
- When 4222 is used in combination with the PR 4500 display / programming units, all operational parameters can be modified to suit any application. As the 4222 is designed with electronic hardware switches, it is not necessary to open the device for setting of DIP-switches.
- A green front LED indicates normal operation.
- Continuous check of vital stored data for safety reasons.
- 3-port 2.3 kVAC galvanic isolation.

### Mounting / installation / programming

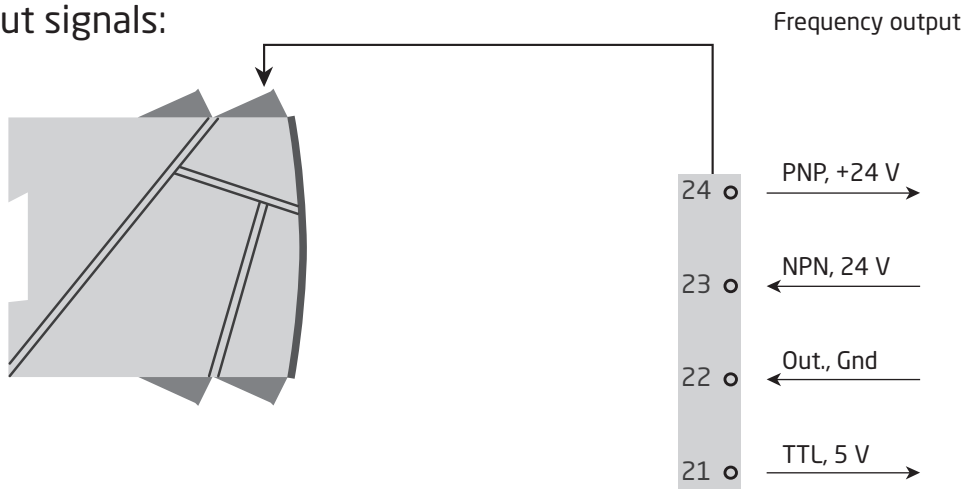
- Very low power consumption means units can be mounted side by side without an air gap - even at 60°C ambient temperature.
- Configuration, monitoring, 2-point process calibration and more are accomplished using PR's PR 4500 detachable displays.
- All programming can be password-protected.

# Applications

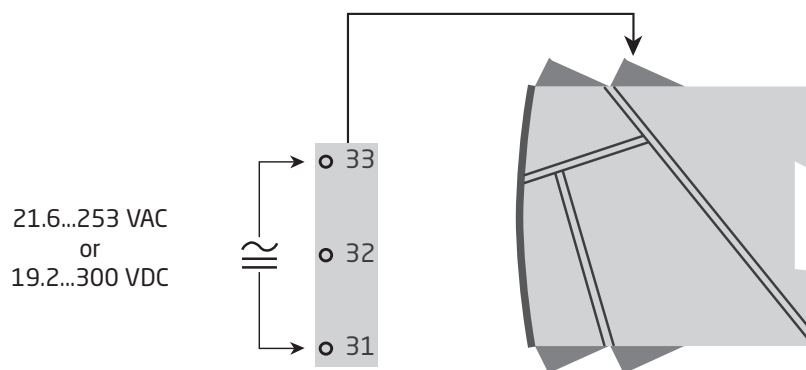
Input signals:



Output signals:



Supply:





# PR 4500 display / programming front



## Functionality

The simple and easily understandable 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 4222.
- Can be moved from one 4222 device to another and download the configuration of the first unit to subsequent units.
- Fixed display for readout of process data and status.



## Technical characteristics

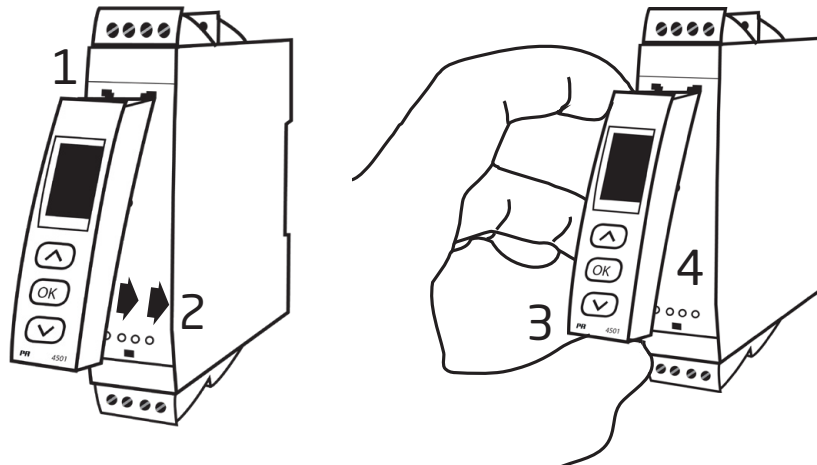
- LCD display with 4 lines:
  - Line 1 (H=5.57 mm) shows the input signal.
  - Line 2 (H=3.33 mm) shows the selected engineering unit.
  - Line 3 (H=3.33 mm) alternates between digital output value and scaling (kHz, Hz, mHz, P/m, P/h, P/d) or shows TAG no.
  - Line 4 shows tendency readout for the input signal and communication status.
- Programming access can be blocked by assigning a password. The password is saved in the device in order to ensure a high degree of protection against unauthorized modifications to the configuration.

# Mounting / demounting the PR 4500

- 1: Insert the tabs of the PR 4500 into the holes at the top of the device.
- 2: Hinge the PR 4500 down until it snaps into place.

## Demounting of the PR 4500

- 3: Push the release button on the bottom of the PR 4500 and hinge the the PR 4500 out and up.
- 4: With the PR 4500 hinged up, remove from holes at the top of the device.



## Order

4222 = Universal I/f converter

## Accessories

4501 = Display / programming front

4511 = Modbus communication enabler

4512 = Bluetooth communication enabler

## Electrical specifications

### Environmental conditions

|                                                                             |                      |
|-----------------------------------------------------------------------------|----------------------|
| Operating temperature . . . . .                                             | -20°C to +60°C       |
| Storage temperature . . . . .                                               | -20°C to +85°C       |
| Calibration temperature. . . . .                                            | 20...28°C            |
| Relative humidity . . . . .                                                 | < 95% RH (non-cond.) |
| Protection degree . . . . .                                                 | IP20                 |
| Installation in pollution degree 2 & measurement / overvoltage category II. |                      |

### Mechanical specifications

|                                              |                                                         |
|----------------------------------------------|---------------------------------------------------------|
| Dimensions (HxWxD) . . . . .                 | 109 x 23.5 x 104 mm                                     |
| Dimensions (HxWxD) w/ 4501 / 451x . . . . .  | 109 x 23.5 x 116 / 131 mm                               |
| Weight approx. . . . .                       | 155 g                                                   |
| Weight incl. 4501 / 451x (approx.) . . . . . | 170 g / 185 g                                           |
| DIN rail type. . . . .                       | DIN EN 60715 - 35 mm                                    |
| Wire size. . . . .                           | 0.13...2.08 mm <sup>2</sup> / AWG 26...14 stranded wire |
| Screw terminal torque. . . . .               | 0.5 Nm                                                  |

### Common electrical specifications

|                                                   |                                                 |
|---------------------------------------------------|-------------------------------------------------|
| Supply voltage, universal. . . . .                | 21.6...253 VAC, 50...60 Hz<br>or 19.2...300 VDC |
| Fuse . . . . .                                    | 400 mA SB / 250 VAC                             |
| Max. required power. . . . .                      | ≤ 2.5 W                                         |
| Max. power dissipation . . . . .                  | ≤ 2.5 W                                         |
| Isolation voltage - test . . . . .                | 2.3 kVAC                                        |
| Isolation voltage - working. . . . .              | 250 VAC (reinforced) / 500 VAC (basic)          |
| Programming . . . . .                             | PR 4500                                         |
| Signal dynamics, input / output . . . . .         | 24 bit / -                                      |
| Signal / noise ratio. . . . .                     | > 60 dB (0...100 kHz)                           |
| Response time (0...90%, 100...10%), programmable: |                                                 |
| Temperature input. . . . .                        | 1...60 s                                        |
| mA / V input . . . . .                            | ≤ 400 ms                                        |

### Auxiliary supplies

|                                           |                         |
|-------------------------------------------|-------------------------|
| 2-wire supply (terminal 44...43). . . . . | 25...16 VDC / 0...20 mA |
|-------------------------------------------|-------------------------|

Accuracy, the greater of general and basic values:

| General values |                          |                                |
|----------------|--------------------------|--------------------------------|
| Input type     | Absolute accuracy        | Temperature coefficient        |
| All            | $\leq \pm 0.1\%$ of span | $\leq \pm 0.01\%$ of span / °C |

| Basic values                    |                              |                                                |
|---------------------------------|------------------------------|------------------------------------------------|
| Type                            | Basic accuracy               | Temperature coefficient                        |
| mA                              | $\leq \pm 4 \mu\text{A}$     | $\leq \pm 0.4 \mu\text{A} / ^\circ\text{C}$    |
| Volt                            | $\leq \pm 20 \mu\text{V}$    | $\leq \pm 2 \mu\text{V} / ^\circ\text{C}$      |
| Pt100                           | $\leq \pm 0.2^\circ\text{C}$ | $\leq \pm 0.01^\circ\text{C} / ^\circ\text{C}$ |
| Linear resistance               | $\leq \pm 0.1 \Omega$        | $\leq \pm 0.01 \Omega / ^\circ\text{C}$        |
| Potentiometer                   | $\leq \pm 0.1 \Omega$        | $\leq \pm 0.01 \Omega / ^\circ\text{C}$        |
| TC type:<br>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: B, R, S,<br>W3, W5, LR | $\leq \pm 2^\circ\text{C}$   | $\leq \pm 0.2^\circ\text{C} / ^\circ\text{C}$  |

|                                                                     |                       |
|---------------------------------------------------------------------|-----------------------|
| EMC - immunity influence. . . . .                                   | $< \pm 0.5\%$ of span |
| Extended EMC immunity:<br>NAMUR NE Z1, A criterion, burst . . . . . | $< \pm 1\%$ of span   |

### Input specifications

#### RTD, linear resistance and potentiometer input

Input for RTD types:

Pt10, Pt20, Pt50, Pt100, Pt200, Pt250, Pt300, Pt400, Pt500, Pt1000

Ni50, Ni100, Ni120, Ni1000

| Input type    | Min. value | Max. value | Standard  |
|---------------|------------|------------|-----------|
| Pt10...Pt1000 | -200°C     | +850°C     | IEC 60751 |
| Ni50...Ni1000 | -60°C      | +250°C     | DIN 43760 |
| Lin. R        | 0 Ω        | 10000 Ω    | -         |
| Potentiometer | 10 Ω       | 100 kΩ     | -         |

Cable resistance per wire (max.), RTD . . . . . 50 Ω

Sensor current, RTD . . . . . Nom. 0.2 mA

Effect of sensor cable resistance (3- / 4-wire), RTD . . . . .  $< 0.002 \Omega / \Omega$

Sensor error detection, RTD . . . . . Yes

Short circuit detection, RTD . . . . .  $< 15 \Omega$

## 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 . . . . . 0...23 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 . . . . . 0...12 VDC

Programmable measurement ranges . . . . . 0...1 / 0.2...1 / 0...2.5 / 0.5...2.5 /  
0...5 / 1...5 / 0...10 and 2...10 VDC

Input resistance, nom. . . . . 10 MΩ

## Output specifications

### Frequency output

Frequency range . . . . . 0...25000 Hz

Min. frequency (span) . . . . . 0 Hz

Duty cycle (0...25000 Hz). . . . . 50% or

Programmable pulse time ( $f \leq 500$  Hz). . . . . 1...1000 ms (max. 90% duty cycle)

### PNP output

I<sub>out</sub> max. . . . . 30 mA

V<sub>out</sub> . . . . . 24 VDC ± 10%

C<sub>out</sub>. . . . . 10 nF

R<sub>out</sub> typ. . . . . 20 Ω

Electromechanical counter . . . . . 24 V / 135 mA / 20 ms / ≤ 10 Hz

### NPN output

I<sub>sink</sub> max. . . . . 150 mA

I<sub>sink</sub> max. peak . . . . . 300 mA

External voltage (terminal 23) max. . . . . 55 VDC

C<sub>out</sub>. . . . . 10 nF

R<sub>out</sub> typ. . . . . 10 Ω

**TTL output**

|                             |         |
|-----------------------------|---------|
| Isink/source max. . . . .   | 15 mA   |
| Isink/source peak . . . . . | 100 mA  |
| Vout . . . . .              | 5 V ±5% |
| Cout. . . . .               | 10 nF   |
| Rout typ. . . . .           | 55 Ω    |

**Sensor error detection**

|                        |              |
|------------------------|--------------|
| Programmable . . . . . | 0...26250 Hz |
|------------------------|--------------|

**of span** = of the currently selected measurement range

**Observed authority requirements**

|               |                |
|---------------|----------------|
| EMC. . . . .  | 2014/30/EU     |
| LVD. . . . .  | 2014/35/EU     |
| RoHS. . . . . | 2011/65/EU     |
| EAC. . . . .  | TR-CU 020/2011 |

**Approvals:**

|                          |         |
|--------------------------|---------|
| c UL us, UL 508. . . . . | E231911 |
| FM . . . . .             | 3025177 |

## Visualisation in the PR 4500 of sensor error detection and input signal outside range

| Sensor error check: |               |                         |
|---------------------|---------------|-------------------------|
| Device              | Configuration | Sensor error detection: |
| 4222                | OUT.ERR=NO    | OFF                     |
|                     | Else:         | ON                      |

### Signal conditioning limits

| Outside range readout (IN.LO, IN.HI):<br>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...2.5 / 0.5...2.5 / 0...5 V / 1...5 V /<br>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                                                                                                           | Min. readout = 0%, Max. readout = 100%                           | 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 | Flashing 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<br>No SE.SH for Pt10, Pt20 and Pt50 | SE.BR   | > ca. 15 kΩ             |
|                                        |                                                             | SE.SH   | < ca. 15 Ω              |

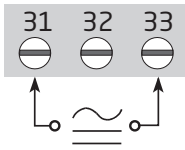
## Error indications

| Readout at hardware error                                |         |                                                |
|----------------------------------------------------------|---------|------------------------------------------------|
| Error search                                             | Readout | Cause                                          |
| Test of internal CJC sensor                              | CJ.ER   | CJC sensor defect or temperature outside range |
| Checksum test of the configuration in FLASH              | FL.CO   | Error in FLASH                                 |
| Communications test PR 4500 / 4222                       | NO.CO   | Connection error                               |
| Check that input signal matches input configuration      | IN.ER   | 1) Error levels on input                       |
| Check that saved configuration in PR 4500 matches device | TY.ER   | Configuration is not 4222                      |

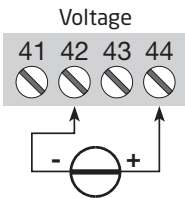
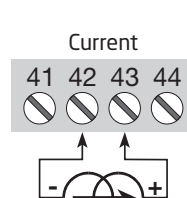
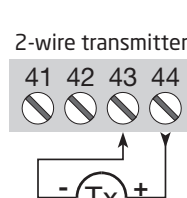
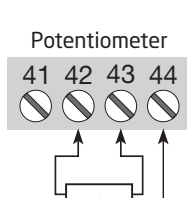
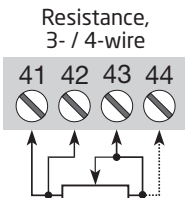
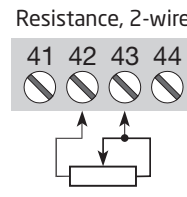
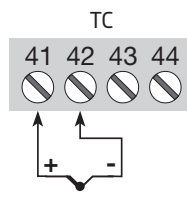
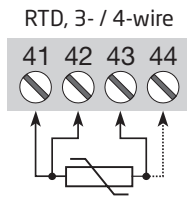
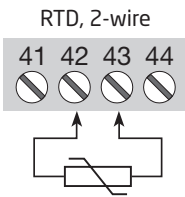
|    |                                                                                                                                                                                                                                                                                                                 |
|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| !  | All error indications in the display flash once per second. The help text explains the error. If the error is a sensor error, the display backlight flashes as well - this is acknowledged (stopped) by pushing the  button. |
| 1) | The error is reset by switching off and then switching on the supply voltage to the device.                                                                                                                                                                                                                     |

# Connections

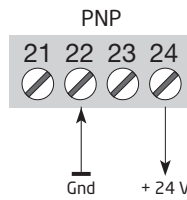
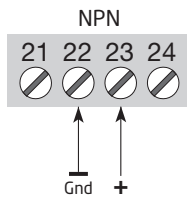
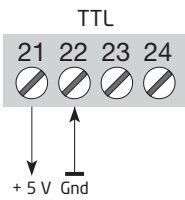
## Supply



## Inputs:

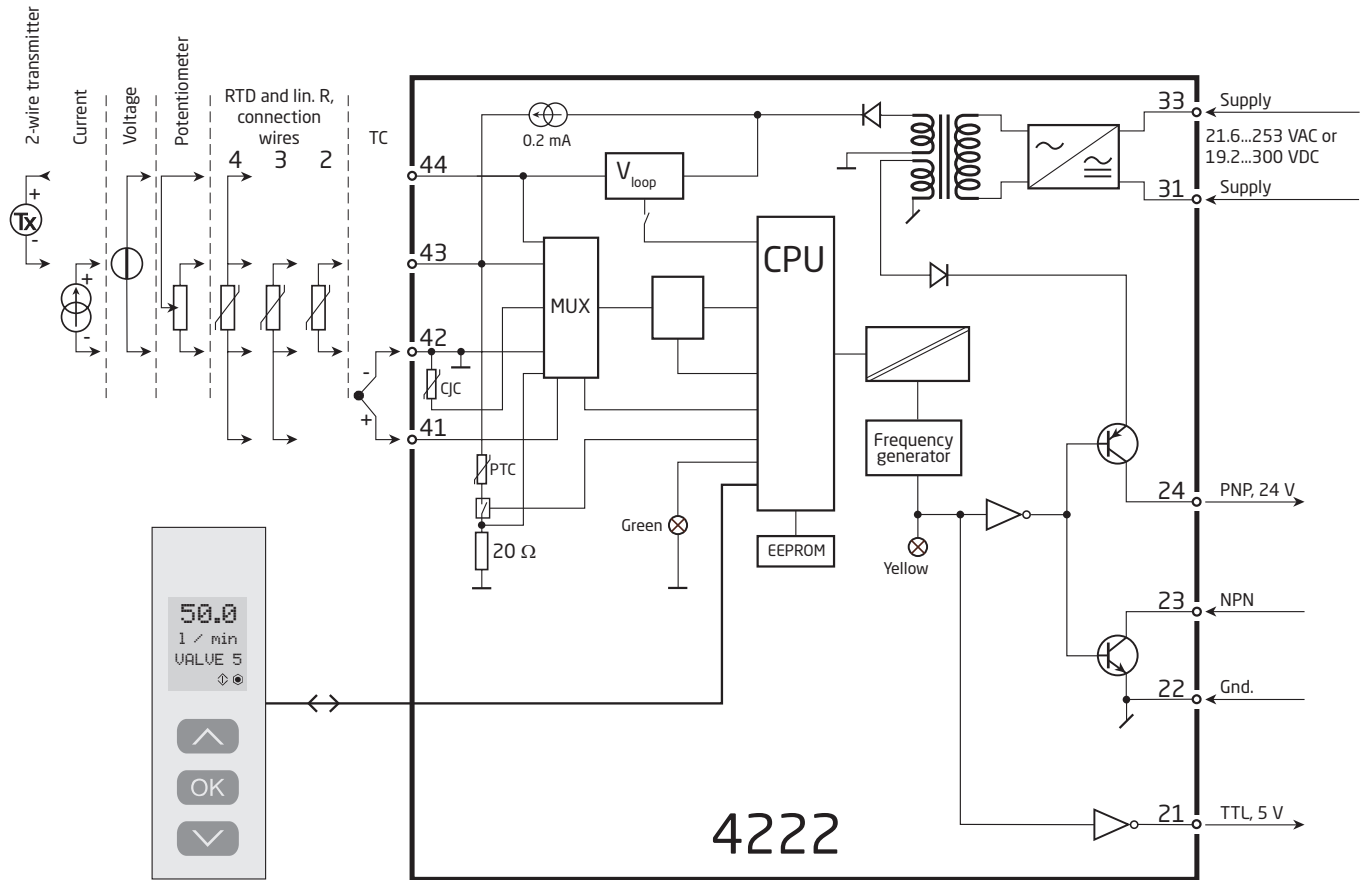


## Outputs:





# Block diagram



# Configuration / operating the function keys

Documentation for routing diagram.

## In general

When configuring the 4222, 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 use of the 3 function keys:

- ⏪ will increase the numerical value or choose the next parameter
- ⏩ will decrease the numerical value or choose the previous parameter
- ⏹ will save the chosen value and proceed to the next menu

When configuration is completed, the display will return to the default state 1.0. Pressing and holding ⏹ 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

**Password protection:** Programming access can be blocked by assigning a password. The password is saved in the device in order to ensure a high degree of protection against unauthorized modifications to the configuration.

If the configured password is not known, please contact PR electronics support - [www.prelectronics.com/contact](http://www.prelectronics.com/contact).

## Signal and sensor error info via display front PR 4500

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 3 as text and at the same time the backlight flashes. Line 4 of the display is a status line which displays COM (flashing bullet) indicating correct functioning of PR 4500 and arrow up/down which indicates tendency readout of the input signal.

## Signal and sensor error indication without display front

Status of the unit can also be read from the red / green LED in the front of the device.

Green flashing LED 13 Hz indicates normal operation.

Green flashing LED 1 Hz indicates sensor error.

Steady green LED indicates internal error.

## Advanced functions

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

**Memory (MEM):** In the memory menu you can save the configuration of the device in the PR 4500, and then move the PR 4500 onto another device of the same type and download the configuration in the new device.

**Display setup (DISP):** Here you can adjust the brightness contrast and the backlight. Setup of TAG numbers with 6 alphanumeric. Selection of functional readout in line 3 of the display. This line can either show the digital output or the TAG number.

**Two-point process calibration (CAL):** The device 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 via PR 4500. Then a high signal (not necessarily 100%) is applied and the actual value is entered via PR 4500. If you accept to use the calibration, the device will work according to this new adjustment. If you later reject this menu point or choose another type of input signal the device will return to factory calibration.

**Process simulation function (SIM):** In the menu point "EN.SIM" it is possible to simulate an input signal by means of the arrow keys and thus control the output signal up or down. You must exit the menu by pressing ⏹ (no time-out). The simulation function exits automatically, if the PR 4500 is detached.

**Password (PASS):** Here you can choose a password between 0000 and 9999 in order to protect the unit against unauthorized modifications to the configuration. The unit is delivered default without password.

**Language (LANG):** In the menu "LANG" 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 device performs an advanced auto diagnosis of the internal circuits.

The following possible errors can be displayed in the front unit PR 4500.

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 PR 4500 does not match this product type

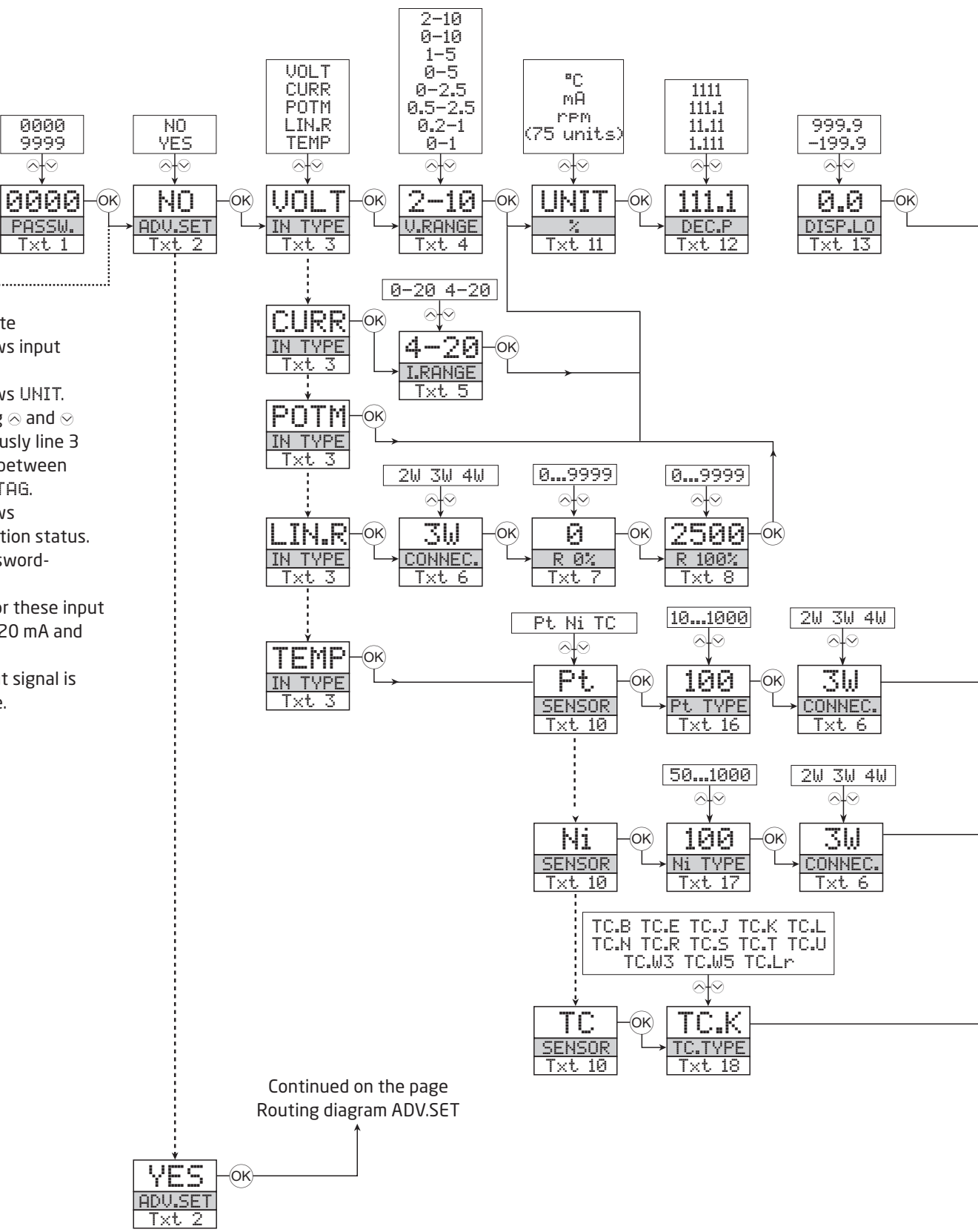
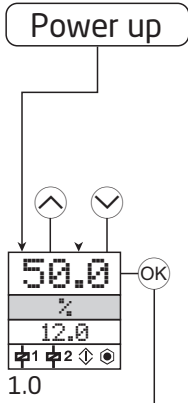
### **Selection of units**

After choosing the input signal type you can choose which process units should be displayed 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

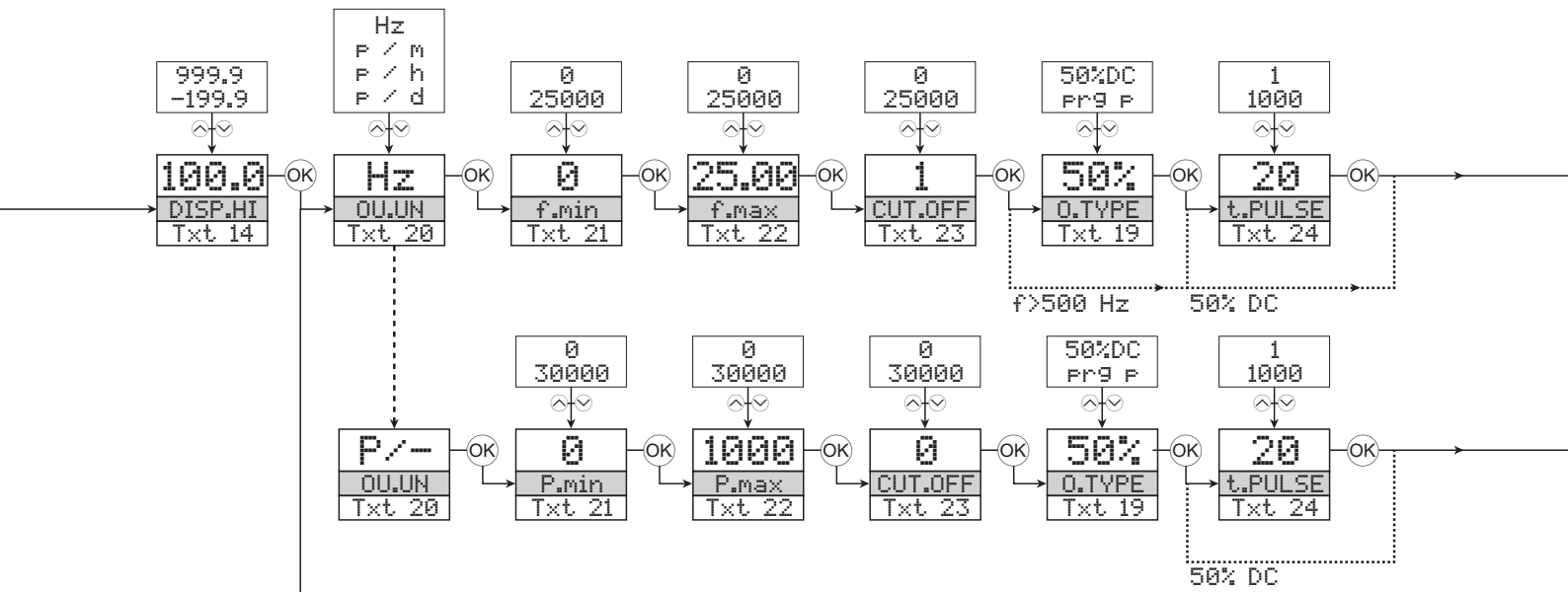
If no key is activated for 1 minute, the display will return to the default state 1.0 without saving configuration changes.

- ⬆ 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.

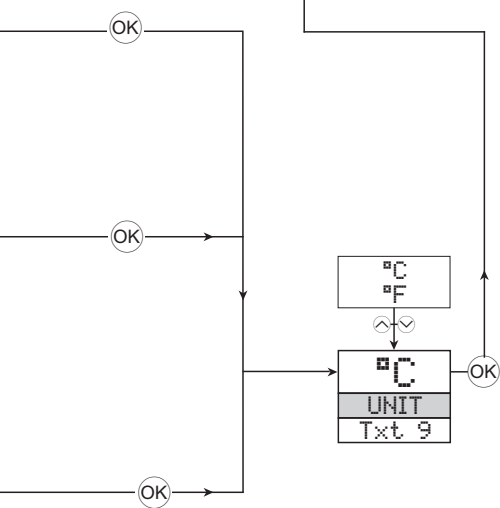


- 1.0 = Default state  
Line 1 shows input signal.  
Line 2 shows UNIT.  
By pressing ⬆ and ⬇ simultaneously line 3 alternates between f.Out and TAG.  
Line 4 shows communication status.
- 1.1 = Only if password-protected.
- 1.2 = Not valid for these input signals: 0...20 mA and voltage.
- 1.3 = Only if input signal is temperature.

Continued on the page Routing diagram ADV.SET

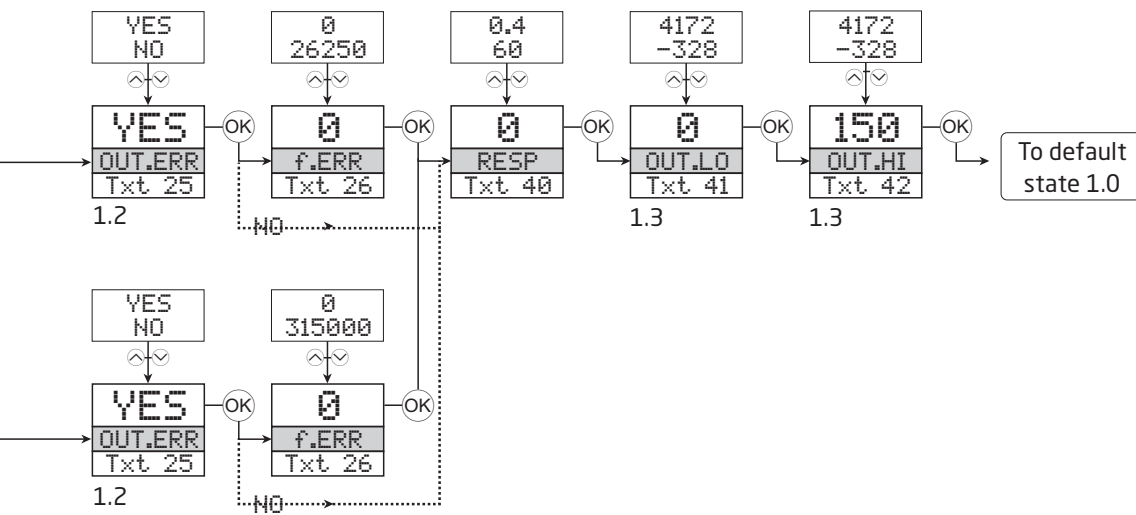


Continued on the next page



Selectable UNITS:

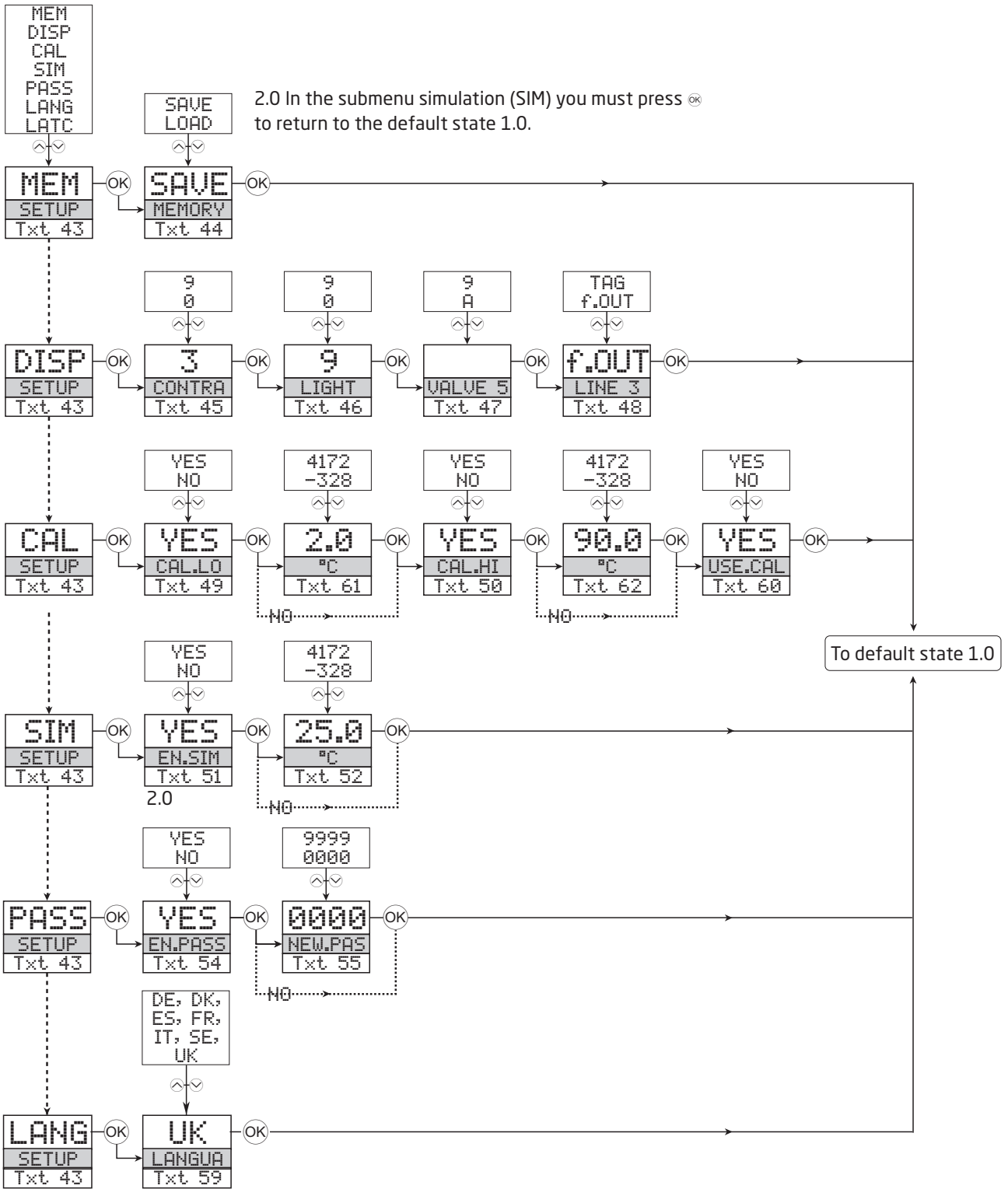
|         |        |                  |                   |         |
|---------|--------|------------------|-------------------|---------|
| %       | hPa    | kWh              | mils              | Pa      |
| °C      | Hz     | l                | min               | PH      |
| °F      | in     | l/h              | mm                | rPM     |
| A       | in/h   | l/min            | mm/s              | s       |
| bar     | in/min | l/s              | mm/s <sup>2</sup> | S       |
| cm      | in/s   | m                | mol               | t       |
| ft      | lps    | m/h              | MPa               | t/h     |
| ft/h    | K      | m/min            | mV                | uA      |
| ft/min  | kA     | m/s              | MW                | um      |
| ft/s    | kG     | m/s <sup>2</sup> | MWh               | uS      |
| g       | kHz    | m3               | N                 | V       |
| gal/h   | kJ     | m3/h             | Ohm               | W       |
| gal/min | kPa    | m3/min           | P/day             | Wh      |
| GW      | kV     | mbar             | P/h               | yd      |
| hp      | kW     |                  | P/min             | [blank] |



1.2 = Not valid for these input signals: 0...20 mA and voltage.

1.3 = Only if input signal is temperature.

# Routing diagram, advanced settings (ADV.SET)



## Help text overview

- [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 0-2.5 V input range
  - Select 0.5-2.5 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 0% resistance value
- [08] Set 100% resistance value
- [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 readout low
- [14] Set display readout high
- [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 50% duty cycle output
  - Select programmable pulse time
- [20] Select Hz as output unit
  - Select pulses/minute as output unit
  - Select pulses/hour as output unit
  - Select pulses/day as output unit
- [21] Set output frequency for 0% input
- [22] Set output frequency for 100% input
- [23] Set low cut-off frequency
- [24] Set pulse time in milliseconds
- [25] Select no error action - output undefined at error
  - Select output at specific frequency on input error
- [26] Set output frequency on input error
- [40] Set response time in seconds
- [41] Set temperature for frequency output low
- [42] Set temperature for frequency output high
- [43] Enter language setup
  - Enter password setup
  - Enter simulation mode
  - Perform process calibration
  - Enter display setup
  - Perform memory operations
- [44] Load saved configuration into module
  - Save configuration in display front
- [45] Adjust LCD contrast
- [46] Adjust LCD backlight
- [47] Write a 6-character device TAG
- [48] Output frequency is shown in display line 3
  - Device TAG is shown in display line 3
- [49] Calibrate input low to process value?
- [50] Calibrate input high to process value?
- [51] Enter simulation mode?
- [52] Simulate input value
- [54] Enable password protection?
- [55] Set new password
- [59] Select language
- [60] Use process calibration values?
- [61] Set value for low calibration point
- [62] Set value for high calibration point



## Document history

The following list provides notes concerning revisions of this document.

| <b>Rev. ID</b> | <b>Date</b> | <b>Notes</b>                    |
|----------------|-------------|---------------------------------|
| 100            | 0845        | Initial release of the product. |
| 101            | 1311        | FM and EAC approvals added.     |

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