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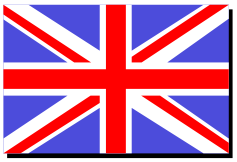
Precision Measuring Instrument
T995 instrument



English language

Operation manual

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1. Handling

1.1 General advice

- For cleaning the instrument please do not use abrasive cleaner but a dry or wet piece of cloth.
- Please store the measuring instrument in a dry and clean place.
- Avoid any force like shocks or pressure to the instrument.
- Do not use force to connect the probe or interface plugs in. The interface plug is different from the probe plug.
- If no sensor is connected to the instrument while switching on „open“ shows on the display (Please refer to chapter error codes/troubleshooting).
- A retractable stand on the back of the instrument allows it to be used as a bench top instrument.

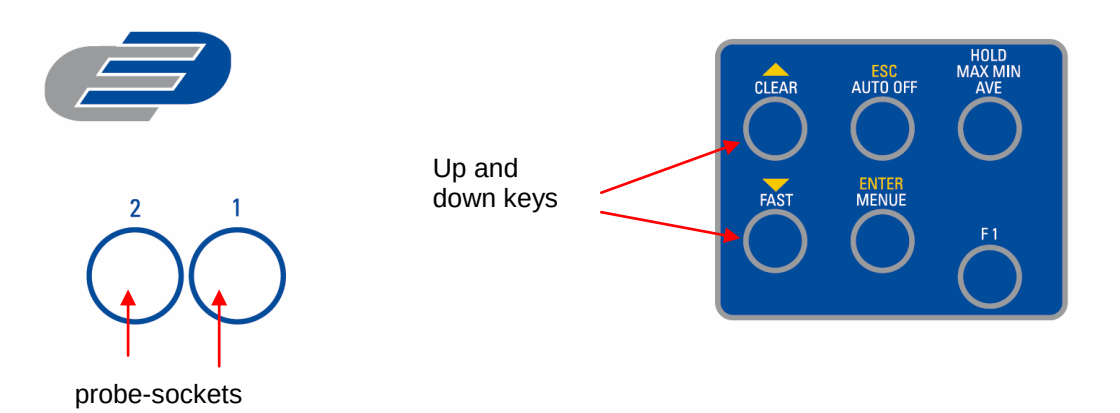
1.2 Operation

Connect the mains plug with a 230V / 50Hz socket on the rear side. Before switch on the instrument connect the probes on the instrument and take in the calibration number, which is marked on the handle. On the front there are the two probe plugs marked with 1 and 2.

1.3 Switching on and off

The On/off-key you will find on the rearside of the housing: 0 = switch off / 1 = switch on. After switching on the instrument indicates a full segment test for 1,5 sec. Then it starts operating in measurement mode indicating the actual measurement value. All instruments display the measurement value of channel 1 on the top display line. Directly below you will see the trending bargraph. The second channel of our 2-channel instruments you will see on the bottom line.

1.4 Menu



The adjustments of the instruments like the measurement value, calibration of probes, deactivation of channels and so on are resulting from the structure of the menu. You will reach into the main menu by pressing [ENTER/MENUE]. With the up and down keys [↑↓] you can choose your required menu item. Press [ESC] to be back in the measuring mode.

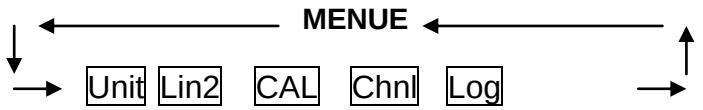
Menu structure

Unit	Lin2	CAL	Chnl	Lo6	Dac
°C	T1-T2	OFF	OFF	OFF	0.00
°F		OP1	ON	ON	1.00
Ohm		OP2			
		OP3			
		OP4			

1.4.1 Measuring unit switching °C and °F respective %rH, td or g/m³ / [Unit]

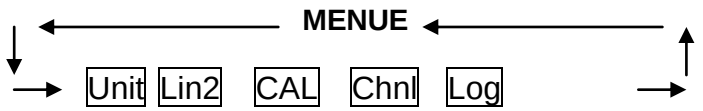
Unit = Measuring unit
Measuring unit temperature (°C=Celsius, F°=Fahrenheit)

To change the measuring unit press [ENTER/MENUE]. Use the up and down keys [🡅🡇] to select **Unit**. Press again [ENTER/MENUE]. On the left corner of the display appears a small **1**, which indicates the selected channel. For changing the channel use the up and down keys [🡅🡇]. Press [ENTER/MENUE] to confirm. On the right corner of the display appears **°C** or **°F**. Use the up and down keys [🡅🡇] again to adjust the requested measuring unit and press [ENTER/MENUE] to confirm. Press [ESC] to be back in the measuring mode.



1.4.2 Difference temperature (only 2-channel instruments) / [Lin2]

To display the difference temperature press [ENTER/MENUE]. Use the up and down keys [🡅🡇] to select **Lin2**. Press again [ENTER/MENUE]. On the right corner of the display appears a **T_1-T_2**. Use the up and down keys [🡅🡇] to adjust the requested selection. Press [ENTER/MENUE] to confirm. Press [ESC] to be back in the measuring mode.



Note: Both channel have to be activated for showing the difference temperature.

1.4.3 Calibration function / [CAL]

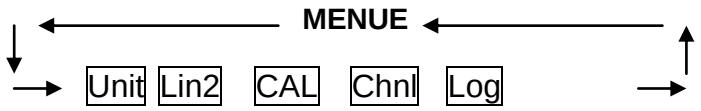
Despite high quality manufacturing techniques, each probe is slightly different from specified standards. To eliminate inaccuracies caused by exchanging or ageing of probes, the instrument offer easy calibration functions which guarantee that the system accuracy is always as good as if the instrument was specifically calibrated to the individual probes in our laboratory.

The instruments offer three calibration options:

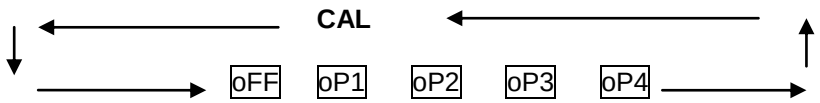
1) [OFF]:Standard characteristic curve (e.g. Pt100-resistance according DIN IEC 60751)
2) [OP1]:Calibration by code (2 x four digit code) is equivalent to a 2-point calibration
   The code is marked clearly by a label on each standard probe.
3) [OP2]:Calibration by physical standard references (1-point, 2-point or 3-point calibration)
4) [OP3]:Calibration according EN60751(R0ABC-coefficients)
5) [OP4]:EEprom probe(automatic detection by switch on) with Calibration

CAL = calibration

Press [ENTER/MENUE] to calibrate the instrument with sensor. Use the up and down keys [↑↓] to select **CAL**. Press again [ENTER/MENUE]. On the left corner of the display appears a small **1**, which indicates the selected channel. For changing the channel use the up and down keys [↑↓]. Press [ENTER/MENUE] to confirm



Use the up and down keys [↑↓] to select the requested calibration option. Press [ENTER/MENUE] to confirm.



1.) Standard calibration according DIN IEC 60751 / [oFF

Use the up and down keys [↑↓] to select **[oFF**. Push [ENTER/MENUE] to confirm. Push [ESC] to revert back to the measuring mode.

2-) Calibration by code / oP1

Use the up and down keys [↑↓] to select **oP1**. Push [ENTER/MENUE] to confirm. On the bottom of the display appears a small **1**, after this number a four-digit number (Hex-Code/0..F) is displayed. For changing the number use the up key [↑]. To step to the next number use the down key [↓]. If the requested number is complete then push [ENTER/MENUE] to confirm. At the bottom of the display a very small **2** appears, after which a second four-digit number is displayed. For changing the number please follow the manual as before. Push [ESC] to revert back to the measuring mode.

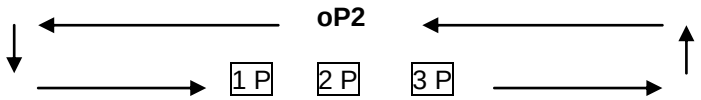
Note: After confirming **oP1** by pushing [ENTER/MENUE] the function **oP1** (calibration by code) is activated, even though you leave the menu by pressing [ESC].

Display-indication with active calibration code(OP1):

The **CAL**-segment and the small **1** indicates to the user that **oP1** is activated.

3.) Calibration by physical standard references / oP2

Use the up and down keys [🡅🡇] to select **oP2**. Push [ENTER/MENUE] to confirm. On the bottom of the display appears **1 P**. For changing between a 1-Point **1 P**, 2-Point **2 P** or 3-Point **3 P** - calibration use the up and down keys [🡅🡇].



Example of a 1-Point calibration:

Push [ENTER/MENUE] to confirm. On the display appears **CALC**. After the displayed measuring value is stabile push [ENTER/MENUE]. On the first display line you can see the “frozen” measurement value. On the second line as a default you can see **-100.000**. Now you have to Enter (instead of -100.000) the correct measurement value from your reference:
By using the up key[🡅] you are able to move the decimal point to setup the number of decimal places. Push [ENTER/MENUE] to confirm.
Now the algebraic sign is blinking**„-„**. Use the up key [🡇] to toggle for positive or negative number. Change the number using the up and down keys [🡅🡇].
Note:
Up key 🡅 is changing the blinking segment
Down key🡇 is jumping to the next segment
Push [ENTER/MENUE] to confirm, revert back to the measuring mode.

Important: A break of the physical calibration cannot be done by the [ESC]-button.

Display-indication with active calibration code (OP2):

The **CAL**-segment and the small **2** indicates to the user that **oP2** is activated.

4.) Calibration according to Coefficients of EN60751 (R0,ABC)
By using Option 3 you are able to activate coefficients according to EN60751 (R0,A,B,C). The coefficients have to be calculated using special software on a PC (e. g. P7_CALC). Before you are able to activate this option you have to transmit the coefficients from the PC to the instrument. Therefore you have to use the Software P7_CALC, too.

Use the up and down keys [🡅🡇] to select **oP3**. Push [ENTER/MENUE] to confirm. Now the calibration option 3 is activated!
Push [ESC] to revert back to the measuring mode.

Note: After confirming **oP3** by pushing [ENTER/MENUE] the function **oP3** (calibration by code) is activated, even though you leave the menu by pressing [ESC].

Display-indication with active calibration code (OP3):

The **CAL**-segment and the small **3** indicates to the user that **oP3** is activated.

5) Smart EEprom-probes with internal calibration (AUTO-Detection)/ oP4
The Option 4 will be activated automatically by using Smart EEprom probes. This option will be activated by switching on the instrument when the Smart EEprom probe has been connected to the instrument.

The **CAL**-segment and the small **4** indicates to the user that **oP4** is activated.

Note: If a Smart probe will be disconnected during the instrument is working the instrument automatically switch to the CAL-menu.

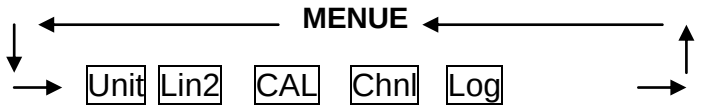
Use the up and down keys [↑↓] to select **[oFF**. Press [ENTER/MENUE] to confirm. Press [ESC] to be back in the measuring mode.

1.4.4 Channel activation (only 2-channel instruments) / [Chnl]

Chnl = channel

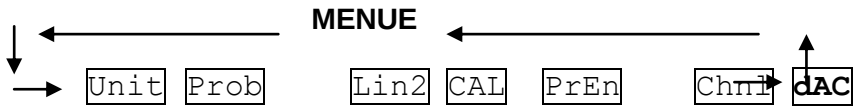
To activate or deactivate a measuring channel press [ENTER/MENUE]. Use the up and down keys [↑↓] to select **Chnl**. Press again [ENTER/MENUE]. On the left corner of the display appears a small **1**, which indicates the selected channel. For changing the channel use the up and down keys [↑↓]. Press [ENTER/MENUE] to confirm. Use the up and down keys [↑↓] again to activate **on** or deactivate **off** the requested measuring channel and press [ENTER/MENUE] to confirm. Press [ESC] to be back in the measuring mode.

Note: As a minimum one channel is active!



1.4.6 dAC
Analogue output

Each instrument of the T900-series contains an analogue output(0-1Volt) per channel. To get the optimal resolution and accuracy it is possible to scale the analogue output by limiting the measuring range.
Press [ENTER/MENUE] to change the measuring range(default: 0..100). Use the up and down keys [↑↓] to select **dAC**. Press [ENTER/MENUE] to confirm.



On the left corner of the display appears a small **1**, which indicates the selected channel. For changing the channel use the up and down keys [↑↓]. Press again [ENTER/MENUE] to confirm. On the display appears **dA1b**. To change between measuring range upper limit [**dA1E**] and measuring range lower limit [**dA1b**] use the up and down keys [↑↓]:
dA1b = Lower limit (default 00.00)
dA1E = Upper limit (default 100.00)
Press [ENTER/MENUE] to confirm.
Use the up and down keys [↑↓] to select the number of digits after decimal point.
dP. = two decimal digits
dP . = one decimal digit (decimal point moves one digit to the right)
Press [ENTER/MENUE] to confirm. On the second line of the display appears **Si -**.
Use the up and down keys [↑↓] to select the requested sign.
Si _ = reference standard shows a negative measuring value (below 0,00C°)

Si _I = reference standard shows a positive measuring value (above 0,00C°)
Press [ENTER/MENUE] to confirm. On the second line of the display appears **Fd 0**.
Use the up and down keys [🡅🡇] to select the requested range:
Fd 0 = below 100,00°C
Fd 1 = above 100,00°C
Press [ENTER/MENUE] to confirm. On the display appears **00.00**. For changing the value use the up key [🡅]. For stepping to the next number use the down key [🡇]. If the requested value is complete then press [ENTER/MENUE] to confirm.
Press [ESC] to return to measuring mode.
For changing the upper measuring range please repeat the above procedure.

Note: The adjustable measuring range limits are corresponding to the selected measuring size[menu Probe].
e. g.:

	T900-menu	**scale**	**Meas. range °C**	**Meas. range %rF**	**Analog signal**
Lower limit	dA1b	00.00	00,00°C	0,0%rF	0,000 Volt
Upper limit	dA1E	10.00	10,00°C	10,00%rF	1,000 Volt

1.5 Recalling the memory data (HOLD MAX MIN AVE)

After pressing first time the key [HOLD MAX MIN AVE] the actual value will be hold on the top display line (big display). pressing again the key [HOLD MAX MIN AVE], the saved maximum-, minimum and average value will be displayed in the bottom display line (small display).
Note for 2-channel instruments: First the MAX-MIN-AVE-values of channel 1 will be displayed – afterwards the values of the channel 2 will be displayed. Is there only one probe on a 2-channel instrument we suggest to deactivate the channel without probe (menu Chnl).

Note: During the recall of the memory data the extremes (MAX MIN) and the average value (AVE) will not be calculated or carried on.

Clearing the memory (MAX MIN AVE)
Press [CLEAR] key once to erase the stored maximum, minimum and average from memory. On the display appears **Clr**. – After erasing the memory the instrument automatically switches back to measuring mode indicating the actual measured value again.

1.6 Measuring rate (FAST-mode)

Press [FAST/🡻] key once to change the measuring rate. Now the measuring rate is app. 4 measurements per second. Press [FAST/🡻] key again and the instrument is back in the standard mode (1 measurement per second).

Note: In the fast mode the battery consumption is three times higher than in the standard mode.

1.7 AUTO-OFF-function

EAoF = Enable Auto-off
dAoF = Disable Auto-off

Press [ESC/AUTO-OFF] key once. On the display appears **EAoF**. Now the instrument switches off automatically after app. 30 minutes. Press [ESC/AUTO-OFF] key again. On the display appears **dAoF**. Now the Auto-Off-function is deactivated.

Note: After switching off and on the instrument, the Auto-Off function is automatically deactivated.

1.8 Special-functions (Ohm/Micro volt/Volt/Hertz-display)

If you want to get the shown value displayed according to the basic units you will have to press, when you switch on, the keys FAST and ON/OFF at the same time for approximately 3 seconds till the next basic unit appears:

o = Ohm (Pt100)
H = Hertz (flow m/s)
u = Micro volt (thermocouples)
U = Volt (humidity)

2. Power supply

For the power supply of the instrument 230V AC / 50Hz is used.

3. Error Codes

By displaying the following error codes the instrument support the operation of the instrument.

Error	Meaning
oPEn	no probe connected
/oLo	„too low“ below the measuring range
/oHi	„too high“ above the measuring range
/Er1	CJC temperature is above the measuring range
/Er2	CJC temperature is below the measuring range