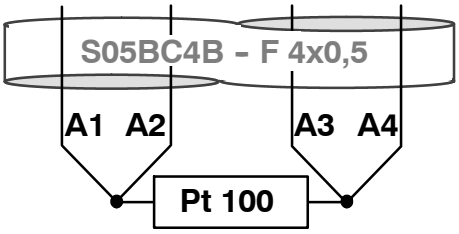
Pt 100

Pt 100 temperature sensor

Temperature sensor installed in the motor on option; for measuring the temperature of the motor's water fill.
The sensor is equipped with a shielded 10 metre power cable S05BC4B – F 4 x 0.5 mm^2 as a standard feature.



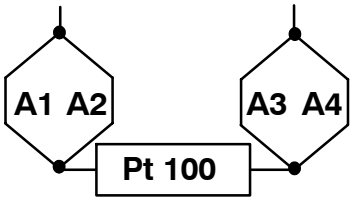
A1 = **BLACK** core
A2 = **BLACK** or **GREY** core
A3 = **BROWN** core
A4 = **BLUE** core

Only one Pt 100 temperature sensor is required for protecting the submersible motor.
For analysing the measured signal, a separate analysing device (e.g. accessory "display / control unit for temperature monitoring", ident. No. 90 064 446) is required.

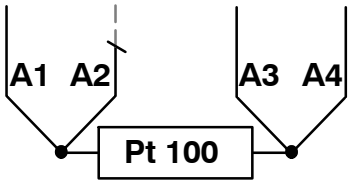
Connection

The sensor can be connected by 2-, 3- or 4-wire system.
(For 3-wire configuration, one of the two black cores must be cut off at the cable end.)

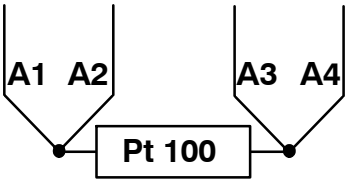
2-wire system



3-wire system



4-wire system



The voltage at the Pt 100 measuring sensor must not exceed 6V. (U_{max} < 6V)

Checking

a) Core-to-core resistance (measure with d.c. voltage U < 6V)
If the temperature sensor is intact, resistances between the individual cores shall be as follows:
A1 to A2 and A3 to A4: 0 Ω to 30 Ω
A1 to A3 and A2 to A4: 100 Ω to 130 Ω

b) Insulation resistance (measure with d.c. voltage U < 100V)
Combine all core ends. Between the core ends and earth (e.g. motor housing), resistance must be higher than 6 MΩ.

Function

Two temperature limits are important for submersible motors.

a) Alert temperature t_{Alert}
If the alert temperature limit t_{Alert} is exceeded, there is a malfunction (e.g. inadmissible contamination / ochre content of motor housing). Corrective action must be initiated.
Setting:
$t_{Alert} = t_{Operation} + (t_{Cutout} - t_{Operation})/2$
$t_{Operation}$ = normal operating temperature after approx. 1.5 hours' operation

b) Cutout temperature t_{Cutout}
If the cutout temperature is reached, the motor must be tripped. It must not be re-started until the malfunction has been remedied.
Setting:
Submersible motors with J1 winding (PVC) t_{Cutout} t = 55°C
Submersible motors with J2 winding (PE) t_{Cutout} t = 75°C
See UMA../.1 or UMA../.2 designation)
Motor type 14D and motors with rated voltages higher than 900V are fitted with J2 winding.

Display / control unit for temperature monitoring

Model A5121 - 14

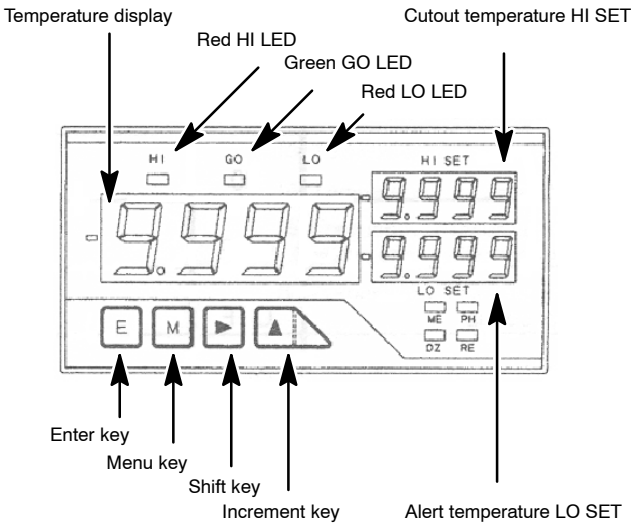
Caution!

The information provided in the enclosed manufacturer's instructions must be observed, particularly any warnings and technical specifications.

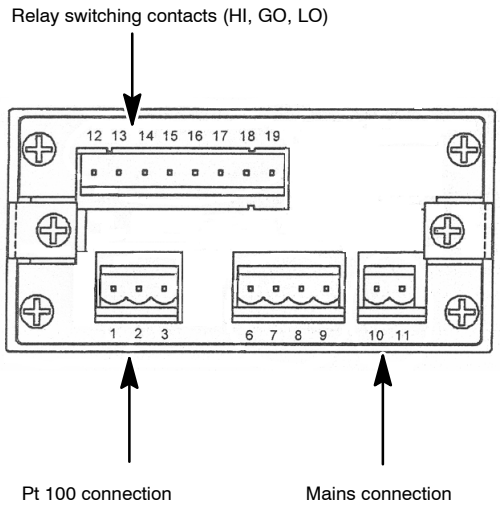
Description

Via the Pt 100 sensor (3-wire configuration) installed in the motor, the unit determines and displays the actual temperature of the motor water fill. Also, alert temperature (LO SET) and cutout temperature (HI SET) can be set, which are displayed separately on the unit. If the temperature measured is lower than the alert temperature set, the red "LO" LED will light up. If the alert temperature has been exceeded, the green "GO" LED will light up, and if the cutout temperature has been exceeded the red "HI" LED will light up. In addition, relays indicate the LO, GO and HI temperature ranges by changing their switching status, enabling control of external equipment.

Front: Settings / Displays



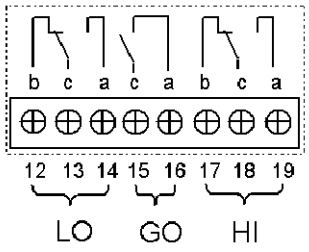
Back: Terminals

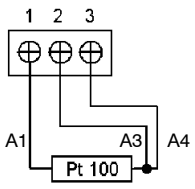


Connection

Relay contact capacity:	240V AC, 8A
(resistive load)	30V DC, 8A
Mains supply:	100 to 240V AC ± 10%

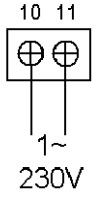
Relay contact





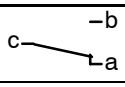
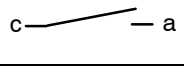
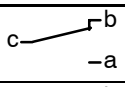
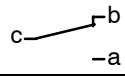
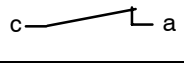
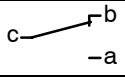
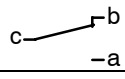
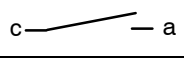
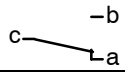
A1 = Black core *)
A3 = Brown core
A4 = Blue core

Mains connection



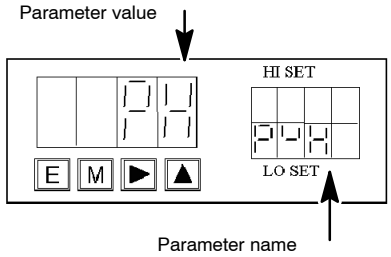
*) Pt 100: 3- wire configuration (Only one black core (A1) must be connected. Cut off the surplus black core at the cable end).

Switching status of relay outputs

Temperature t_{PT100}	LED	Connection LO	Connection GO	Connection HI
t_{PT100} < LO	LO red			
LO < t_{PT100} < HI	GO green			
t_{PT100} > HI	HI red			

Setting the main functions

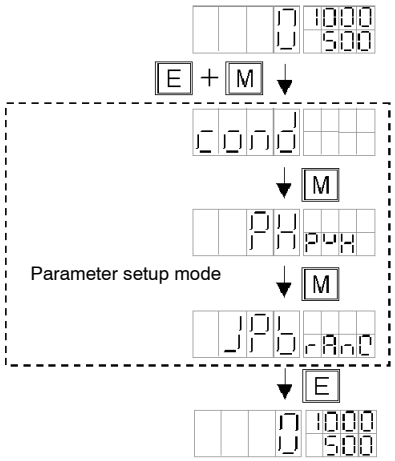
Settings are made by changing parameters in the parameter setup mode. In the parameter setup mode, the display shows the following data:



N.B.:

- The changes described below have to be made step by step.
- Parameters can only be changed by pressing the increment key.
- Pressing the Enter key will return the unit to measurement mode, saving all values that have been changed (also in the event of power failure)
- In the event of incorrect input, the values must be checked against the manufacturer's operating instructions and reset to default, if necessary.

Step 1: Changing the measurement resolution:



1. Press Enter key [E] and Menu key [M] together to change to parameter setup mode. → Sub-menu cond is displayed.
2. Press [M] twice. → Parameter name rAnG with parameter value JPb is displayed.
3. Press increment key [▲] to change parameter value to PA
4. Press [E] to return to temperature measurement mode. → Temperature is now displayed in decimals.

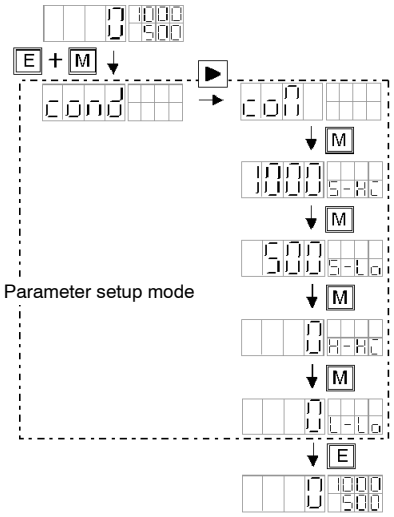
Step 2: Setting the cutout and alert temperatures

Specification:

Cutout temperature
= 55 (corresponds to 55°C for submersible motors with J1 insulation)
= 75 (corresponds to 75°C for submersible motors with J2 insulation)

Alert temperature = operating temperature (after an operating period of 1.5 h of the motor) plus 5°C or as required.

Cutout and alert hysteresis = 5 (corresponds to 5°C)



1. Press E and then M together to change to parameter setup mode. → Sub-menu cond is displayed. Change to submenu con by pressing ▶.
2. Press M and set cutout temperature via parameter S-HC as specified. Press ▶ to select digit to be changed (decimal point flashes) and set required value by pressing ▲. (Important: do not set negative values!)
3. Press M and set alert temperature via parameter S-Lo as specified. Proceed as described in para 2.
4. Press M and set cutout hysteresis via parameter H-HC as specified. Proceed as described in para 2.
5. Press M and set alert hysteresis via parameter L-Lo as specified. Proceed as described in para 2.
6. Press E to return to the temperature measurement mode. → Cutout and alert temperatures are shown in the HI SET and LO SET displays.

Faults

Please note:
To eliminate faults please refer to the enclosed manufacturer's operating manual. If incorrect settings have been entered the correction of which is causing problems, the original default settings can be loaded again. To do so, disconnect the unit from the mains voltage, hold down all four keys simultaneously and switch mains voltage back on. Hold down the keys until initialisation has been completed.

Fault	Cause	Remedy
Display [o.L] or [---] flashes	– Pt 100 resistance measurement fault	– Check cable connection; replace defective Pt 100.
[Err] is displayed	– Comparison temperature limits overlap. – Linearisation active.	– Set HI SET, LO SET correctly. Reduce hysteresis. – Disconnect unit from mains voltage. Reset linearisation with LINE parameter.
No display or weak display, LED lit	– Display has been switched off, or display brightness has been altered.	– Set BLNK parameter to OFF.
Incorrect temperature indication.	– Temperature is displayed in Fahrenheit. – Display range restricted.	– Change UNIT parameter to C. – Restore to full display range by setting DLHI parameter to 9999 and DLLO parameter to -9999.
Temperature resolution not in 0.1 °C increments.	– Wrong resolution selected. – Temperature increments have been altered.	– Set RANG parameter to PA. – Set S.DU parameter to increment 1 (1digit).

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