JUMO ecoTRON M

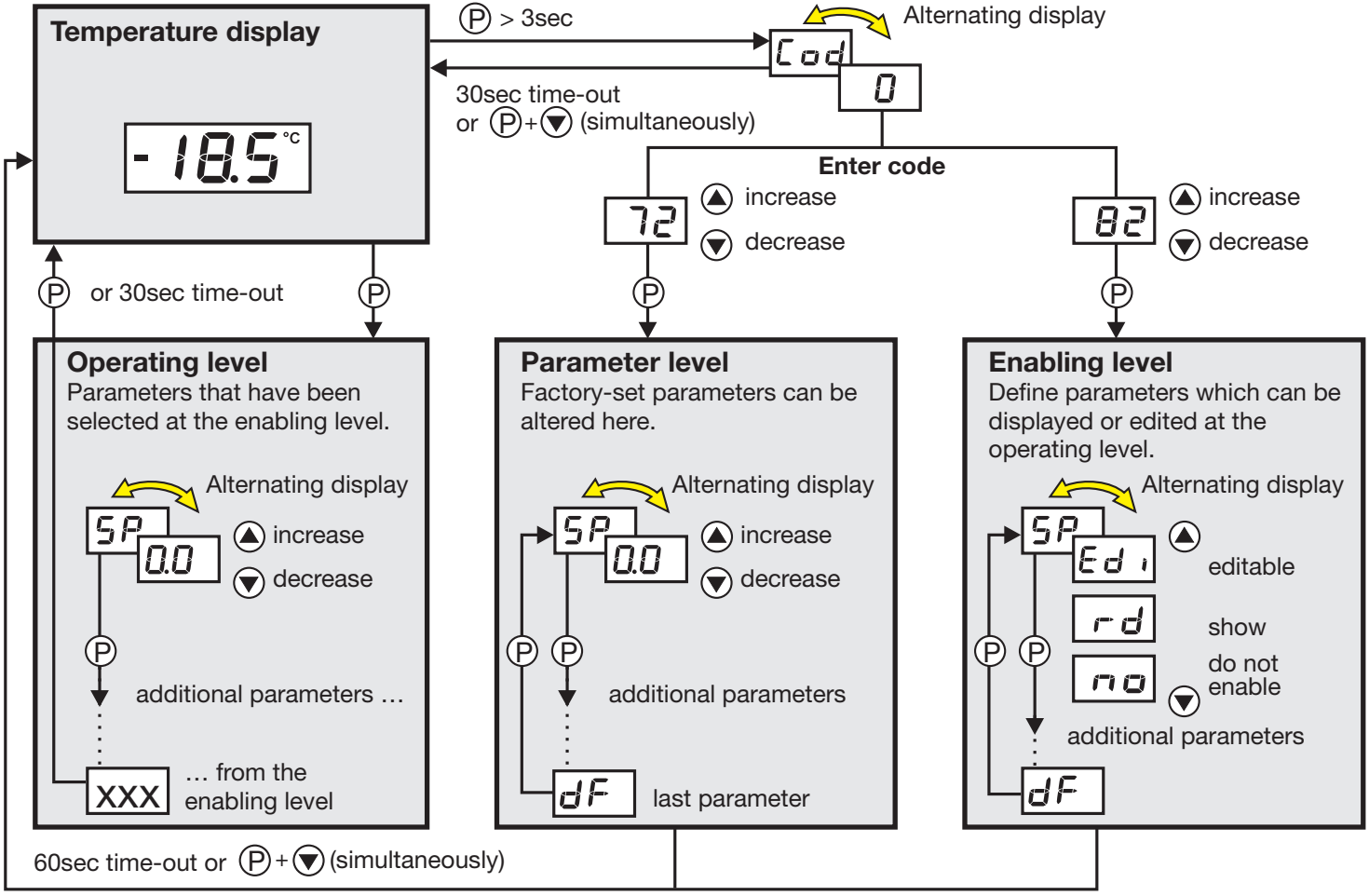
Electronic Microstat

B 70.1060.0

Operating Instructions

01.03/00412150

Overview of operation



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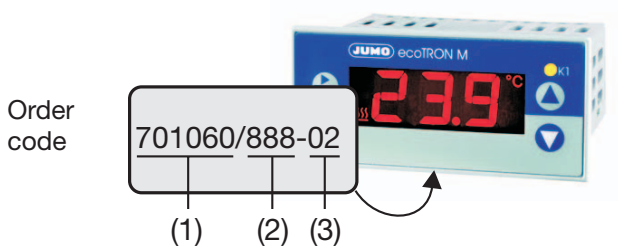
1 Instrument identification

The nameplate is affixed to the bottom of the instrument. The supply that is connected must correspond to the voltage specified on the nameplate.

All necessary settings are described in these Operating Instructions. If any difficulties should still arise during start-up, you are asked not to carry out any unauthorized manipulation on the unit. You could endanger your rights under the instrument warranty! Please contact the nearest subsidiary or the head office.

Please read these operating instructions carefully before commissioning the instrument. Keep the manual in a place that is accessible to all users at all times. Please assist us to improve these operating instructions, where necessary.



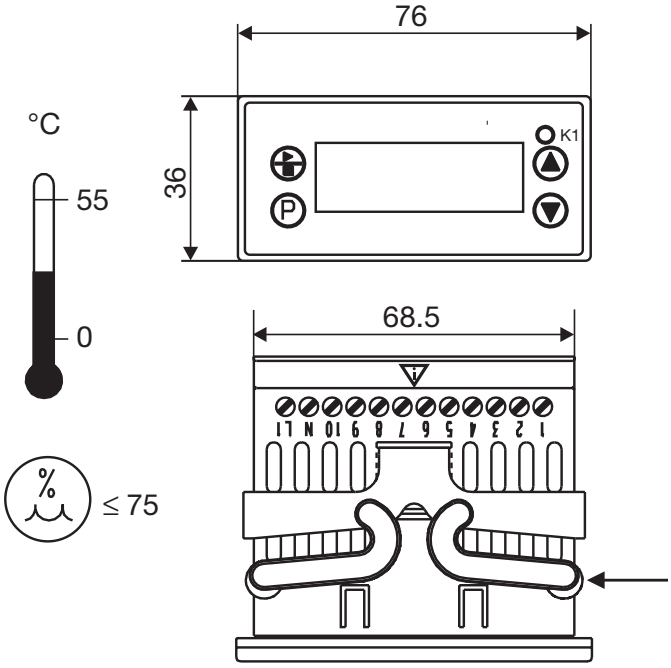
		(1) Basic version
701060		JUMO ecoTRON M
		(2) Measurement input
888		factory setting, configurable
999		customized configuration
	003	Pt100 in 2-wire circuit
	005	Pt1000 in 2-wire circuit
	606	KTY2X-6
		(3) Supply
02		230V AC +10/-15% 48 — 63Hz
05		115V AC +10/-15% 48 — 63Hz
18		24V DC +15/-15%
20		12V DC +15/-15%

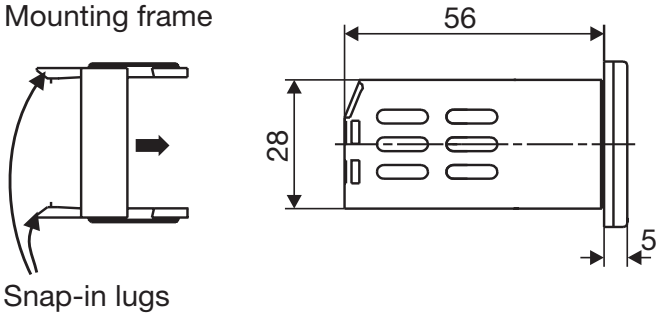
factory setting

Delivery package

1 seal
1 mounting frame
1 Operating Instructions 70.1060

2 Mounting





Bezel size:	76mm x 36 mm
Panel cut-out:	$69^{+2.5}_{-0}$ mm x 28.5^{+1}_{-0} mm
Side-by-side mounting up to 40°C max. ambient temperature	10mm horizontal, 15mm vertical

* Pull off mounting frame from instrument.
* Insert the instrument from the front into the panel cut-out and make sure that the bezel seal is seated correctly.
* From the back, push mounting frame onto the housing until the spring clips are under tension and the snap-in lugs have engaged at top and bottom.

3 Electrical connection

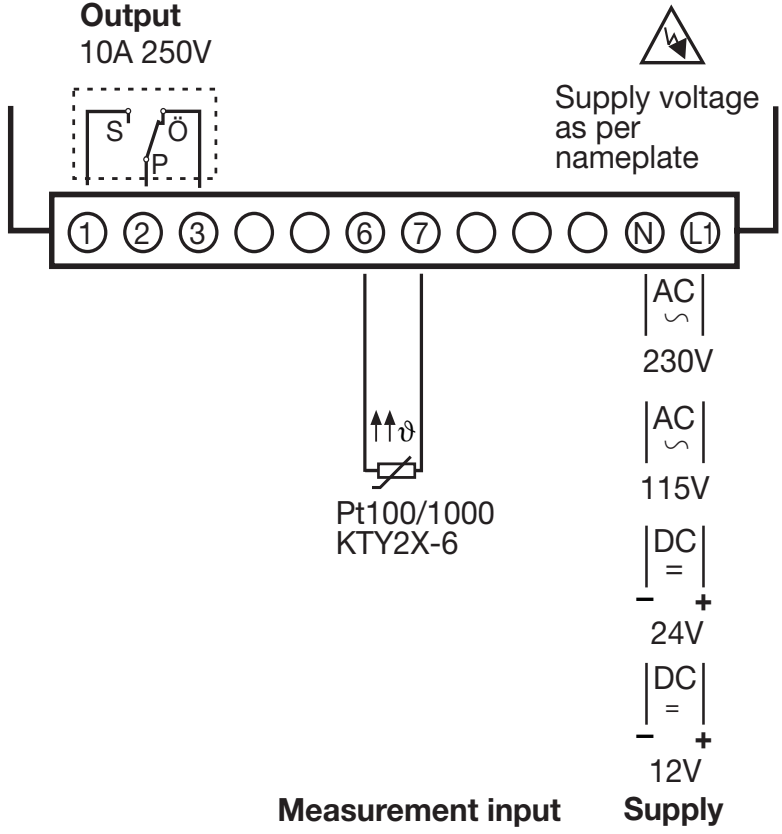
3.1 Installation notes

- ❏ The choice of cable, the installation and the electrical connection must conform to the requirements of VDE 0100 “Regulations on the Installation of Power Circuits with nominal voltages below 1000 V” or the appropriate local regulations.
- ❏ The electrical connection must only be carried out by qualified personnel.
- ❏ The electromagnetic compatibility (EMC) conforms to the standards and regulations listed under Technical Data.
- ❏ The instrument is not suitable for installation in areas with an explosion hazard.
- ❏ Apart from faulty installation, incorrect settings on the thermostat (setpoint, data of parameter and configuration levels) may also affect the proper functioning of controlled processes or lead to damage. Provision should therefore always be made for safety devices independent of the thermostat, e. g. overpressure valves or temperature limiters/monitors. Adjustments must be restricted to specialist personnel (lock parameters for operation). Please observe the corresponding safety regulations in this matter. Unfavorable parameter adjustments may lead to unstable control. The resulting process value should therefore be monitored for its stability and knowledge about the process should be obtained.
- ❏ The load circuit must be fused for the maximum relay current in order to prevent welding of the output relay contacts in the event of a short circuit.
- ❏ Do not connect any additional loads to the supply terminals of the instrument.
- ❏ The external fuse of the supply should not be rated below 1A, depending on the conductor cross-section. If contact with live components is possible while working on the instrument, the Microstat must be disconnected on both poles from the supply.

❏	**Supply**		**Measurement input and supply**
	AC	short-circuit-proof	electrically isolated from each other
	DC	not short-circuit-proof	not electrically isolated from each other

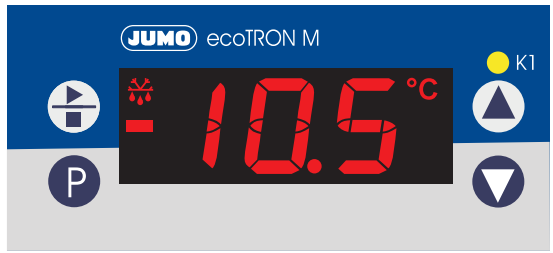
3.2 Connection diagram

The electrical connection must only be carried out by qualified personnel!



4 Commissioning the instrument

4.1 Displays and controls

LC display	3-digit, 9-segment display, 13 mm high, with symbols for temperature unit, h, min, s, defrosting and heating, red background lighting.	**Temperature display**
LED K1	LED K1 comes on when relay is energized. LED K1 goes out when relay is de-energized.	
Keys	for start-stop during heating and cooling operation programming increase value select operational status at enabling level decrease value select operational status at enabling level	

✱ When connected to the supply, all segments light up twice as a test (segment test).

When everything is connected correctly on the instrument, the present temperature is shown (temperature display)

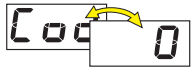
If an alarm message appears, see Chapter 7 “Alarm messages”.

The relay operates according the controller type that was set,
see Chapter 4.2 “Setting the instrument functions (parameter level)”.

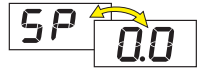
4.2 Setting the instrument functions (parameter level)

☞ Time-out:
If no key is pressed for 60 sec, the instrument automatically switches back to the temperature display, see *Overview of operation* on the first inside page.

The instrument functions and values are set at the parameter level.

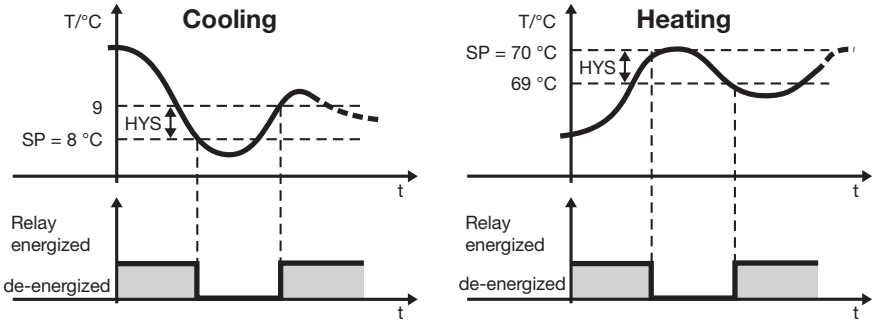
* Press the Ⓟ key for 3 seconds and  will appear alternately.

* Set code 72 for accessing the parameter level by pressing the ▲ and ▼ keys.
The longer the key is pressed the faster the value changes.

* Acknowledge with Ⓟ,
parameter name and **value** appear alternately, e.g.  .

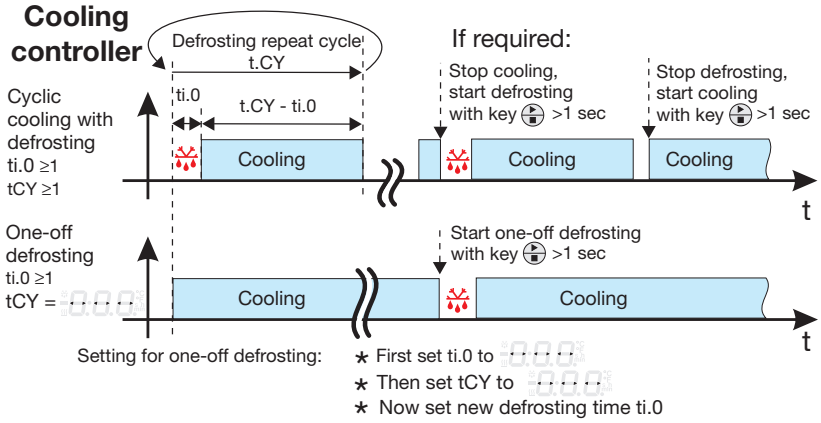
* Set value within the specified range using the ▲ and ▼ keys.
* Acknowledge settings with Ⓟ.
* Set next parameter, see *Overview of Operation* on the front inside page.

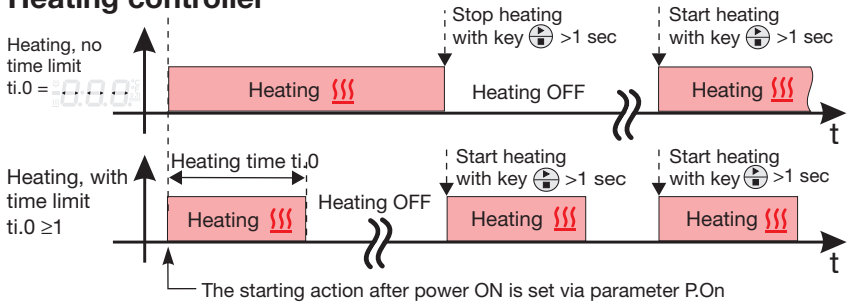
Controller

Parameter	Meaning	Value range from...**factory-set**...to
SP	**Setpoint** The target temperature	SP.L ... **0.0** ... SP.H
HYS	**Hysteresis** 	0.2 ... **1.0** ... 99.9 °C/°F
SP.L	**Low setpoint limit** The lower limit for setpoint selection.	-350 ... **-50** ... 999°C/°F
SP.H	**High setpoint limit** The upper limit for setpoint selection.	-350 ... **500** ... 999°C/°F
typ	**Controller type** CoL : cooling controller Hot : heating controller	Hot , CoL
dly	**Switch-on delay after power ON** For staggered switch-on of several equipment units.	**0** ... 60 min

Parameter	Meaning		Value range from...**factory-set**...to
t.On	**Minimum ON time**	Here you can set the minimum time for which the equipment unit, for example, has to remain switched on or off. These values depend on the heating or cooling unit being used (observe manufacturer's specification). In the event of a **probe error,** the relay (as set in parameter S.Er) is operated immediately.	**0** ... 999 s
t.OF	**Minimum OFF time**		**0** ... 999 s

Timer

t i.0	**Defrosting/heating time** Defrosting time for cooling contr. (Col), heating time for heating contr. (Hot). 	- - - - ,1... 999 min The 6 dots indicate: no time limit. This is shown instead of the value "0". factory-set: - - - -
t.CY	**Defrosting repeat cycle** only with the cooling controller setting (Col)	0 ... **24** ... 999 h

Parameter	Meaning	Value range from...**factory-set**...to
t. i	**Currently remaining running time** for example for cooling/heating operation etc. **Heating controller**  	999h ... 2h, 120min ... 2min, 120s ... 0s, With setting 0.0.0.0, t. i cannot be edited
t.S i	**Service interval** The time period after which the equipment unit has to be serviced is set here. The active relay time is taken into account. (t = thousand)	**0** ... 999h ... 9.9t h
t. S	**Current service counter for equipment unit connected** This shows how much time has elapsed since the last service. On reaching the interval t.S i, an alarm message is generated. If the counter is reset after a service, the alarm message disappears.	0 ... 999h ... 9.9t h
t. h	**Display of the total operating hours** Active time of relay for maintenance of heating or cooling units.	0 ... 999h ... 9.9t h

Parameter	Meaning	Value range from...**factory-set**...to
d.S	**Temperature display during defrosting** freeze temperature value during defrosting: 0 update temperature value continuously: 1	0, **1**
P.On	**Response after power ON** **0**: Defrosting / Heating OFF **1**: Cooling / Heating	0, **1**
btn	**Enabling the start-stop key** 0: inhibited 1: enabled	0, **1**

Alarms

AL.L	**Low alarm limit temperature** [1] If the process value falls below this limit during heating or cooling, the alarm message AL.L is output to the display, see Chapter 7 “Alarm messages”.	-350 ... **-200** ... 999°C/°F
AL.H	**High alarm limit temperature** [1] If the process value goes above this limit during heating or cooling, the alarm message AL.H is output to the display, see Chapter 7 “Alarm messages“.	-350 ... **500** ... 999°C/°F
AL.d	**Alarm suppression time**[1] The alarm AL.L or AL.H is not displayed until this time has elapsed. If the alarm is present for longer than AL.d, then it will be displayed.	**0** ... 60 min

1.) During defrosting and also during heating OFF (symbol for heating has gone out), alarm monitoring is inactive.

Parameter	Meaning	Value range from...**factory-set**...to
S.Er	**Response to over/underrange** 0: relay immediately de-energized 1: relay immediately energized	**0**, 1

Input

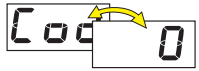
SEn	**Transducer** Transducer connected in 2-wire circuit	**Pt 100: P.1h** Pt 1000: P.1t KTY2X-6: PtC
OF.t	**Temperature offset** Temperature offset in °C or °F	-99.9 ... **0.0** ... 99.9 °C/°F
OF.r	**Lead compensation resistance** This value is used to compensate the resistance of the probe cable and depends on the cable length. For optimum temperature measurement, the resistance value of the probe cable (with shorted probe) has to be entered here. If the total resistance at the measurement input (transducer resistance + value selected for OF.r) exceeds 320 Ω with Pt100, or 3200 Ω with Pt1000/KTY2x-6, a measurement error will result !	0.0 ... **0.0** ... 99.9 Ω
Uni	**Unit** for the temperature displayed Only the measured value is converted accordingly when changing over to °F. All other temperature variables e.g. SP will retain their values.	°**C** or °F

Parameter	Meaning	Value range from...**factory-set**...to
dF	**Filter time constant** For adapting the digital input filter (0.0 seconds = filter OFF). With a signal step, 63 % of the change is registered after the filter time constant has elapsed. Values between 0.1 and 0.7 are interpreted as 0.8 (sampling time). If the filter time constant is too long: - high damping of interference signals - slow reaction of the process value display to process value changes	0.0 ... **0.8** ... 99.9 s

☞ Return to the first parameter SP at the parameter level by pressing Ⓟ > 3 seconds.

4.3 Allocating user rights (enabling level)

The setting at the enabling level defines **user rights** which determine whether a parameter is shown at the operating level, can be edited, or is not shown at all.

* Press the Ⓟ key for 3 seconds and  appears.

* Set code 82 for accessing the enabling level by pressing the ▲ and ▼ keys.

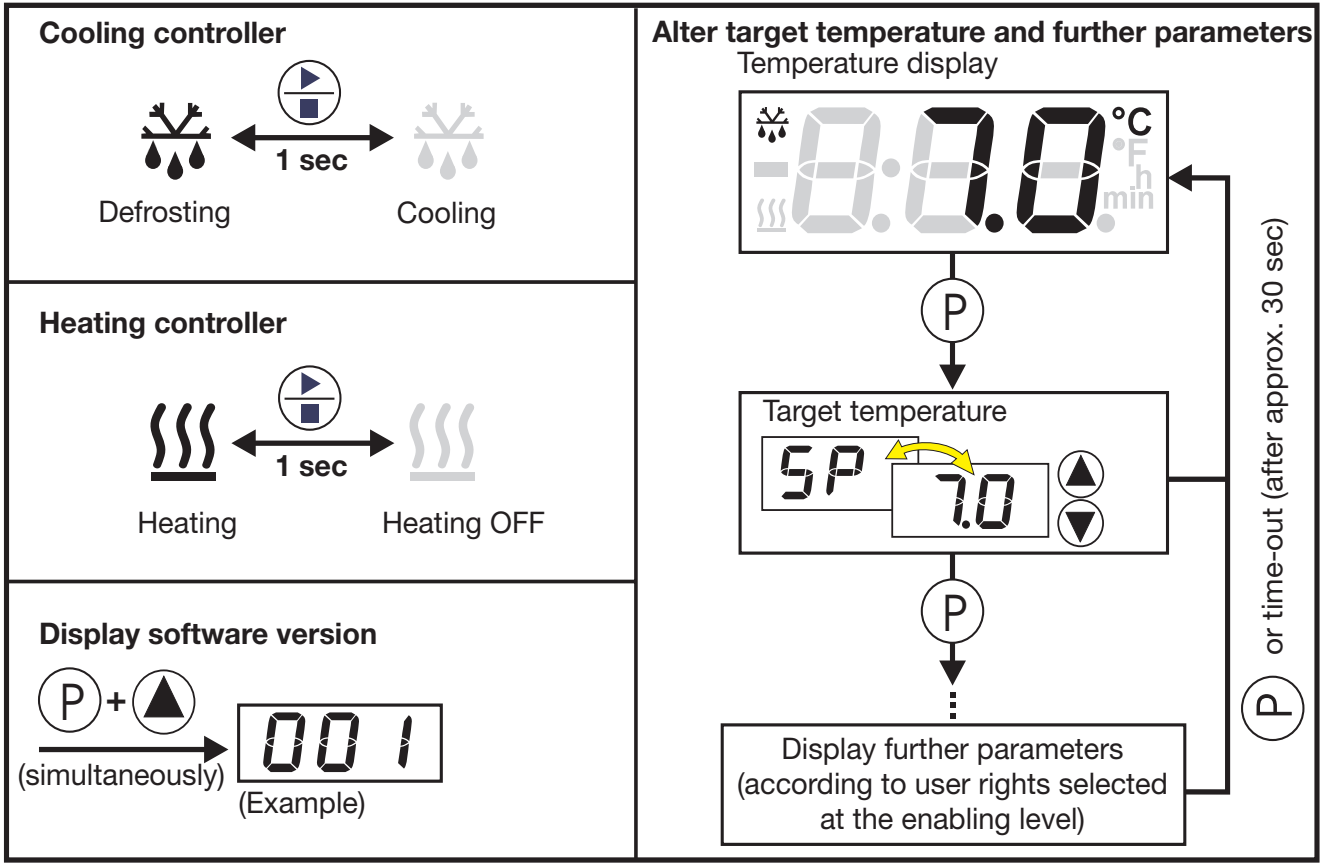
* Acknowledge with Ⓟ
  Parameter and **User rights** blink alternately e.g.

* Use the ▲ and ▼ keys to set user rights to Ed i , rd or no

User rights	**Display**	**factory-set**
Parameter **editable** at the operating level	Ed i	SP
Parameter **appears** at the operating level	rd	-
Parameter **does not appear** at the operating level	no	all other parameters

* Acknowledge setting with Ⓟ.
* Set next parameter, see *Overview of operation* on the front inside page.

5 Operation


Cooling controller
1 sec
Defrosting
Cooling
Heating controller
1 sec
Heating
Heating OFF
Display software version
P + ▲
(simultaneously)
001
(Example)
Alter target temperature and further parameters
Temperature display
°C
°F
h
min
P
Target temperature
SP
7.0
P
Display further parameters
(according to user rights selected
at the enabling level)
P or time-out (after approx. 30 sec)

6 Technical data

Measurement input

Designation	Range	Accuracy	Overrange/underrange
Pt100 EN 60 751	-200 to +500°C	0.1%	is recognized
Pt1000 EN 60 751	-200 to +500°C	0.1%	is recognized
KTY2X-6	-50 to 150 °C	1%	is recognized
Temperature error	≤ 100 ppm per °C of range		
Sampling time	250 msec, resolution > 14bit		
Input filter	1st order digital filter; filter constant adjustable from 0 — 99.9sec		
Lead compensation[1]	adjustable via the parameter Lead compensation resistance OF.r		
Temperature offset[1]	adjustable via the parameter Temperature offset OF.t		
Features	temperature display °C, can be changed over to °F		

1. see Chapter 4.2 “Setting the instrument functions” (parameter level)

Environmental influences

Ambient temperature range	0 to +55°C, for side-by-side mounting: 0 to +40°C
Storage temperature range	-40 to +70°C
Climatic conditions	≤ 75% rel. humidity, no condensation
Care of the front panel	The front panel can be cleaned with all the usual rinsing and cleaning agents. Do not use solvents such as methylated spirit, white spirit, P1 or xylene.

Output

Relay (changeover contact)	150,000 operations at 10A 250V AC 50Hz resistive load 800,000 operations at 3A 250V AC 50Hz resistive load

Supply

Supply voltage	230V AC +10/-15%, 24V DC +15/-15% 115V AC +10/-15%, 12V DC +15/-15%
Power consumption	< 3VA

Housing

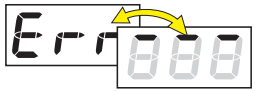
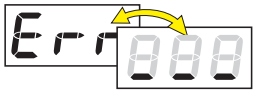
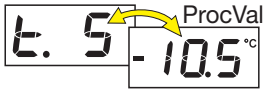
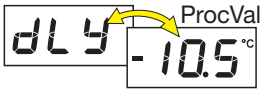
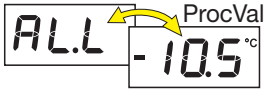
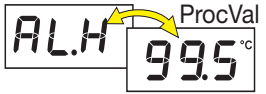
Material	polycarbonate
Mounting	in panel cut-out with bezel seal
Operating position	unrestricted
Weight	approx. 160g
Protection	front IP65, rear IP20
Flammability class	UL 94 VO

Electrical data

Data backup	EEPROM
Connection	screw terminals for wire cross-sections up to 4 mm^2 solid wire and up to 2.5 mm^2 stranded wire
Electromagnetic compatibility - interference emission - immunity to interference	EN 61 326 Class B to industrial requirements
Operating conditions	The instrument is designed for flush panel mounting.
Electrical safety	EN 61 010, Part 1, overvoltage category III, pollution degree 2
Accuracy of timer	2.5 min per month, temperature error 10ppm per 10°C

7 Alarm messages

The following alarm messages can be shown in the temperature display:

Error message	Cause	Elimination
	**Display overrun** The measured value is too large and is outside the range.	- Check sensor and connecting cable for damage and short circuit - Check whether the correct sensor has been set or connected ⇨ Chapter 4 “Commissioning the instrument” ☞ These messages are only output to the temperature display.
	**Display underrun** The measured value is too small and is outside the range.	
	**Service interval** has elapsed The time that was set for servicing a heating or cooling unit has elapsed.	✱ Carry out service ✱ Reset t. S manually to 0 at the parameter level ⇨ Chapter 4 “Commissioning the instrument”
	Time for **switch-on delay** after power ON has elapsed. With display over/underrun, the switch-on delay becomes ineffective.	✱ Cancel switch-on delay with Ⓟ + ▼
	Value has fallen below the low **alarm limit temperature**	✱ Depending on the selected controller type, check whether the heating or cooling unit functions faultlessly. ✱ Check whether the relay fuse installed is still in good working order. The alarm disappears when the temperature goes above or below the AL limits by the amount of the hysteresis.
	Value has gone above the high **alarm limit temperature**	

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