

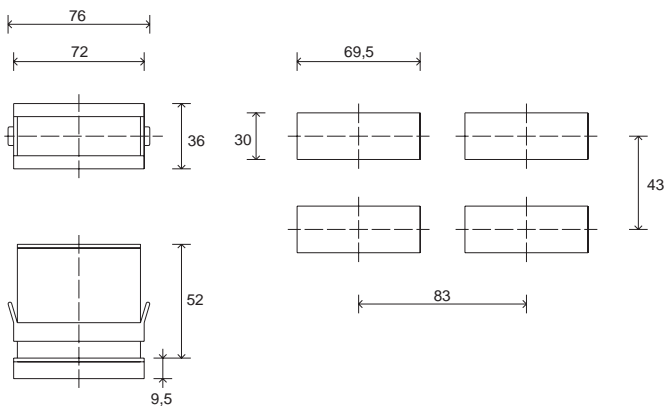
USER'S MANUAL

SOFTWARE VERSION 1.0x
code 81761A / edition 05 - 06/04



1 • INSTALLATION

• Dimensions and cut-out: Panel mounting



For correct and safe installation, follow the instructions and observe the warnings contained in this manual.

Panel mounting:

Fix the device with the bracket provided before making any electrical connections. To mount two or more devices side by side, use the cut-out dimensions shown above.

CE MARKING: EMC (electromagnetic compatibility) conformity to EEC Directive 89/336/CEE with reference to the generic Standard EN61000-6-2 (immunity in industrial environments) and EN50081-1 (emission in residential environments). BT (low voltage) conformity to Directive 73/23/CEE as modified by Directive 93/68.

MAINTENANCE: Repairs must be done out only by trained and specialized personnel. Cut power to the device before accessing internal parts.

Do not clean the case with hydrocarbon-based solvents (Petrol, Trichlorethylene, etc.). Use of these solvents can reduce the mechanical reliability of the device. Use a cloth dampened in ethyl alcohol or water to clean the external plastic case.

SERVICE: GEF 40T 72 PID has a service department. The warranty excludes defects caused by any use not conforming to these instructions.

2 • TECHNICAL SPECIFICATIONS

Display	4 digit red LED's, digit height 14mm
Keys	3 mechanical keys (Raise, Lower, F)
Accuracy	0.2% f.s. at 25°C ambient temperature
Main input	TC, RTD (Pt100), PTC 60mV, Ri ≥ 500K; 20mA, Ri = 50Ω; 10V Ri < 20K
Thermocouples	IEC 584-1 (J, K, R, S, T, B, E, N)
Cold junction error	0,1° / °C
RTD type (scale configurable within indicated range, with or without decimal point)	DIN 43760 (Pt100)
Max. RTD line resistance	20Ω
PTC type (on request)	990Ω, 25°C
Safety	detection of short circuit or opening of probes, LBA alarm
°C / °F selection	Faceplate configurable
Linear scale ranges	-1999 to 9999 configurable decimal point position
Control actions	Pid, Autotune, on-off
pb	0,0...999,9 %
dt	0,00...99,99 min
di	0,00...99,99 min
Action	heat or cool
Control outputs	on / off, pwm
Limitation Max power heat / cool	0,0...100,0 %
Cycle time	0...200 sec
Type of main output	relay, logic
Softstart	0,0...500,0 min
Fault power setting	-100,0...100,0 %
Software turn-off function	Can be excluded
Configurable alarms	Up to 3 alarm functions assignable to an output and configurable as: maximum, minimum, symmetrical, absolute/relative, LBA
Alarm masking	exclude on power-up
Relay contact	NO (NC) 5A, 250V
Logic output for static relays	power supply > 18Vdc/dc, Rout = 560Ω (6Vmin / 20mA)
Triac output	20...240Vac ±10%, 2Amax, load I't = 128A's
Fault settings	Alarm states can be configured in probe fault condition
2-wire Transmitter Power Supply (option)	18V ±10% 50mA 1.2V for potentiometer > 100 Ω (version P77)
Power supply (not isolated from sensor input)	11...27Vdc, 18...27Vac ±10%, 50/60Hz, 4,5VA
Faceplate protection	IP65
Working / Storage temperatures	0 to 50°C / -20 to 70°C
Relative humidity	20 to 85%, non-condensing
Installation	Panel mounting
Weight	110g for the complete version

EMC conformity has been tested with the following connections

FUNCTION	CABLE	LENGTH USED
TC input probe	0,8 mm ² compensated	5 mt
"PT100" input probe	1 mm ²	3 mt
Power supply cable	1 mm ²	1 mt
Relay output cables	1 mm ²	3,5 mt

3 • DESCRIPTION OF FACEPLATE

PV display: Indication of process variable •• Indication of 'Hi' or 'Lo' out of range •• Indication of open circuit (br) or short circuit (Er) •• Display of configuration and calibration messages

Indication of output states:
OUT 1 (MAIN); OUT 2 (Alarm 1); OUT 3 (Alarm 2)

Label with engineering units



"Raise" and "Lower" keys:

These keys are used for any operation that requires a numerical parameter to be raised or lowered. ••The speed of change is proportional to the time the key is pressed. •• The operation is not cyclic: once the maximum (minimum) limit is reached, there will be no further increase (decrease) of the value, even if the key remains pressed.

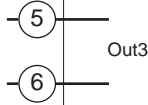
Function key:

Gives access to different configuration stages •• Confirms any parameter changes

4 • CONNECTIONS

• Outputs

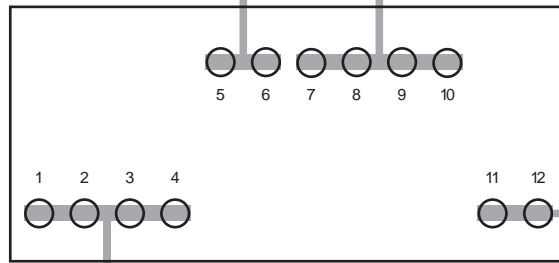
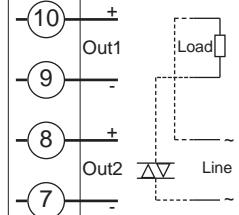
Generic user-configurable output
- relay 5A/250Vac



• Outputs

Generic user-configurable outputs

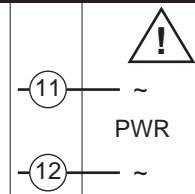
- relay 5A/250Vac
- logic 6V/20mA, Rout = 560Ω with power supply > 18Vac/dc
- Triac 20...240Vac ±10%, 2Amax



• Power supply

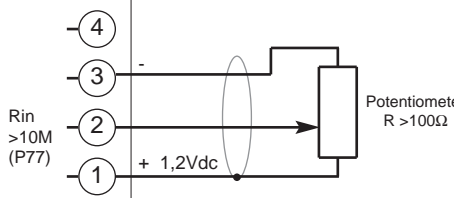
Standard:
18 to 27 Vac, 11 to 27Vdc ±10%

50/60 Hz, 4.5 VA max. not isolated from sensor input

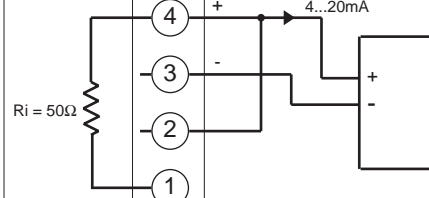


• Inputs

• Linear input for potentiometer



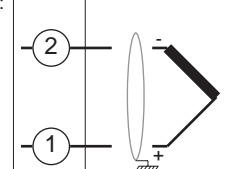
• Linear input with 2-wire transmitter



• TC

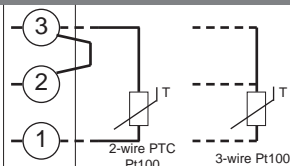
Available thermocouples:
J, K, R, S, T, B, E, N

- Respect polarities
- For extensions, use compensated cable appropriate for thermocouple.



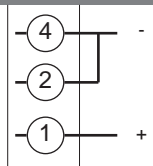
• Pt100 / PTC / NTC

Use wires of adequate thickness (min. 1mm²)
PT100, JPT100, PTC



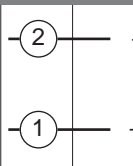
• Linear Input (I)

dc current linear input
20mA, Ri = 50Ω
(The signal must be insulated from power supply)



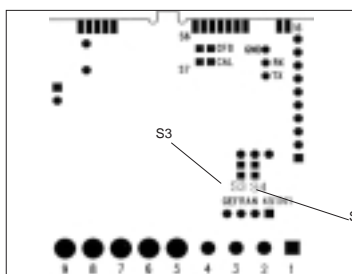
• Linear Input (V)

dc voltage linear input
60mV, 1V, 5V, 10V, Ri ≥ 500KΩ
(The signal must be insulated from power supply.)



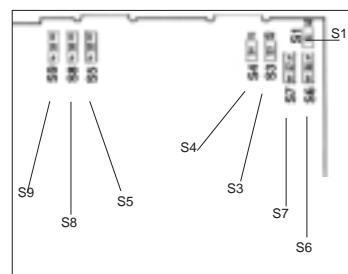
• Device structure: identification of boards

CPU board



	RTD, PTC, NTC input	Transmitter and potentiometer power supply
S3	ON	OFF
S4	OFF	ON

OUTPUT board

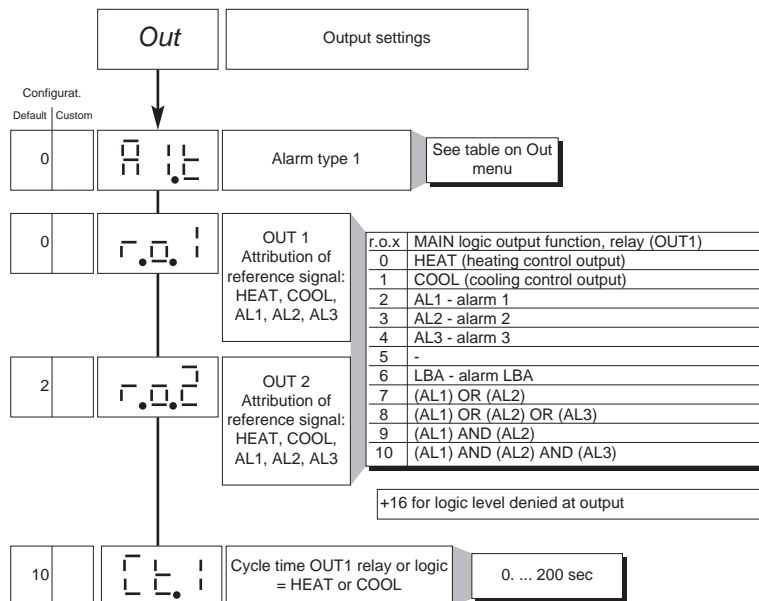
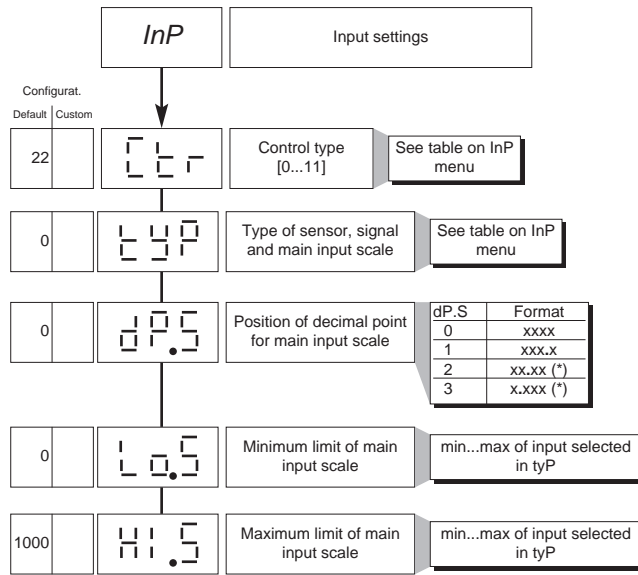
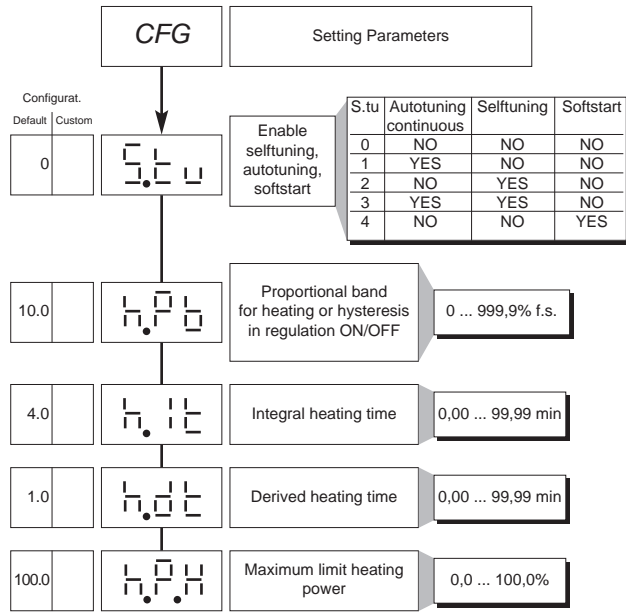


Probe power supply

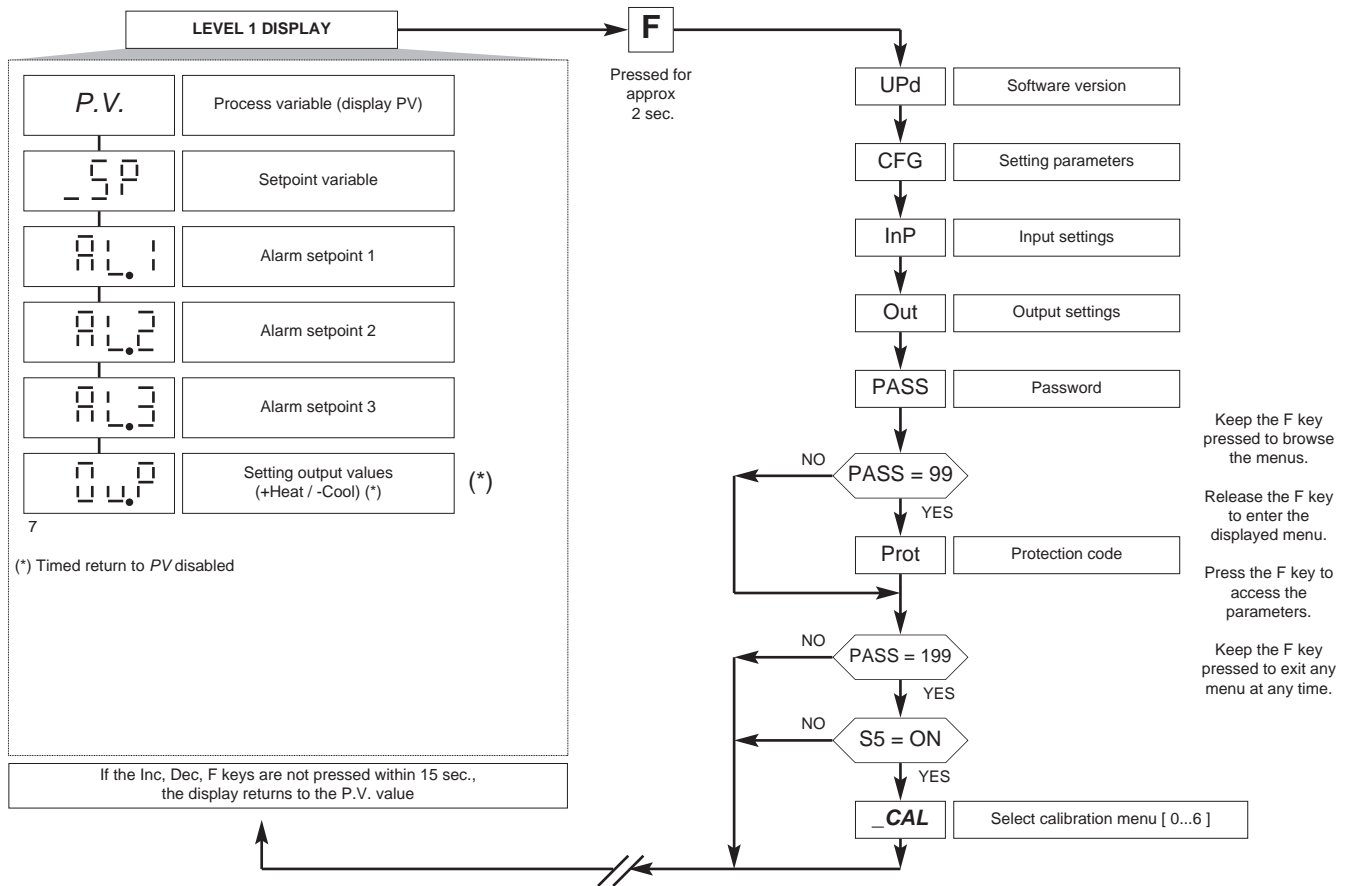
Voltage	Jumpers
1V	S4 - S6B - S7A
24V (18V)	S6B - S7A

S5 = Status of Out 1 relay
S8 = Status of Out 2 relay
S9 = Status of Out 2 relay
A = Direct
B = Inverse

5 • Standard Configuration Menu

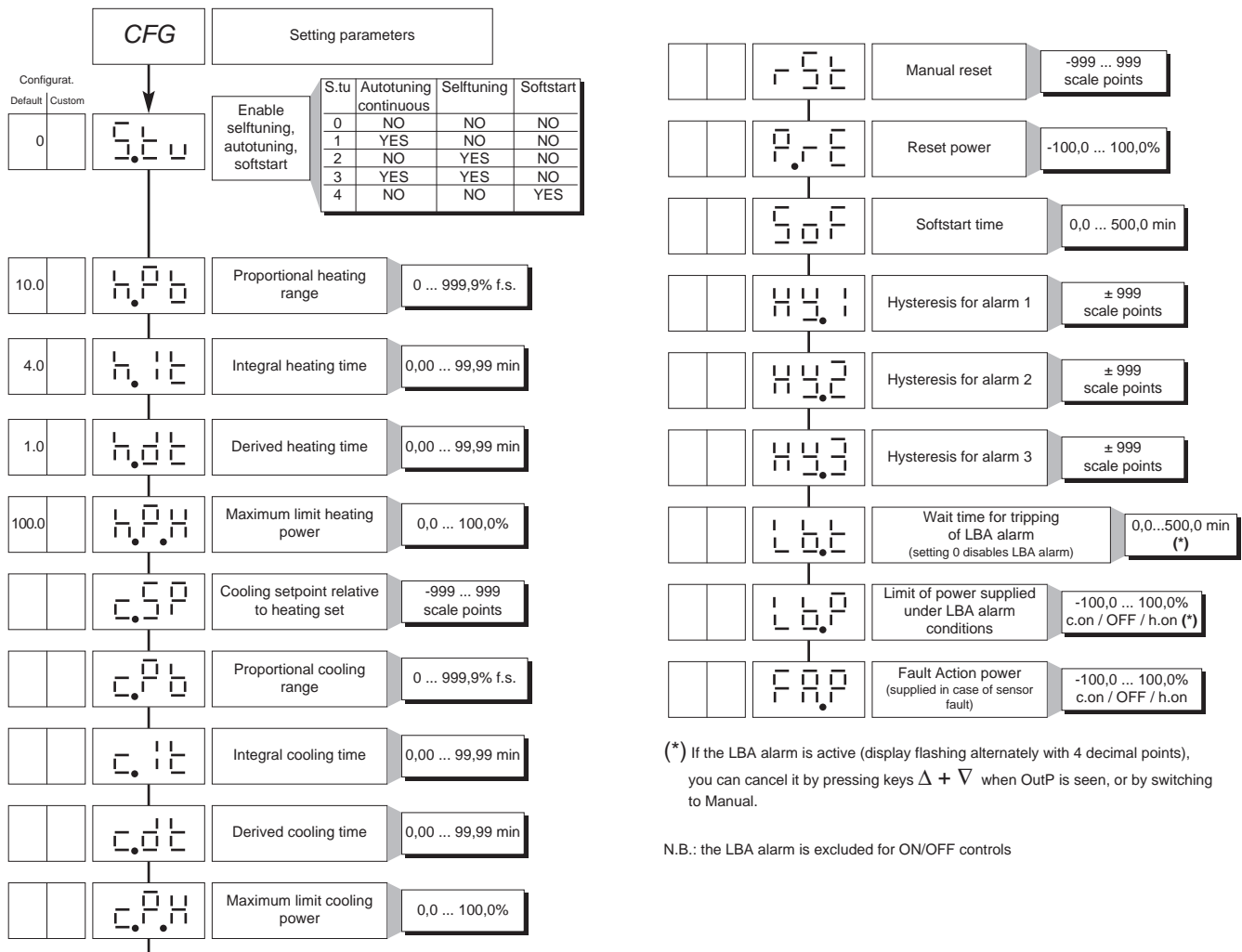


6 • PROGRAMMING and CONFIGURATION



NB: Parameters not required for a particular configuration are not displayed

• CFG



• InP

Configurat. Default Custom

22

Type of control [0...27]

Ctrl	Type of control
0	P heat
1	P cool
2	P heat / cool
3	PI heat
4	PI cool
5	PI heat / cool
6	PID heat
7	PID cool
8	PID heat / cool
9	ON-OFF heat
10	ON-OFF cool
11	ON-OFF heat / cool

+16 disable parameters
CFG: rst, PrE, SoF, Lbt, Lbp, FAP, HY.2, HY.3
InP: FLt, FLd, oFS, LoL, HiL
Out: ALn, A2t, A3t, rEL

FLt, FLd, oFS stay at set value.
 All other parameters are considered 0.

0

Type of probe, signal and scale of main input

SENSOR: TC (CAL = 1)

tYP	Type of probe	Scale (C/F)	Max. scale range without decimal point	Max. scale range with decimal point
0	J (Fe-CuNi)	C	0 / 1000	0,0 / 999,9
1	J (Fe-CuNi)	F	32 / 1832	32,0 / 999,9
2	K (NiCr-Ni)	C	0 / 1300	0,0 / 999,9
3	K (NiCr-Ni)	F	32 / 2372	32,0 / 999,9
4	R (Pt13Rh - Pt)	C	0 / 1750	not available
5	R (Pt13Rh - Pt)	F	32 / 3182	not available
6	S (Pt10Rh - Pt)	C	0 / 1750	not available
7	S (Pt10Rh - Pt)	F	32 / 3182	not available
8	T (Cu-CuNi)	C	-200 / 400	-199,9 / 400,0
9	T (Cu-CuNi)	F	-328 / 752	-199,9 / 752,0
10	B (Pt30Rh - Pt6Rh)	C	44 / 1800	not available
11	B (Pt30Rh - Pt6Rh)	F	111 / 3272	not available
12	E (NiCr-CuNi)	C	-100 / 750	-100,0 / 750,0
13	E (NiCr-CuNi)	F	-148 / 1382	-148,0 / 999,9
14	N (NiCrSi-NiSi)	C	0 / 1300	0,0 / 999,9
15	N (NiCrSi-NiSi)	F	32 / 2372	32,0 / 999,9

SENSOR: RTD 3 wires (CAL = 2)

tYP	Type of probe	Scale (C/F)	Max. scale range without decimal point	Max. scale range with decimal point
16	PT100	C	-200 / 600	-199,9 / 600,0
17	PT100	F	-328 / 1112	-199,9 / 999,9

SENSOR: PTC (on request) [alternate to RTD 3 wires] (CAL = 3)

tYP	Type of probe	Scale (C/F)	Max. scale range without decimal point	Max. scale range with decimal point
18	PTC	C	-55 / 120	-55,0 / 120,0
19	PTC	F	-67 / 248	-67,0 / 248,0

SENSOR: VOLTAGE 60mV (CAL = 4)

tYP	Signal type	Scale	Max. scale range
20	0...60mV	linear	-1999 / 9999
21	12...60mV	linear	-1999 / 9999

SENSOR: CURRENT 20mA or TRANSMITTER (CAL = 5)

tYP	Signal type	Scale	Max. scale range
22	0...20mA	linear	-1999 / 9999
23	4...20mA	linear	-1999 / 9999

SENSOR: VOLTAGE 10V or TRANSMITTER (CAL = 6)

tYP	Signal type	Scale	Max. scale range
24	0...10V	linear	-1999 / 9999
25	2...10V	linear	-1999 / 9999

0

Digital filter on main input 0.0 to 20.0 sec

0

Digital filter on display of process variable; acts as hysteresis 0.0 to 9.9 scale points

0

Decimal point position for main input scale

dP.S	Format
0	xxxx
1	xxx.x
2	xx.xx (*)
3	x.xxx (*)

(*) not available for TC, RTD, PTC scales

0

Minimum limit of main input scale min...max scale of input selected in t.P

1000

Maximum limit of main input scale min...max scale of input selected in t.P

0

Main input offset correction -999...999 scale points

0

Lower limit for local setpoint and absolute alarms Lo.S ... Hi.S

0

Upper limit for local setpoint and absolute alarms Lo.S ... Hi.S

• Out

Out Output settings

Configurat. Default Custom

Number of alarms 0 ... 3

0

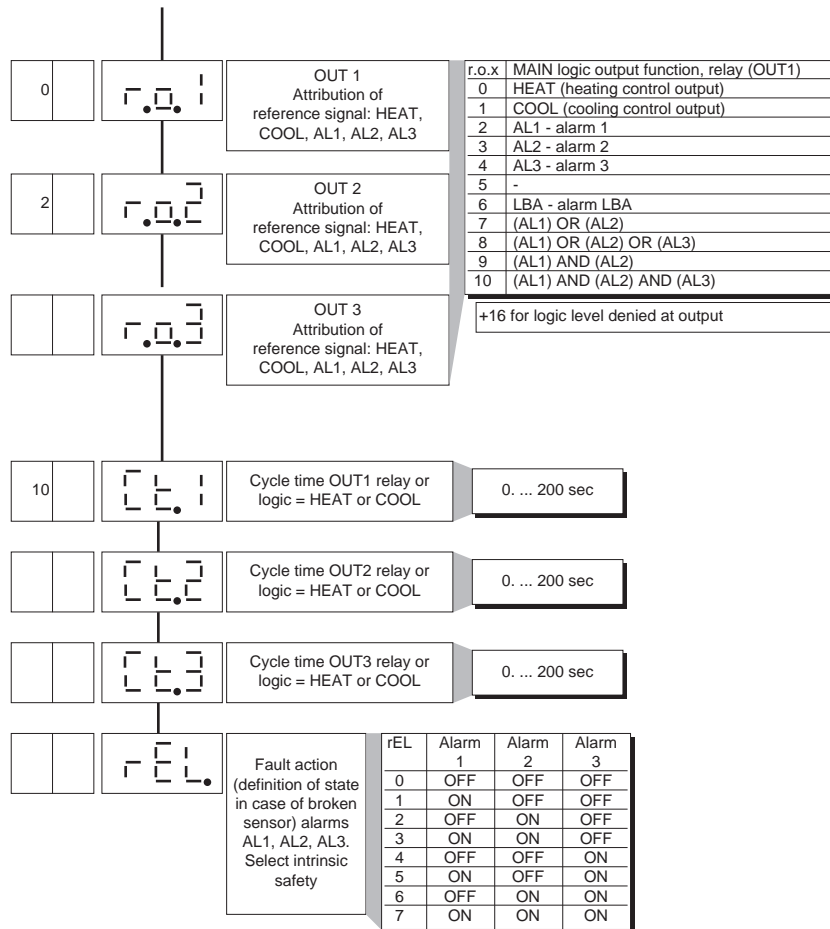
Alarm type 1

AL.x	Direct (max.) Inverse (min.)	Absolute Relative to previous	Normal Symmetrical (window)
0	direct	absolute	normal
1	inverse	absolute	normal
2	direct	relativo	normal
3	inverse	relativo	normal
4	direct	absolute	symmetrical
5	inverse	absolute	symmetrical
6	direct	relativo	symmetrical
7	inverse	relativo	symmetrical

Alarm type 2

Alarm type 3

to disable on power-up until first alarm



- 1) In case of broken sensor, the logic state of the alarm assumes the logic value selected without consideration of alarm type (direct or reverse): ON = alarm active, OFF = alarm inactive.
 2) Alarms are assigned to available outputs by setting codes r.o.1, r.o.2, r.o.3.

• Prot

Pro	Protection code
Pro	Protection code
0	SP, alarms, OutP
1	SP, alarms, OutP
2	SP
3	SP

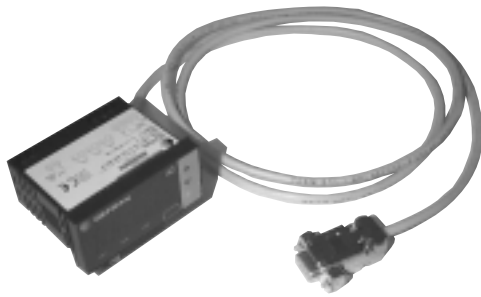
Pro	Display	Change
0	SP, alarms, OutP	SP, alarms
1	SP, alarms, OutP	SP
2	SP	SP
3	SP	

+ 4 disable InP, Out
 + 8 disable CFG
 + 16 disable "SW turn on – turn off"

To activate the turn off SW function, press keys F + Δ for 5 secs. in P.V.
 To return to normal functioning, press key F for 5 secs.

7 • ACCESSORIES

• RS323 interface cable for configuration



N.B.: the PC configuration cable is supplied with the programming software.

WARNING: make the connection with the device powered and with inputs and outputs disconnected.

• ORDER CODE

WSK-0-0-0	Interface cables + CD Winstrum
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• Transformer



TRAFO 1

TRAFO 5

Size

TRAFO 1: L: 44,5mm, B: 46,2mm, H: 32,5mm

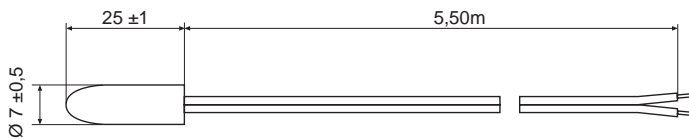
TRAFO 5: L: 51,5mm, B: 52,5mm, H: 35mm

• ORDER CODE

TRAFO 1	3VA, 230/24Vac transformer
TRAFO 5	10VA, 230/24Vac transformer

Conform to VDE 0551, EN 60742, CE

• PTC



• ORDER CODE

PTC 7 x 25 5m

TECHNICAL DATA

Mod. probe:	Ambient probe
Cap material:	Plastic (Ø 7 x 25mm)
Temperature range:	-20...80°C
PTC:	R 25°C = 1KΩ ±1% (KTY 81-110)
Response time:	20sec (in still air)
Isolation:	100MΩ, 500Vd.c. between cap and terminals
Wire material:	Unipolar in PVC (12/0,18)
Wire length:	5,50m

• Installation notes

Always power the devices by means of the TRAFO1 transformers specified in the manual (one for each device) when:

- The application is unknown.
- Multiple devices have input signals that are not isolated from one another, such as, for example: non-isolated grounded thermocouples, transducers or transmitters powered by a single supply, linear inputs with voltage or current not isolated from one another.
- It is a general rule that devices with shared signals (probes, transmitters, signal retransmission, etc.) must be powered by a separate transformer for each device.
- Any special cases not covered by the above example must be evaluated from time to time.
- One possible example of a power supply by a single transformer is the case of devices with RTD or PTC probes, with relay or logic outputs connected to individually isolated devices (such as GTS static groups).

ATTENTION: in case of an input with a NON-isolated grounded thermocouple, the secondary of the power transformer for the device CANNOT be grounded: doing so will cause the device to fail, with probable blowing of the internal fuse.

ORDER CODE

40T 72 PID 9

Sensor power supply	
None	0 0
For T input (alternative to RTD, PTC)	
1.2Vdc for potentiometer (*)	0 1
18Vdc, 50mA for 2-wire transmitter	2 4

Output 1, Output 2	
Relay, Relay	R R
Relay, Static D2	R D
Triac, None	T 0

Power supply	
9	27Vdc, 18...27Vac not isolated

Output 3	
0 0	Absent
R 0	Relay
D 0	Static D2

(*) For input from potentiometer, request version P77 (R input > 10MΩ)

Kindly contact GEFRA for information on available codes.

• WARNINGS



WARNING: this symbol indicates danger.
It is seen near the power supply circuit and near high-voltage relay contacts.

Read the following warnings before installing, connecting or using the device:

- follow instructions precisely when connecting the device.
- always use cables that are suitable for the voltage and current levels indicated in the technical specifications.
- the device has no ON/OFF switch: it switches on immediately when power is turned on. For safety reasons, devices permanently connected to the power supply require a two-phase disconnecting switch with proper marking. Such switch must be located near the device and must be easily reachable by the user. A single switch can control several units.
- if the device is connected to electrically NON-ISOLATED equipment (e.g. thermocouples), a grounding wire must be applied to assure that this connection is not made directly through the machine structure.
- if the device is used in applications where there is risk of injury to persons and/or damage to machines or materials, it MUST be used with auxiliary alarm units. You should be able to check the correct operation of such units during normal operation of the device.
- before using the device, the user must check that all device parameters are correctly set in order to avoid injury to persons and/or damage to property.
- the device must NOT be used in inflammable or explosive environments. It may be connected to units operating in such environments only by means of suitable interfaces in conformity to local safety regulations.
- the device contains components that are sensitive to static electrical discharges. Therefore, take appropriate precautions when handling electronic circuit boards in order to prevent permanent damage to these components.

Installation: installation category II, pollution level 2, double isolation

- power supply lines must be separated from device input and output lines; always check that the supply voltage matches the voltage indicated on the device label.
- install the instrumentation separately from the relays and power switching devices
- do not install high-power remote switches, contactors, relays, thyristor power units (particularly if "phase angle" type), motors, etc... in the same cabinet.
- avoid dust, humidity, corrosive gases and heat sources.
- do not close the ventilation holes; working temperature must be in the range of 0...50°C.

If the device has faston terminals, they must be protected and isolated; if the device has screw terminals, wires should be attached at least in pairs.

• **Power:** supplied from a disconnecting switch with fuse for the device section; path of wires from switch to devices should be as straight as possible; the same supply should not be used to power relays, contactors, solenoid valves, etc.; if the voltage waveform is strongly distorted by thyristor switching units or by electric motors, it is recommended that an isolation transformer be used only for the devices, connecting the screen to ground; it is important for the electrical system to have a good ground connection; voltage between neutral and ground must not exceed 1V and resistance must be less than 60Ω; if the supply voltage is highly variable, use a voltage stabilizer for the device; use line filters in the vicinity of high frequency generators or arc welders; power supply lines must be separated from device input and output lines; always check that the supply voltage matches the voltage indicated on the device label.

• **Input and output connections:** external connected circuits must have double insulation; to connect analog inputs (TC, RTD) you have to: physically separate input wiring from power supply wiring, from output wiring, and from power connections; use twisted and screened cables, with screen connected to ground at only one point; to connect adjustment and alarm outputs (contactors, solenoid valves, motors, fans, etc.), install RC groups (resistor and capacitor in series) in parallel with inductive loads that work in AC (*Note: all capacitors must conform to VDE standards (class x2) and support at least 220 VAC. Resistors must be at least 2W*); fit a 1N4007 diode in parallel with the coil of inductive loads that operate in DC.

GEFRAN spa will not be held liable for any injury to persons and/or damage to property deriving from tampering, from any incorrect or erroneous use, or from any use not conforming to the device specifications.