GEFRAN

4T 72

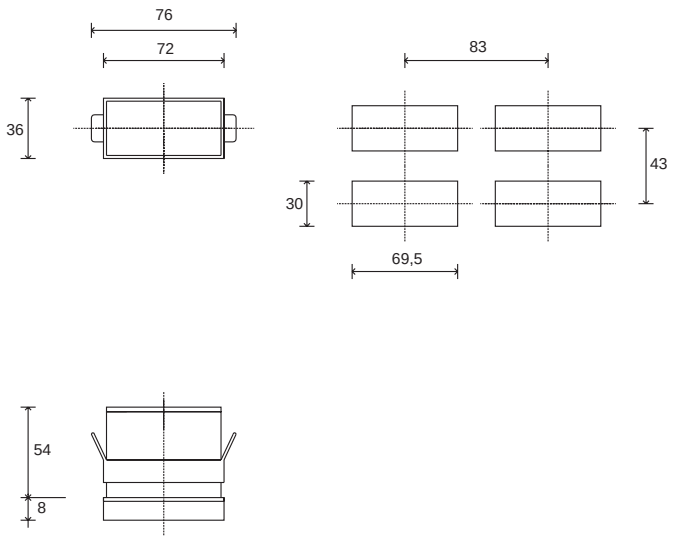
UNIVERSAL TEMPERATURE INDICATOR

USER'S MANUAL

SOFTWARE VERSION **1.0x / 2.0x**
code **81606A** / edition **0.5** - **05/04**

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*:** GEFRAN has a service department. The warranty excludes defects caused by any use not conforming to these instructions.

2 • TECHNICAL SPECIFICATIONS

Display	2, 3, 4 digits, red, height 14 mm
Keys	3 mechanical keys (Raise, Lower, F)
Accuracy	0.2% f.s. at 25°C ambient temperature, ts=120msec
Resolution (function of settable sample time)	120msec, >13bit - 8000 points 60msec, >13bit - 8000 points (only for linear inputs) 30msec, >12bit - 4000 points (only for linear inputs) 15msec, >11bit - 2000 points (only for linear inputs)
Main input	TC, RTD, PTC, NTC 60 mV, 1 V, 5 V, 10 V, Ri ≥ 500KΩ 20 mA, Ri = 50Ω adjustable digital filter
Thermocouples	J, K, R, S, T, B, E, N (IEC 584-1, CEI EN 60584-1, 60584-2) L GOST, U, G, D, C Custom linearization available on request
Cold junction error	0,1° / °C
RTD type (scale configurable within indicated range, with or without decimal point) *Max. RTD line resistance*	DIN 43760 (PT100), JPT100 20Ω
PTC type / NTC type	990Ω, 25°C / 1KΩ, 25°C
Max. non-linearity error	See **t.P** parameter at page 3
°C / °F selection	Faceplate configurable
Linear scale ranges	-1999 to 9999 (with 4 digit display) -999 to 999 (with 3 digit display) -99 to 99 (with 2 digit display) Configurable decimal point position, possible 32 segment linearization
(option) Power supply for 2-wire transmitter	18V ±10%, 30 mA 1.2 V DC for potentiometer > 100 Ω (version P77)
Power supply (switching)	11...27 V DC, 18...27VAC ±10%, 50/60Hz, 3VA (not isolated)
Faceplate protection	IP65
Working / Storage temperatures	0...50°C / -20...70°C
Relative humidity	20 to 85%, non-condensing
Installation	Panel mounting
Weight	90g for the complete version

EMC conformity has been tested with the following connections

FUNCTION	CABLE	LENGTH USED
TC input probe	0,8 mm² compensated	5 mt
"PT100" input probe	1 mm²	3 mt
Power supply cable	1 mm²	1 mt

3 • DESCRIPTION OF FRONT PANEL

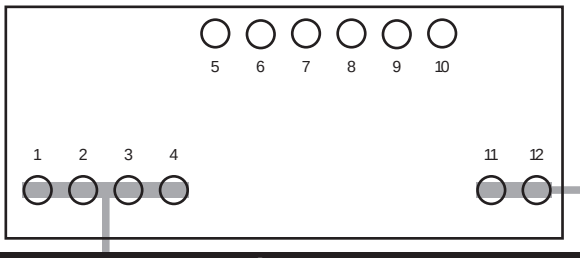
PV display: Indication of process variable
Indication of 'HI' or 'Lo' out of range •• Indication of open circuit (br) or short circuit (Er) •• Display of configuration and calibration messages

Label with engineering unit

Function key:
Gives access to different configuration stages •• Confirms any parameter changes

"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.
The keys can be configured to perform reset, hold, display of the peak value, etc. as determined by the 't.U.' and 't.d.' parameters on the 'In' menu.

4 • CONNECTIONS

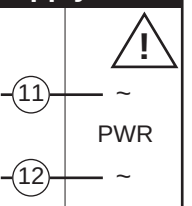


• Power supply

Standard:

11...27Vdc ±10%
18...27Vac ±10%

50/60Hz, 3VA max.
not isolated

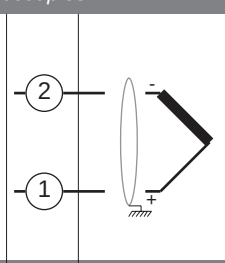


• Inputs

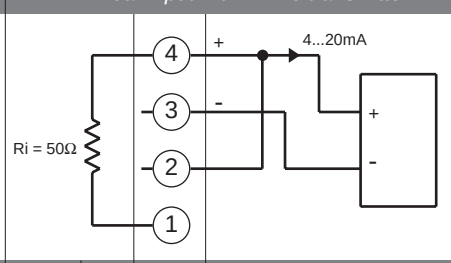
• Thermocouples

Available thermocouples:
J, K, R, S, T, B, E, N, L, U, G, D, C

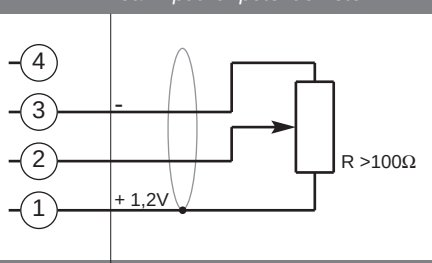
- Respect polarities
- For extensions, use compensated cable appropriate for thermocouple.



• Linear input with 2-wire transmitter

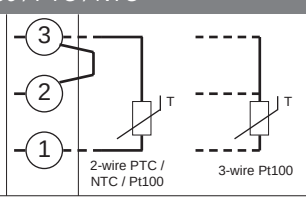


• Linear input for potentiometer



• Pt100 / PTC / NTC

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

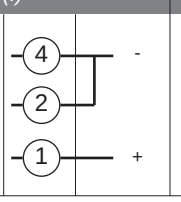


• Linear (I)

dc current
linear input

20mA, Ri = 50Ω

(signal must be isolated from power supply)

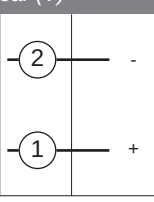


• Linear (V)

dc voltage linear input

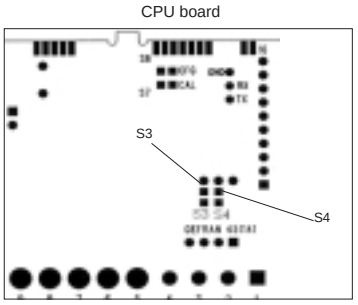
60mV, 1V, 5V, 10V,
Ri ≥ 500KΩ

(signal must be isolated from power supply)



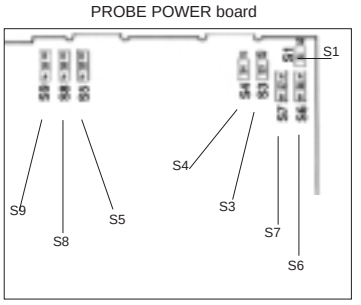
• Device structure: identification of boards

CPU board



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

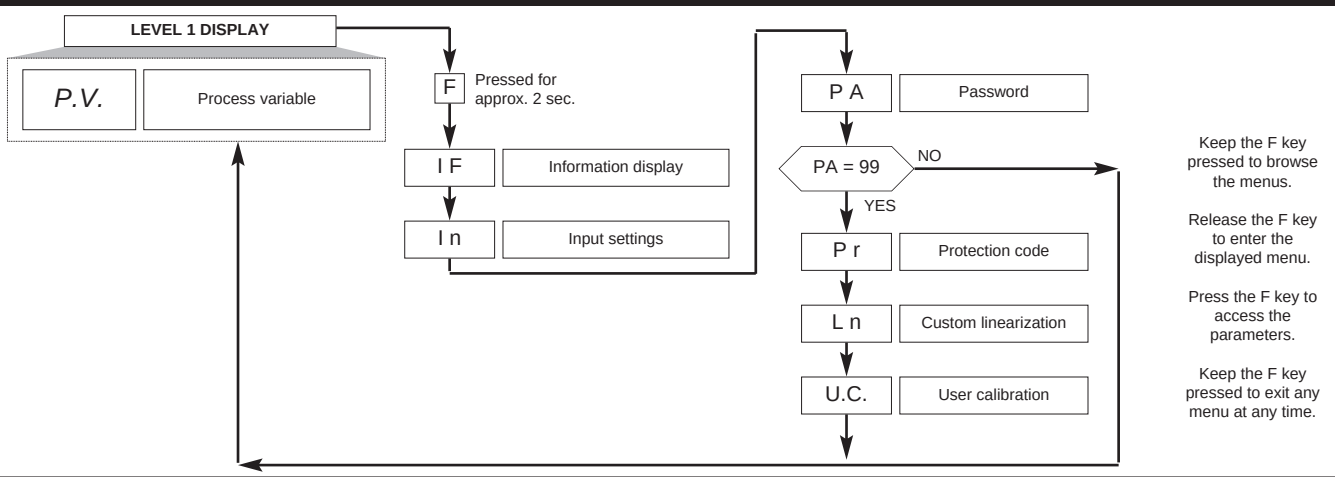
PROBE POWER board



Probe power supply

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

5 • PROGRAMMING and CONFIGURATION



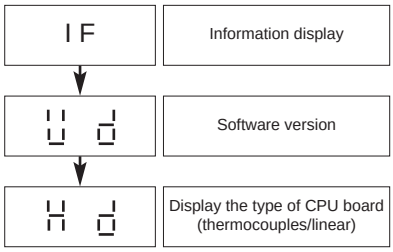
Keep the F key pressed to browse the menus.

Release the F key to enter the displayed menu.

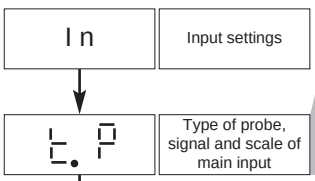
Press the F key to access the parameters.

Keep the F key pressed to exit any menu at any time.

• Information display



• TC/LIN input parameters



Type	Type PROBE	4 DIGIT		3 DIGIT + sign		2 DIGIT + sign	
		without dec. point	with dec. point	without dec. point	with dec. point	without dec. point	with dec. point
	Probe: TC						
0	TC J °C	0/1000	0.0/999.9	0/999	0.0/99.9	0/99	not available
1	TC J °F	32/1832	32.0/999.9	32/999	32.0/99.9	32/99	not available
2	TC K °C	0/1300	0.0/999.9	0/999	0.0/99.9	0/99	not available
3	TC K °F	32/2372	32.0/999.9	32/999	32.0/99.9	32/99	not available
4	TC R °C	0/1750	0.0/999.9	0/999	0.0/99.9	0/99	not available
5	TC R °F	32/3182	32.0/999.9	32/999	32.0/99.9	32/99	not available
6	TC S °C	0/1750	0.0/999.9	0/999	0.0/99.9	0/99	not available
7	TC S °F	32/3182	32.0/999.9	32/999	32.0/99.9	32/99	not available
8	TC T °C	-200/400	-199.9/400.0	-200/400	-99.9/99.9	-99/99	not available
9	TC T °F	-328/752	-199.9/752.0	-328/752	-99.9/99.9	-99/99	not available
10	TC B °C	44/1800	44.0/999.9	not available	not available	not available	not available
11	TC B °F	111/3272	111.0/999.9	not available	not available	not available	not available
12	TC E °C	-100/750	-100.0/750.0	-100/750	not available	not available	not available
13	TC E °F	-148/1382	-148.0/999.9	-148/999	not available	not available	not available
14	TC N °C	0/1300	0.0/999.9	0/999	not available	non dsip.	not available
15	TC N °F	32/2372	32.0/999.9	32/999	not available	not available	not available
16	TC L °C	0/600	0.0/600.0	0/600	0.0/99.9	0/99	not available
17	TC L °F	32/1112	32.0/999.9	32/999	32.0/99.9	32/99	not available
18	TC U °C	-200/400	-199.9/400.0	-200/400	-99.9/99.9	-99/99	not available
19	TC U °F	-328/752	-199.9/752.0	-328/752	-99.9/99.9	-99/99	not available
20	TC G °C	0/2300	0.0/999.9	0/999	not available	not available	not available
21	TC G °F	32/4172	32.0/999.9	32/999	not available	not available	not available
22	TC D °C	0/2300	0.0/999.9	0/999	not available	not available	not available
23	TC D °F	32/4172	32.0/999.9	32/999	not available	not available	not available
24	TC C °C	0/2300	0.0/999.9	0/999	not available	not available	not available
25	TC C °F	32/4172	32.0/999.9	32/999	not available	not available	not available
26	TC °C	Custom	Custom	Custom	Custom	Custom	not available
27	TC °F	Custom	Custom	Custom	Custom	Custom	not available
	Probe: RTD						
28	PT100 °C	-200/600	-199.9/600.0	-200/600	-99.9/99.9	-99/99	not available
29	PT100 °F	-328/1112	-199.9/999.9	-328/999	-99.9/99.9	-99/99	not available
30	JPT100 °C	-200/600	-199.9/600.0	-200/600	-99.9/99.9	-99/99	not available
31	JPT100 °F	-328/1112	-199.9/999.9	-328/999	-99.9/99.9	-99/99	not available
	Probe: PTC - NTC						
32	PTC °C	-55/120	-55.0/120.0	-55/120	-55.0/99.9	-55/99	not available
33	PTC °F	-67/248	-67.0/248.0	-67/248	-67.0/99.9	-67/99	not available
34	NTC °C	-10/70	-10.0/70.0	-10/70	-10.0/70.0	-10/70	not available
35	NTC °F	14/158	14.0/158.0	14/158	14.0/99.9	14/99	not available
	Probe: Voltage + Current						
36	0...60mV	-1999/9999	-199.9/999.9	-999/999	-99.9/99.9	-99/99	-9.9/9.9
37	0...60mV	custom linear	custom linear	custom linear	custom linear	custom linear	custom linear
38	12...60mV	-1999/9999	-199.9/999.9	-999/999	-99.9/99.9	-99/99	-9.9/9.9
39	12...60mV	custom linear	custom linear	custom linear	custom linear	custom linear	custom linear
40	0...20mA	-1999/9999	-199.9/999.9	-999/999	-99.9/99.9	-99/99	-9.9/9.9
41	0...20mA	custom linear	custom linear	custom linear	custom linear	custom linear	custom linear
42	4...20mA	-1999/9999	-199.9/999.9	-999/999	-99.9/99.9	-99/99	-9.9/9.9
43	4...20mA	custom linear	custom linear	custom linear	custom linear	custom linear	custom linear
44	0...10V	-1999/9999	-199.9/999.9	-999/999	-99.9/99.9	-99/99	-9.9/9.9
45	0...10V	custom linear	custom linear	custom linear	custom linear	custom linear	custom linear
46	2...10V	-1999/9999	-199.9/999.9	-999/999	-99.9/99.9	-99/99	-9.9/9.9
47	2...10V	custom linear	custom linear	custom linear	custom linear	custom linear	custom linear
48	0...5V	-1999/9999	-199.9/999.9	-999/999	-99.9/99.9	-99/99	
49	0...5V	custom linear	custom linear	custom linear	custom linear	custom linear	custom linear
50	1...5V	-1999/9999	-199.9/999.9	-999/999	-99.9/99.9	-99/99	-9.9/9.9
51	1...5V	custom linear	custom linear	custom linear	custom linear	custom linear	custom linear
52	0...1V	-1999/9999	-199.9/999.9	-999/999	-99.9/99.9	-99/99	-9.9/9.9
53	0...1V	custom linear	custom linear	custom linear	custom linear	custom linear	custom linear
54	200mV...1V	-1999/9999	-199.9/999.9	-999/999	-99.9/99.9	-99/99	-9.9/9.9
55	200mV...1V	custom linear	custom linear	custom linear	custom linear	custom linear	custom linear
	Probe: Custom PT100 - PTC - NTC						
56	PT100 JPT	custom	custom	custom	custom	custom	custom
57	PTC	custom	custom	custom	custom	custom	custom
58	NTC	custom	custom	custom	custom	custom	custom

In case of non-availability, maximum and minimum limits are set to 0.
In case of custom linearization, test limits for setting LO and HI errors are given by the calibration values.
If these limits are not exceeded, they are taken into consideration as limits LO_S and HI_S.

Max. non-linearity error for thermocouples (TC), resistors (PT100) and thermistors (PTC, NTC).

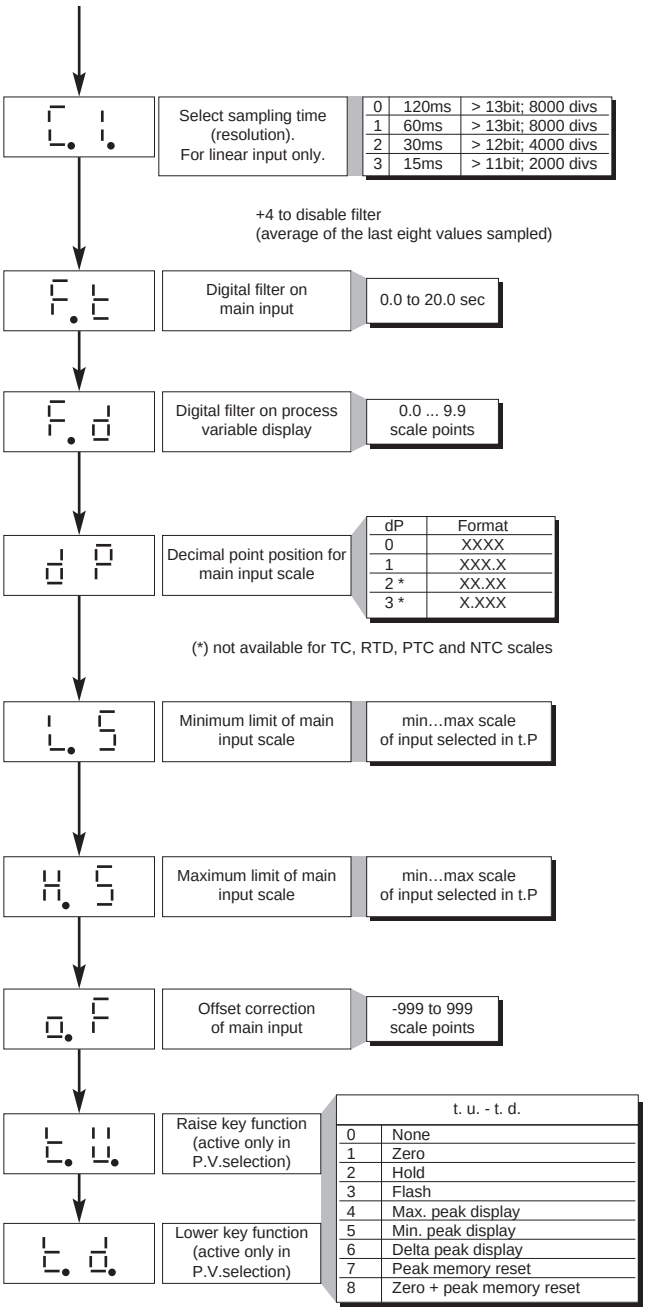
The error is calculated as deviation from theoretical value and is expressed as percentage of full scale (in °C).

S, R range 0...1750°C; error < 0.2% f.s. (t > 300°C) / for other range; error < 0.5% f.s.
T error < 0.2% f.s. (t > -150°C)
B range 44...1800°C; error < 0.5% f.s. (t > 300°C) / range 44,0...999,9; error < 1% f.s. (t > 300°C)
U range -99,9...99,9 and -99...99°C; error < 0.5% f.s. / for other range; error < 0.2% f.s. (t > -150°C)
G error < 0.2% f.s. (t > 300°C)
D error < 0.2% f.s. (t > 200°C)
C range 0...2300; error < 0.2% f.s. / for other range; error < 0.5% f.s.

NTC error < 0.5% f.s.

Tc: **J, K, E, N, L** error < 0.2% f.s.

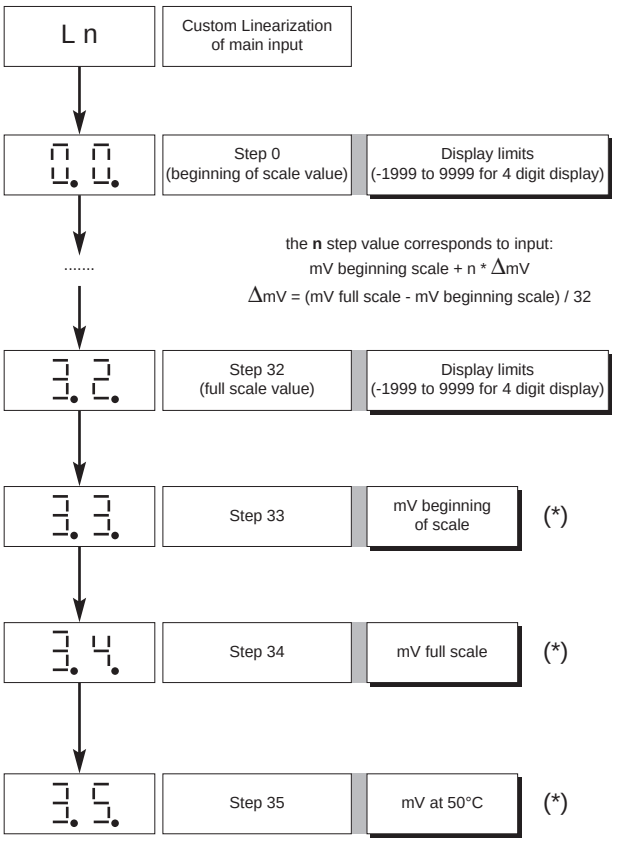
PT100, JPT100 and **PTC** error < 0.2% f.s.



• Protection

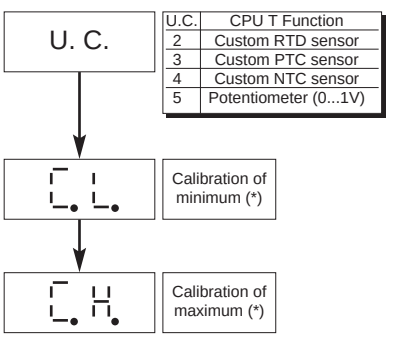
+4 to disable In pages
+16 to enable maintenance of reset latch at power-off (for linear inputs only)
+32 base configuration (the following parameters will not be displayed:
In: Ft, Fd, Of, L_L, H_L

• Custom Linearization



(*) only for CPU, TC_LIN and tP = TC CUSTOM

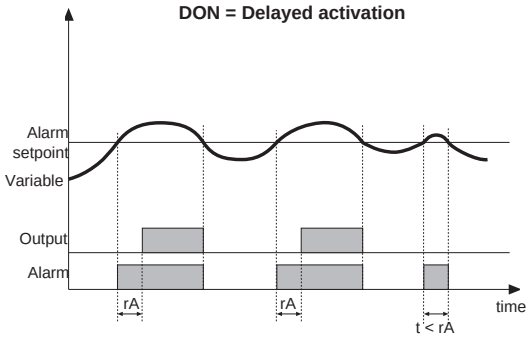
• User Calibration



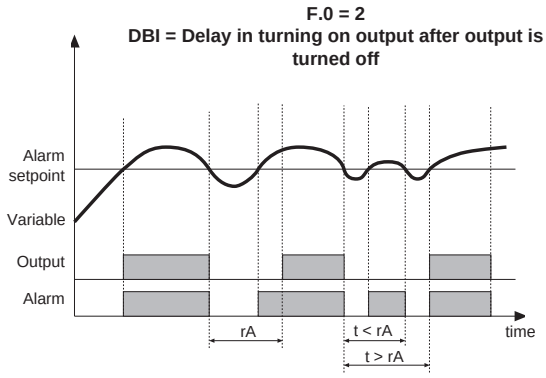
• Filter - outputs with reference to parameters F.0 and r.A

The diagrams refer to a normal absolute alarm with hysteresis H = 0

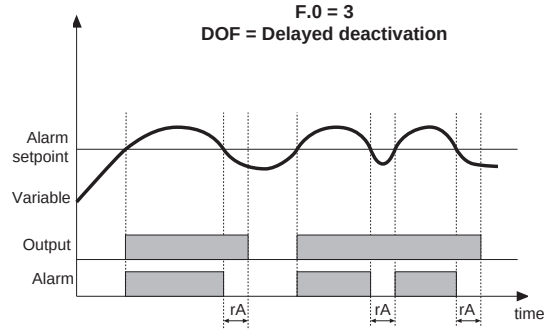
F.0 = 1
DON = Delayed activation



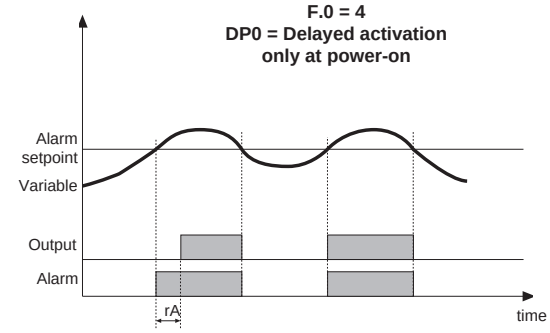
F.0 = 2
DBI = Delay in turning on output after output is turned off



F.0 = 3
DOF = Delayed deactivation



F.0 = 4
DP0 = Delayed activation only at power-on



7 • ACCESSORIES

• 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

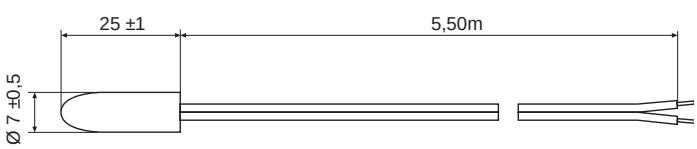
Conform to VDE 0551, EN 60742, CE

• RS323 interface cable for configuration

N.B.:
the PC configuration cable is supplied with the programming software. Make the connection with the device powered and with inputs and outputs disconnected.

• ORDER CODE	
WSK-0-0-0	Interface cables + CD Winstrum

• PTC / NTC



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, 500Vdc between cap and terminals
Wire material:	Unipolar in PVC (12/0,18)
Wire length:	5,50m

• ORDER CODE
PTC 7 x 25 5m
NTC

• 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

4T 72 □ □□ 9

N° Digits	
2 + sign	2
3 + sign	3
4	4

Power supply	
9	11 to 27VDC, 18…27 VAC not isolated

Sensor power supply	
None	00
(alternative to RTD, PTC, NTC)	
1.2VDC for potentiometer (*)	01
18Vdc, 50 mA for 2-wire transmitter	24

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

Kindly contact GEFRAN 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 6Ohm; 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.