

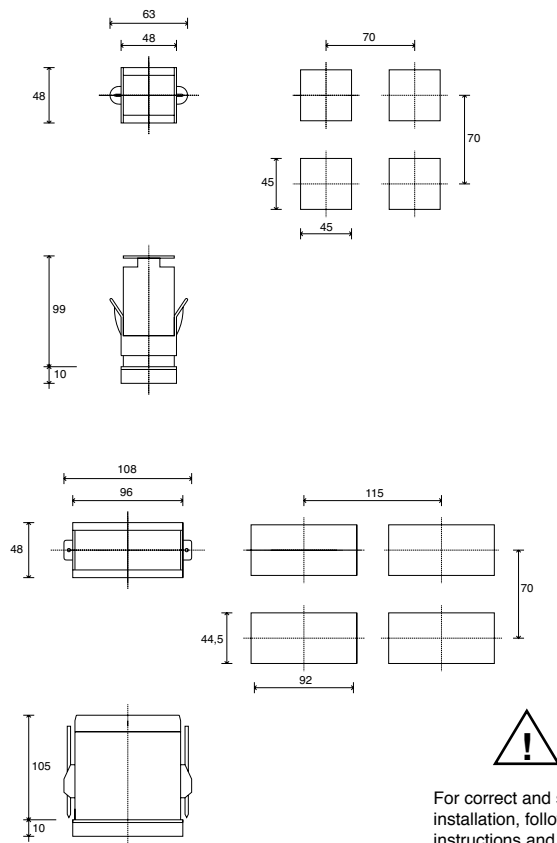
### USER'S MANUAL

SOFTWARE VERSION 1.0x / 2.0x  
code 81651E / edition 11 - 06-2012



## 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:** The instrument conforms to the European Directives 2004/108/CE and 2006/95/CE with reference to the generic standards: **EN 61000-6-2** (immunity in industrial environment) **EN 61000-6-3** (emission in residential environment) **EN 61010-1** (safety).

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

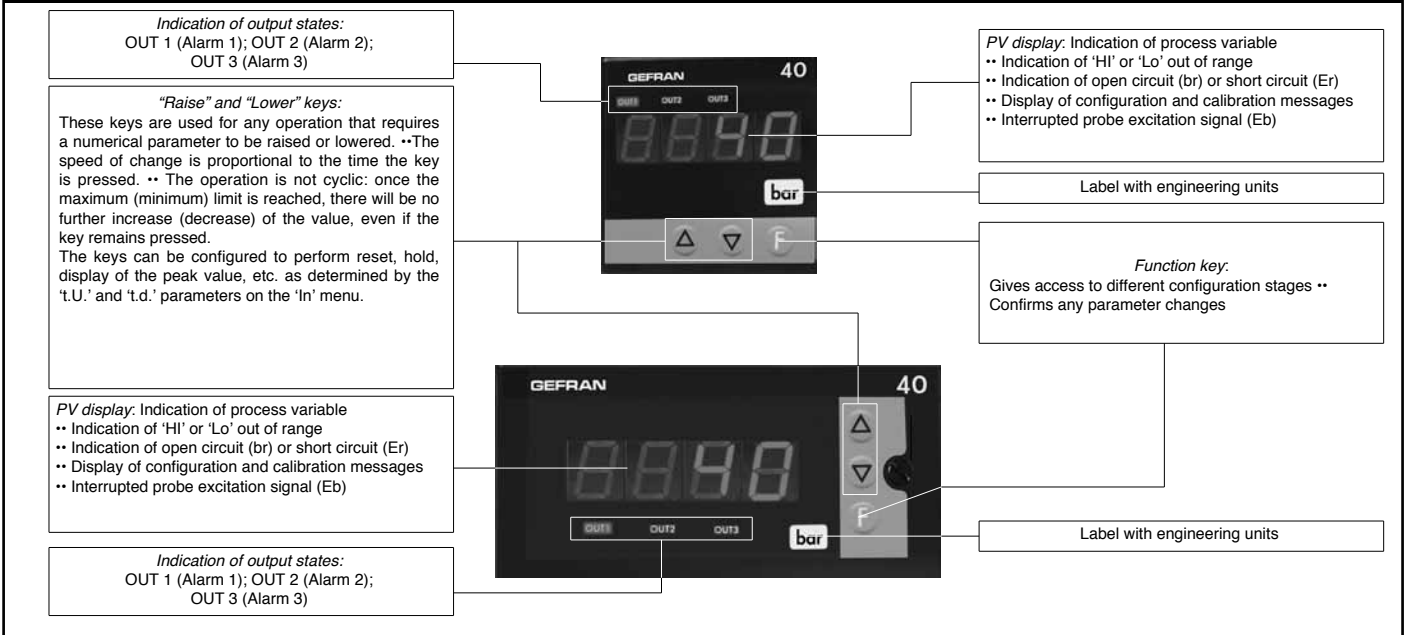
## 2 • TECHNICAL SPECIFICATIONS

Display	3, 4 digit red LED's mod. 48 digit height 10mm (4 digits) mod. 96 digit height 20mm (3 digits), digit height 14mm (4 digits)
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 >13-bit, s.t. 120 msec. with probe power supply control >12-bit, s.t. 30 msec. (60msec with probe power supply control) >11-bit, s.t. 15 msec. (30msec with probe power supply control)
Main input	Differential input: - from strain-gauge 350Ω (for pressure, force, etc.), sensitivity 5mV/V with strain-gauge max power 15V, (7.5mV/V with max power 10V - 15mV/V with max power 5V), positive or symmetrical polarization, calibration with automatic calibration of sensitivity, interrupted probe power signal - from potentiometer with 1.2V ≥ 100 Ω power supply
Linear scale ranges	-1999 to 9999 (with 4 digit display) -999 to 999 (with 3 digit display - only for model 96) Configurable decimal point position, possible 32 segment linearization
Alarms (set points)	Maximum of three configurable alarms: absolute, deviation, symmetrical deviation. Adjustable hysteresis
Alarm masking	ability to: - exclude on power-up - latch reset from key and/or external contact - insert delay filter (DON, DBI, DOF, DPO) - set minimum intervention time
Relay contact	NO (NC) 5A, 250V
Logic output	11Vdc, Rout = 220Ω (6V/20mA)
Triac output (option, only for 96 format)	20...240Vac ±10%, 3A max Snubberless, inductive and resistive load (It = 128A's)
Fault settings	Alarm states can be configured in probe fault condition
Analog retransmission (option)	4 to 20mA, max. 150 Ω load
Logic input	Ri = 5,6KΩ (24V, 4mA), 1500V isolation
Logic input functions	configurable for alarm memory reset, hold, flash, zero, selection of max., min. peak value, peak-peak
Transmitter / Sensor Power Supply	1.2 Vdc for potentiometer > 100 Ω 5 Vdc, 10 Vdc max. 120mA, (for strain-gauge) 15 Vdc, 24 Vdc max. 50mA, (for transmitter)
Power supply (switching)	<b>40B 48</b> (std) 100...240Vac ±10%, 8VA (optional) 11...27Vac/dc ±10%, 8VA <b>40B 96</b> (std) 100...240Vac/dc ±10%, 10,5VA (optional) 11...27Vac/dc ±10%, 8VA
Fuse (inside device, not operator serviceable)	100 to 240Vac/dc - type T - 500mA - 250V 11 to 27Vac/dc - type T - 1.25A - 250V
Faceplate protection	IP65
Working / Storage temperatures	0 to 50°C / -20 to 70°C
Relative humidity	20 to 85%, non-condensing
Installation	Panel mounting, extractable from front
Weight	160g (mod. 48); 320g (mod. 96) for the complete version

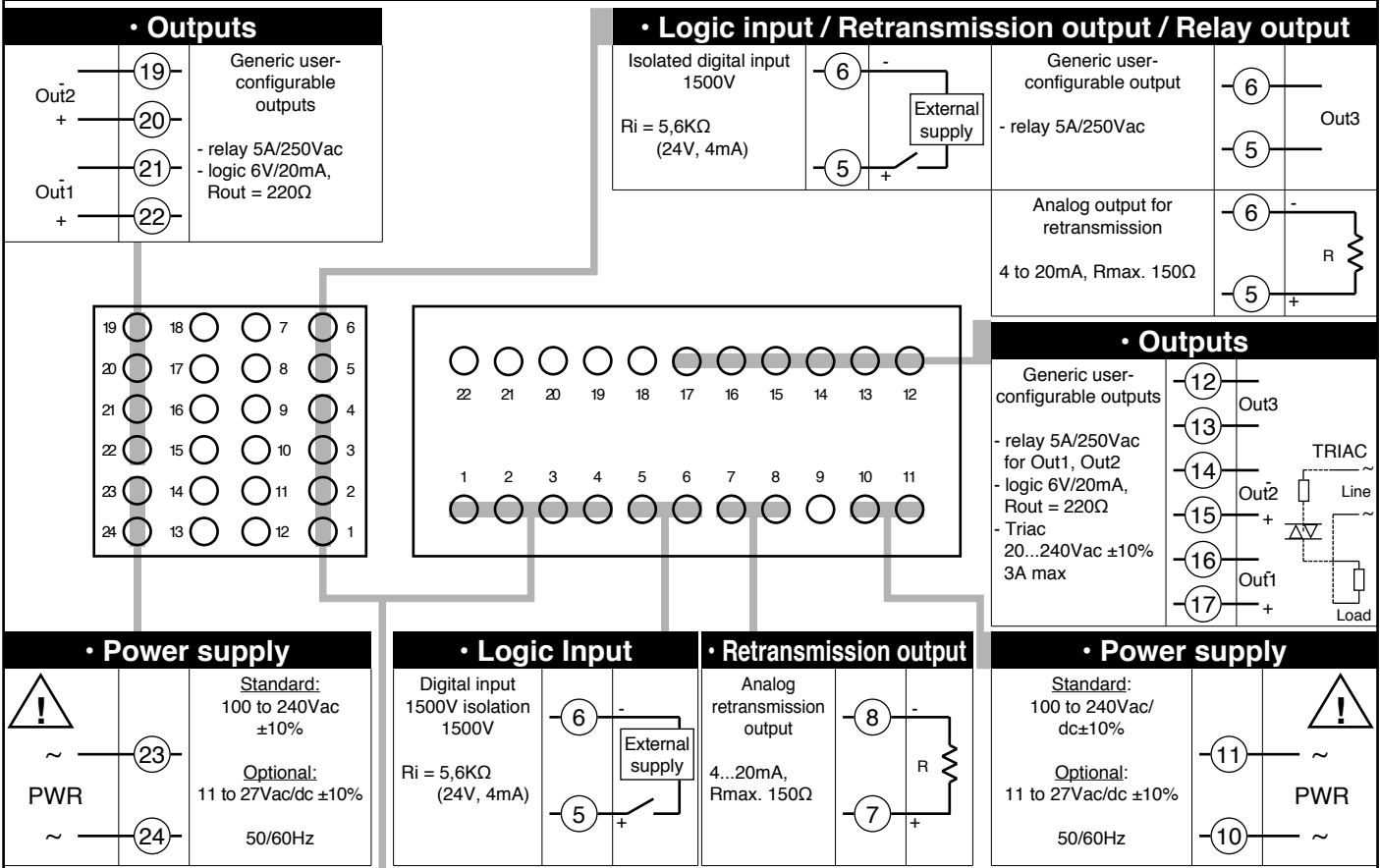
EMC conformity has been tested with the following connections

FUNCTION	CABLE	LENGTH USED
Input	1 mm <sup>2</sup>	3 m
Power supply cable	1 mm <sup>2</sup>	1 m
Relay output cables	1 mm <sup>2</sup>	3,5 m

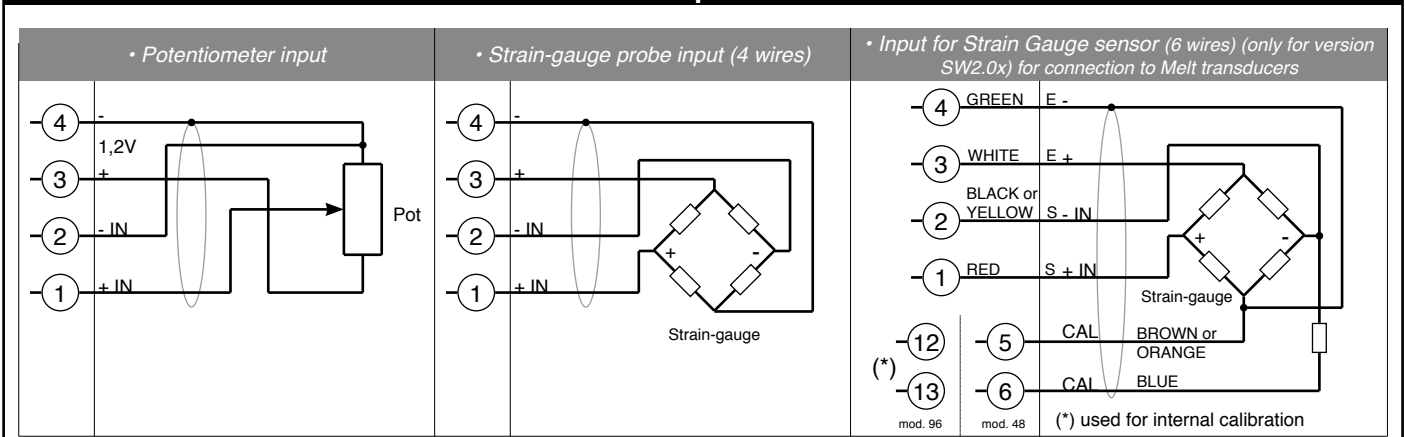
### 3 · DESCRIPTION OF FACEPLATE



### 4 · CONNECTIONS

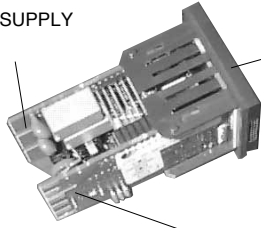


### • Inputs



## Device structure: identification of boards

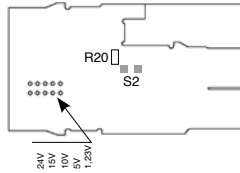
POWER SUPPLY BOARD



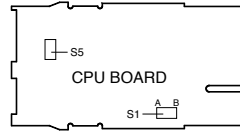
DISPLAY BOARD

CPU BOARD

POWER SUPPLY BOARD

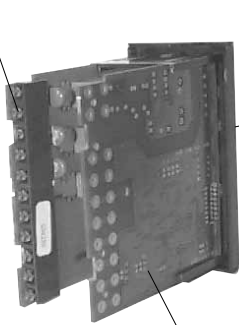


**N.B. :** you can keep the **OUT1** relay energized at power-up by inserting jumper **S2** and removing resistance **R20**.



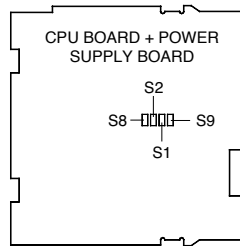
S1 = Status of Out 3 relay  
A = Direct  
B = Inverse  
S5 = ON with digital input

OUTPUT BOARD



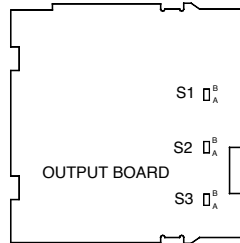
DISPLAY BOARD

CPU BOARD + POWER SUPPLY BOARD



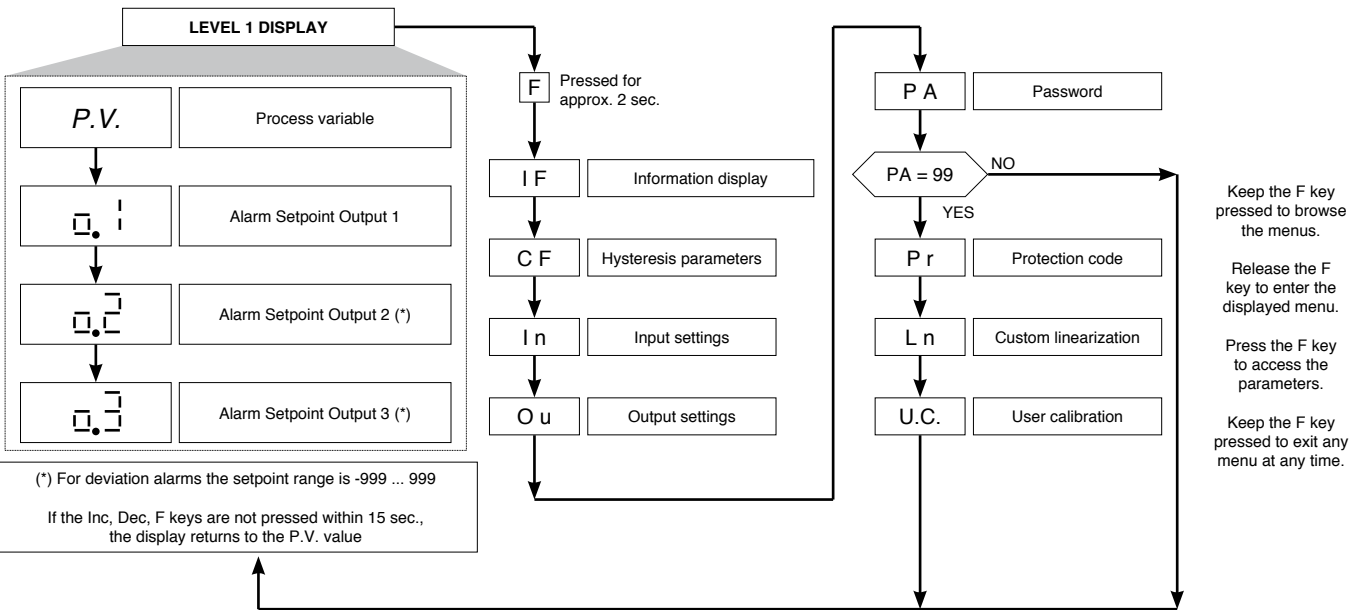
Sensor supply

	S1	S2	S8	S9
1V	OFF	OFF	OFF	ON
5V	ON	OFF	OFF	OFF
10V	OFF	ON	OFF	OFF
15V	OFF	OFF	ON	OFF
24V	OFF	OFF	OFF	OFF

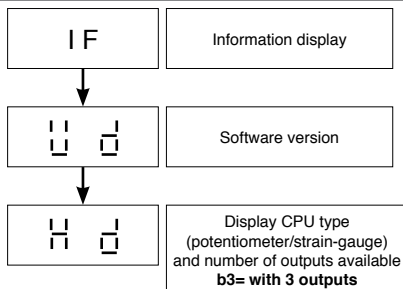


S1 = Status of Out 1 relay  
S2 = Status of Out 2 relay  
S3 = Status of Out 3 relay  
A = Direct  
B = Inverse

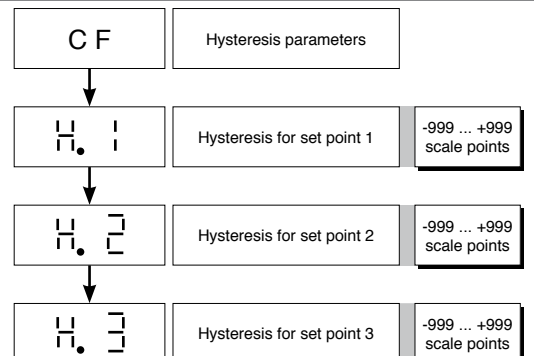
## 5 · PROGRAMMING and CONFIGURATION



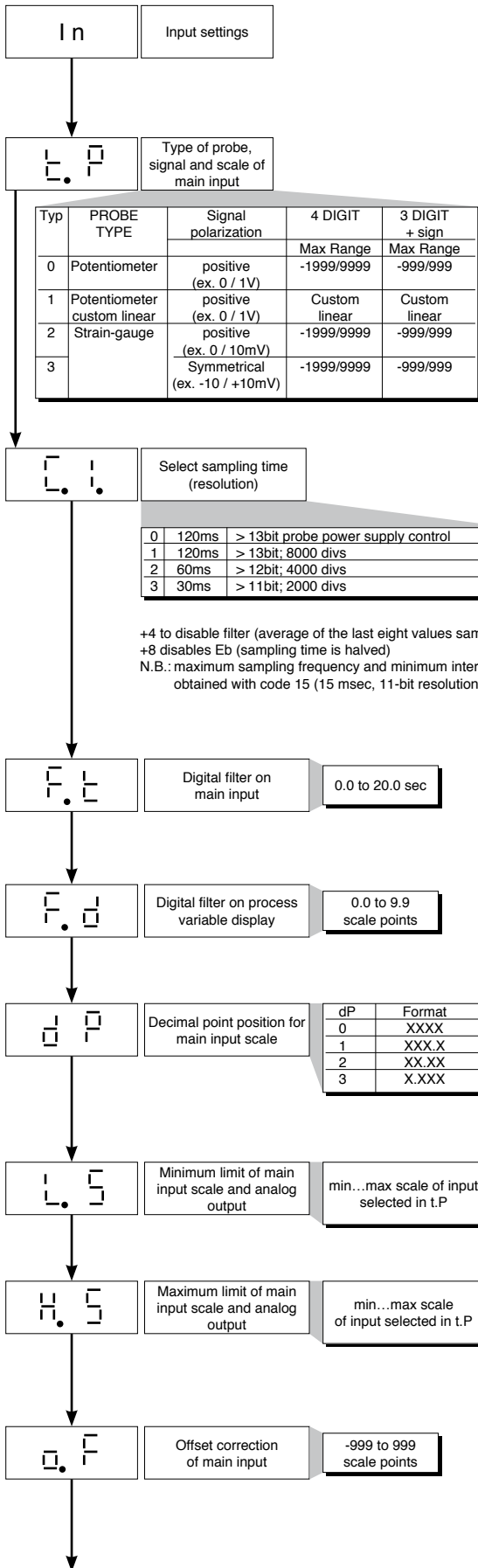
### · Information display



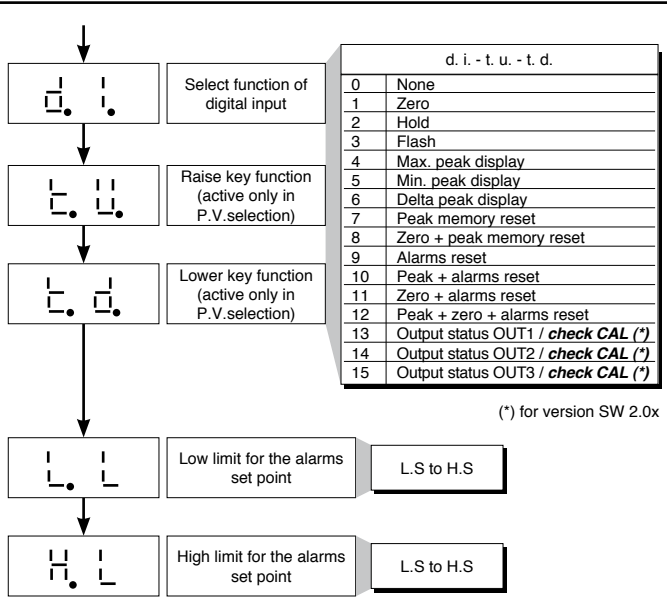
### · Configuration parameters



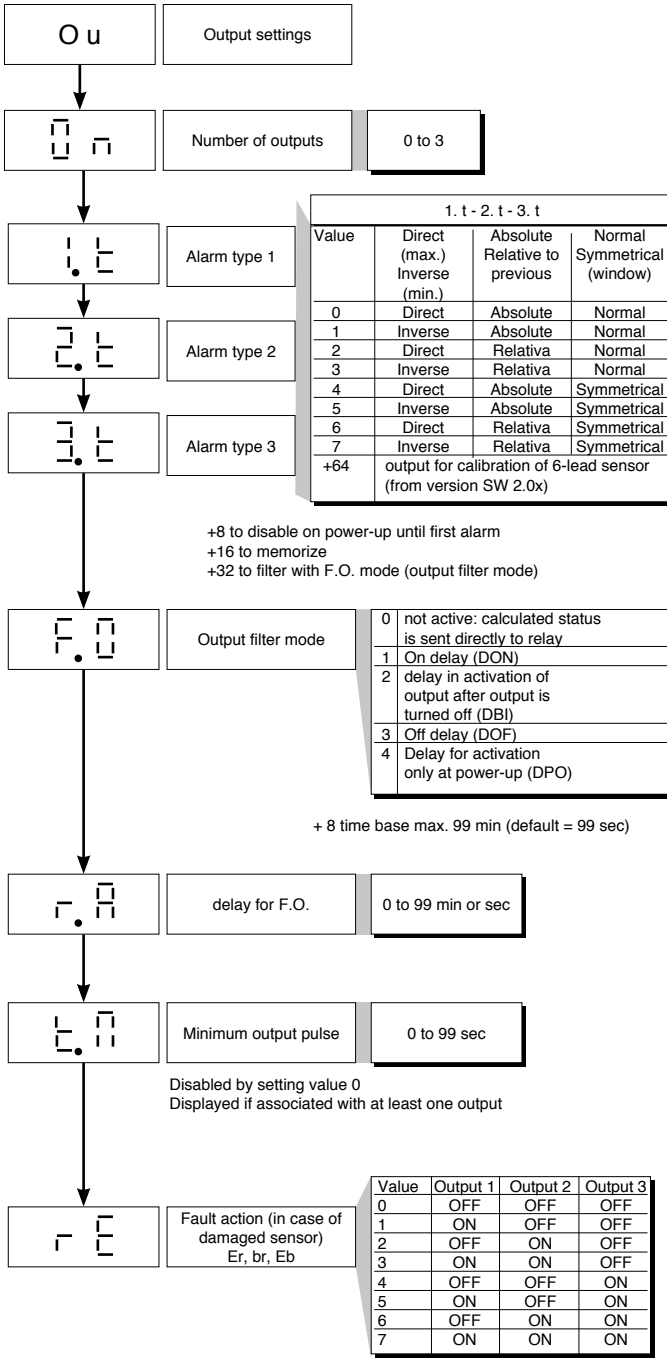
# POTENTIOMETER / STRAIN-GAUGE input parameters



+4 to disable filter (average of the last eight values sampled)  
 +8 disables Eb (sampling time is halved)  
 N.B.: maximum sampling frequency and minimum intercept time is obtained with code 15 (15 msec, 11-bit resolution, filter off)



# Output parameters

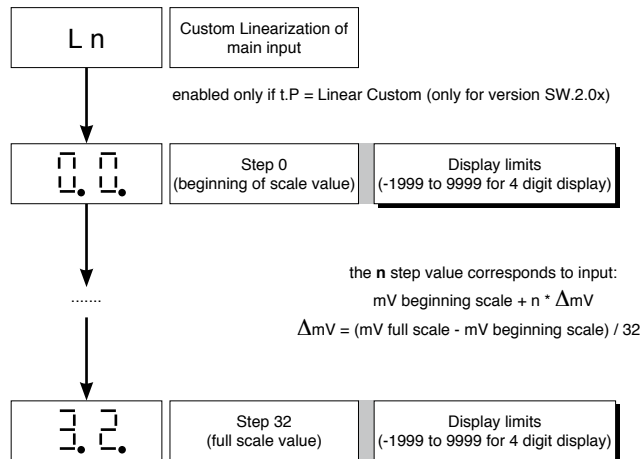


## • Protection

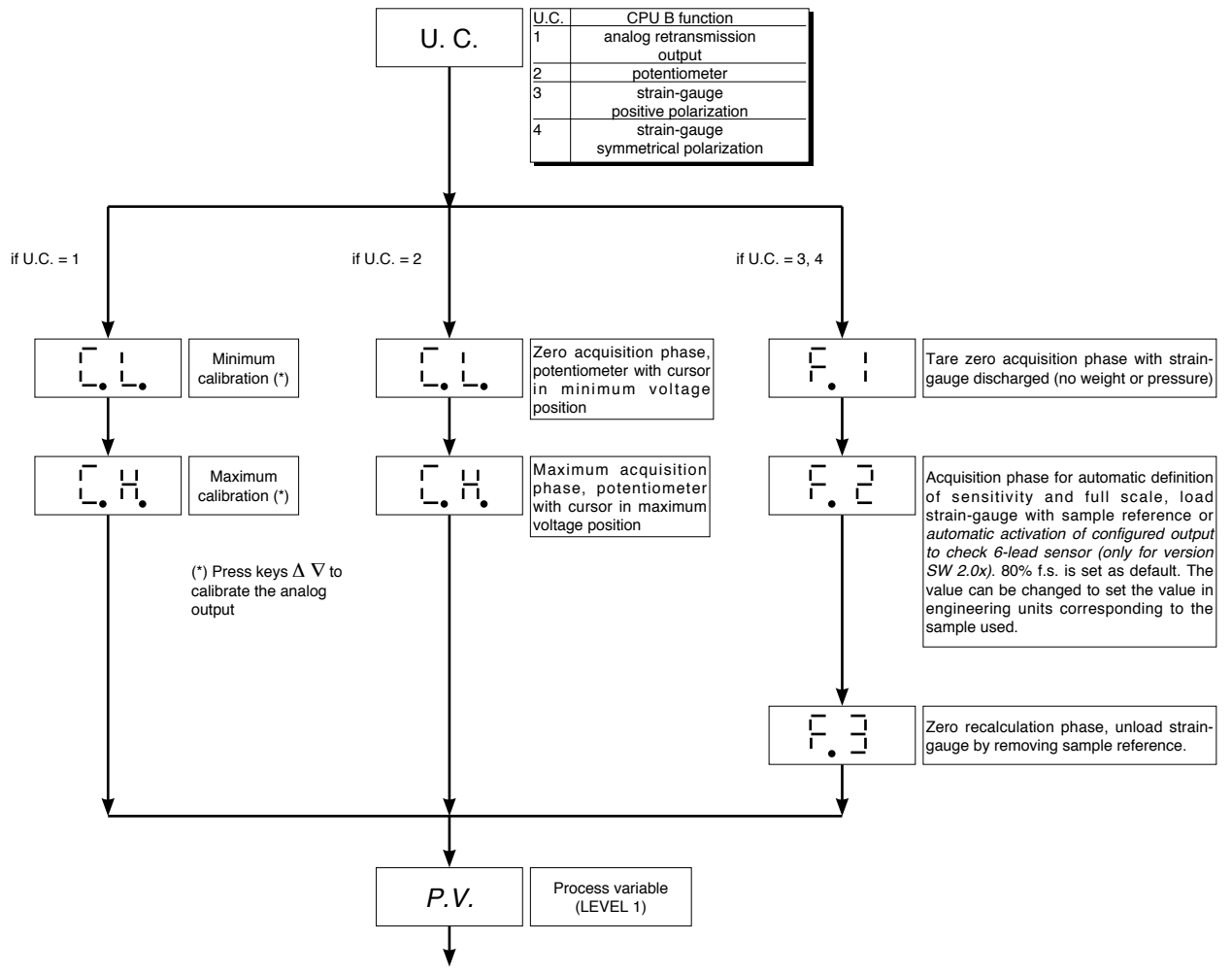
P r	Protection code	Value	Displayed parameters	Modifiable parameters
		0	o.1, o.2, o.3	o.1, o.2, o.3
		1	o.1, o.2	o.1, o.2
		2	o.1	o.1
		3	o.1	none

+4 to disable In and Ou pages  
 +8 to disable Cf page  
 +16 to enable maintenance of reset memory at shutdown  
 +32 base configuration (the following parameters will not be displayed:  
*In*: Ft, Fd, Of, L\_L, H\_L  
*Ou*: On [forced to no. outputs present], rE)

## • Custom Linearization



## • User Calibration



**Note:** between the calibration phases some seconds could be requested to elaborate data.

## • Eb Function

The standard device is produced with parameter C.I.= 8,  
with sampling time of 120 msec and Eb function disabled.

The Eb function lets you detect if the probe power supply is interrupted. This function is valid for probe currents > 20mA (8mA in version 2.0x)

Example:

- probe voltage 10V  
- strain-gauge resistance 350Ω

$$\text{- current} = \frac{V}{R} = \frac{10}{350} \approx 28\text{mA}$$

or for three probes connected in parallel

- probe voltage 10V  
- strain-gauge resistance 350Ω

$$\text{- corrente} = \frac{V}{R} = \frac{10}{\frac{350}{3}} = \frac{30}{350} \approx 85\text{mA}$$

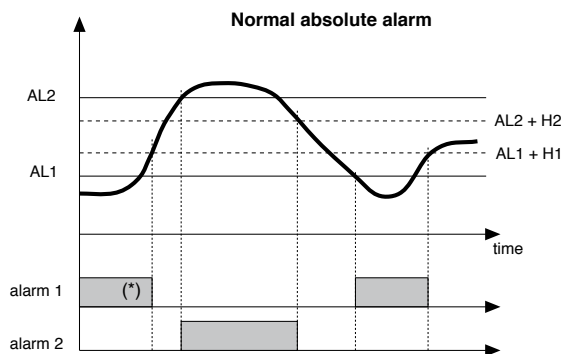
## • HOLD function

The input value and alarms are frozen while the logic input is active.  
With the logic input active, a reset turns OFF both the relay outputs and the alarms latch.

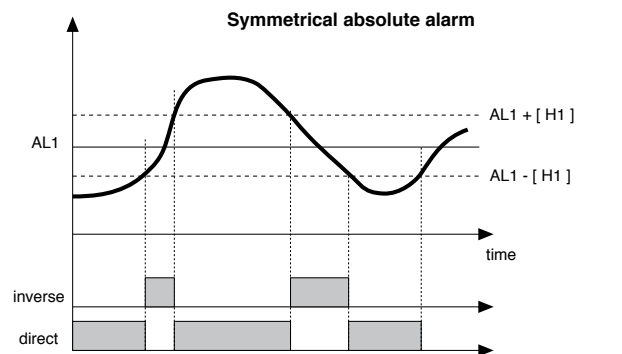
## • FLASH function

Input value is sampled; state of alarms is not transferred to outputs; outputs are "frozen".  
When the logic input is active the input value is "frozen" and the outputs are updated according to the calculated alarms state, including the ones latched.

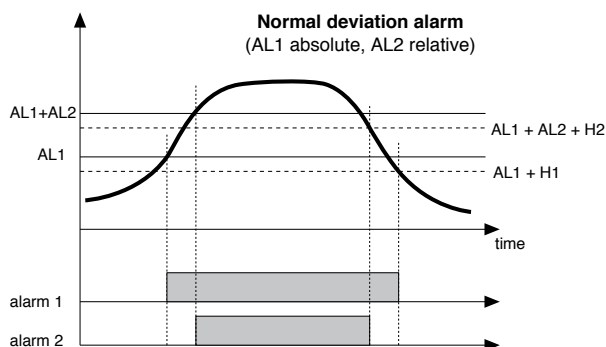
## 6 • ALARMS



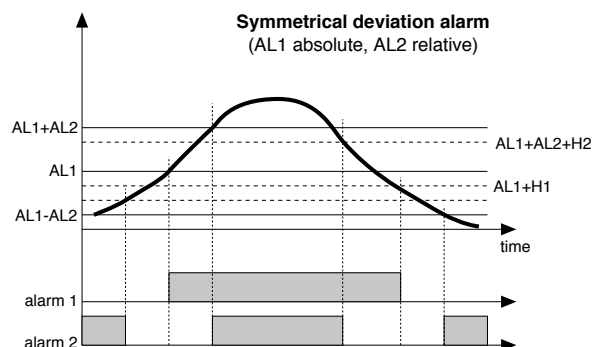
For AL1 inverse absolute alarm (min.) with positive H1, 1 t = 1  
(\*) = OFF if disabling on power-on exists  
For AL2 direct absolute alarm (max) with negative H2, 2 t = 0



For AL1 inverse absolute, symmetrical alarm with hysteresis H1, 1 t = 5  
For AL1 direct absolute, symmetrical alarm with hysteresis H1, 1 t = 4



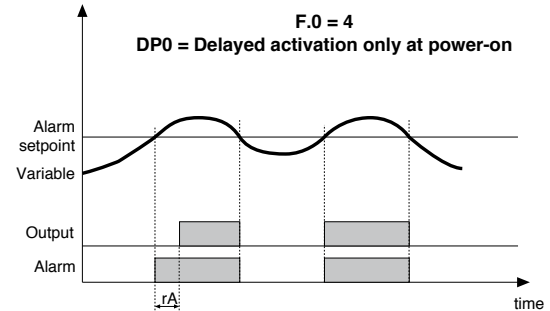
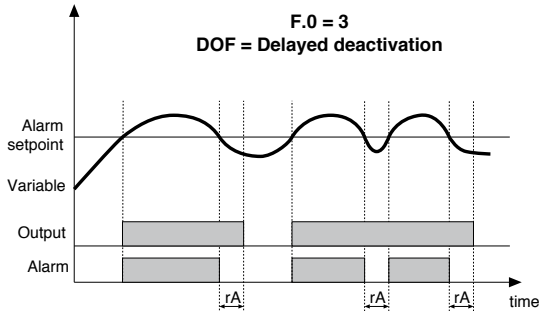
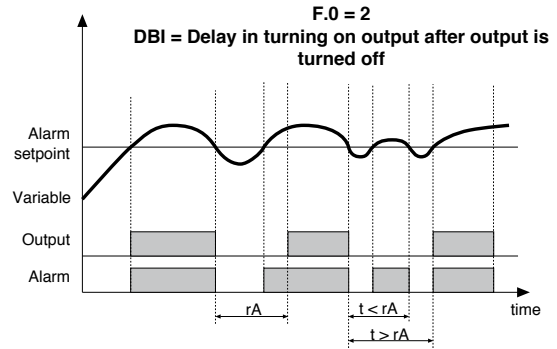
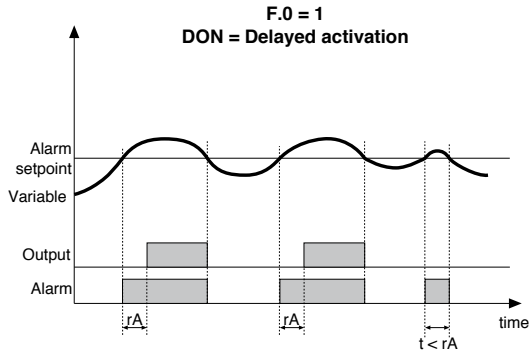
For AL1 direct absolute alarm (max) with negative H 1, 1 t = 0  
For AL2 direct relative alarm (max) with negative H2, 2 t = 2



For AL1 direct absolute alarm (max) with negative H1, 1 t = 0  
For AL2 symmetrical deviation alarm H2, 2 t = 6

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

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



## • UCAL: strain-gauge calibration

### a) Positive signal polarization

Suppose we test a probe (load cell) with sensitivity of  $2\text{mV/V}$ , powered at  $10\text{V}$ .

The input signal range is  $0$  to  $20\text{mV}$ . From unloaded to loaded cell you should see a value from  $0$  to  $1000$ .

Set scale limits: L.S. =  $0$ ; H.S. =  $1000$ . Calibration procedure: U.C. =  $3$ .

Phase F1: unload the cell (equal to applying input voltage of  $0\text{mV}$ ). Wait  $2$  seconds for the signal to stabilize. Press key F.

Phase F2: load the cell with a sample weight: for example,  $80\%$  of total weight (equal to applying input voltage of  $80\%$  of  $20\text{mV}$  ( $2\text{mV} \cdot 10\text{V}$ ) =  $16\text{mV}$ ). On display, set a value equal to  $80\%$  of H.S. =  $800$ .

Press key F.

Phase F3: unload the cell (equal to applying input voltage of  $0\text{mV}$ ). Wait  $2$  seconds for the signal to stabilize. Press key F (calibration finished).

### b) Suppose we test a probe (force sensor) with sensitivity of $2\text{mV/V}$ , powered at $10\text{V}$ .

The input signal range is  $-20\text{mV}$  to  $20\text{mV}$ . From maximum compression to maximum traction you should see a value from  $-1000$  to  $1000$ . Set scale limits: L.S. =  $-1000$ ; H.S. =  $1000$ .

Calibration procedure: U.C. =  $4$ .

Phase F1: do not apply any traction or compression to the sensor (equal to applying input voltage of  $0\text{mV}$ ).

Wait  $2$  seconds for the signal to stabilize. Press key F.

Phase F2: apply compression equal to  $80\%$  of total compression (equal to applying input voltage of  $80\%$  of  $20\text{mV}$  ( $2\text{mV} \cdot 10\text{V}$ ) =  $16\text{mV}$ ). On display, set a value equal to  $80\%$  of H.S. =  $800$ .

Press key F.

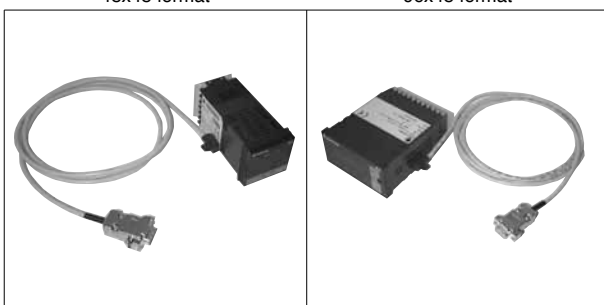
Phase F3: do not apply any traction or compression to the sensor (equal to applying input voltage of  $0\text{mV}$ ).

Wait  $2$  seconds for the signal to stabilize. Press key F (calibration finished).

## • RS323 interface cable for configuration

48x48 format

96x48 format



**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 cable + CD Winstrum



## ORDER CODE

40B 48 4            

N° Digits	
4	4
Sensor power supply	
1.2Vdc for potentiometer	01
5Vdc	05
10Vdc, 120mA	10
15Vdc (transmitter)	15
24Vdc, 50mA (transmitter)	24
Output 1, Output 2	
Relay, Relay	R R
Relay, Static D2	R D

Power supply	
0	11 to 27Vac/dc
1	100 to 240Vac
Digital input / Retransmission output (alternative to output 3)	
0	None
1	Digital input
2	Retransmission output 4...20mA on max 150Ω
Output 3 (alternative to digital input / retransmission output)	
0	None
R	Relay

40B 96              

N° Digits	
3 + sign	3
4	4
Sensor power supply	
1.2Vdc for potentiometer	01
5Vdc	05
10Vdc, 120mA	10
15Vdc (transmitter)	15
24Vdc, 50mA (transmitter)	24
Output 1, Output 2	
Relay, Relay	R R
Relay, Static D2	R D
Triac, None	T 0

Power supply	
0	11 to 27Vac/dc
1	100 to 240Vac/dc
Digital input / Retransmission output	
0	None
1	Digital input
3	Digital input + Retransmission output 4...20mA on max 150Ω
Output 3	
0	None
R	Relay

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.**