



cod. 80312B - 10-2016 - ENG

INSTALLATION AND OPERATION MANUAL

- Side 1
- 1

Dimensions and cut-out; panel mounting
- 2

Installation and connection
- 3

Description of faceplate
- 4

Connections
- Side 2
- 5

Technical specifications
- 6

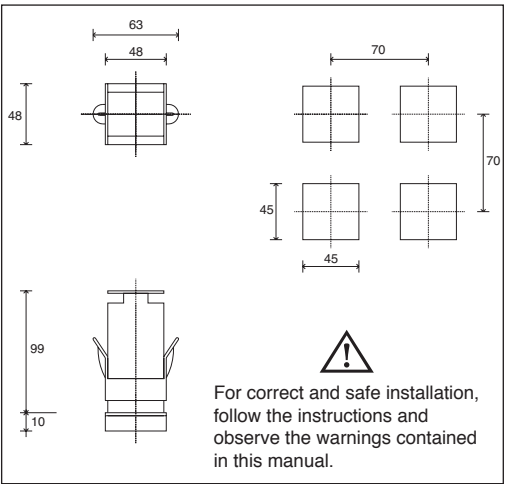
Programming and configuration
- 7

Quick start guide

The complete manual is available for download from the website [www.gefran.com](http://www.gefran.com)

GEFRAN spa reserves the right to make any aesthetic or functional change at any time and without notice.

1 • DIMENSIONS AND CUT-OUT;  
PANEL MOUNTING



Panel mounting:

To fix the unit, insert the brackets provided into the seats on either side of the case.  
To mount two or more units side by side, respect the cut-out dimensions shown in the drawing.

2 • INSTALLATION AND CONNECTION



This section contains the instructions needed for correct installation of the 450 controllers in the control panel of the machine or host system and for correct connection of the power supply and of controller inputs and outputs.



Before proceeding with installation read the following warnings carefully! Remember that lack of observation of these warnings could lead to problems of electrical safety and electromagnetic compatibility, as well as invalidating the warranty.

Electrical power supply

- the controller is NOT equipped with an On/Off switch: the user must provide a two-phase disconnecting switch that conforms to the required safety standard (CE marking), to cut off the power supply upstream of the controller. The switch must be located in the immediate vicinity of the controller and must be within easy reach of the operator. One switch may control more than one controller.
- if the controller is connected to NOT isolated electrical equipment (e.g. thermocouples), the earth connection must be made with a specific conductor to prevent the connection itself from coming directly through the machine structure.

- if the controller is used in applications with risk of damage to persons, machinery or materials, it is essential to connect it up to auxiliary alarm equipment. It is advisable to make sure that alarm signals are also triggered during normal operation. The controller must NOT be installed in flammable or explosive environments; it may be connected to equipment operating in such atmospheres only by means of appropriate and adequate types of interface, conforming to the applicable safety standards.

Notes Concerning Electrical Safety and Electromagnetic Compatibility:

CE MARKING:

EMC compliance in accordance with Directive 2014/30 / EU with reference to EN 61326-1  
Safety LVD in compliance with Directive 2014/35 / EU with reference to EN 61010-1

Series 450 temperature controllers are mainly designed to operate in industrial environments, installed on the switchboards or control panels of productive process machines or plants.



Advice for Correct Installation for EMC

Instrument power supply

- The power supply to the electronic equipment on the switchboards must always come directly from an isolation device with a fuse for the instrument part.
- The electronic instruments and electromechanical power devices such as relays, contactors, solenoid valves, etc., must always be powered by separate lines.
- When the electronic instrument power supply is strongly disturbed by the commutation of transistor or power units or motors, an isolation transformer should be used for the controllers only, earthing the screen.

- It is essential that the plant has a good earth connection:
  - the voltage between neutral and earth must not be >1V
  - the Ohmic resistance must be <6Ω;
- If the mains voltage fluctuates strongly, use a voltage stabilizer.
- In the proximity of high frequency generators or arc welders, use adequate mains filters.

- The power supply lines must be separate from the instrument input and output ones.

Inputs and outputs connection

- The externally connected circuits must be doubly isolated.
- To connect the analogue inputs (TC, RTD) the following is necessary:
  - physically separate the input cables from those of the power supply, the outputs and the power connections.
  - use woven and screened cables, with the screen earthed in one point only

- To connect the regulating and alarm outputs (contactors, solenoid valves, motors, fans, etc.), fit RC groups (resistance and condensers in series) in parallel to the inductive loads that operate in Alternating Current. (Note: all the condensers must conform to VDE (class X2) standards and withstand a voltage of at least 220V AC. The resistances must be at least 2W).

- Fit a 1N4007 diode in parallel with the coil of this can be removed inductive loads that operate in Direct Current.



GEFRAN S.p.A. declines all responsibility for any damage to persons or property caused by tampering, neglect, improper use or any use which does not conform to the characteristics of the controller and to the indications given in these Instructions for Use.

Warnings and instructions for mounting to the panel



Instructions for installation category II, pollution level 2, double isolation.

- only for low power supply: supply from Class 2 or low voltage limited energy source.
- the power supply lines must be separate from the controller input and output ones
- group the instruments together keeping them separate from the powered part of the relay

- do not install high-power remote switches, contactors, relays, thyristor power units (especially the "phase angle" type), motors, etc. in the same switchboard

- avoid dust, humidity, corrosive gasses and heat sources

- do not block the ventilation holes: the working temperature must be between 0...50°C

- surrounding air: 50°C

- use 60/75°C copper (Cu) conductor only, wire size range 2x No 22 - 14AWG, Solid/Stranded

- use terminal tightening torque 0.5N m

Nominal ambient conditions

Altitude	Up to 2000 metres.
Working/storage temperature	0..50°C/-20...70°C
Non condensing relative humidity	20...85%



Before supplying the Controller with power, make sure that the mains voltage is the same as that shown in the last number of the order code.

GEFRAN

GEFRAN spa via Sebina, 74 - 25050 Provaglio d'Iseo (BS)  
Tel. 03098881 - fax 0309839063 Internet: <http://www.gefran.com>

3 • DESCRIPTION OF FACEPLATE

Function indicators:  
Indicates modes of operation

- L1
- MAN/AUTO = OFF ((automatic control)  
ON (manual control)
- L2
- AUTO-TUNING =ON (auto-tuning ON)
- L3
- SELF-TUNING/SOFT-START = ON (during self-tuning or soft-start).

Automatic/Manual adjustment selection Active only when PV display visualises the process variable

"Inc" and "Dec" key:

Press to increment (decrement) any numerical parameter • Increment (decrement) speed is proportional to time key stays pressed • The operation is not cyclic: once the maximum (minimum) value of a field is reached, the value will not change even if the key remains pressed.



Indication of output states  
OUT 1 (Main); OUT 2 (AL)

PV Display: Indication of process variable

Error Indication: LO, HI, Sbr, Err

LO = the value of process variable is < di LO\_S

HI = the value of process variable is > di HI\_S

Sbr = faulty sensor or input values higher than max. limits

Err = PT100 third wire opened for PT100, or input values lower than min. limits (i.e.: TC wrong connection)

SV display: Indication of setpoint

Function key

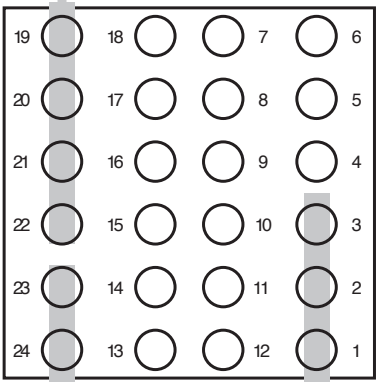
Gives access to the various configuration phases • Confirms change of set parameters

4 • CONNECTIONS

• Ammeter outputs/input

- Out2 (AI)
- 19
- User configurable generic output  
- 5A/250Vac relay
- 20
- Out1 (Main)
- 21
- 5A a 250Vac relay  
- 12V logic (6V / 20mA)
- 22

TOP

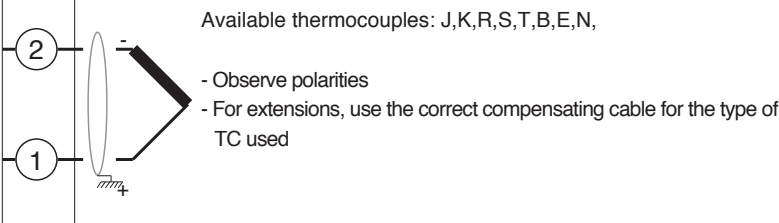


• Power Supply

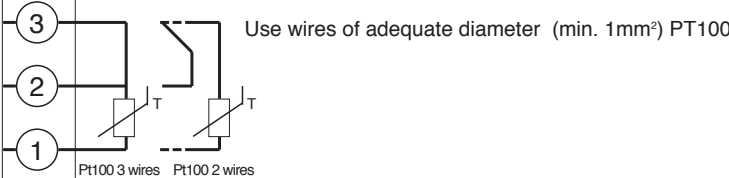
- ~
- 23
- Standard:  
100...240Vac ±10%
- PWR
- Optional:  
11...27Vac/dc ±10%
- ~
- 24
- Max. power 10VA; 50/60Hz

• Inputs

• TC Input



• Pt100 2-3 wires

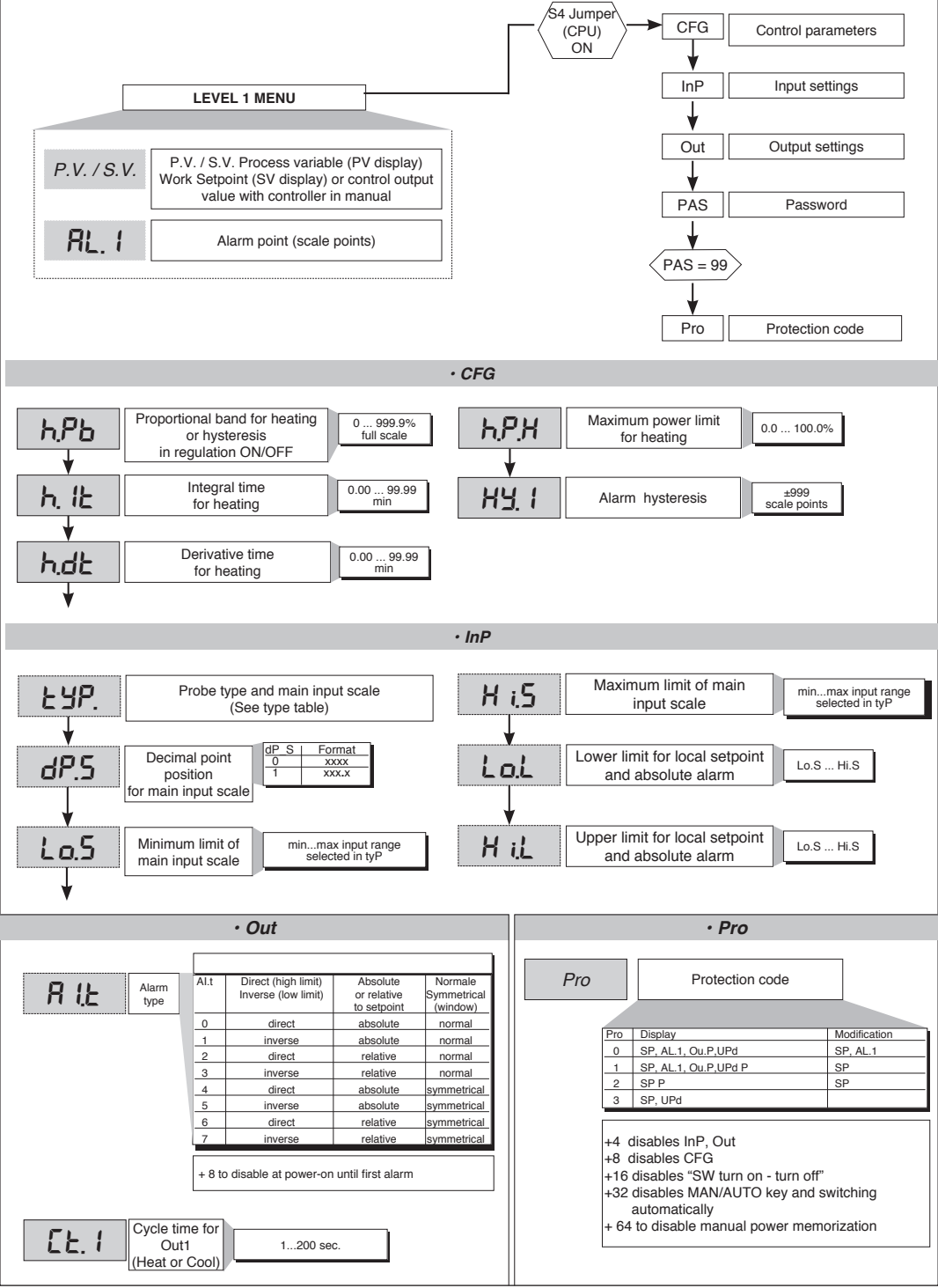


5 • TECHNICAL SPECIFICATIONS

This section contains a list of the Technical Specifications for the 450 Controller.

Display	2x4 digits, green, height 10 and 7mm
Keys	4 mechanical keys (Man/Auto, INC, DEC, F)
Accuracy	0.2% f.s. ±1 at 25°C room temperature
Thermal drift	0,005% f.s. / °C
Main input (configurable digital filter)	TC, RTD, Ri≥1MΩ. Sampling time 120 msec.
Type TC (Thermocouples , ITS90)	J, K, R, S, T, B, E, N (IEC 584-1)
Cold junction error	0,1° / °C
RTD Type (temperature resistance) (ITS90)	Pt100 (DIN 43760)
Max. line resistance for RTD	20Ω
Safety	detection of short circuit or opening of probes, LBA alarm
°C / °F selection	configurable from faceplate
Controls	Pid, Autotune, on-off
pb - dt - it	0,0...999,9 % - 0,00...99,99 min - 0,00...99,99 min
Action	heat or cool
Control outputs	on / off
Max. power limit heat / cool	0,0...100,0 %
Cycle time	0...200 sec
Main output type	relay, logic
Softstart	0,0...500,0 min
Fault power setting	-100,0...100,0 %
Automatic blanking	maintains PV value display, optional exclusion
Configurable alarm	Up to 3 alarm functions assignable to an output and configurable as: maximum, minimum, symmetrical, absolute/relative, LBA
Alarm masking	exclusion during warm up
Type of relay contact	NO (NC), 5A, 250Vac/30Vdc cosφ=1
Logic output for static relays	12Vdc ±10% (6V min a 20mA)
Power supply (switching type)	(standard) 100...240Vac/dc ±10% Vac 50/60Hz (optional) 11...27Vac/dc ±10% 10VA max
Faceplate protection	IP65
Working / Storage temperature range	0...50°C / -20...70°C
Relative humidity	20...85% Ur non-condensing
Environmental working conditions	for indoor use, altitudes up to 2000m
Installation	panel, removable faceplate
Installation specifications	installation category II, pollution level 2, double isolation
Weight	160 g

6 • PROGRAMMING AND CONFIGURATION



7 • QUICK START GUIDE

