GEFRAN

# 1200/1300
*CONTROLLER*

cod. **80309 - 01/2014 - ENG**

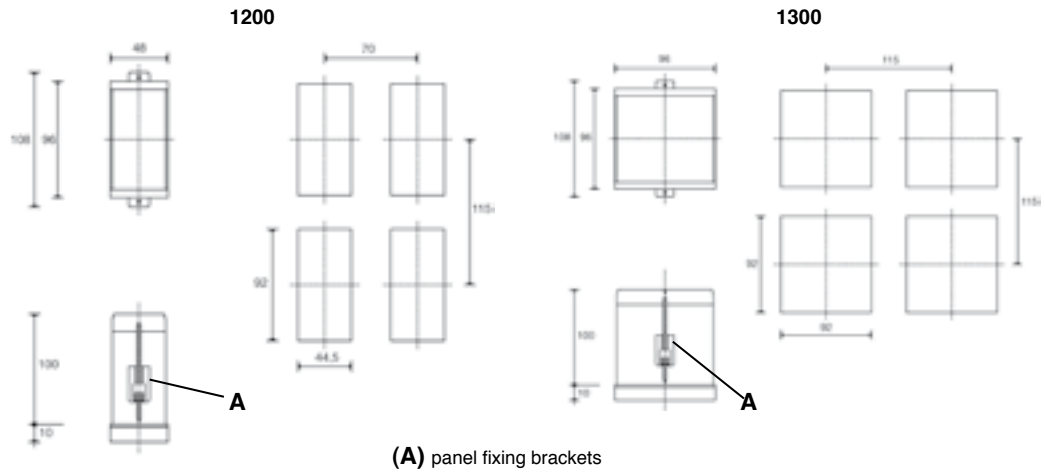
**INSTALLATION AND OPERATION MANUAL**



**The complete manual is available for download from the website www.gefran.com**



## 1 · DIMENSIONS AND CUT-OUT; PANEL MOUNTING




**(A)** panel fixing brackets

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

***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 & CONNECTION

*This section contains the instructions necessary for correct installation of the 1200/1300 controllers into the machine control panel or the host system and for correct connection of the controller power supply, inputs, outputs and interfaces.*

**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:**
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).
Series 1200/1300 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 indica tions 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 2000m |
| Working/storage temperature | 0..50°C/-20...70°C |
| Non condensing relative humidity | 20...85% |

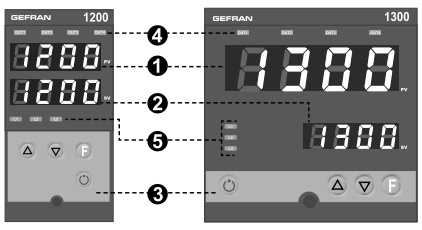
**Before supplying the Controller with power, make sure that the mains voltage is the same as that shown in the last number of the order code.**

## 3 · DESCRIPTION OF FACEPLATE

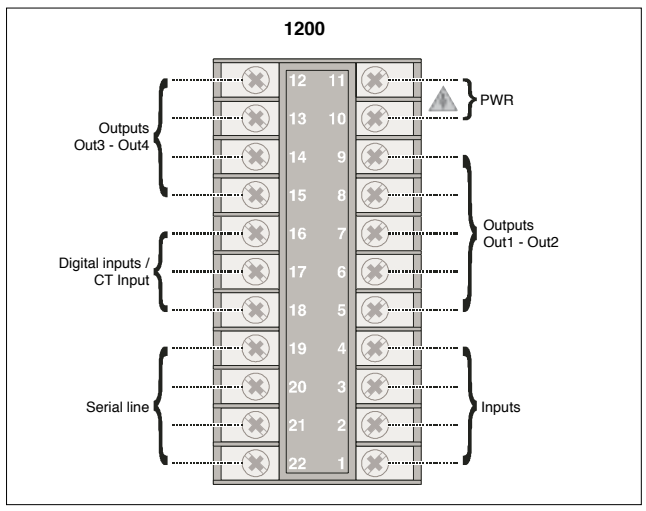
| ID | Symbol | Function |
|---|---|---|
| ❶ | 1200 | PV : Shows the process variable, the menu identification, the parameters identification and the error codes |
| ❷ | 1300 | SV : Shows the setpoint value, the value of the parameter displayed in PV and three dashes (- - -) when PV contains a menu heading |
| ❸ | △ ▽ | Increases/Decreases the value of the parameter displayed in SV until the max/min. value is reached.<br>Held down: progressively increases the speed of increasing/decreasing the value displayed in SV. |
| | F | Used to move between the various menus and parameters of the controller.<br>Confirms the value of the current parameter (or parameter edited using △ ▽ ) and selects the next parameter. |
| | ⏻ | Button with configurable function: with standard configuration commutes the controller operating mode (MANUAL/AUTOMATIC).<br>Is only on when the display ❶ shows the process variable.<br>(for configuration see parameter but in the Hrd menu) ) |
| | F + ⏻ | Confirms the value of the current parameter (or parameter edited using △ ▽ ) and selects the previous parameter. |
| ❹ | OUT1 OUT2 OUT3 OUT4 | Output status indicators:<br>OUT1 (AL1), OUT2 (Main), OUT3 (HB), OUT4 |

❺ **L1 L2 L3** — Function indicators: with standard configuration they show the controller operating status.
For configuration see parameter Ld.1, Ld2, Ld3 in the Hrd

- L1 MAN/AUTO = OFF (automatic control) / ON (manual control)
- L2 SETPOINT 1/2 = OFF (IN1= OFF local Setpoint 1) / ON (IN1=ON local Setpoint 2)
- L3 SELFTUNING = ON (Self activated) / OFF(Self deactivated)

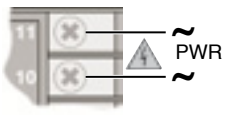



## 4 · CONNECTIONS




*Always make the connections using cable types suitable for the voltage and current limits given in Section 5 - Technical Specifications.*
*If the Controller has faston terminals these must be protected and isolated.*
*If it has screw terminals, the wires must be attached, at least in pairs*

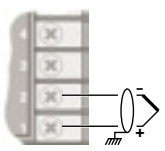
### Power Supply




Standard:
100...240Vac/dc ±10% , max 18VA
Optional:
11...27Vac/dc ±10%, max 11VA 50/60 Hz

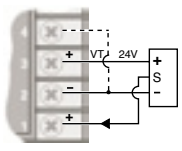
### Inputs

**TC Input**



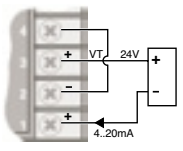
Available thermocouples:
J, K, R, S, T
(B,E, N, L, U, G, D, C possible by inserting a custom linearization)
- Observe polarities
- For extensions, use the correct compensating cable for the type of TC used

**Linear input with 3-wire transmitter supplied from the instrument**



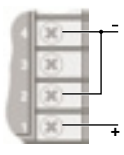

Connect for
0/4..20mA
input

**Linear input with 2-wire Transmitter supplied from the instrument**




Jumper S3 closed on CPU board (see CAP. 6 Maintenance)

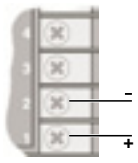
**Linear input (I)**



Linear input in Direct Current
0/4..20mA, Ri = 50Ω

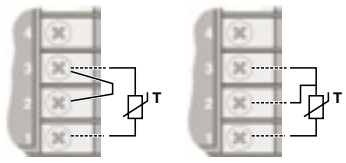
### Inputs

**Linear input (V)**



Linear input in Direct Current
60 mV, 1V (Ri > 1MΩ)
5V, 10V (Ri > 10KΩ)

**PTC/NTC/Pt100/JPT100 input**

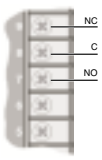



*2-wire connection* *3-wire connection*

Jumper S2 closed on CPU board (see CAP. 6 Maintenance)
Use wires of adeguate diameter (min. 1mm²)

### Outputs Out1, Out 2 — User configurable generic outputs

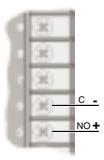
**Out 1**




- Relay 5A 250Vac/30Vdc

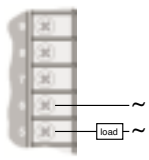
NC not available if Out2 is triac type

**Out 2**




- Relay 5A 250Vac/30Vdc
- Logic 24V (10V a 20mA)

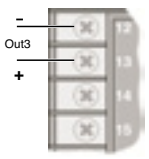
**Out 2**




Triac
20...240Vac,
max. 1A ± 10%

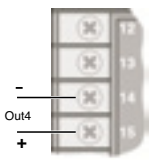
### Outputs Out3, Out 4 — User configurable generic outputs

**Out 3**




- Relay 5A 250Vac/30Vdc
- Logic 24V 10V a 20mA
- Direct 0...10V, 0/4...20mA
- Analogue 0...10V, 0/4...20mA
- 0/2...10V (S1-ON),
  0/4...20mA (S1-OFF)
  S1 is a jumper on the board for continuous or analogic output

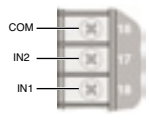

**Out 4**




- Relay 5A 250Vac/30Vdc
- Logic 24V (10V a 20mA )

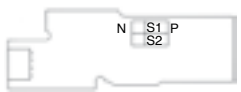
### Digital inputs / CT Input — User configurable generic inputs

**IN1, IN2 digital inputs**



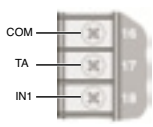

Digital input 24V 5mA
(Jumpers S1, S2 in position P)
or from non-powered terminal
(Jumpers S1, S2 in position N)

Hrd Menù configuration
Parameter diG or di2 = +16



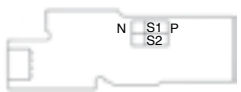

**CT, IN1 inputs**

- Input from current transformer 50mAac, 10W 50/60Hz



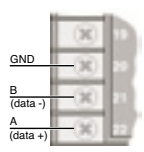

- Digital input 24V 5mA
  (Jumpers S1, S2 in position P)
  or from non-powered terminal
  (Jumpers S1, S2 in position N)

Hrd Menù configuration
Parameter diG or di2 = +16

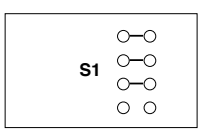



### Serial line

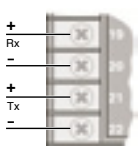
**Modbus 2 wires (Standard)**




RS485 isolated serial line

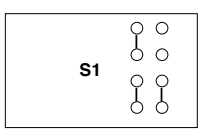



**Modbus 4 wires / Cencal**




RS485 isolated serial line

For configuration
Modbus 4 wires/Cencal.

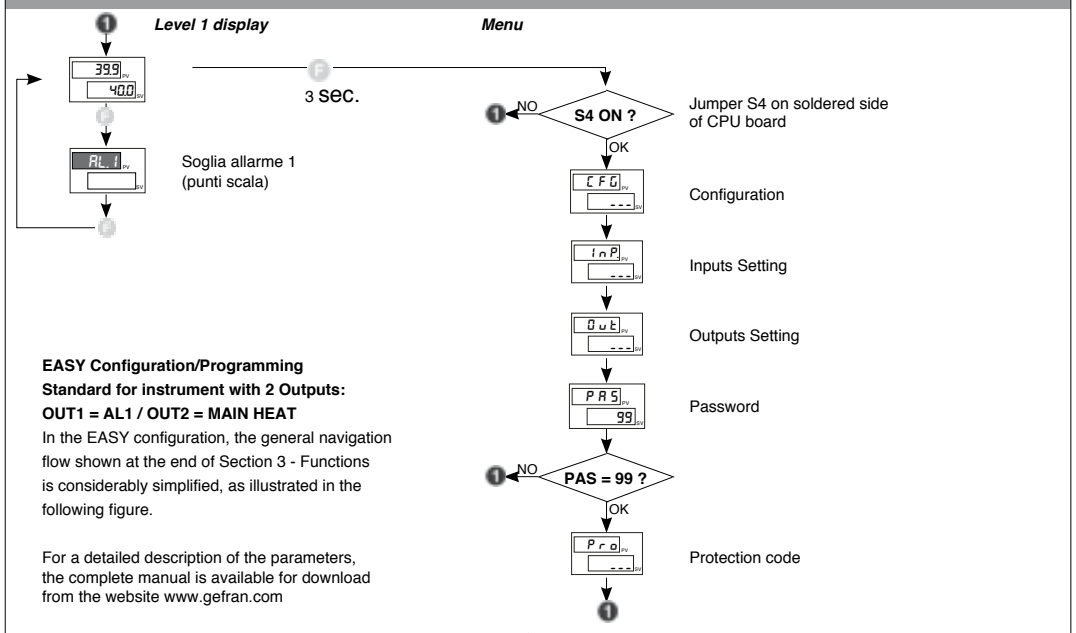


## 5 • TECHNICAL SPECIFICATIONS

This section contains a list of the Technical Specifications for the 1200/1300 Controllers

| | |
|---|---|
| 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, PTC, NTC 60mV,1V Ri≥1MΩ;<br>5V,10V Ri≥10KΩ; 20mA Ri=50Ω<br>Sampling time 120 msec. |
| Type TC (Thermocouples) (ITS90) | J, K, R, S, T (IEC 584-1, CEI EN 60584-1,60584-2)<br>a custom linearization can be inserted |
| Cold junction error | 0.1° / °C |
| RTD Type (temperature resistance) (ITS90) | Pt100 (DIN 43760), JPT100 |
| Max. line resistance for RTD | 20Ω |
| PTC Type / NTC Type | 990Ω, 25°C / 1KΩ, 25°C |
| Safety | detection of short circuit or opening of probes, LBA alarm,<br>HB alarm |
| °C / °F selection | configurable from faceplate |
| Linear scale ranges | -1999...9999, with configurable decimal point position |
| Controls | Pid, Autotune, on-off |
| pb - dt - it | 0.0...999.9 % - 0.00...99.99 min - 0.00...99.99 min |
| Action | heat / cool |
| Control outputs | on / off, continuous |
| Max. power limit heat / cool | 0.0...100.0 % |
| Cycle time | 0...200 sec |
| Main output type | relay, logic, continuous (0...10V / 4...20mA) |
| Softstart | 0.0...500.0 min |
| Fault power setting | -100.0...100.0 % |
| Automatic blanking | maintains PV value display, optional exclusion |
| Configurable alarms | up to 3 alarm functions assignable to an output and configurable of<br>type: maximum, minimum, symmetrical, absolute/relative, LBA, HB |
| Alarm masking | exclusion during warm up, memory, reset from faceplate and/or contact |
| Type of relay contact | NO (NC), 5A, 250V/30Vdc cosφ=1 |
| Logic output for static relays | 24V ±10% (10V min at 20mA) |
| Triac output | 20...240Vac ±10%, 1A max, inductive and resistive load I2t = 128A |
| Transmitter power supply | 24Vdc, max 30mA short-circuit protection |
| Analogue retransmission | 10V/20mA Rload max 500Ω 12 bit resolution |
| Digital inputs | Ri = 4,7KΩ (24V, 5mA) or from terminal not supplied with power |
| Serial interface (optional) | RS485, isolated |
| Baudrate | 1200, 2400, 4800, 9600, 19200 |
| Protocol | Gefran CENCAL / MODBUS |
| Amperometric input option | C.T. 50mAac, 50/60Hz, Ri = 10Ω |
| Power supply (switching type) | (standard) 100...240Vac/dc ±10% max 18VA<br>(optional) 11...27Vac/dc ±10% max 11VA<br>50/60Hz |
| 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 (complete version) |

## 6 • "EASY" PROGRAMMING and CONFIGURATION




**EASY Configuration/Programming**
**Standard for instrument with 2 Outputs:**
**OUT1 = AL1 / OUT2 = MAIN HEAT**
In the EASY configuration, the general navigation flow shown at the end of Section 3 - Functions is considerably simplified, as illustrated in the following figure.

For a detailed description of the parameters, the complete manual is available for download from the website www.gefran.com

### • CFG

Enabling self-tuning, autotuning, softstart (**)

Proportional band for heating or hysteresis for ON/OFF control **[0 ... 999.9] % f.s.**

Integral time for heating **[0.00 ... 99.99] min.**

Derivative time for heating **[0.00 ... 99.99] min.**

MAX power limit for heating **[0.0 ... 100.0] %**

Hysteresis for Alarm 1 **[±999] punti scala**

### • Out

SV Alarm type 1
If more alarms are enabled the functionality is valid also for (A2t, A3t).

OUT 1
Allocation of reference signal
If more outputs are available (rL2, rL3, rL4)

OUT 2 Cycle time (HEAT or COOL)
**[1 ... 200] sec.**
the same setting range is valid also for Ct1, Ct3, Ct4.

### • InP

Type of probe, signal, custom linearization enabling and main scale input (See input connection)

Decimal Point Pos. for Input Scale

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

Main Input Scale MIN Limit Min..Max value assigned to input selected with the tYP parameter

Main Input Scale MAX Limit Valore Min..Max value assigned to input selected with the tYP parameter

Lower limit for SP and absolute alarms LoS ... HiS

Upper limit for SP and absolute alarms LoS ... HiS

### • Pro

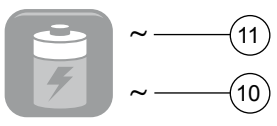
| Pro | Display | Modification |
|---|---|---|
| 0 | SP, alarms | SP, alarms |
| 1 | SP, alarms | SP |
| 2 | SP | |

By adding the following amounts to the values shown in the table a series of supplementary functions can be enabled:
+4: to disable InP, Out
+8: to disable CFG
**+128: to enable the display of all the parameters and menus.**

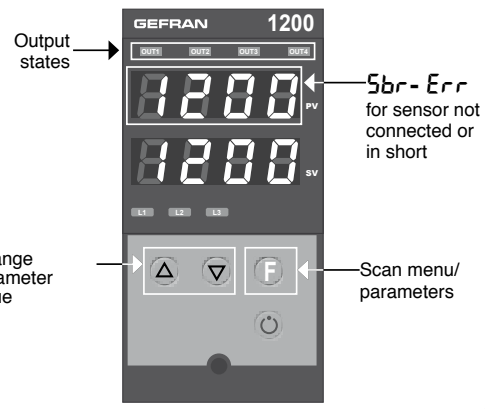
## 7• QUICK START GUIDE

### 1 FIRST STEPS

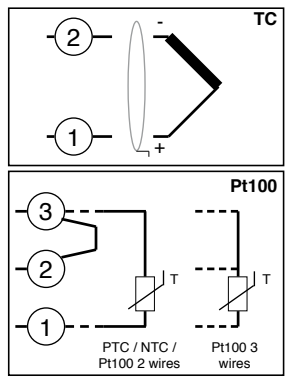
- Open the package
- Power up the device according to the "Supply" information on the label.




### 2 DESCRIPTION




### 3 1.INPUT CONNECTION



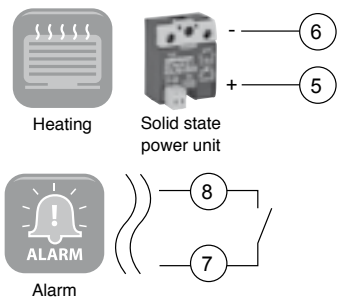

| Input sensor | | | |
|---|---|---|---|
| | Sensor type | | Sensor type |
| 0 | TC J °C | 30 | PT100 °C |
| 1 | TC J °F | 31 | PT100 °F |
| 2 | TC K °C | 32 | JPT100 °C |
| 3 | TC K °F | 33 | JPT100 °F |
| 4 | TC R °C | 34 | PTC °C |
| 5 | TC R °F | 35 | PTC °F |
| 6 | TC S °C | 36 | NTC °C |
| 7 | TC S °F | 37 | NTC °F |
| 8 | TC T °C | 44 | 4...20 mA |
| 9 | TC T °F | 46 | 0...10 V |

**Input programming**
- tYP parameter
- On InP menu

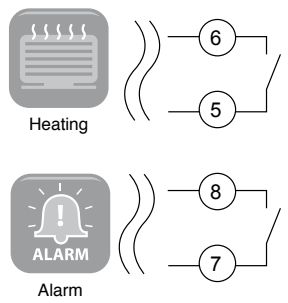

If the correct value of the input (for example, temperature) is not displayed, check the connections.

### 4 CONNECTING OUTPUTS ACCORDING TO ORDER CODE

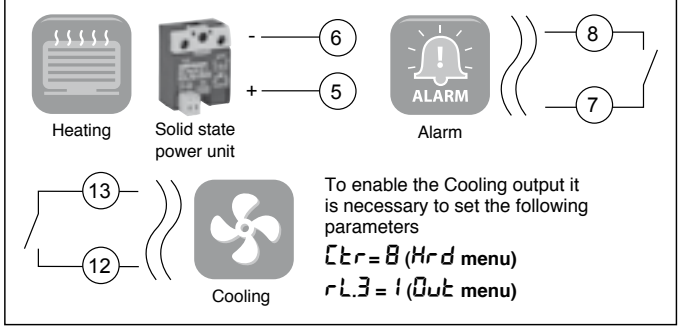
**1200/1300-R-D-X-X-X-X-X**




**1200/1300-R-R-X-X-X-X-X**

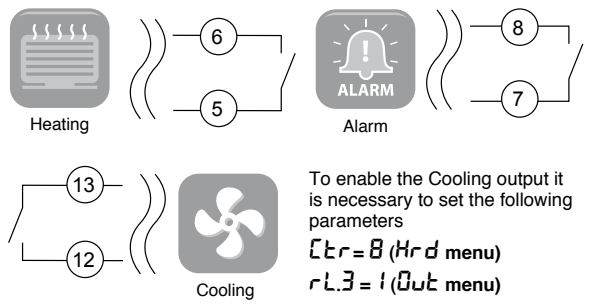



**1200/1300-R-D-R-X-X-X-X**




To enable the Cooling output it is necessary to set the following parameters
CtrL = 8 (Hrd menu)
rL.3 = 1 (Out menu)

**1200/1300-R-R-R-X-X-X-X**




To enable the Cooling output it is necessary to set the following parameters
CtrL = 8 (Hrd menu)
rL.3 = 1 (Out menu)

### 5

PROGRAMMING **SP**

Use the ▲ and ▼ buttons to set the control reference value (SV) on the main page. (see point 2 DESCRIPTION)

PROGRAMMING **AL1**

Press F once on the main page: you will see AL.1, which lets you change the reference value of Alarm 1.

### 6 CHECKING OUTPUT OPERATION


Set **SP=AL1= PV+10**, wait 20 seconds, and check the state of the LEDs.

**H**: LED OUT2 **ON**
**AL1**: LED OUT1 **OFF**
**C**: LED OUT3 **OFF**


Set **SP=AL1= PV-10**, wait 20 seconds, and check the state of the LEDs.

**H:** LED OUT2 **OFF**
**AL1:** LED OUT1 **ON**
**C:** LED OUT3 **ON**