# ID 961-L

**electronic controllers for refrigerating units**

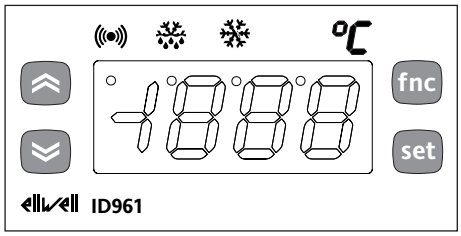
## USER INTERFACE

The user has a display and four keys for controlling status and programming of the instrument.

### KEYS AND MENUS

| | | |
|---|---|---|
| UP key | ⌃ | Scrolls through the menu items<br>Increases the values<br>Activates manual defrost* |
| DOWN key | ⌄ | Scrolls through the menu items<br>Decreases the values<br>Programmable by parameter |
| fnc key | fnc | ESC function (exit)<br>Programmable by parameter |
| set key | set | Accesses the setpoint<br>Accesses the menus<br>Confirms the commands<br>Displaying the alarms (if present) |

*programmable by parameter (see par.H31)




At start-up the instrument performs a Lamp Test; for few seconds the display and the leds blink, in order to verify their integrity and correct operation. The instrument has two main menus: the “Machine Status” and “Programming” menu.

### ACCESSING AND USING MENUS

Resources are arranged in a menu, which can be accessed by pressing and quickly releasing the “set” key (“Machine Status” menu) or by holding down the “set” key for more than 5 seconds (“Programming” menu).
To access the contents of each folder, indicated by the relevant label, just press the “set” key once.
You can now scroll through the contents of each folder, modify it or use its functions.

If you do not use the keyboard for over 15 seconds (time-out) or if you press the “fnc” key once, the last value shown on the display is confirmed and you return to the previous screen mask.

### MACHINE STATUS MENU
### (See Machine Status Menu)

To access the “Machine Status” menu Press and quickly release the “set” key.
If alarms are not present, the label “SEt” appears. By using the “UP” and “DOWN” keys you can scroll through the other folders in the menu:
-Pb1: probe 1 value folder;
-SEt: Setpoint setting folder.

**Set Setting**

Access the “Machine Status” menu by pressing and quickly releasing the “set” key. The label of the “Set” folder appears.
To display the Setpoint value press the “set” key again.
The value appears on the display.
To change the Setpoint value, use the “UP” and “DOWN” keys within 15 seconds.
If the parameter is LOC = y the Setpoint cannot be changed.

**Displaying Probes**

By pressing the “set” key when the appropriate label appears, the value of the probe associated to it is displayed.

### PROGRAMMING MENU
### (See Programming Menu Diagram)

**1) Level 1 Parameters**

To access the “Programming” menu, press the “set” key for more than 5 seconds. If specified, the level 1 access PASSWORD will be requested (see parameter “PA1”) and (if the password is correct) the label of the first folder will follow. If the password is wrong, the display will show the PA1 label again.
To scroll other folders, use the “UP” and “DOWN” keys; **the folders contain only the level 1 parameters.**
**NOTE: At this point level 2 parameters are NOT visible, even if they aren’t protected by password.**

**2) Level 2 Parameters**

In the Programming Menu go into the “CnF” folder, scroll all the parameter until you reach the PA2 label. By pressing and releasing the “set” button you will enter to level 2 parameters and the label of the first folder in the programming menu will follow.
The level 2 parameters may be protected by a second password (see “PA2” parameter inside “diS” folder, not to be confused with PA2 label inside “CnF” folder.
If specified, level 2 parameters are hidden to user; accessing the “CnF” folder the level 2 access PASSWORD will be requested and (if the correct password is entered) the label of the first folder in the programming menu will follow.
**NOTE: At this point you will see only level 2 parameters.**
Level 1 parameters will NOT be visible; to reach them you shall exit the Programming Menu and re-entry the Programming Menu section (see step 1).
To enter the folder, press “set”. The label of the first visible parameter appears. To scroll through the other parameters, use the “UP” and “DOWN” keys; to change the parameter, press and release “set”, then set the desired value using the “UP” and “DOWN” keys, and confirm with the “set” key. Move to the next parameter.
**PLEASE NOTE:** It is suggested to switch-off and switch-on again the instrument everytime it is changed the configuration of the parameters: this prevents malfunctioning on regulation and delay time occuring.

### PASSWORD

The passwords “PA1” and “PA2” allow access respectively to level 1 and level 2 parameters. In the standard configuration passwords are not present. To enable and assign them (value 0) the desired value, access the “Programming” menu, within the folder with the “diS” label. If passwords are enabled, they will be requested:
- PA1 at the entrance of the “Programming” menu (see the “Programming Menu“ section);
- PA2 within the folder with the “Cnf” label containing level 1 parameters.

### MANUAL ACTIVATION OF THE DEFROSTING CYCLE

To manually activate the defrosting cycle, press the “UP” key for 5 seconds.

### LED

| Position | Related Function | Status |
|---|---|---|
| ❄ | Compressor or relay 1 | ON when the compressor is started up; blinking in case of delay, protection or blocked enabling |
| ❄ | Defrost | ON when defrosting; blinking in case of manual enabling |
| ((•)) | Alarm | ON when the alarm is enabled; blinking when the alarm is silenced |
| °C | Setpoint | On for setting Setpoint |

**COPY CARD**

The Copy Card is an accessory connected to the TTL serial port which allows programming quickly the instrument parameters. The operation is performed as follows:

**Format**

This command allows copy card formatting, an operation recommended in case of first use.

Warning: if the copy card has been programmed, using the “Fr” the data entered are erased. This operation cannot be cancelled.

**UL-Upload**

This operation loads the programming parameters from the instrument.

**dL-Download**

This operation downloads to the instrument the programming parameters.

The operations are performed accessing the folder identified by the “FPr” label and selecting, according to the case, “UL”, “dL” or “Fr” commands; the operation is confirmed by pressing the “set” key. If the operation is successful an “y” is displayed, on the contrary, if it fails a “n” will be displayed.

**NOTE:**

**• UPLOAD: instrument --> Copy Card**

**• DOWNLOAD: Copy Card --> instrument.**

**KEYBOARD LOCKING**

The instrument includes a facility for disabling the keyboard, by programming the “Loc” parameter (see folder with “diS” label). If the keyboard is locked, you can still access the programming menu by pressing the “set” key.

The Setpoint can also be viewed.

# DIAGNOSTICS

The alarm condition is always signalled by the buzzer (if present) and by the led of the alarm icon

The alarm signal produced by a faulty thermostat probe (probe 1) is shown as E1 on the instrument display.

When the sensor detects an error condition:

Error table

| DISPLAY | ERROR |
|---|---|
| E1 | Thermostat probe fault |

• the code E1 is displayed

• the regulator is activated as indicated by the "On" and "Off" parameters if programmed for the duty cycle or:

| Ont | Oft | Compressor output |
|---|---|---|
| 0 | 0 | OFF |
| 0 | >0 | OFF |
| >0 | 0 | ON |
| >0 | >0 | dc |

# INSTALLATION

The instrument is designed for panel mounting. Make a hole of 29x71 mm, insert the instrument and fix it using the brackets provided. Do not mount the instrument in humid and/or dirty places; it is suitable for use in ordinary polluted places. Ventilate the place in proximity to the instrument colling slits.

# ELECTRICAL WIRING

**Attention! Never work on electrical connections when the machine is switched on.**

The instrument is equipped with screw terminal boards for connection of electrical cables with a diameter of 2.5 $mm^2$ (one conductor only per terminal for power connections).

For the capacity of the terminals, see the label on the instrument.

The relay contacts are voltage free. Do not exceed the maximum current allowed; in case of higher loads, use an appropriate contactor. Make sure the power supply voltage complies with the one required by the instrument.

In 12V versions the power supply must be provided by a security transformer with the protection of a delayed 250 mA fuse.

Probes have no connection polarity and can be extended using a regular bipolar cable (note that the extension of the probes affects the EMC electromagnetic compatibility of the instrument: pay extreme attention to wiring).

Probe cables, power supply cables and the TTL serial cables should be distant from power cables.

# CONDITIONS OF USE

**PERMITTED USE**

For safety reasons the instrument must be installed and used according to the instruction provided and in particular, under normal conditions, parts bearing dangerous voltage levels must not be accessible.

The device must be adequately protected from water and dust as per the application and must also only be accessible via the use of tools (with the exception of the frontlet).

The device is ideally suited for use on household appliances and/or similar refrigeration equipment and has been tested with regard to the aspects concerning European reference standards on safety. It is classified as follows:

• according to its manufacture: as an automatic electronic control device to be incorporated by independent mounting;

• according to its automatic operating features: as a 1 B-type operated control type;

• as a Class A device in relation to the category and structure of the software

**UNPERMITTED USE**

Any other use other than that permitted is de facto prohibited. It should be noted that the relay contacts provided are of a practical type and therefore subject to fault. Any protection devices required by product standards or dictated by common sense due to obvious safety reasons should be applied externally.

# TECHNICAL DATA

Frontal panel protection: IP65.

Casing: plastic body in resin type PC+ABS UL94 V-0, inspection window in polycarbonate, buttons in thermoplastic resin.

Dimensions: frontal panel 74x32 mm, depth 60 mm.

Installation: on panel, with drilling template 71x29 mm (+0.2/–0.1 mm).

Use temperature: –5...55 °C.

Storage temperature.: –30...85 °C.

Use environment humidity: 10...90 % RH (not condensing).

Storage environment humidity: 10...90% RH (not condensing).

Viewing range: –50...99 without decimal point on 2 digit + mark display.

Analog inputs: one PTC or NTC input (selectable through parameter H00*).

Serial: TTL for connection to Copy Card.

Digital outputs: 1 relay contact SPDT 8(3)A 250V~.

Measuring range: from –50 to 99 °C.

Accuracy: 0.5% better than end scale + 1 digit.

Resolution: 1°C.

Consumption:

• model 230V: 3 VA max.

• model 12V: 1,5 VA max.

Power supply: 12 V~/⎓ ±10% or 230V~ ±10% 50/60 Hz.

***NOTE 1: Switch off and switch on again the instrument after changing the input type NTC/PTC (par. H00)**

**NOTE 2: check the power supply specified on the instrument label; for relay and power supply capacities, contact the Sales Office).**

**PLEASE NOTE: The technical data included in this document, related to measurement (range, accuracy, resolution, etc.) refer to the instrument itself, and not to its equipment such as, for example, sensors.**
**This means, for example, that sensor(s) error(s) shall be added to the instrument’s one.**

Tab. 1 Parameter Table

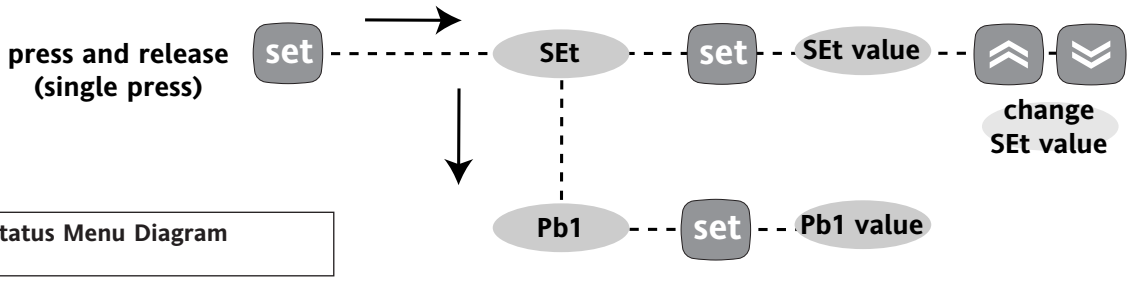
| PAR. | DESCRIPTION | RANGE | DEFAULT* | VALUE** | LEVEL*** | U.M. |
|---|---|---|---|---|---|---|
| | **COMPRESSOR REGULATOR (folder with "CP" label)** | | | | | |
| diF | diFferential. Relay compressor tripping differential. The compressor stops on reaching the Setpoint value (as indicated by the adjustment probe), and restarts at temperature value equal to the Setpoint plus the value of the differential. Note: the value 0 cannot be assumed. | 1...30 | 2 | | 1 | °C/°F |
| HSE | Higher SEt. Maximum possible setpoint value. | LSE..302 | 99 | | 1 | °C/°F |
| LSE | Lower SEt. Minimum possible setpoint value. | -58...HSE | -50 | | 1 | °C/°F |
| HC | Heat/Cool Mode. If set to H the generic regulator actuates for hot operation. If set to C the generic regulator actuates for cold operation | H/C | C | | **2** | flag |
| | **COMPRESSOR PROTECTIVE DEVICE (folder with "CP" label)** | | | | | |
| Ont (1) | On time (compressor). Compressor activation time in the event of faulty probe. If set to "1" with Oft at "0" the compressor is always on, while at Oft >0 it functions always in duty cycle mode. | 0...250 | 0 | | 1 | min |
| OFt (1) | OFF time (compressor). Compressor in disabled state time in the event of a faulty probe. If set to "1" with Ont at "0" the compressor is always off, while at Ont >0 it functions always in duty cycle mode. | 0...250 | 1 | | 1 | min |
| dOn | delay (at) On compressor. Delay time in activating the compressor relay after switch-on of instrument | 0...250 | 0 | | 1 | sec |
| dOF | delay (after power) OFF. Delay after switch off; the indicated time must elapse between switch-off of the compressor relay and the successive switch-on. | 0...250 | 0 | | 1 | min |
| dbi | delay between power-on. Delay between switch-ons; the indicated time must elapse between two successive switch-ons of the compressor. | 0...250 | 0 | | 1 | min |
| OdO | delay Output (from power) On. Delay time in activating the outputs after switch-on of the instrument or after a power failure. | 0...250 | 0 | | 1 | min |
| | **DEFROSTING REGULATOR (folder with "dEF" label** | | | | | |
| dit | defrost interval time. Interval between the start of two successive defrosting operations. | 0...250 | 6h | | 1 | h |
| dt1 | defrost time 1. Measure unit for time intervals between defrosting ("dit" parameter). 0 = "dit" parameter in hours; 1 = "dit" parameter in minutes; 2= "dit" parameter in seconds. | 0/1/2 | 0 | | **2** | num |
| dt2 | defrost time 2. Measure unit for defrosting duration ("dEt" parameter). 0 = "dEt" parameter in hours; 1 = "dEt" parameter in minutes; 2 = "dEt" parameter in seconds. | 0/1/2 | 1 | | **2** | num |
| dCt | defrost Counting type. Selection of count mode for the defrosting interval. 0 = compressor operating hours (DIGIFROST® method); 1 = Real Time – appliance operating time; 2 = compressor stop. | 0/1/2 | 1 | | 1 | num |
| dOH | defrost Offset Hour. Start-of-defrosting delay time from start up of instrument. | 0...59 | 0 | | 1 | min |
| dEt | defrost Endurance time. Defrosting time-out; determines duration of defrosting. | 1...250 | 30min | | 1 | min |
| dPO | defrost (at) Power On. Determines if at the start-up the instrument must enter defrosting (if the temperature measured allows this operation). y = yes; n = no. | n/y | n | | 1 | flag |
| | **DISPLAY (folder with "diS" label)** | | | | | |
| LOC | (keyboard) LOCk. Keyboard locking. However, you can enter parameter programming modify them along with the status of this parameter in order to allow keyboard locking. y = yes; n = no | n/y | n | | 1 | flag |
| PA1 | PAssword 1. When enabled (value other than 0) it constitutes the access key for level 1 parameters. | 0...250 | 0 | | 1 | num |
| PA2(°) | PAssword 2. When enabled (value different from 0) it represents the access key for level 2 parameters. | 0...255 | 0 | | **2** | num |
| ndt | number display type. View with decimal point. y = yes; n = no. | n/y | n | | 1 | flag |
| CA1 | CAlibration 1. Positive or negative temperature value added to the value read by probe 1. | -12...12 | 0 | | 1 | num |
| CA | CAlibration Intervention. Intervention on view offset, thermostat offset or both. 0 = modifies the temperature displayed only; 1 = adds to the temperature used by regulators, not to the temperature displayed, which stays unchanged; 2 = adds to the temperature displayed that is also used by regulators. | 0/1/2 | 2 | | **2** | num |
| LdL | Low display Label. Minimum value the instrument is able to display. | -55...302 | -55 | | **2** | °C/°F |
| HdL | High display Label. Maximum value the instrument is able to display. | -55..302 | 140 | | **2** | °C/°F |
| ddL | defrost display Lock. Viewing mode during defrosting. 0 = shows the temperature read by the thermostat probe; 1 = locks the reading on the temperature value read by thermostat probe when defrosting starts, and until the next time the Setpoint value is reached; 2 = displays the label "deF" during defrosting, and until the next time the Setpoint value is reached. | 0/1/2 | 1 | | 1 | num |
| dro | display read-out. Select °C or °F for displaying the temperature read by the thermostat probe. 0 = °C, 1 = °F. | 0/1 | 0 | | **2** | flag |
| | **CONFIGURATION (folder with "CnF" label)** | | | | | |
| H00 (!) | Probe type selection, PTC or NTC. 0 = PTC; 1 = NTC. | 0/1 | **0/1** | | 1 | flag |
| H31 | Configurability UP key. 0 = disabled; 1 = defrosting; 2 = auxiliary; 3 = reduced set (economy). | 0/1/2/3 | 1 | | **2** | num |
| reL | reLease firmware. Device version: read only parameter. | / | / | | 1 | / |
| tAb | tAble of parameters. Reserved: read only parameter. | / | / | | 1 | / |
| | **COPY CARD (folder with "Fpr"label)** | | | | | |
| UL | Up load. Programming parameter transfer from instrument to Copy Card. | / | / | | 1 | / |
| dL | Down load. Programming parameter transfer from Copy Card to instrument | / | / | | 1 | / |

**(1) see Duty Cycle Diagram**

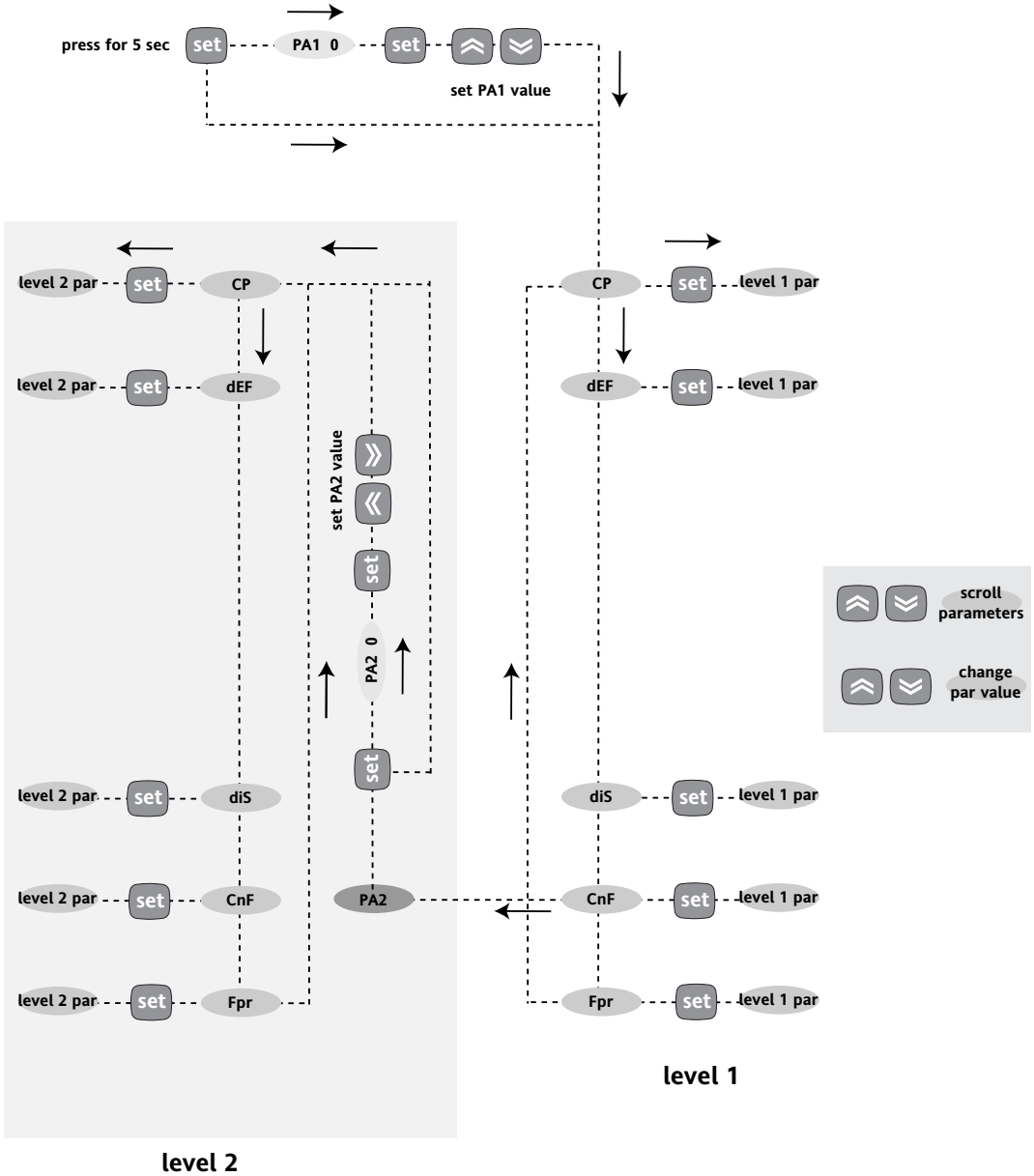
* DEFAULT column: for H00 parameter default is depending on model
*** NOTE 1: Switch off and switch on again the instrument after changing the input type NTC/PTC (par. H00)**

** VALUE column: to be filled manually, with customized settings (if different from the default value).
*** LEVEL column: indicates the level of visibility of parameters accessible by PASSWORD (see the related paragraph)
(°) PA2 is visible (it will be requested, if specified) at level 1 in **CnF folder** and can be set (it can be modified) at level 2 in **diS folder**

**(!) WARNING!**
• It is strongly recommended, anyway to switch off and switch on again the controller anytime parameters have been changed to prevent malfunctioning on configuration and/or ongoing timings.




Machine Status Menu Diagram



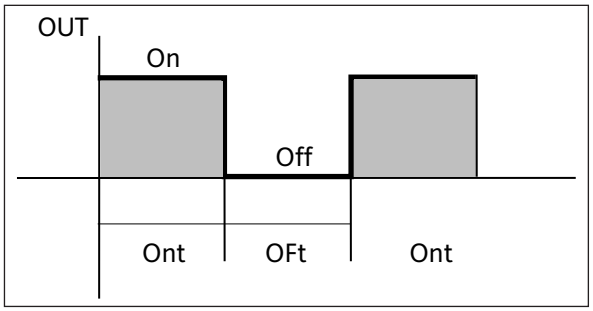

Programming Menu Diagram

**Duty Cycle Diagram**

Ont, OFt parameters programmed for Duty Cycle

| Ont | OFt | Output compressor |
|---|---|---|
| 0 | 0 | OFF |
| 0 | >0 | OFF |
| >0 | 0 | ON |
| >0 | >0 | dc |

When the sensor detects an error condition:
• the code E1 is displayed
• the regulator is activated as indicated by the "Ont" and "OFt" parameters if programmed for the duty cycle or:



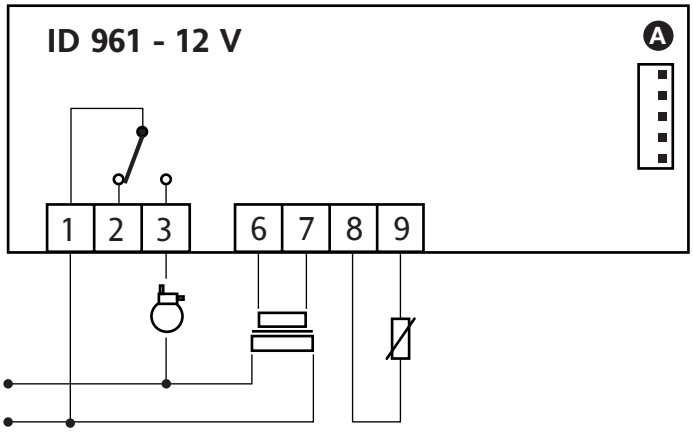

Wiring diagram

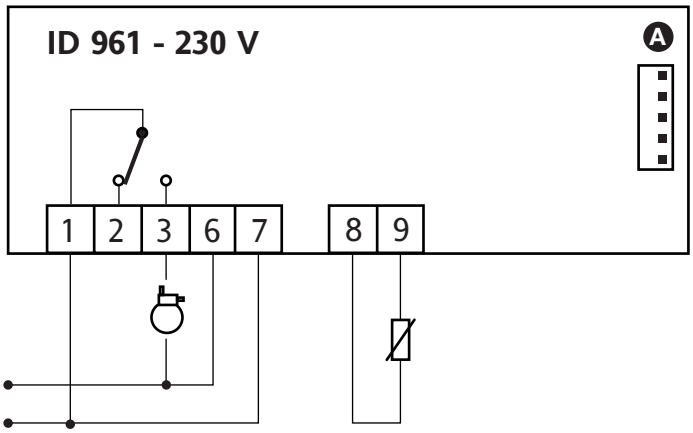
**TERMINALS (12 and 230V)**

| | |
|---|---|
| 1 - 2 | N.C. compressor relay |
| 1 - 3 | N.O. compressor relay |
| 6 - 7 | Power supply • model 230V: 3 VA max.<br>• model 12V: 1,5 VA max. |
| 8 - 10 | Probe 1 input (thermostat) |
| A | TTL input for Copy Card |

**NOTE:**

• User Default Settings
• For relay capacities check on the instrument label.
In the diagram it is shown relays with 8(3) 1/2 hp 250V capability and 12/230V supply

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- use on boards which allow access to dangerous parts without the use of tools;
- tampering with and/or alteration of the products;
- installation/use on boards that do not comply with the standards and regulations in force.

**Invensys Controls Italy s.r.l**
via dell'Industria, 15 Zona Industriale Paludi
32010 Pieve d'Alpago (BL) ITALY
Telephone +39 0437 986111
Facsimile +39 0437 989066
Internet http:/www.climate-eu.invensys.com

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