Y39 - Y39S

DIGITAL ELECTRONIC REFRIGERATION UNITS CONTROLLER

OPERATING INSTRUCTIONS

20/04 - code: ISTR_M_Y39-_E_04_--

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PREFACE

⚠ This manual contains the information necessary for the product to be installed correctly and also instructions for its maintenance and use; we therefore recommend that the utmost attention is paid to the following instructions and to save it.

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⚠ Whenever a failure or a malfunction of the device may cause dangerous situations for persons, thing or animals, please remember that the plant has to be equipped with additional electromechanical devices which will guarantee safety.

1 INSTRUMENT DESCRIPTION

1.1 General Description

Y39 is a digital controller with microprocessor that is typically used in **cooling applications** that have temperature control with **ON/OFF control** and **defrosting control** at intervals time or at reaching temperature by **stopping compressor** or by means of **electrical heating** or **hot gas/reverse cycle**.

The instrument has up to **3 relay outputs**, up to **3 inputs for PTC or NTC** temperature probes and **a digital input** (alternative to a temperature input), in addition can be equipped with an **internal buzzer** that is the sound system for alarms.

The 3 outputs can be can all be configured for controlling the compressor or the temperature control device, the defrosting device, the evaporation fan or, alternatively any of the previous functions, using an auxiliary device or an alarm.

The 3 inputs for temperature probes can be used to measure the control temperature, the evaporator temperature, products or aux temperature, while the digital input alternative to evaporator or **Aux** temperature input can be programmed to carry out various functions such as door opened signal, defrosting commands, selecting a different set of temperature

regulations, external alarm signals, activating a continuous cycle, and activating an auxiliary output etc..
The model Y39S have the “S-touch” capacitive sensor keyboard system.

1.2 Front Panel Description

1. **P Key:** Used to change the Set Point (press and release) and to program the function parameters (pressed for 5 s). In programming mode is used to enter in parameters edit mode and confirm the values. In programming mode it can be used together with the ▲ key to change the programming level of the parameters. When the keyboard is locked it can be used together with the ▲ (hold pressed for 5 s) key to unlock the keyboard.
2. **▼/Aux Key:** In programming mode is used for decreasing the values to be set and for selecting the parameters. Hold pressed for 1 s, while in normal mode, it can also be programmed via parameter `t.Fb` to carry out other functions such as activating the **Aux** output, starting up the continuous cycle, etc. (see functions of keys U and ▼).
3. **▲/☼ Key:** In normal mode can be used to start/stop a manual defrost (pressed for 5 s). In programming mode is used to increase the value to be set and to select the parameters. In programming mode can be used, togetherwith key P to change parameters level. Pressed together with P key for 5 s allows the keyboard unlock.
4. **U/⏻ Key:** Press and release the key to display the instrument variables (measured temperatures etc.). In programming mode press the key for 2 s to return in normal mode. Hold pressed for 1 s, while in normal mode, it can also be programmed via parameter `t.uF` to carry out other functions such as turn ON and OFF (stand-by) the device, activate the **Aux** output, start up the continuous cycle, etc. (see functions of keys U and ▼).
5. **LED SET:** During the normal operating mede, signals that a ket is pressed. In programming mode indicates the programming level of the parameters.
6. **LED ☼ - COOL:** Indicates the output status (compressor or temperature control device) when the istrument is programmed for cooling operation: ON (**ON**), OFF (**OFF**) or inhibited (**flashing**).
7. **LED ☀ - HEAT:** Indicates the output status (compressor or temperature control device) when the istrument is programmed for heating operation: ON (**ON**), OFF (**OFF**) or inhibited (**flashing**).
8. **LED ☼:** Indicates: Defrost in progress (**ON**) or drainage time in progress (**flashing**).
9. **LED :** hows the Fan output status: ON (**ON**), OFF (**OFF**) or inhibited (**flashing**).
10. **LED ⚠:** Shows the Alarm status (**ON**), OFF (**OFF**) and Acknowledged or Lached (**flashing**)
11. **LED Aux:** Shows the Auxiliary output status: ON (**ON**), OFF (**OFF**) or inhibited (**flashing**).
12. **LED Stand-By:** When the instrument is in Stand-by mode is the only lit LED.

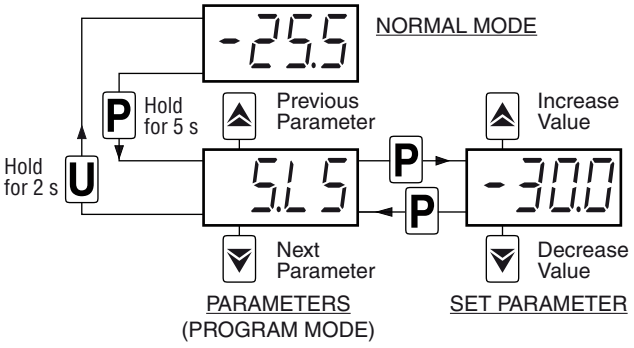
2 PROGRAMMING

2.1 Fast Set Point Programming

The normal mode to program the setpoint is done by momentarily pressing the P key, the display shows `SP` (or `SP2`) alternated to the programmed value.
To change it press the ▲ key to increase the value or ▼ to decrease it. These keys increase or decrease the value one digit at a time, but if the button is pressed for more than one second the value increases or decreases rapidly and, after two seconds, the speed increases even more in order to quickly reach the desired value.
When the desired value is set press the key P to exit the Set Point programming mode. The Set Point programming mode can be abandoned by pressing the P key or automatically if no key is pressed for 10 seconds. After that time the display returns to the Normal function mode.

2.2 Standard Mode Parameters Programming

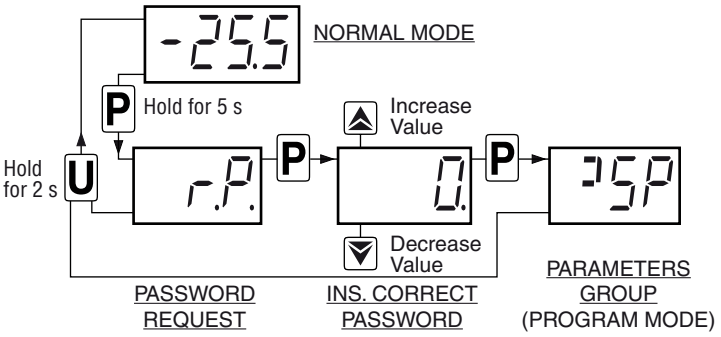
To access the instrument function parameters when password protection is disabled, press the P key and keep it pressed for about 5 seconds, after which the display shows the code that identifies the first programmable parameter
The desired parameter can be selected using the ▲/▼ keys, then, pressing the P key, the display shows the parameter code alternated to its value that can be changed with the ▲ and ▼ keys.
Once the desired value has been set, press the key again: the new value is stored and the display shows only the code of the selected parameter.
Pressing the ▲ and ▼ keys, it is possible to select another parameter and change it as described.
To exit the programming mode, press no keys for about 30 s, or keep the U key pressed for 2 s until the controller returns in normal mode.



2.3 Parameter Protection Using a Password

The instrument has a parameter protection function with password that can be customized using the `t.PP` parameter.
To protect the parameters, set the desired Password Number in parameter `t.PP`.
When the protection is active, keep the P key pressed for about 5 s to access the parameters, the display shows `r.P`.
Press again the P key, the display changes to `0`, now, using the ▲/▼ keys, insert the programmed password number and press the key P again.
If the password is correct the instrument displays the code of the first parameter and it will be possible to program the instrument in the same way described in the previous paragraph.
The password protection can be disabled by setting `t.PP` = **oF**.
Note: If the Password gets lost, just switch OFF and ON the instrument power supply, push P key during the initial

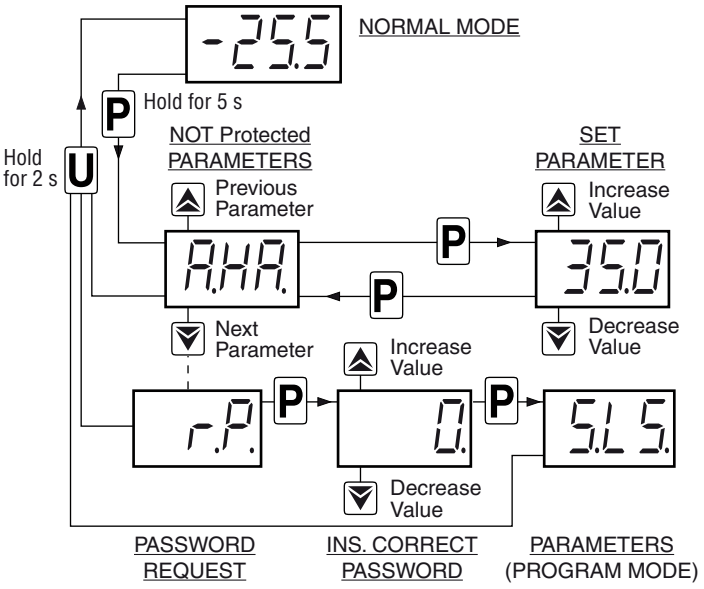
test and keep it pressed for 5 seconds. In this way is possible to have access to ALL the parameters, verify and modify the parameter *t.PP*.



2.4 Customized Mode Parameters Programming (parameters programming level)

The password protection hides all the configuration parameters behind a factory set password to avoid unwanted changes being made to the programming of the controller. To make a parameter accessible without having to enter the password when *t.PP* password protection is active follows this procedure:

– Enter the Program mode using the *t.PP* Password and select the parameter thatmust always be accessible (no password protection).
– Once the parameter has been selected, a blinking **SET** LED means that the parameter can be programmed only entering the password (is protected), if the LED is steady ON the parameter is programmable without password (not protected).
– To change the parameter visibility, press the P key and keeping it pressed also press the ▲ key. The **SET** LED chenges its state indicating the new access level of the parameter (**on** = not protected; **blinking** = protected by password).
In case some parameters are not protected, accessing the the programming mode the display first shows the not protected parameters, then the *r.P* parameter (through which will be possible to access the "*protected*" parameters).



2.5 Reset Parameters to Default Value

The instrument allows the reset of the parameters to those values programmed in factory as default.

To restore the default parameters value, set the value **-48** at *r.P* password request.

Therefore, to make the reset to the default parameters, enable the Password using the *t.PP* parameter so that the *r.P* setting is requested, at this point insert **-48** instead of the programmed access password.

Once confirmed the password with the P key, the display shows "- - -" for 2 s after which the instrument resets all the parameters to the factory default setting.

2.6 Keyboard Lock Function

On the instrument it is possible to completely lock the keyboard. This function is useful when the controller is installed in an accessible area and changes must be avoided.

To activate the keyboard lock it is enough program the parameter *t.Lo* to a value different than **oF**.

The *t.Lo* value is the keys inactivity time after which the instrument automatically locks the keyboard. Therefore, pressing no buttons for the time set at *t.Lo*, the normal functions of the keys are automatically disabled.

When the keyboard is locked, if any of the key is pressed, the display shows *Ln* to indicate that the lock is active.

To unlock the keyboard it is enough to contemporarily press P + ▲ keys and keep them pressed for 5 s, after which the label *LF* appears on the display and all the key functions will be available again.

3 USAGE WARNINGS

3.1 Admitted Usage

The instrument has been projected and manufactured as a measuring and control device to be used according to EN60730-1 at altitudes operation below 2000 m.

The use of the instrument for applications not expressly permitted by the above mentioned rule must adopt all the necessary protective measures.

The instrument **MUST NOT BE USED** in dangerous (flammable or explosive) environments without adequate protections.

The instrument used with NTC 103AT11 probe (identifiable by the printed code “103AT-11” visible on the sensor part) is compliant with standard EN 13485 (“Thermometers for measuring the air and product temperature for the transport,storage and distribution of chilled, frozen, deep-frozen/quick-frozen food and ice cream”) with the following classification:
[EN13485 air, S, A, 2,- 50°C +90°C]

Remember that the end user must periodically check and verify the thermometers in compliance with standard EN 13486.

The installer must ensure that EMC rules are respected, also after instrument installation, if necessary using proper filters.

4 INSTALLATION WARNINGS

4.1 Mechanical Mounting

The instrument, in case 78 x 35 mm, is designed for flush-in panel mounting. Make a hole 71 x 29 mm and insert the instrument, fixing it with the provided special brackets.

In order to obtain the declared front protection degree, use the screw type bracket (optional).

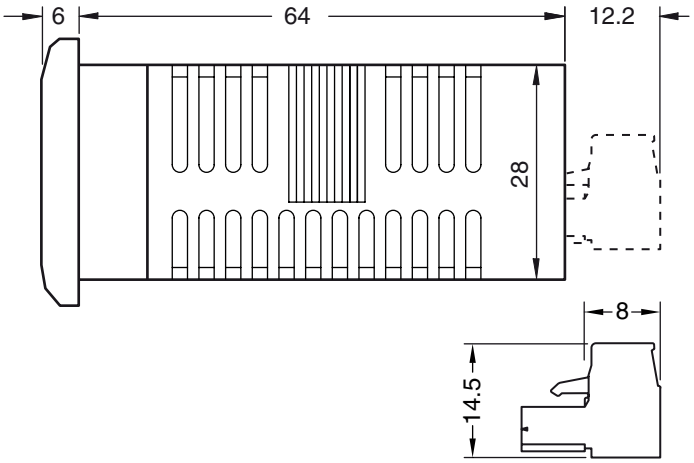
Avoid placing the instrument in environments with very high humidity levels or dirt that may create condensation or introduction of conductive substances into the instrument.

Ensure adequate ventilation to the instrument and avoid installation in containers that house devices which may overheat or which may cause the instrument to function at a higher temperature than the one permitted and declared.

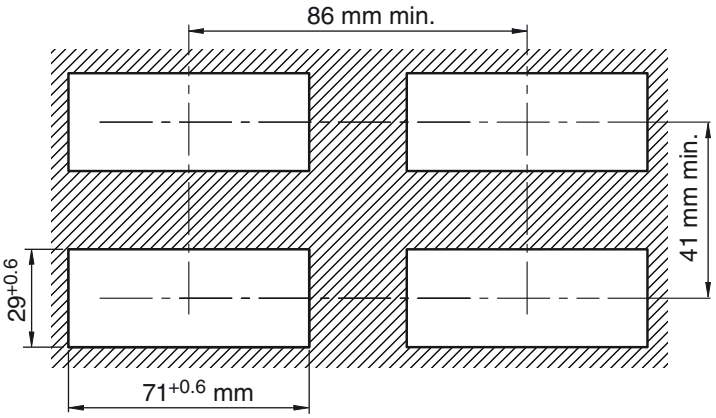
Connect the instrument as far away as possible from sources of electromagnetic disturbances such as motors, power relays, relays, solenoid valves, etc..

4.2 Dimensions [mm]

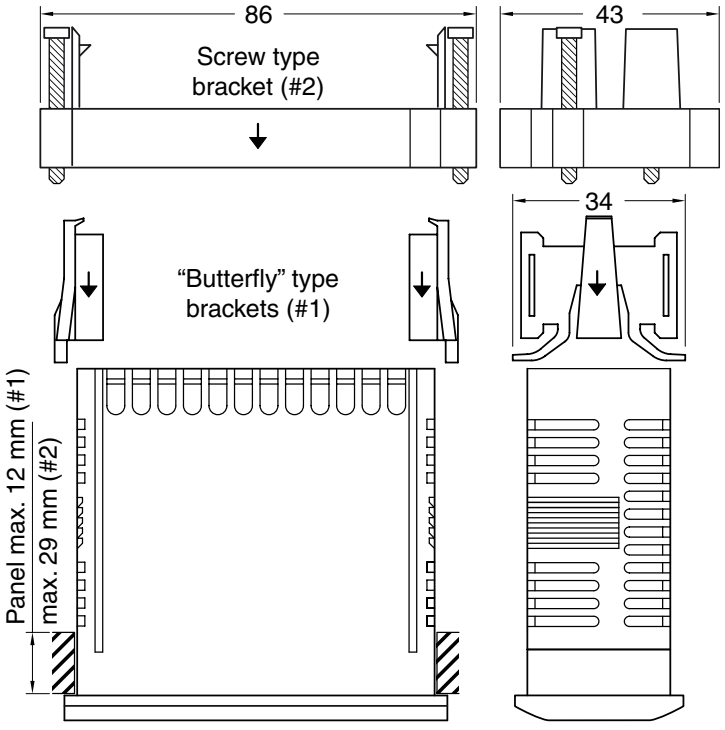
4.2.1 Mechanical Dimensions



4.2.2 Panel Cut-Out



4.2.3 Mounting



4.3 Electrical Connections

Carry out the electrical wiring by connecting only one wire to each terminal, according to the following diagram, checking that the power supply is the same as that indicated ON the instrument and that the load current absorption is no higher than the maximum electricity current permitted.

As the instrument is built-in equipment with permanent connection inside housing, it is not equipped with either switches or internal devices to protect against overload of current: the installation will include an overload protection and a two-phase circuit-breaker, placed as near as possible to the instrument, and located in a position that can easily be reached by the user and **marked as instrument disconnecting device** which interrupts the power supply to the equipment.

It is also recommended that the supply of all the electrical circuits connected to the instrument must be properly protected, using devices (ex. fuses) proportionate to the circulating currents.

It is strongly recommended that cables with proper insulation, according to the working voltages and temperatures are to be used.

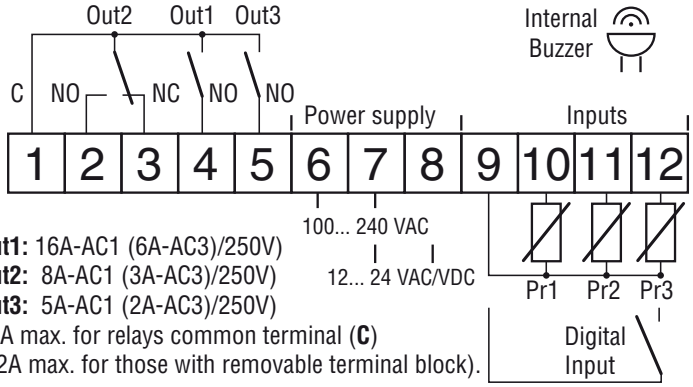
Furthermore, the probe input cable must be kept separate from line voltage wiring.

When a probe shielded cable is used, the protection shield should be connected to ground at only one side.

Whether the instrument is a 12/24 V version (Power supply code F/G) it is recommended to use an external TCTR transformer, or with equivalent features (class II insulation) and to use only one transformer for each instrument because there is no insulation between supply and input.

⚠ We recommend that a check should be made that the parameters are those desired and that the application functions correctly **before connecting the outputs** to the actuators so as to avoid malfunctioning that may cause irregularities in the plant that could cause damage to people, things or animals.

4.3.1 Electrical Wiring Diagram



Out1: 16A-AC1 (6A-AC3)/250V)
Out2: 8A-AC1 (3A-AC3)/250V)
Out3: 5A-AC1 (2A-AC3)/250V)
16A max. for relays common terminal (**C**)
(12A max. for those with removable terminal block).

5 FUNCTIONS

5.1 ON/STAND-BY Function

Once powered the instrument can assume 2 different conditions:

ON: The controller uses the control functions.

STAND-BY: The controller uses no control function and the display is turned OFF except for the Stand-by LED.

The transition between Standby and ON status is equivalent to power ON the instrument providing the electrical power.

In case of power failure, the system always sets itself in the condition it was in before the black-out.

The ON/Stand-by function can be selected:

– Pressing the key ⏻/⏻ for at least 1 s if *tuF* = **4**;

– Pressing the key ▼/**Aux** for at least 1 s if *tFb* = **4**;

– Using the Digital Input if parameter *iF1* = **10**.

5.2 Measure and Display configuration

Through parameter *SE* it is possible to select the type of probes that that is to be used. The probe type can be: thermistors PTC KTY81-121 (Pt) or NTC 103AT-2 (nt).

With parameter *uP* it is possible to select the temperature engineering unit and the desired measure resolution (C0 = °C/1°; C1=°C/0.1°; F0 = °F/1°; F1 = °F/0.1°).

The instrument allows the measure calibration, which can be used to re-calibrate the instrument according to application needs, through the parameters *C1* (for input **Pr1**), *C2* (for input **Pr2**) and *C3* (for input **Pr3**).

The function carried out by **Pr2** and **Pr3** probes is defined by parameters *P2* and *P3*. These parameters can be configured for the following functions:

EP Evaporator probe: used to managing the defrost and the evaporator fans (see relative functions);

Au Auxiliary probe;

dG Digital input (see Digital input functions);

If probe **Pr2** and/or **Pr3** is/are not used, set the relative parameters *P2* and/or *P3* = **oF**.

It is not possible to program the two parameters for the same function, if so, priority goes to *P2*.

Using *Ft* parameter can be set a software filter for measuring the input values in order to decrease the sensibility to rapid temperature changes (increasing the sampling time).

Through the *dS* parameter is possible to set the variable normally displayed:

P1 Probe Pr1 measurement;

P2 Probe Pr2 measurement;

P3 Probe Pr3 measurement;

SP Active set point value;

oF Numerical display switched OFF.

When one of the measures is displayed (*dS* = **P1**/**P2**/**P3**) the *CU* parameter allows to set an offset that is to be applied only to the displayed variable (all controls will always made according to the correct temperature value, changed only by the calibration parameters *C1*, *C2*, *C3*).

The normally displayed value is established by parameter *dS*, but, repeatedly pressing and releasing U key, it is possible to display all the variables and also the **Pr1** high and low peak measurement values. The display alternately shows the code that identifies the variable and its value.

The variables that can be displayed are:

Pr1 Pr1 probe temperature;

Pr2 Pr2 probe temperature (on/oF if set as Digital input);

Pr3 Pr3 probe temperature (on/oF if set as Digital input);

Lt Minimum stored Pr1 temperature;
Ht Maximum stored Pr1 temperature.

The peak (min./max.) temperature values of **Pr1** probe **are NOT stored in case of power failure**. The peak values can be reset while are displayed pressing the ▼ key for 3 s. At the end of the ▼ key pressure, the display shows "---" for an instant to indicate that the min./max. values have been erased and the new peak is the temperature read in that moment.

The system exits the variable display mode after 15 s from the last U key pressure.

Must be noted that the **Pr1** probe display can also be changed by "*Defrost display lock*" function via the ddL parameter (see the *Defrost function*).

5.3 Digital Input Configuration

The digital input function (available ON terminal **11** as an alternative to **Pr2** input if iP2 = **dg** or ON terminal **12** as an alternative to **Pr3** input if iP3 = **dg**) is defined using the iF parameter and the action is delayed for the time programmed with parameter i.ti. The iF parameter can be configured for the following functions:

0 No function;

1 Start Defrost command via NO contact: closing the digital input (and after the it time) a defrost cycle is activated.

2 End Defrost command via NO contact: closing the digital input (and after the it time) the defrost cycle is ended if in progress or defrost is inhibited.

3 Continuous cycle activation command via NO contact: closing the digital input (and after the it time) a continuous cycle is started up as described in the "*Continuous cycle function*" paragraph.

4 External alarm signal via NO contact: closing the digital input (and after the it time) the alarm is activated and the instrument alternately shows ON the display the label AL and the variable set at parameter id5.

5 Cell door opening with fan stop via NO contact: closing the digital input (and after the it time) the fans are stopped and the instrument alternately shows ON the display the label oP and the variable set at parameter id5. With this function mode, the action of the digital input also activates the time that can be set with parameter AoA after which the alarm is activated to point out that the door has been left open and the fan restarts.

6 Cell door opening with compressor and fan stop with contact NO: similar to iF = **5** but with fan and compressor stop. At the intervention of the "Door open alarm" compressor and fan restart.

7 Auxiliary output remote control via NO contact: closing the digital input (and after the it time) the auxiliary output is activated as described at auxiliary output iFo = **2** function mode.

8 Active Set Point (**SP/SP2**) selection via NO contact: closing the digital input (and after the it time) the **SP2** temperature Set Point is activated. When instead the digital input is open, is active the **SP** Set Point.

9 External alarm signalling with deactivation of all control outputs via NO contact: closing the digital input (and after the it time) all the control outputs are disabled, the alarm is activated and the instrument alternately shows ON the display the label AL and the variable set at parameter id5.

10 Instrument Switch ON/OFF (ON/Stand-by) of instrument via NO contact: closing the digital input (and after the it time) the instrument is switched **ON** while it is placed in **Stand-by** when the digital input is open.

11 Active set point (**SP**/**SP2**) selection and heating/cooling control mode via NO contact: closing the digital input (and after the it time) the temperature set point **SP2** with **cooling action** is activated. When instead the digital input is open is active the set point **SP** with **heating action**.

-1, **-2**, **-3**, **-4**, **-5**, **-6**, **-7**, **-8**, **-9**, **-10**
These functions are like those just described, but work with a reversed logic as the contact is NC.

5.4 Outputs and Buzzer Configuration

The instrument outputs can be configured by the relative parameters o1, o2 and o3. The outputs can be configured for the following functions:

ot To control the compressor or however, the temperature control device;
dF To control the defrosting device;
Fn To control the fans;
Au To control the auxiliary device;
At To control a silenceable alarm device through a contact that is normally open, and then closed when the alarm sounds;
AL To control an alarm that cannot be silenced through a contact that is normally open and closed when the alarm sounds;
An To control an alarm with a memory function through a contact that is normally open and closed when the alarm sounds (see alarm memory);
-At To control a silenceable alarm device through a contact that is normally closed, and then open when the alarm sounds;
-AL To control an alarm that cannot be silenced through a contact that is normally closed and open when the alarm sounds;
-An To control an alarm with a memory function through a contact that is normally closed and open when the alarm sounds;
on Output ON when the instrument is in ON state. This mode can be used to control lights, non-misting resistance ON room door or other utilities;
oF Disabled output.

The function carried out for auxiliary output (o1, o2, o3 = **Au**) is defined by the parameter oFo and the function is conditioned by the time set with parameter otu.

oFo can be configured for the following functions:

oF Auxiliary output not active;

1. Temperature control output delayed with NO contact: the auxiliary output is activated with the delay set with otu applied to the output configured as **ot**. The output is then turned **OFF** at the same time as the **ot** output is disabled. This function mode can be used as a command for a second compressor or for all other working utilities according to the same ot output conditions, but which must be delayed after the start up of the compressor to avoid excess electricity absorption.

2. Activation by the key U/⏻, ▼/**Aux** or by Digital Input with contact NO: the output is activated pressing a key U/⏻ or ▼/**Aux**)suitably configured tuF or tFb = **1**) or via the digital input (iF = **7**). These commands have a bi-stable function (toggle), which means that when first pressed, the output is activated while the second is

disabled. In this mode, the **Aux** output can be turned OFF automatically after a certain time that can be set ON the parameter oEu. With oEu = **oF** the output is activated and deactivated only manually, using a key (U), (▼), or via the digital input. Differently, the output, once activated, is turned OFF automatically after the oEu time. This mode of operation can be used as a control of the shop window lighting, anti-fogging resistors or other utilities.

3. Light output managed by Active Set Point ("*eco*" function). This output will be ON in "*Normal*" mode (Set Point **SP** active) and OFF in economy (eco) mode operation (Set Point **SP2** active).
4. Internal Light output managed by digital input. The output will be ON when door is opened (iF1 = **5**, **6**).

The internal buzzer (when present) can be configured by parameter oBu to carry out the following functions:

oF Buzzer always disabled;

1 The Buzzer sounds when an alarm is active;

2 The Buzzer sounds when a key pressed (no alarm);

3 The Buzzer sounds when a key pressed and when an alarm is active.

5.5 Active Set Point Selection

The instrument allows up to 2 different Set Points to be pre-set (**SP** and **SP2**) and then choose which one is to be made Active.

This function can be used if it is necessary to switch between two different temperatures (e.g. day and night or positive and negative etc). The Active Set Point can be selected:

– Using the parameter SSA;

– Using the key (U)/⏻ (parameter tUF = **3**;

– Using the key (▼)/**Aux** (parameter tFb = **3**);

– Using the Digital Input (parameter iF1 = **8** or **11**).

The selection of the Active Set point can be combined also with the Switch OFF Auxiliary output function if used as light (oFo = **3**) and to change between Heating/Cooling action via the digital input (iF1 = **11**).

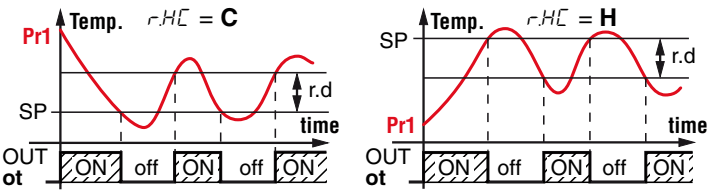
SP and **SP2** can be set to a value between the values programmed with parameters SLS and SHS.

Note: In the examples that follow, the Set point is generally indicated as **SP**, but the instrument will work according to the Set point selected as active.

5.6 Temperature Control

The instrument control is ON/OFF and acts ON the output configured as **ot** depending on the measure of probe **Pr1**, the active Set Point (**SP** or **SP2**), the differential (hysteresis) rd and the action rHC.

Depending ON the function mode programmed with parameter rHC the differential is automatically considered by the controller with **positive** values for **Cooling** actions (rHC = **C**) or with **negative** values for **Heating** actions (rHC = **H**).



In the event of probe error, it is possible to set the instrument so that the output continues working in cycles according to the times programmed with parameters rt1 (activation time) and rt2 (deactivation time).

If a probe error occurs, the instrument activates the output for the rt1 time, then deactivates it for the rt2 time and so on whilst the error remains.

Programming rt1 = **oF** the output, in probe error condition, remains switched OFF.

Programming instead rt1 to any value and rt2 = **oF** the output, in probe error condition, remains switched ON.

The instrument has a continuous cycle function through which is possible to mantain active the **ot** control output for the time set at parameter rtC, regardless the temperature controller command.

The function can be used, for example, when a rapid temperature drop of the product is required after the refrigerator has been loaded.

It should be noted that during the continuous cycle defrosts are inhibited and the temperature alarms are disabled throughout the whole cycle and also subsequently for the time set at parameter AdA.

The start of a continuous cycle can only take place through a manual command using the (U)/⏻ or (▼)/**Aux** keys (tUF or tFb = **2**) or via the digital input (iF1 = **3**) if properly programmed.

The continuous cycle in progress is indicated on the display with the indication CC and can be stopped by further action (as for activation) on the button or on the digital input.

The continuous cycle function cannot be activated during defrosts and with rtC = **oF**.

Remember that the temperature control function can be conditioned by the "*Compressor Protection and output delay at power-on*", "*Defrost*", "*Door open*" and "*External alarm with outputs disable*" functions.

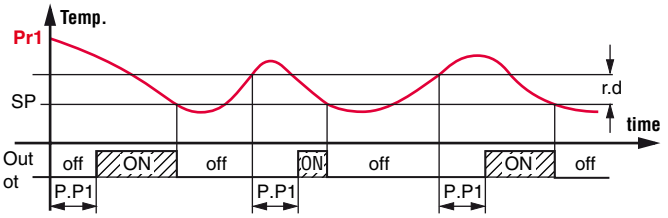
5.7 Compressor Protection Function and Delay at Power-ON

The "*Compressor Protection*" function aims to avoid close compressor start ups controlled by the instrument in Cooling applications.

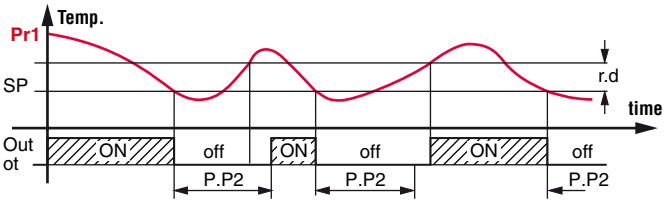
This function provides **3** time controls. These control functions manage the switching ON of the output configured as **ot** associated with the temperature control request.

The protection consists of preventing the output being enabled (switched ON) during the times set with parameters PP1, PP2 and PP3 and therefore that any activation occurs only after all the times have elapsed.

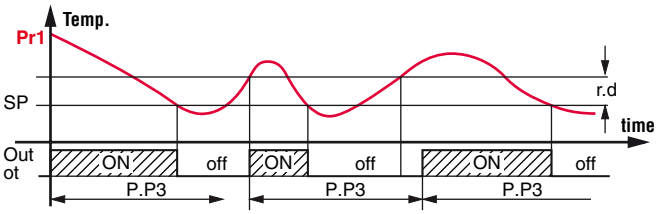
First control (parameter PP1) foresees a delay to the **ot** output activation (switching ON delay).



Second control (parameter PP2) inhibits the activation of **ot** output by a time delay (PP2) that starts when the output is turned OFF (delay after switching-OFF).



Third control (parameter *PP3*) inhibits the activation of the **ot** output by a time delay (*PP3*) that starts when the output was turned ON last time (delay between switching-ONs).



During the output inhibition the LED **OUT** (Cool ❄ or Heat ☀) blinks. It is also possible to prevent activation of all the outputs after the instrument is turned ON, for the time set with parameter *Pod*.

During the power ON delay phase, the display shows the indication *od* alternated with the normal visualization.

All these functions are disabled if the relative parameters are set to **OFF** (*oF*).

5.8 Defrost Control

The defrost control acts on the outputs configured as **ot** and **dF**.

The type of defrost that the instrument must carry out is set with parameter *ddt* that can be programmed as:

EL With **electrical heating** (or by **stopping compressor**): during defrost, the output **ot** is deactivated while the output **dF** is enabled. The defrost will be made by Stopping compressor when **dF** output is not used;

in With **hot gas** or **inversion of cycle**: during defrost the outputs **ot** and **dF** are enabled;

no **Without compressor output conditioning**: during defrost, the output **ot** continues operating in order to control the temperature while **df** output is enabled.

Et With **electrical heating** and **defrost temperature control**: during defrost, the **ot** output is deactive while **df** output operates as evaporator temperature control.

With this selection, the defrost end is always timed (time *ddE*). During defrost **dF** output behaves as an heating action temperature control with Set Point = **d.tE**, fixed differential at 1°C and operates using as reference the reading of the evaporator temperature probe (**EP**).

5.8.1 Automatic Defrosts Start

The automatic control of defrost occours by interval times.

The automatic defrost is therefore obtained by setting, with *dd1* parameter, the time that must elapse between the end of a defrost and the beginning of the next one.

The first defrost after Power ON can be set with parameter *d5d*. This allows to perform the first defrost at a different interval from *dd1* time.

To force the instrument to perform a defrost cycle at each power ON (as long as the conditions set with parameters *dt5* and *dtE* are satisfied) set parameter *d5d* = **oF**.

This allows the evaporator to be permanently defrosted, even when frequent power supply interruptions occur that may stop several defrost cycles.

If, on the other hand, all defrosts must be executed at the same interval time, set *d5d* = *dd1*.

Setting *dd1* = **oF** interval defrosts are disabled (including the first one, regardless of the time set at *d5d* parameter).

Counting mode interval and automatic defrost start modes are set with parameter *ddC*:

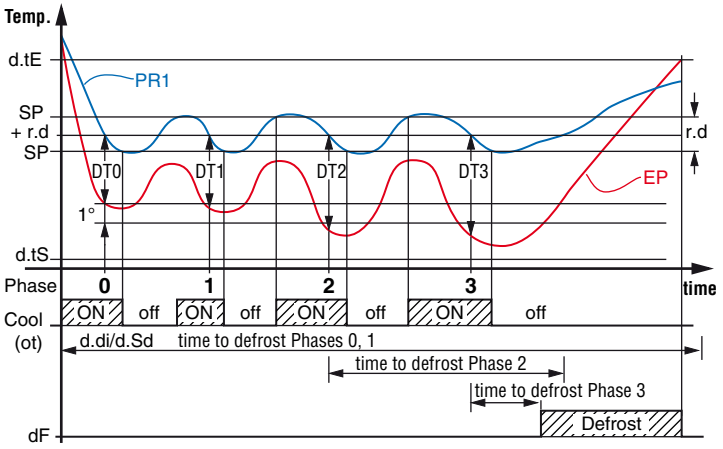
rt At real-time power-ON intervals. *dd1* interval is counted referring to the total time the instrument is switched ON. Mode currently used in the refrigerators systems.

ct At time intervals of the compressor operation (output **ot** switched ON). Mode typically used in the positive temperature refrigerators systems with defrost by stopping compressor.

cS Defrost cycle at each compressor stop (i.e. at each deactivation of the output **ot**) or however at defrost interval end with counts the total working time (instrument ON). If *dd1* = **oF** the defrost happens only at compressor stops. This mode is used only on particular refrigerator systems in which is needed to have the evaporator at the maximum efficiency conditions at all compressor cycles.

St Defrost due to evaporator temperature. The instrument starts a defrost cycle when the temperature evaporator (**EP** probe) goes below the *dt5* programmed temperature or however at defrost interval end as for the **rt** mode (instrument **ON**). If *dd1* = **oF** the defrost happens only when the evaporator temperature goes below the one set at *dt5*. This metod can be used in heat pump defrost systems (in this case the defrost intervals are usually disabled) or to guarantee a defrost if the evaporator reaches very low temperatures that normally result symptomatic of a bad thermal exchange in comparison to the normal working conditions.

dd Dynamic defrost intervals system. This mode allows to dynamically reduce the defrost interval counting in progress (*dd1* or *d5d* if it is the first defrost), anticipating the execution of a defrost when necessary, following an algorithm that allows to notice a performance decreasing of refrigerator thermal exchange. Besides it maintains active the mode **St** that allows a further control of the defrost in order to notice a performance decreasing of refrigerator thermal exchange.
The algorithm allows to esteem a reduction of thermal exchange in base to the increase of the difference of temperature between **Pr1** (controlled temperature) and evaporator (**EP** probe) that is stored by the instrument in proximity of the Set Point.
The advantage of the "*Dynamic Defrost Interval*" is the possibility to program a defrost interval time longer than normal. The instrument has the possibility to anticipate the defrost when necessary or to start the cycle after the programmed time.
If the *DDI* is correctly set many un-necessary defrost cycles can be avoided (obtaining an energy saving) which instead can happen, in the normal operation when, to guarantee with greater certainty the system efficiency, the defrost interval is programmed at a too low time.



In addition to normal defrost parameters the "*Dynamic Defrost Intervals System*", it foresees the parameter:

d.dd Defrost interval percentage reduction.
It allows to establish the percentage of reduction of the remaining time to start defrost when the conditions for the reduction happen. If parameter dDd = 100% at the first increase of the memorized difference of temperature between cell (**Pr1**) and evaporator (**> 1**°) a defrost starts immediately.
For correct functioning the instrument needs a first reference value of the temperature difference between cell and evaporator.
Every variation of the value of the Active Set Point, of the differential r.d, the start of a continuous cycle or the a defrost execution delete this reference value and any reduction will be performed until the acquisition of a new reference value.
Example "*Dynamic defrost intervals system*" with a reduction dDd = 40% and end defrost by temperature.

5.8.2 Manual Defrost

To start up a manual defrosting cycle, press the key ▲/☼ when it is not in programming mode and keep it pressed for about 5 s after which, if the conditions are correct, the LED ☼ lights up and the instrument carries out a defrosting cycle.

To stop a defrosting cycle, press the key ▲/☼ during a defrost cycle and keep it pressed for about 5 s. If correctly programmed (see Digital Input paragraph) the ON/OFF commands of a defrost cycle can also be given by a digital input.

5.8.3 Defrosts End

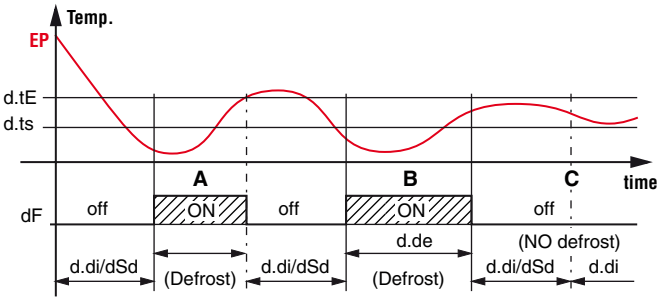
The automatic defrost cycle can be timed or, if an evaporator probe is used (**EP** probe), when the evaporator reaches a certain temperature.

If the evaporator probe is not used or if the thermostated defrost mode is used (parameter ddY = **Et**) the defrost duration is set by the parameter ddE.

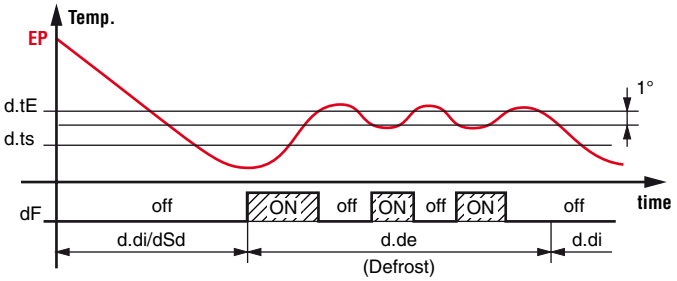
If, on tyhe other hand, the evaporator probe is used and the thermostated electric defrost has not been selected (parameter ddY = **EL**, **in**, **no**) the defrost cycle ends when the temperature measured by the evaporator probe exceeds the temperature set at parameter dtE. If dtE temperature is not reached inside the time set at parameter ddE, defrost is interrupted.

In order to avoid pointless defrosts when the evaporator temperature is high in ddC = **rt**, **ct**, **cS** modes, ddc parameter allows to set the evaporator temperature, below which defrosts are possible.

Therefore, in the modes previously indicated, if the evaporator probe temperature is higher than the one set at parameter dt5 and, in any case, higher than the one set at parameter dtE, defrosts are inhibited.



Example: Defrost **A** ends because the dtE temperature has been reached, defrost **B** ends when ddE time has elapsed as temperature dtE has NOT been reached, defrost **C** does not take place as the evaporator temperature is higher than dt5.



Example of electric defrost with evaporator temperature control: The defrost ends when ddE time has elapsed. During defrost, the **dF** output switches ON/OFF to control the evaporator temperature in Heat mode with set point dtE and a differential (Hysteresis) of 1°.

The active defrost is shown on the instrument display with the lighting up of the LED ☼.

At defrost end, it is possible to delay the new compressor start up (**ot** output) for the time set with parameter dtd to allow the evaporator to drain. During this delay, the LED ☼ flashes to indicate the draining status.

5.8.4 Defrost Display Lock

Through parameter ddL and RdA it is possible to define the display behaviour during defrost. ddL values:

ON During the defrost cycle, the display shows the last **Pr1** temperature read until, at the end of defrost, the temperature has not returned below the value of the last reading, or reached the value [**SP** + **r.d**] or is elapsed the time set at parameter RdA.

Lb During the defrost cycle, the display shows the label dEF and the label PdF at defrost end until the **Pr1** temperature has not returned below the value of the last reading or reached the value [**SP** + **r.d**] or is elapsed the time set at parameter RdA

oF During the defrost cycle, the display shows the temperature measured by **Pr1** probe.

5.9 Evaporator Fans Control

The evaporator fan control operates on the output configured as **Fn** according to certain control states of the instrument and the temperature measured by the evaporator probe (probe configured as **EP**).

When the evaporator probe is not used or in error, the **Fn** output activation depends on parameters Ftn, FtF and FFE.

Parameters Ftn and FtF manage the fans functioning when the output configured as **ot** (compressor) is OFF.

When output **ot** is switched OFF the instrument activates the **Fn** output for the time Ftn, then deactivates it for the time FtF and so on whilst the otuput **ot** remains OFF.

Programming Ftn = **oF** the output **Fn** is disabled when **ot** output is in OFF condition (evaporator fans connected to compressor status).

Programming Ftn to any value and FtF = **oF**, the **Fn** output remains ON, also when **ot** output is in OFF condition (evaporator fans enabled with compressor OFF).

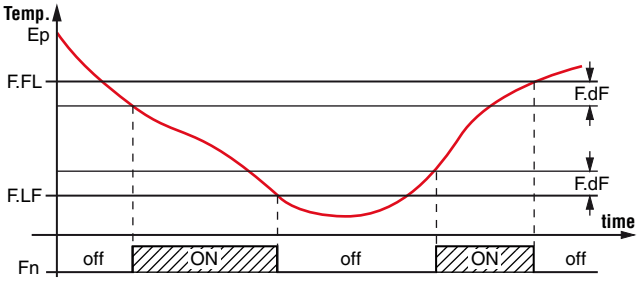
Parameter FFE instead decides whether the fans must always be switched ON independently of the defrost status (FFE = **on**) or switched OFF during defrost (FFE = **oFF**).

In this latter case, it is possible to delay the fans start even after the end of the defrost by the time set at the parameter FFd. When this delay is active the LED ✣ flashes to warn that the delay in progress.

When the **EP** evaporator probe is used, the fans are conditioned by parameters F.tn, F.tF and F.FE as well as are conditioned by the temperature control.

It is possible to disable the fans when the temperature measured by the evaporator probe is higher than the one set with parameter F.FL (temperature too hot) or is lower than the one set at parameter F.LF (temperature too cold).

Associated with these parameters there is also their differential that can be set with parameter F.dF.



Remember that the fans functioning can be conditioned by the *Door open* function operated by the digital input.

Note: It is necessary to pay attention to the correct use of this fans temperature control functions because in the typical application of refrigeration the evaporator fans stop, also stops the thermal exchange.

5.10 Alarm Functions

The alarm conditions of the instrument are:

– Probe errors: E1, -E1, E2, -E2, E3, -E3;

– Temperature alarms: H1 and Lo;

– External alarm: AL ;

– Open door alarm: oP.

The instrument alarm functions act on the alarm LED ⚠, on internal buzzer (if present and programmed by parameter oAu) and on the desired output, if configured with parameters o1, o2 or o3 according to the parameters set.

All alarm conditions are pointed out lighting up the ⚠ LED, while the silenced or stored alarms are shown with ⚠ LED flashing.

The buzzer (if oAu = **1** or **3**) is activated in alarm condition and can be manually disabled pressing any instrument key (alarm silencing).

The possible selections of output parameters for the alarm signalling function are:

At The output must be activated in alarm condition and can be manually deactivated by pressing any key of the instrument (typical application for an acoustic signal);

AL The output must be activated in alarm condition but cannot be manually disabled; the alarm status ends when the alarm condition ceases (typical application for a light signal);

An The output must be activated in alarm condition and must remain active when the alarm has ceased. The disabling action (recognition of a stored alarm) can only be carried out manually by pressing any key when the alarm status has ended (typical application for light signal);

-t Function similar to At but with inverse logic function (output active in normal conditions, disabled in alarm).

-L Function similar to AL but with inverse logic function (output active in normal conditions, disabled in alarm).

-n Function is similar to An but with inverse logic function (output active in normal conditions, disabled in alarm).

The instrument is equipped with the “alarm memory” function which can be activated via the AtA parameter. AtA values are:

oF The instrument disables the alarm signal (⚠) when the alarm status ends;

on The instrument maintains the alarm signal (⚠) when the alarm status ends.

To cancel the alarm memory signal, press any key.

It must be remembered that if an output function is desired with an alarm memory (o1, o2, o3 = **An** or = **-An**) it is necessary to set the parameter AtA = **ON**.

5.10.1 Temperature Alarms

The temperature alarms work according to the programmed probe measurement, the type of alarm set at parameter AAy, the alarm thresholds at parameters AHA (maximum alarm) and ALA (minimum alarm) and the relative differential Ad.

Through parameter AAy it is possible to set if alarm thresholds AHA/ALA are to be considered as Absolute or Relative to the Set Point , if the reference temperature must be related to **Pr1** or **Au** probe and if the message H1 (maximum alarm)/Lo (minimum alarm) is to be displayed at alarm intervention.

The possible selections of the parameter AAy are:

1 **Pr1** Absolute Alarms with H1/Lo label;

2 **Pr1** Relative Alarms with H1/Lo label;

3 **Au** probe Absolute Alarms H1/Lo label;

4 **Au** probe Relative Alarm H1/Lo label;

5 **Pr1** Absolute Alarms with no label;

6 **Pr1** Relative Alarms with no label;

7 **Au** probe Absolute Alarms with no label;

8 **Au** probe Relative Alarms with no label.

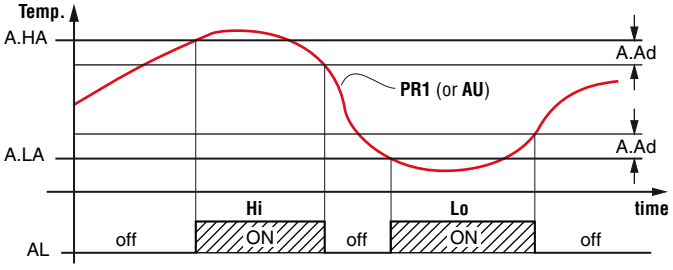
Using some parameters it is also possible to delay the enabling and the intervention of these alarms.

These parameters are:

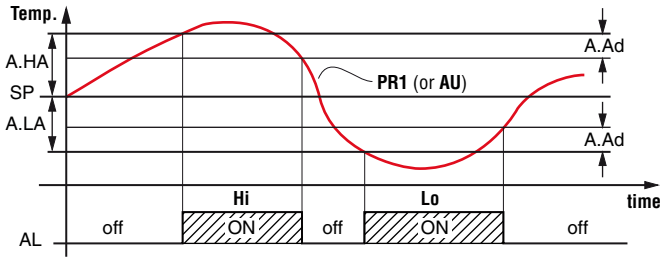
A.PA Temperature alarm intervention delay **at instrument power ON** when the instrument is in alarm status at power ON. If the instrument is not in alarm status at power ON, APA is not considered.

A.dA Temperature alarm exclusion time at the end of defrost cycle (and, if programmed, after the draining) or after a continuous cycle.

A.At Temperature alarms delay activation time. Temperature alarms are enabled at the end of the exclusion times and are activated after the AAt time when the temperature measured by the probe exceeds or goes below the respective maximum and minimum alarm thresholds. The alarm thresholds are those set at parameters AHA and ALA when the alarms are set as absolute (AAy = **1**, **3**, **5**, **7**);



or assume the values [**SP** + AHA] and [**SP** + ALA] if the alarms are relative (AAy = **2**, **4**, **6**, **8**).



The maximum and minimum temperature alarms can be disabled setting AHA and ALA = **oF**.

5.10.2 External Alarm from Digital Input

The instrument can notify an alarm external to the instrument when the digital input configured iF_1 = **4** or **9** is activated.

Simultaneously to the configured alarm signal (buzzer and/or output), the instrument points out the alarm lighting up the ⚠ LED and displaying the label AL alternated to the variable set at parameter $id5$.

iF_1 = **4** mode produces no action on the control outputs while with iF_1 = **9** the control outputs are disabled at digital input intervention.

5.10.3 Open Door Alarm

The instrument can notify an **Open door alarm** activated by the digital input with the function programmed as iF_1 = **5** or **6**.

When the digital input is activated, the instrument shows the label oP on the display, then, after the delay programmed at parameter AoA, the instrument signals the alarm via the activation of the configured alarm output (buzzer/ouput), lighting up the ⚠ LED while continues displaying the label oP.

At the intervention of the open door alarm the inhibited output are immediately reactivated (fans or fans + compressor).

5.11 Function of Keys [U] ⏻ and [▼]/Aux

Two of the instrument keys, in addition to their normal functions, can be configured to operate other commands.

The [U]/⏻ key function can be defined by the parameter UF while the [▼]/Aux key function can be defined by the parameter UFb.

Both the parameters can be configured to perform the following functions:

oF The key carries out no function;

1 Pressing the key for at least 1 s it is possible to enable/disable the auxiliary output if configured as oFo = **2**;

2 Pressing the key for at least 1 s it is possible to enable/disable a continuous cycle;

3 Pressing the key for at least 1 s it is possible to select one of the 2 stored Set Point in rotation. Once the selection has been made, the display shows flashing the active Set Point code for about 1 s (**SP**, **SP2**);

4 Pressing the key for at least 1 s it is possible to switch the instrument from the ON status to Stand-by status and vice versa;

6 ACCESSORIES

The instrument is equipped with a connector that allows the connection to some accessories.

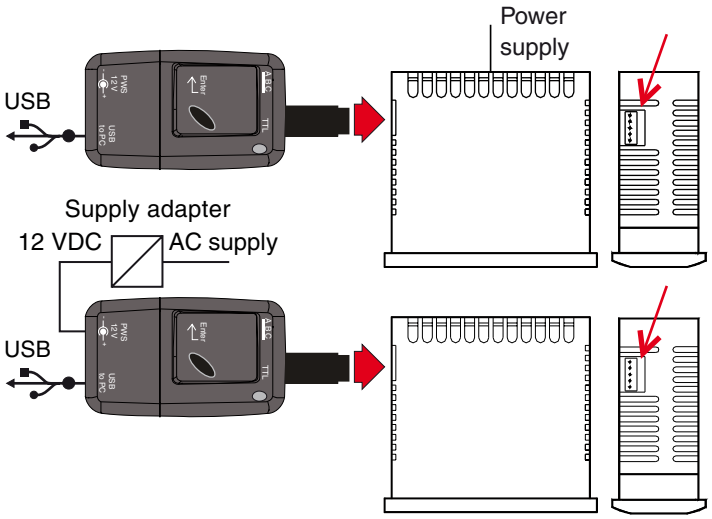
6.1 Parameters Configuration by A01

The instrument is equipped with a 5 poles connector that allows the transfer from and toward the instrument of the functioning parameters through the device **A01**.

This device it is mainly usable for serial programming those instruments that need the same parameters configuration or to keep a copy of the parameters setting of an instrument and allow its fast duplication.

The same device allows to connect a PC via USB with which, through the appropriate configuration software for "*AT UniversalConf tools*", the operating parameters can be configured.

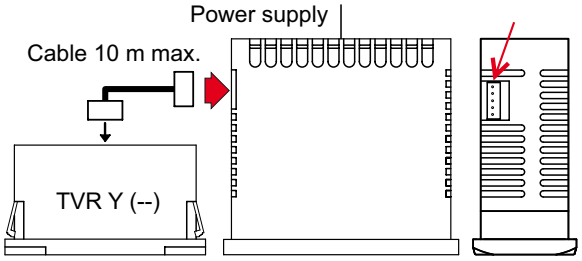
To use the **A01** device it is necessary that the device or instrument are being correctly supplied.



For additional info, please look at the A01 instruction manual.

6.2 TVR Y Remote Display

To the instrument it is possible to connect the remote display **TVR Y** through a special cable that can have a maximum length of 10 m. The device **TVR Y**, directly supplied by the instrument, allows to show the temperature measured by the probe **Pr1** through a 2½ digit display.



For additional info, please look at the TVR Y instruction manual.

6.3 RS 485 Serial Interface by TLCNV

The instrument can be connected by a special cable to the TLCNV device (mod. C - TTL/RS485 interface), by means of which it is possible to connect the controller with a network to which other instruments (controllers or PLC) are connected, all depending typically on a Personal Computer used as plant supervisor.

Using a Personal Computer it is possible to acquire all the function information and to program all the instrument configuration parameters.

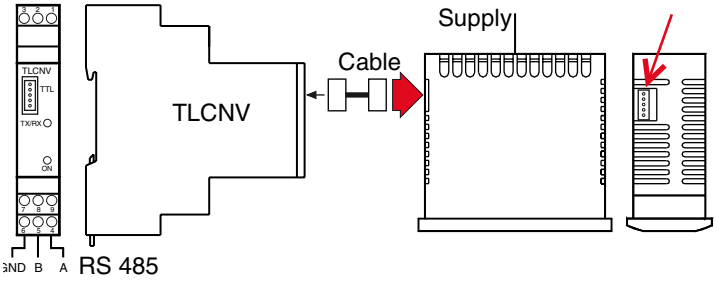
The software protocol adopted for the instrument is a MODBUS RTU type, widely used in several PLC and supervision programs available on the market (Y and Z series protocol manual is available on request).

If the instrument is used with TLCNV program with parameter `tAd` the station Address.

Set a different number for each controller from 1 to 255.

Note: The baud-rate is fixed at 9600 baud.

TLCNV interface is directly supplied by the instrument.



For additional info, please consult the TLCNV instruction manual.

7 PROGRAMMABLE PARAMETERS TABLE

Here below is a description of all the parameters available on the instrument. Some of them may not be present because depend on the model/type of instrument.

"S." - Set Point parameters

Parameter		Description	Range	Default
1	`SLS`	Minimum Set Point	-99.9 ÷ HS	-50.0
2	`SHS`	Maximum Set Point	LS ÷ 999	99.9
3	`SSA`	Active Set Point	1 ÷ 2	1
4	`SP`	Set Point (1)	S.LS ÷ S.HS	0.0
5	`SP2`	Set Point 2	S.LS ÷ S.HS	0.0

"i" - Inputs parameters

Parameter		Description	Range	Default
6	`iSE`	Probes Type	Pt PTC; nt NTC.	nt
7	`iuP`	Unit of measurement and resolution (decimal point)	C0 °C resolution 1°; F0 °F resolution 1°; C1 °C resolution 0.1°; F1 °F resolution 0.1°.	C1
8	`iFt`	Measurement filter	oF/20.0 s	2.0
9	`iC1`	Pr1 Probe Calibration	-30.0 ÷ +30.0°C/°F	0.0
10	`iC2`	Pr2 Probe Calibration	-30.0 ÷ +30.0°C/°F	0.0
11	`iC3`	Pr3 Probe Calibration	-30.0 ÷ +30.0°C/°F	0.0
12	`iCU`	Measure offset (display)	-30.0 ÷ +30.0°C/°F	0.0
13	`iP2`	Pr2 input function	oF No function; EP Evaporator; Au Aux probe; dG Digital input	EP
14	`iP3`	Pr3 input function		dG

Parameter		Description	Range	Default
15	i F 1	Function and function logic of digital	0 No function; 1 Start defrost; 2 End defrost; 3 Continuous cycle; 4 External alarm; 5 Door open with fan stop; 6 Door open with fan and compressor stop; 7 Auxiliary output command; 8 Selection of active Set Point; 9 External alarm with deactivation of control outputs; 10 Switch on/off (Stand-by); 11 Active Set Point and control action (SP-H, SP2-C) selection.	0
16	i t 1	Delay in acquiring digital input	oF/0.01 ÷ 9.59 (min.s) ÷ 99.5 (min.s x 10)	oF
17	i d S	Variable normally shown on display	oF Display off; P1 Pr1 measurement; P2 Pr2 measurement; P3 Pr3 measurement; SP Active Set Point.	P1

"r" - Temperature control parameters

Parameter		Description	Range	Default
18	r d	Differential (Hysteresis)	0 ÷ 30°C/°F	2.0
19	r t 1	Output (**ot**) activation time for probe (Pr1) error	oF/0.01 ÷ 9.59 (min.s) ÷ 99.5 (min.s x 10)	oF
20	r t 2	Output (**ot**) deactivation time for probe (Pr1) error	oF/0.01 ÷ 9.59 (min.s) ÷ 99.5 (min.s x 10)	oF
21	r H C	Output (ot) operating mode	H Heating C Cooling	C
22	r t C	Continuous cycle Time	oF/0.01 ÷ 9.59 (h.min) ÷ 99.5 (h.min x 10)	oF

"d" - Defrost control parameters

Parameter		Description	Range	Default
23	d d t	Defrosting Type	EL Electrical heating/Stop Compressor; In Hot gas/reverse cycle; No Without compressor output conditioning; Et Electrical heating with evaporator temperature control.	EL
24	d d i	Defrosting interval	oF/0.01 ÷ 9.59 (h.min.) ÷ 99.5 (h.min x 10)	6.00
25	d S d	1st defrost delay at power	oF Defrost at power-on; 0.01 ÷ 9.59 (h.min) ÷ 99.5 (h.min x 10)	6.00
26	d d E	Length (max.) of defrost cycle	oF/0.01 ÷ 9.59 (min.s) ÷ 99.5 (min.s x 10)	20.0
27	d t E	Defrost stop temperature	-99.9 ÷ +999°C/°F	8.0
28	d t S	Defrost enable temperature (d d C = **rt** or ct) or start (d d C = **St**)	-99.9 ÷ +999°C/°F	2.0
29	d d C	Defrost starting mode	rt Real time intervals; ct **ot** output on time intervals; cS Defrost every **ot** switching off (+ rt intervals); St Defrost for Pr2 < d t S (+ rt intervals); dd Dynamic defrost intervals (+ Pr2 < d t S).	rt
30	d d d	Dynamic Defrost Percentage reduction	0 ÷ 100%	50
31	d t d	Compressor delay after defrost (dripping time)	oF/0.01 ÷ 9.59 (min.s) ÷ 99.5 (min.s x 10)	oF
32	d d L	Defrost display Lock	oF Display free; On Locked on temperature Pr1 before defrost; Lb Locked on label d E F (defrost) and P d F (post-defrost).	oF

"F" - Evaporator fans control parameters

Parameter		Description	Range	Default
33	F t n	Fan time activation with **ot** output (compressor) OFF	oF/0.01 ÷ 9.59 (min.s) ÷ 99.5 (min.s x10)	5.00
34	F t F	Fan time deactivation with **ot** output (compressor) OFF	oF/0.01 ÷ 9.59 (min.s) ÷ 99.5 (min.s x 10)	oF
35	F F L	High temperature fan deactivation	-99.9 ÷ +999°C/°F	10.0
36	F L F	Low temperature fan deactivation	-99.9 ÷ +999°C/°F	-99.9
37	F d F	Differential fan control	0 ÷ 30°C/°F	1.0
38	F F E	Fan during defrost	oF/on	oF
39	F F d	Fan delay after defrost	oF/0.01 ÷ 9.59 (min.s) ÷ 99.5 (min.s x 10)	oF

"P" - Compressor protection and power on delay parameters

Parameter		Description	Range	Default
40	PP1	Output **ot** activation delay	oF/0.01 ÷ 9.59 (min.s) ÷ 99.5 (min.s x 10)	oF
41	PP2	Delay after output **ot** switch off	oF/.01 ÷ 9.59 (min.s) ÷ 99.5 (min.s x 10)	oF
42	PP3	Minimum time between two output **ot** power on	oF/0.01 ÷ 9.59 (min.s) ÷ 99.5 (min.s x 10)	oF
43	Pod	Delay outputs activation at power on	oF/0.01 ÷ 9.59 (min.s) ÷ 99.5 (min.s x 10)	oF

"A" - Alarm parameters

Parameter		Description	Range	Default
44	AAY	Temperature alarms type	1 Absolute to **Pr1,** label (Hi-Lo); 2 Relative to **Pr1**, label (Hi-Lo); 3 Absolute to **Au,** label (Hi-Lo); 4 Relative to **Au**, label (Hi-Lo); 5 Absolute to **Pr1,** no label; 6 Relative to **Pr1**, no label; 7 Absolute to **Au** no label; 8 Relative to **Au**, no label.	1
45	AHA	High temperature Alarm threshold	oF/-99.9 ÷ +999°C/°F	oF
46	ALA	Low temperature Alarm threshold	oF/-99.9 ÷ +999°C/°F	oF
47	AAd	Temperature Alarms Differential	0 ÷ 30°C/°F	1.0
48	AAt	Temperature Alarms delay	oF/0.01 ÷ 9.59 (min.s) ÷ 99.5 (min.s x 10)	oF
49	AtA	Alarm memory	oF/on	oF
50	APA	Temperature Alarms delay at power ON	oF/0.01 ÷ 9.59 (h.min) ÷ 99.5 (h.min x 10)	2.00
51	AdA	Temp. Alarms delay after defrost and continuous cycle and unlock display delay after defrost	oF/0.01 ÷ 9.59 (h.min) ÷ 99.5 (h.min x 10)	1.00
52	AoA	Alarm delay with door open	oF/0.01 ÷ 9.59 (min.s) ÷ 99.5 (min.s x 10)	3.00

"o" - Outputs and buzzer configuration parameters

Parameter		Description	Range	Default
53	o.o1	OUT1 function	oF No function; ot Temp. Control (compressor); dF Defrosting; Fn Fan; Au Auxiliary; At Silenceable alarm; AL Not silenceable Alarm; An Stored alarm; on On when instrument switched **on**.	ot
54	o.o2	OUT2 function		dF
55	o.o3	OUT3 function		Fn
56	o.bu	Buzzer function mode	oF Disable; 1 Active alarms only; 2 Key pressed only; 3 Active alarms and key pressed.	3
57	oFo	Function mode auxiliary output	oF No Function; 1 Control output **ot** delayed; 2 Manual activation by key or digital input; 3 Light with eco mode (ON with **SP**, OFF with **SP2**); 4 Internal light (OFF with door closed and ON with door opened).	oF
58	o.tu	Time relative to auxiliary output	oF/0.01 ÷ 9.59 (min.s) ÷ 99.5 (min.s x 10)	oF

"t" - Keyboard parameters

Parameter		Description	Range	Default
59	t.UF	Function mode key (U)	oF No function; 1 Auxiliary output command; 2 Continuous cycle command; 3 Selection of active Set Point (+ light off-eco mode); 4 Switch on/off (Stand-by)	oF
60	t.Fb	Function mode key (▼)		oF
61	t.Lo	Keyboard lock function delay	oF/0.01 ÷ 9.59 (min.s) ÷ 30.0 (min.s x 10)	oF
62	t.PP	Access Password to parameter functions	oF/999	oF
63	t.AS	MODBUS address (serial communication)	0 ÷ 255	1

8 PROBLEMS AND MAINTENANCE

8.1 Error messages

Error	Reason	Action
E1 -E1 E2 -E2 E3 -E3	The probe may be interrupted (E) or in short circuit (-E), or may measure a value outside the range allowed	Check the correct connection of the probe with the instrument and check the probe works correctly
EPr	Internal EEPROM memory error	Press the (P) key
Err	Fatal memory error	Replace the instrument or ship to factory for repair

8.2 Other messages

Message	Reason
od	Delay at power-on in progress
Ln	Keyboard lock
Hi	Maximum temperature alarm in progress
Lo	Minimum temperature alarm in progress
AL	Digital input alarm in progress
oP	Door opened
dEF	Defrosting in progress with ddL = **Lb**
PdF	Post-defrosting in progress with ddL = **Lb**
CC	Continuous Cycle in progress

8.3 Cleaning

We recommend cleaning of the instrument only with a slightly wet cloth using water and not abrasive cleaners or solvents.

8.4 Disposal

The appliance (or the product) must be disposed of separately in compliance with the local standards in force on waste disposal.

9 WARRANTY AND REPAIRS

The instrument is under warranty against manufacturing flaws or faulty material, that are found within 18 months from delivery date.

The guarantee is limited to repairs or to the replacement of the instrument.

The eventual opening of the housing, the violation of the instrument or the improper use and installation of the product will bring about the immediate withdrawal of the warranty's effects.

In the event of a faulty instrument, either within the period of warranty, or further to its expiry, please contact our sales department to obtain authorisation for sending the instrument to our company.

The faulty product must be shipped to Ascon Tecnologic with a detailed description of the faults found, without any fees or charge for Ascon Tecnologic, except in the event of alternative agreements.

10 TECHNICAL DATA

10.1 Electrical Data

Power supply: 12 VAC/DC, 12 ÷ 24 VAC/DC, 100 ÷ 240 VAC ±10%;

AC Frequency: 50/60 Hz;

Power consumption: 4 VA approx.

Input/s: 3 inputs for temperature probes: PTC (KTY 81-121, 990Ω @ 25°C) or NTC (103AT-2, 10kΩ @ 25°C); 1 digital input for free of voltage contacts (alternative to Pr2/Pr3 input);

Output/s: up to 3 relay outputs

	EN 61810	EN 60730	UL 60730
Out1 - SPST-NO - 16A - 1HP 250V, 1/2HP 125 VAC	16 (9) A	10 (4) A	12 A Res., 30 LRA, 5 FLA
Out2 - SPDT - 8A - 1/2HP 250V, 1/3HP 125 VAC	8 (3) A	4 (4) A	4 A Res.
Out3 - SPST-NO - 5A - 1/8HP 250V, 1/10HP 125 VAC	5 (2) A	2 (2) A	2 A Res.

16 A max. for common (pin. 1), 12 A max. for extractable terminal block model.

Electrical life for relay outputs: 100000 op. (EN60730);

Action type: type 1.B (EN 60730-1);

Overvoltage category: II;

Protection class: Class II;

Insulation: Reinforced insulation between the low voltage part (supply H type and relay output) and front panel; Reinforced insulation between the low voltage section (supply H type and relay output) and the extra low voltage section (inputs); Reinforced between supply and relay output; No insulation between supply F or G type and inputs.

10.2 Mechanical Data

Housing: Self-extinguishing plastic, UL 94 V0;

Heat and fire resistance category: D;

Ball Pressure Test secondo EN60730: accessible parts 75°C, support live parts 125°C;

Dimensions: 78 x 35 mm, depth 64 mm

Weight: 130 g approx.;

Mounting: Incorporated Flush in panel (thickness 12 mm max.) in 71 x 29 mm hole;

Connections: 2.5 mm^2 screw terminals block or 2.5 mm^2 extractable screw terminals block for 0.2 ÷ 2.5 mm^2/ AWG 24 ÷ 14 cables;

Front panel protection degree: IIP65 (NEMA 3S) mounted with opotional screw type bracket;

Pollution situation: 2;

Operating temperature: 0 ÷ 50°C;

Operating humidity: < 95 RH% with no condensation;

Storage temperature: -25 ÷ +60°C.

10.3 Functional Features

Temperature Control: ON/OFF mode;
Defrost control: Interval cycles or evaporator temperature by Electric Heating/Compressor stops or hot-gas/reverse cycle
Measurement range: NTC: -50 ÷ 109°C/-58 ÷ 228°F,
PTC: -50 ÷ 150°C/-58 ÷ 302°F;
Display resolution: 1° or 0.1°;
Overall accuracy: ±(0.5% fs + 1 digit);
Sampling rate: 130 ms;
Display: 3 Digit Red (Blue optional) h 15.5 mm;
Software class and structure: Class A;
Compliance: Directive 2004/108/CE (EN55022: class B;
EN61000-4-2: 8kV air, 4KV cont.; EN61000-4-3: 10V/m;
EN61000-4-4: 2kV supply and relay outputs, 1kV inputs;
EN61000-4-5: supply 2kV com. mode, 1kV\ diff. mode;
EN61000-4-6: 3V),
Directive 2006/95/CE (EN 60730-1, EN 60730-2-9),
Regulation 37/2005/CE (EN13485 air, S, A, 2,- 50°C +90°C with probe NTC 103AT11).

11 HOW TO ORDER

MODEL
Y39 - Instrument with mechanical keyboard
Y39S - Instrument with Sensitive Touch keyboard

a: POWER SUPPLY
H = 100 ÷ 240 VAC
G = 12 ÷ 24 VAC/VDC
F = 12 VAC/VDC

b: OUT1 OUTPUT
R Out1 Relay SPST-NO 16A(for resistive loads)

c: OUT2 OUTPUT
R = Out2 Relay SPDT 8A (for resistive loads)
- = Not present

d: OUT3 OUTPUT
R = Out3 Relay SPST-NO 5A (for resistive loads)
- = Not present

e: Buzzer
B = Buzzer
- = Not present

f: Terminals
- = Fixed Screw power terminals (standard);
E = Removable screw power terminals;
N = Removable screw power terminals (the fixed part only).

g: DISPLAY
- = Red
B = Blue

Y39	-	a	b	c	d	e	f	g	h	i	j	kk	ll

h, i, j: RESERVED CODES;
kk, ll: SPECIAL CODES.

Note: To order the Optional Screw type Bracket necessary to obtain the IP65 Front protection degree, please, contact your Ascon Tecnologic supplier