OVENS CONTROL

OVENS CONTROL SYSTEM WITH PROGRAMMER

Installation and Usage Manual

24/02 - Code: ISTR_M_-PROseries_E_00_--

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1. OUTLINE DIMENSIONS (mm)

1.1 Mounting requirements

This instrument is intended for permanent installation, indoor use only, in an electrical panel which encloses the instrument, the terminals and wirings specific for a DIN rail mounting.

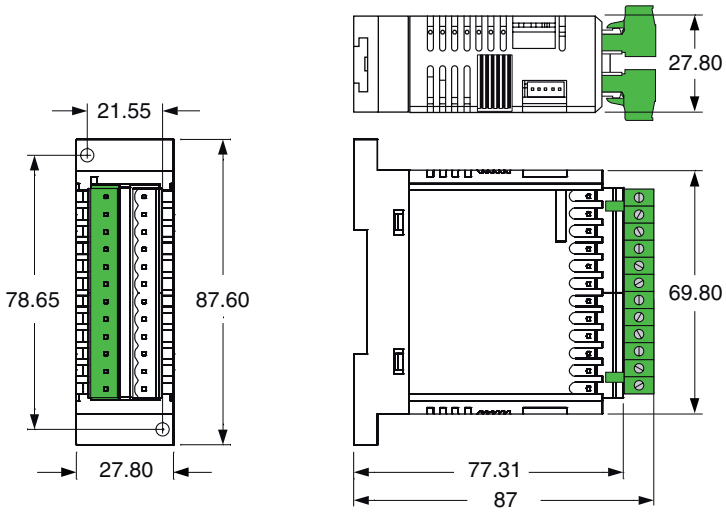
Select a mounting location having the following characteristics:

1. It should be easily accessible;
2. There are minimum vibrations and no impacts;
3. There are no corrosive gases;
4. There are no water or other fluids (i.e. condensation);
5. The ambient temperature is in accordance with the operative temperature (0... 50°C);
6. The relative humidity is in accordance with the instrument specifications (20... 85%);

The instrument can be mounted on a DIN rail or wall.

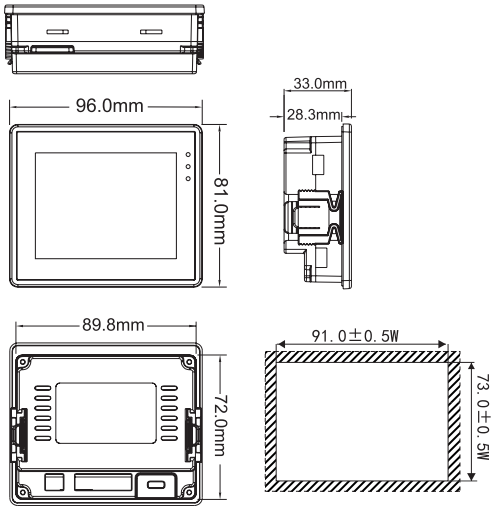
1.2 Dimensions

1.2.1 Programmer

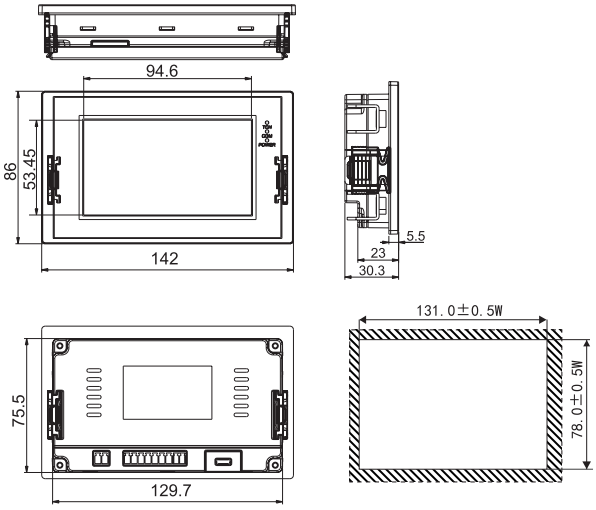


1.2.2 Operator panel

2035T



2043T

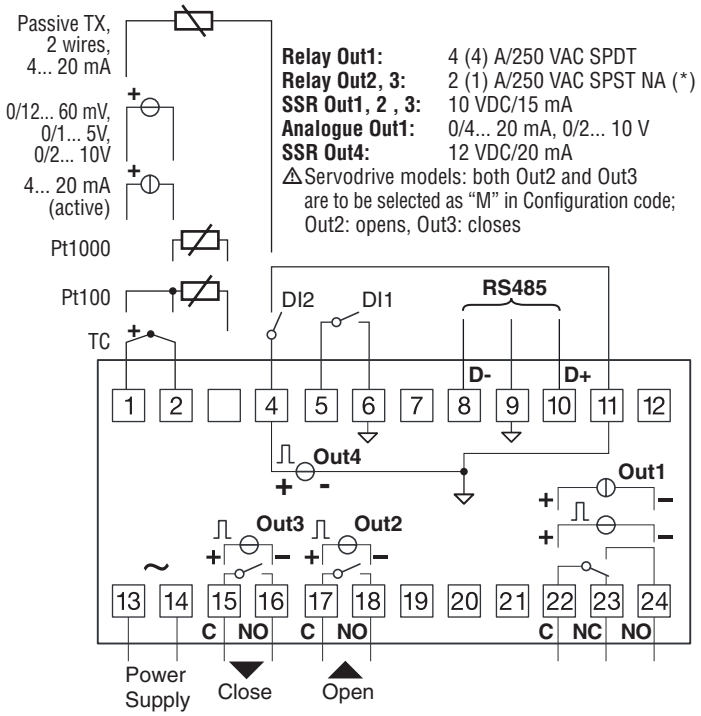


2. CONNECTION DIAGRAM

2.1 General notes about wiring

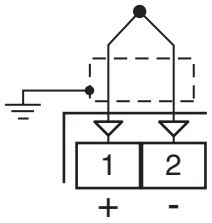
1. Do not run input wires together with power cables.
2. External components (like zener barriers, etc.) connected between sensor and input terminals may cause errors in measurement due to excessive and/or not balanced line resistance or possible leakage currents.
3. When a shielded cable is used, the protection shield should be connected to earth at one end only.
4. Pay attention to the line resistance, a high line resistance may cause measurement errors.

2.2 Programmer electrical connections



2.3 Inputs

2.3.1 Thermocouple Input



External resistance: 100Ω max., error 25 µV max..

Cold junction: Automatic compensation between 0... 50°C.

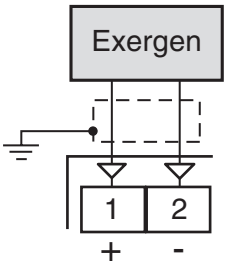
Cold junction accuracy: 0.05°C/°C after a warm-up of 20 minutes.

Input impedance: > 1 MΩ.

Calibration: According to EN 60584-1.

Note: For TC wiring use proper compensating cable preferable shielded.

2.3.2 Infrared Sensor Input



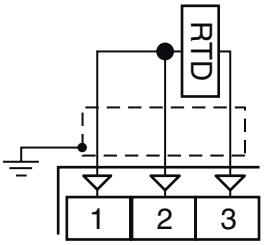
External resistance: Not relevant.

Cold junction: Automatic compensation between 0... 50°C.

Cold junction accuracy: 0.05°C/°C.

Input impedance: > 1 MΩ.

2.3.3 RTD Pt 100 Input



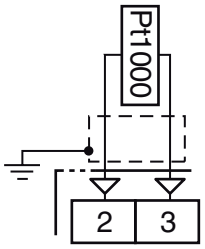
Input circuit: Current injection (150 µA).

Line resistance: Automatic compensation up to 20Ω/wire with maximum error ±0.1% of the input span.

Calibration: According to EN 60751/A2.

Note: The resistance of the 3 wires must be the same.

2.3.4 RTD Pt 1000, NTC and PTC Input

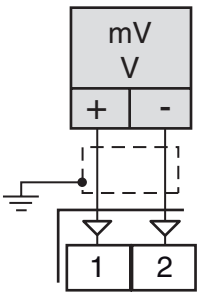


Line resistance: Not compensated.

Pt 1000 input circuit: Current injection (15 µA).

Pt 1000 calibration: According to EN 60751/A2.

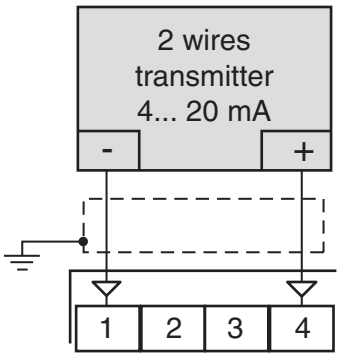
2.3.5 V and mV Input



Input impedance: > 1 MΩ for mV Input
500 kΩ for Volt Input.

2.3.6 mA Input

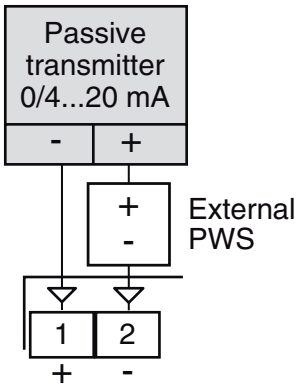
0/4... 20 mA Input wiring for passive transmitter using the auxiliary pws



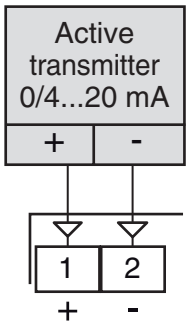
Input impedance: < 51Ω.

Internal auxiliary PWS: 12 VDC (±10%), 20 mA max..

0/4... 20 mA Input wiring for passive transmitter using an external pws



0/4... 20 mA Input wiring for active transmitter



2.3.7 Logic Inputs

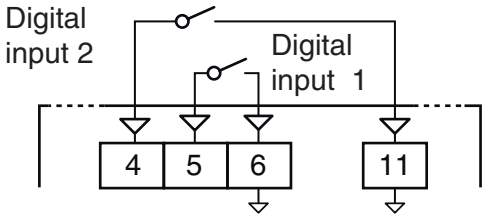
Safety notes:

– Do not run logic input wiring together with power cables;

– The instrument needs 150 ms to recognize a contact status variation;

– Logic inputs are **NOT** isolated by the measuring input. A double or reinforced isolation between logic inputs and power line must be assured by the external elements.

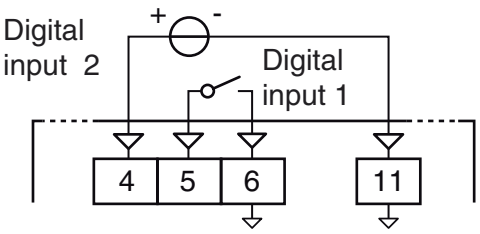
Logic input driven by dry contact



Maximum contact resistance: 100Ω.

Contact rating: DI1 = 10 V, 6 mA;
DI2 = 12 V, 30 mA.

Logic inputs driven by 24 VDC



Logic status 1 voltage: 6... 24 VDC;

Logic status 0 voltage: 0... 3 VDC.

2.4 Outputs

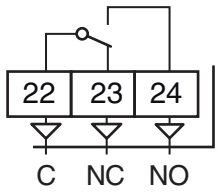
Safety notes:

– To avoid electrical shocks, connect power line at last.
– For supply connections use No. 16 AWG or larger wires rated for at least 75°C.
– Use copper conductors only.
– SSR outputs are not isolated. A reinforced isolation must be assured by the external solid state relays.
– For SSR, mA and V outputs if the line length is longer than 30 m use a shielded wire.

⚠ **Before connecting the output actuators**, we recommend to configure the parameters to suit your application (e.g.: input type, Control strategy, alarms, etc.).

2.4.1 Output 1 (OP1)

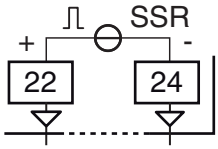
Relay Output



OP1 contact rating: • 4 A /250 V cosφ =1,
• 2 A /250 V cosφ =0.4,

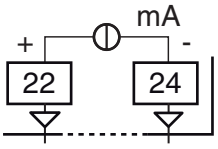
Operation: 1 x 10^5.

SSR Output



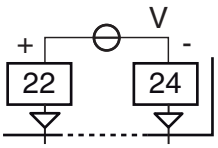
Logic level 0: Vout < 0.5 VDC
Logic level 1: 12 V ± 20%, 15 mA max..

Current Analogue Output



mA output: 0/4... 20 mA, galvanically isolated, RL max. 600Ω.

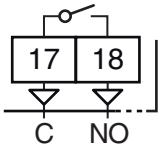
Voltage Analogue Output



V output: 0/2... 10 V, galvanically isolated, RL min.: 500Ω.

2.4.2 Output 2 (OP2)

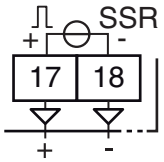
Relay Output



OP1 contact rating: • 2 A /250 V cosφ = 1,
• 1 A /250 V cosφ = 0.4;

Operation: 1 x 10^5.

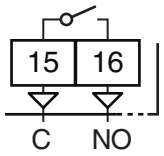
SSR Output



Logic level 0: Vout < 0.5 VDC;
Logic level 1: 12 V ± 20%, 15 mA max..

2.4.3 Output 3 (OP3)

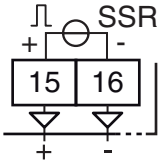
Relay Output



OP1 contact rating: - 2 A /250 V cosφ = 1,
- 1 A /250 V cosφ = 0.4;

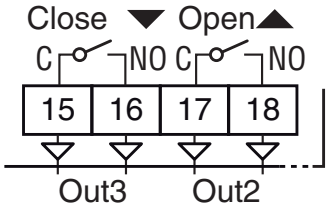
Operation: 1 x 10^5.

SSR Output



Logic level 0: Vout < 0.5 VDC;
Logic level 1: 12 V ± 20%, 15 mA max..

2.4.4 Out2 and Out3 Servomotor Drive

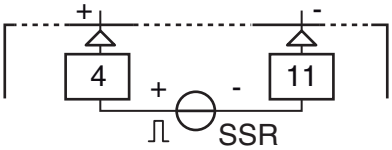


OP2/3 contact rating: • 2 A /250 V cosφ = 1;
• 1 A /250 V cosφ = 0.4.

Operation: 1 x 10^5.

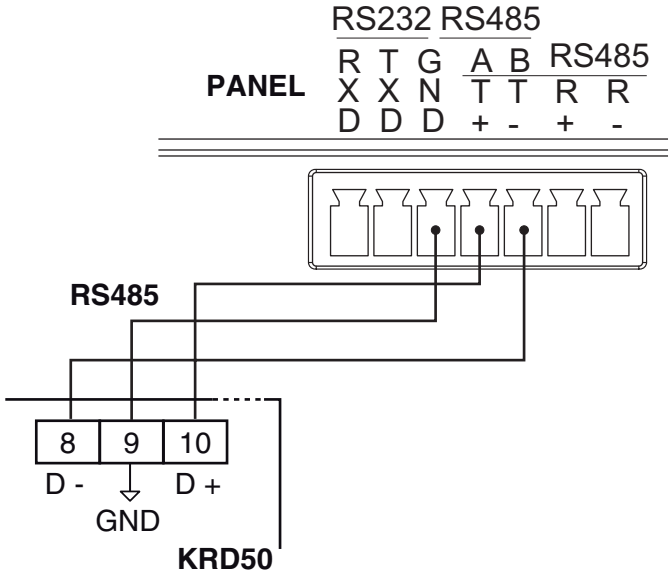
2.4.5 Output 4 (OP4)

SSR Output



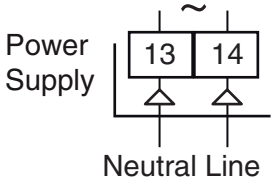
Logic level 0: Vout < 0.5 VDC;
Logic level 1: 12 V ± 20%, 20 mA max..
Note: Overload protected.

2.5 Serial Interface



Interface type: Isolated (50 V) RS-485;
Voltage levels: According to EIA standards;
Protocol type: MODBUS RTU;
Byte format: 8 bit with no parity;
Stop bit: 1 (one);
Baud rate: Fixed at 19200 baud;
Address: Fixed at 1.

2.6 Power Supply



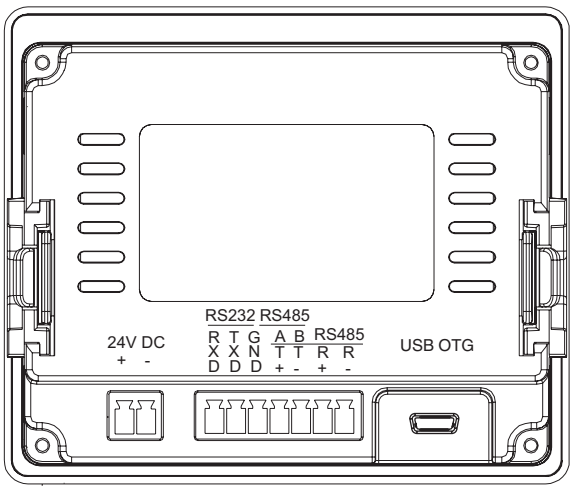
Supply Voltage:

- 24 VAC/DC (±10%)
- 100... 240 VAC (-15... +10%)

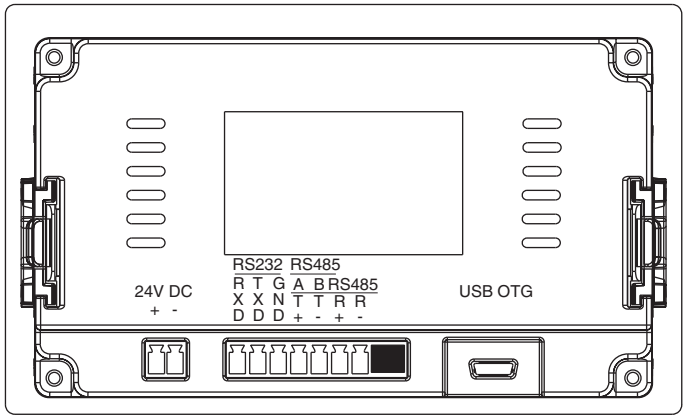
Notes: 1. Before connecting the instrument to the power line, make sure that line voltage is equal to the voltage shown on the identification label;
2. The polarity of the power supply has no importance;
3. The power supply input is NOT fuse protected. Please, provide a T type 1A, 250 V fuse externally.
4. If the 100... 240 VAC programmer model has been selected, a 24 VDC output voltage power supply unit with must be provided to supply the operator panel.

2.7 Oerator panel connections

2.7.1 2032



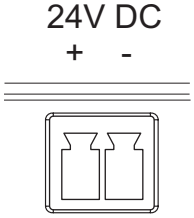
2.7.2 2043



2.7.3 Serial Interface

Note: Please consult the "*Serial Interface*" paragraph of the programmer for details.

2.7.4 Power supply



Power supply: 24 V/DC (±10%).

If the 100... 240 VAC programmer model has been selected, a 24 VDC output voltage power supply unit with must be provided to supply the operator panel (consult *Chapter "10. Accessories" a pagina 18* for details).

3. TECHNICAL CHARACTERISTICS

3.1 Programmer

Case: Plastic, self-extinguishing degree: V-0 according to UL 94;

Terminals protection: IP20 according to EN 60070-1;

Installation: Rear panel on DIN rail;

Terminal block: 24 M3 screw terminals, for cables of 0.25... 2.5 mm² (AWG 22... AWG 14) with connection diagram;

Dimensions: (H x L x D): 75 x 33 x 75.5 mm (2.95 x 1.30 depth 2.97 in.)

Weight: 180 g max..

Power supply:

- 24 VAC/DC (±10% of the nominal value);
- 100... 240 VAC (-15... +10% of the nominal value);

Power consumption: 5 VA max.;

Insulation voltage: 2300 Vrms according to EN 61010-1;

Sampling time: 130 ms;

Resolution: 30000 counts;

Total Accuracy: ±0.5% F.S.V. ±1 digit @ 25°C of room temperature;

Electromagnetic compatibility and safety requirements

Compliance: EMC 2004/108/CE (EN 61326-1) directive, LV 2006/95/CE (EN 61010-1) directive;

Installation category: II;

Pollution category: 2;

Temperature drift: It is part of the global accuracy;

Operating temperature: 0... 50°C (32... 122°F);

Storage temperature: -30... +70°C (-22... +158°F);

Humidity: 20... 85% RH, not condensing.

3.2 Operator panel

Display: 3.5" or 4.3" TFT with LED backlight;

Resolution: 320 x 240 pixel;

Brightness: 300 cd/m²;

Colours: 65536 colours;

Touchscreen: High precision resistive 4 wires touchscreen;

CPU: 32-bits 300MHz RISC;

Memory: 128 MB flash and 128 MB DDRAM;

USB ports: USB 2.0 Host + USB 2.0 Client;

Serial ports: Comm 1 RS422/RS485, Comm 2 RS232;

Power supply: 24 VDC (12... 28 VDC);

Current absorption 200 mA@24V;

Allowed power failure: <5 ms;

Insulation resistance: >20MΩ 500 VDC;

Insulation voltage: 500V AC < 1 minute;

Operating temperature: -10... 60 °C ;

Storage temperature -20... 70°C;

Humidity: 10... 90% RH;

Vibration resistance: 10... 25 Hz (from directions X, Y, Z 2G/30 minutes);

Protection degree IP65;

CE Certification: CE marking;

FCC Certification: FCC Class A.

Mechanical characteristics

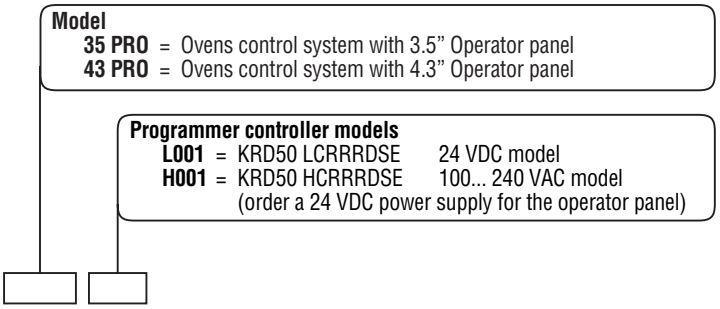
Case: ABS Plastic,

Dimensions: 96 x 81 x 33 mm (35 PRO), 142 x 82 x 30.3 (43 PRO);

Panel Cut-out: 91 x 73 mm (35 PRO), 131 x 78 (43 PRO);

Protection degree: IP65.

4. HOW TO ORDER



5. CONFIGURATION PROCEDURE

5.1 Introduction

When the instrument is powered, it starts immediately to work according to the parameters values loaded in its memory.

The instrument behaviour and its performance are governed by the value of the stored parameters.

At the first start up the instrument will use a “default” parameter set (factory parameter set); this set is a generic one (e.g. a TC J input is programmed).

Before connecting the output actuators, we recommend to configure the parameters to suit your application (e.g.: input type, Control strategy, alarms, etc.).

To change these parameters you need to enter the “*Configuration mode*”.

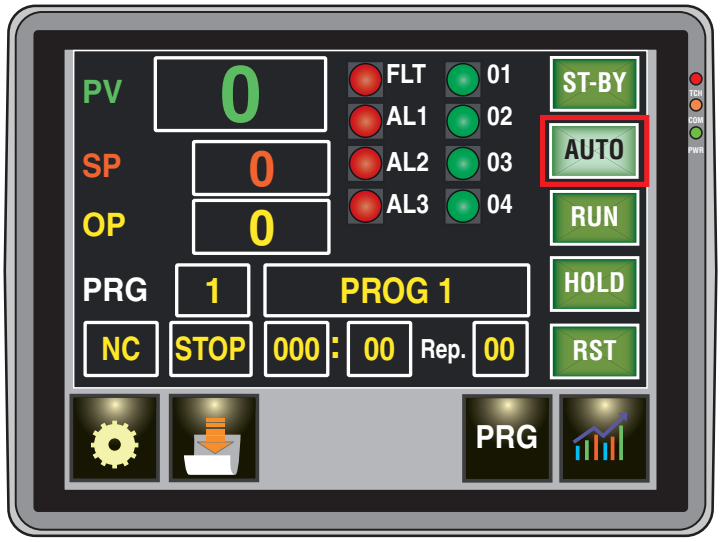
Do not change the **[6] Unit (Engineering Unit)** value during process control as the temperature values inserted by the user (thresholds, limits etc.) are not automatically rescaled by the instrument.

5.2 Instrument behaviour at Power ON

At Power ON the instrument can start in one of the following mode depending on its configuration:

Auto mode without program functions

– The display shows the AUTO button with a light green background and the text in black;



– The instrument is performing the standard control.

Stand-by mode (St.by)

– The display shows the ST-BY button with a light green background and the text in black;

– The instrument does not perform any control (the control outputs are OFF);

– The instrument is working as an indicator.

Auto mode with program in execution

– The display shows the AUTO and RUN buttons with a light green background and the text in black.

5.3 Entering the Configuration mode

The configuration parameters are collected in Groups. Each Group defines all the parameters relating to a specific function (control, alarms, output functions).

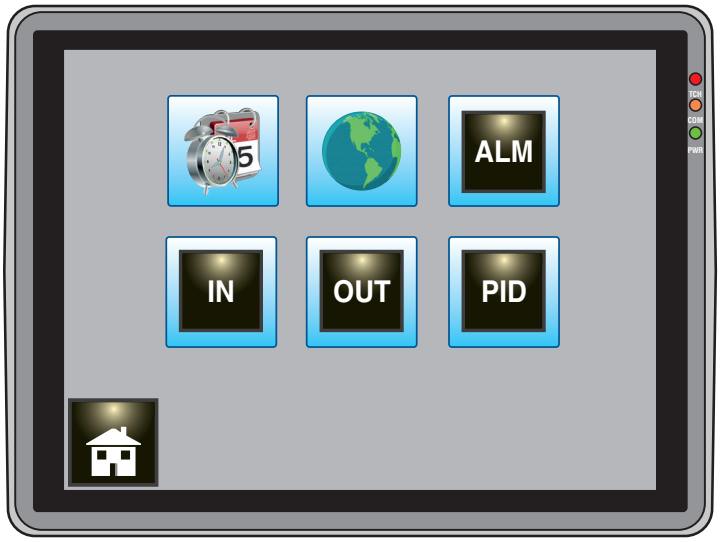
To enter the “*Configuration mode*” Touch the button, the display starts showing the “*Settings page*”.

5.4 Exiting the Configuration mode

Touch in sequence the and the buttons, the instrument returns to the initial page (or “*Status page*”).

5.5 Configuring the parameters

As we have just said, touching the button it is possible to access the settings page.



Note: This page is subject to a 10 minutes timeout, once elapsed the system returns displaying the main page.

In the “*Settings page*” are present the following buttons:

Allows to access the page for setting the current date/time used by the system internal clock.
Note: This page is NOT password protected.

Allows to access the language selecting page.
Note: This page is NOT password protected.

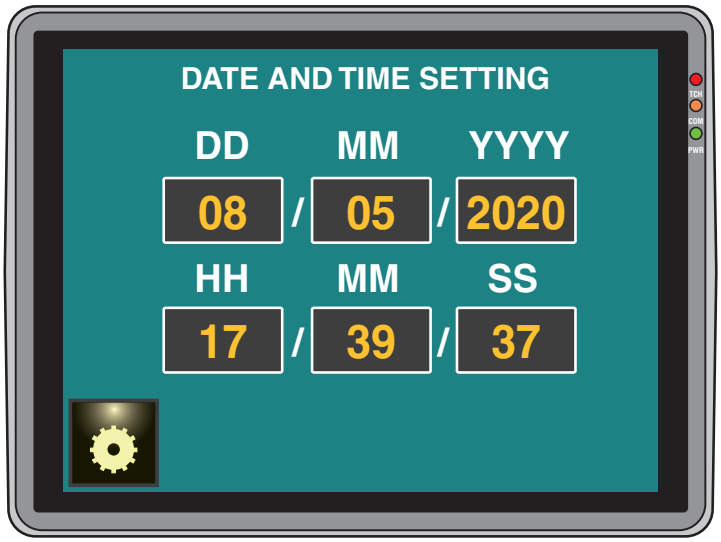
ALM — Allows to access the alarms setting page.
Note: This page is password protected.

IN — Allows to access the input probe and the engineering unit (C° or F°) setting page.
Note: This page is password protected.

OUT — Allows access to the setting page of the function assigned to each physical output.
Note: This page is password protected.

PID — Allows you to access the page for setting the control parameters and to activate/deactivate the auto-tune.
Note: This page is password protected.

5.5.1 Date and time setting



To set the current date and time tap on the desired parameter (DD = day, MM = month, YYYY = year, HH = hour, MM = minute, SS = second); the system at this point shows a numeric keypad to insert the desired value.

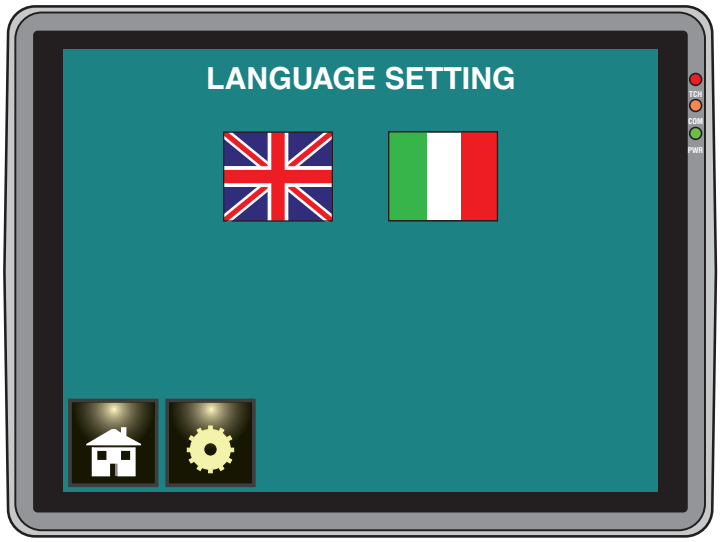
At the top is shown the present value, then the minimum and maximum allowed values. Functions of the keys on the right:

Del Deletes the digit on the right;
Clear Clears the entire field;
Esc Exits the numeric keypad with no changes;
Enter Exits the numeric keypad and saves the inserted value.

The unuseful keys (**+/-** and **.**) are not active.

Once the current date and time have been inserted, tap the button to store the data and exit the Date and Time setting page.

5.5.2 Language selection



To set the desired language, tap on the related flag, then the button to store the selected language and exit the page.

5.5.3 Entering and changing passwords

The system has 2 separate password levels: the 1st one (default 1111) allows to access the alarms setting page only, while the 2nd level (default 5000) allows to access all the setting pages (ALM, IN, OUT, PID). When one of the above keys is pressed, the display shows:

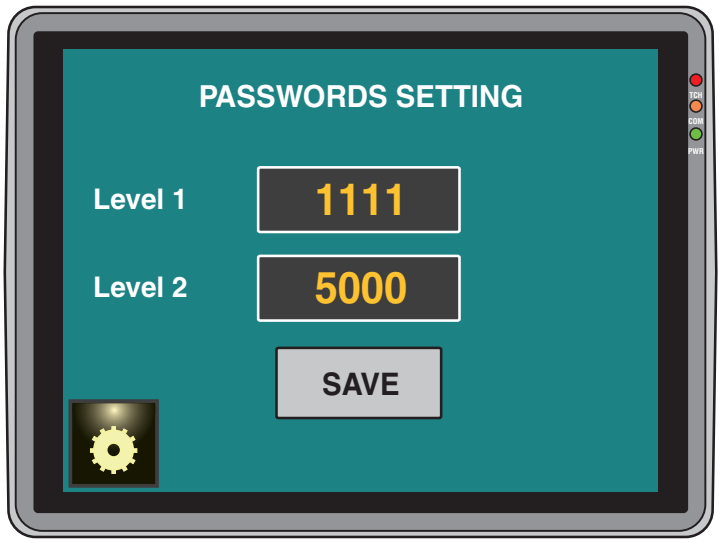
Set the correct password number and press Enter. If the password is correct the system will enter the previously selected page.

Note: Once the password has been entered, it remains active until the setting pages are exited.

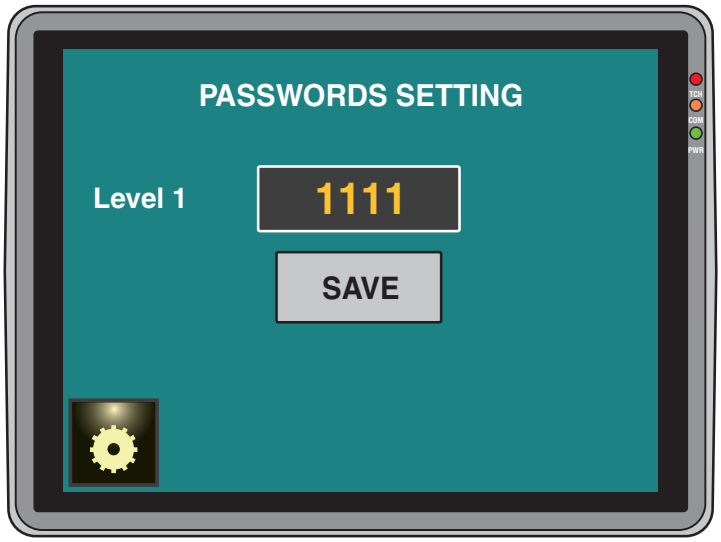
The **ALM** (Alarms) and **OUT** (Outputs) pages contain the PWD button which allow to enter the password change page.

Through the **ALM** page it is possible change the 1st level password only, while from the **OUT** page it is possible to change both 1st and 2nd level passwords.

Therefore from the **OUT** page, pressing the PWD key will access to the following page:

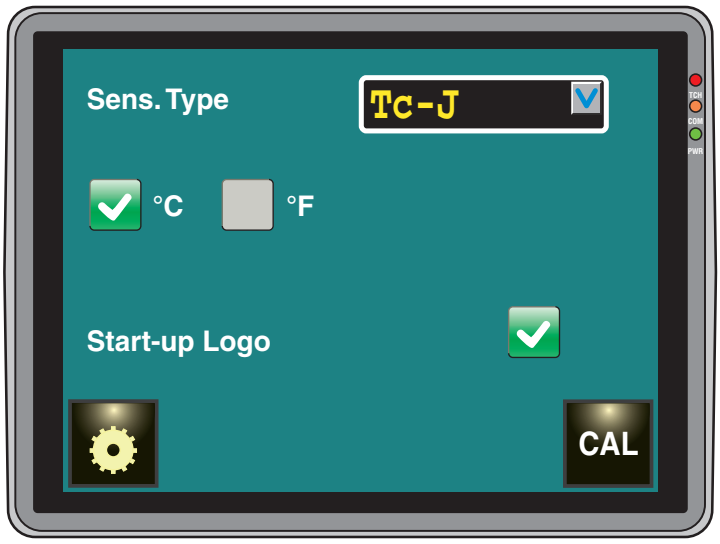


While from the **ALM** page, the tapping of the PWD button causes to display the page:



To change the password, insert the new number ad tap on the SAVE button.

5.5.4 Probe input setting (IN)



In the **Sens. Type** field, select the desired probe type.

Range:	**J**	TC J	(0... 1000°C/32... 1832°F);
	crAL	TC K	(0... 1370°C/32... 2498°F);
	S	TC S	(0... 1760°C/32... 3200°F);
	r	TC R	(0... 1760°C/32... 3200°F);
	t	TC T	(0... 400°C/32... 752°F);
	n	TC N	(0... 1000°C/32... 1832°F);
	ir.J	Exergen IRS J	(0... 1000°C/32... 1832°F);
	ir.cA	Exergen IRS K	(0... 1370°C/32... 2498°F);
	Pt1	RTD Pt 100	(-200... 850°C/-328... 1562°F);
	Pt10	RTD Pt 1000	(-200... 850°C/-328... 1562°F);
	0.60	0... 60 mV linear;	
	12.60	12... 60 mV linear;	
	0.20	0... 20 mA linear;	
	4.20	4... 20 mA linear;	
	0.5	0... 5 V linear;	
	1.5	1... 5 V linear;	
	0.10	0... 10 V linear;	
	2.10	2... 10 V linear.	

Selecting a **non-linear sensor** (thermocouples, resistance thermometers, thermistors or infrared probes) it is also necessary to specify the Engineering Unit (°**C** or °**F**) to be displayed.

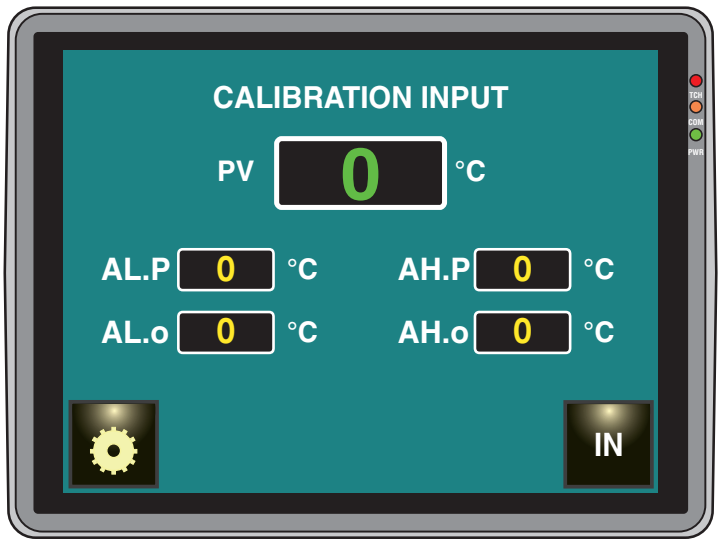
When a linear (mA or V) measurement input is selected, the °C or °F selection has no influence on the measurement, but the display will show the parameters **SSc** = **Start of scale** and **Fsc** = **Full scale**. Set the desired values.

e.g.: A temperature transmitter with **4.20 mA output** and **-20... 400°C** range is connected to the instrument.

Set: **Sensor type** = **4-20 mA**;
SSc = = **-20**;
Fsc = = **400**.

5.5.5 Input calibration (CAL)

From page **Probe input setting**, using the CAL button is possible to access the **Input calibration** page.



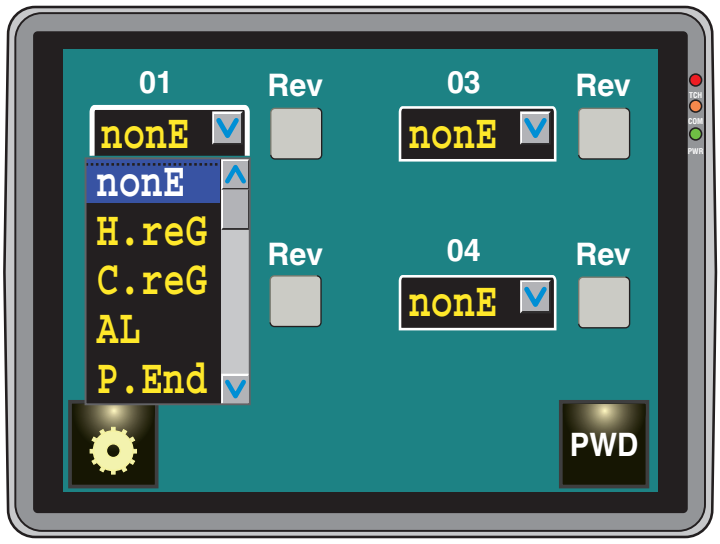
Where:

AL.P Lower calibration point;
AL.o **Offset** applied to the **lower calibration point**;
AH.P Higher calibration point;
AH.o **Offset** applied to the **higher calibration point**.

Example: Climatic chamber with range of use 10... 100°C.

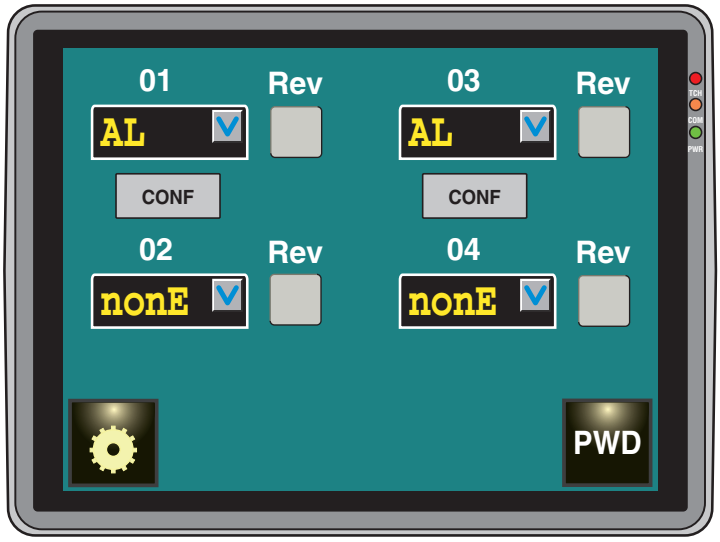
1. Insert in the chamber a reference sensor connected to a reference meter (usually a calibrator);
2. Turn ON the chamber and set a set point temperature equal to the minimum value of the range of use (eg. 10°C). When the chamber temperature is stable, take note of the measurement performed by the reference system (eg. 11°C);
3. Set [139] AL.P = **10** (Lower calibration point) and [140] AL.o = **-1** (the difference between the measurement made by the instrument compared to that made by the reference system). Note that after these settings the measurement of the instrument becomes equal to the measurement made with the reference system;
4. Now set a set point temperature equal to the maximum value of the range of use (eg. 100°C). When the chamber temperature is stable, take note of the measurement performed by the reference system (eg. 98°C);
5. Set [141] AH.P = **100** (Higher calibration point) and [142] AH.o = **+2** (the difference between the measurement made by the instrument compared to that made by the reference system). Also in this case, after these settings, the measurement of the instrument becomes the same as the measurement made with the reference system.

5.5.6 Physical outputs setting (OUT)

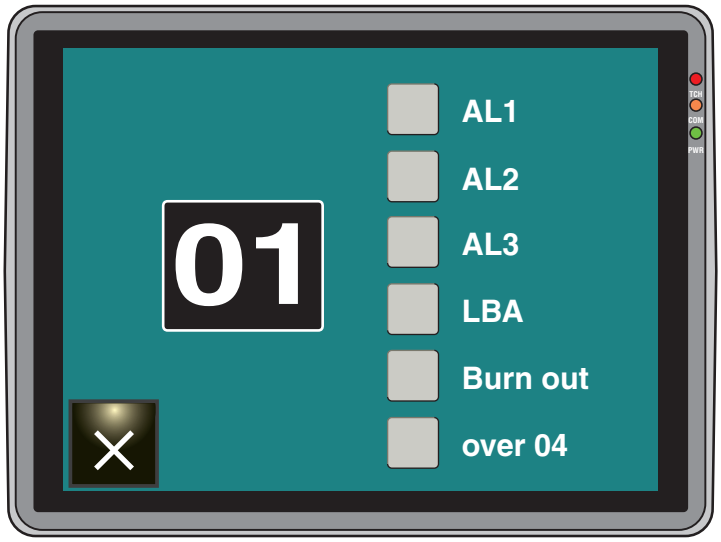


Range: **nonE** Output not used. With this setting the status of this output can be set through the serial interface;
H.rEG Heating output;
c.rEG Cooling output;
AL Alarm output;
P.End Program in "**end**" status label;
P.HLd Program in "**hold**" status label;
P. uit Program in "**wait**" status label
P.run Program in "**run**" status label;
P.Et1 1st program event;
P.Et2 2nd program event;
or.bo Out-of-range or sensor break label;
P.FAL Power supply failure label;
bo.PF Out-of-range, sensor break or power supply failure labe;
St.By Stand -by mode label;
diF1 The output reflects the status of the digital input 1;
diF2 The output reflects the status of the digital input 2;
on Out1 always ON.

When selecting an output 0❑ = **AL** (❑ = 1... 4) the panel displays the button CONF.

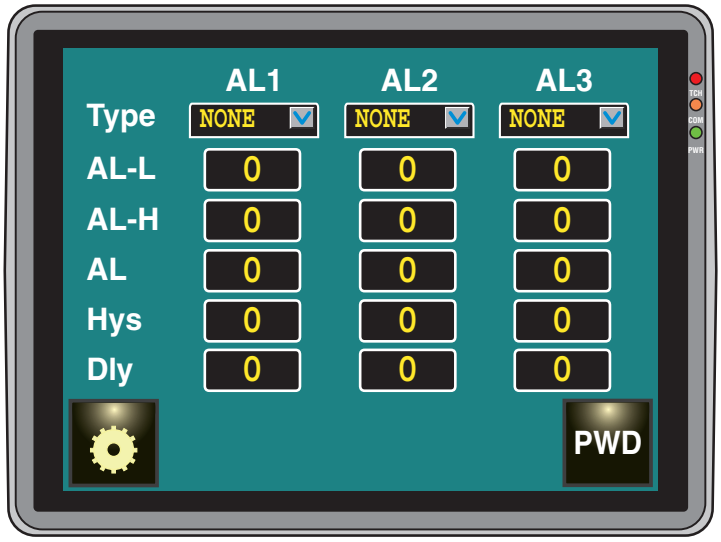


Tapping on the CONF key, the next page allows you to associate one or more alarms (in OR) to the selected output.



After selecting the desired elements, tap on the ✕ button.

5.5.7 Alarms setting (ALM)

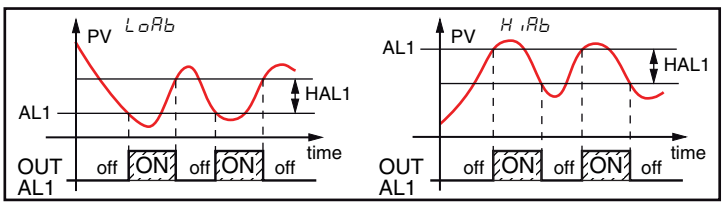


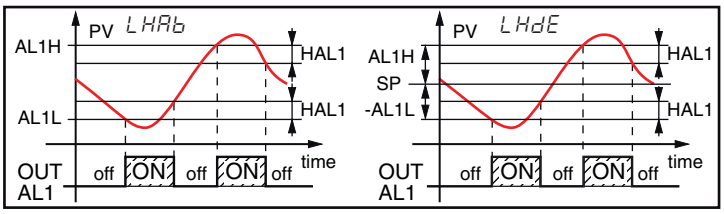
Type - Alarm type 1

Available: One or more outputs are programmed as control outputs.

Range:
- **nonE** Alarm not used;
- **LoAb** Absolute low alarm;
- **HiAb** Absolute high alarm;
- **LHAo** Absolute band alarm with out of the band alarm indication;
- **LHAi** Absolute band alarm with in band alarm indication;
- **SE.br** Sensor break;
- **LodE** Deviation low alarm (relative);
- **HidE** Deviation high alarm (relative);
- **LHdo** Relative band alarm with out of the band alarm indication;
- **LHdi** Relative band alarm with in band alarm indication.

Notes: 1. The relative and deviation alarms refer to the operating set point of the instrument.





2. The (SE.br) sensor break alarm will be ON when the display shows - - - - indication.

AL1L - For High and low alarms, it is the low limit of the AL1 threshold
- For band alarm, it is low alarm threshold

Range: From -1999 to [30] AL1H in engineering units.

AL1H - For High and low alarms, it is the high limit of the AL1 threshold
- For band alarm is high alarm threshold

Range: From [30] AL1L to 9999 engineering units.

AL1 - Alarm threshold

Range: From [30] AL1L to [31] AL1H engineering units.

HAL - Alarm hysteresis

Range: 1... 9999 engineering units.

Notes: 1. The hysteresis value is the difference between the Alarm threshold value and the point the Alarm automatically resets.

2. When the alarm threshold plus or minus the hysteresis is out of input range, the instrument will not be able to reset the alarm.

e.g. 1 Input range 0... 1000 (mBar).
- Set point equal to 900 (mBar);
- Deviation low alarm equal to 50 (mBar);
- Hysteresis equal to 160 (mBar)
  the theoretical reset point is 900 - 50 + 160 = 1010 (mBar) but this value is out of range.
  The reset can be made only by turning the instrument OFF, removing the condition that generates the alarm and then turn the instrument ON again.
- All band alarms use the same hysteresis value for both thresholds;
- When the hysteresis of a band alarm is bigger than the programmed band, the instrument will not be able to reset the alarm.

e.g. 2 Input range 0... 500 (°C).
- Set point equal to 250 (°C);
- Relative band alarm;
- Low threshold equal to 10 (°C);
- High threshold equal to 10 (°C);
- Hysteresis equal to 25 (°C).

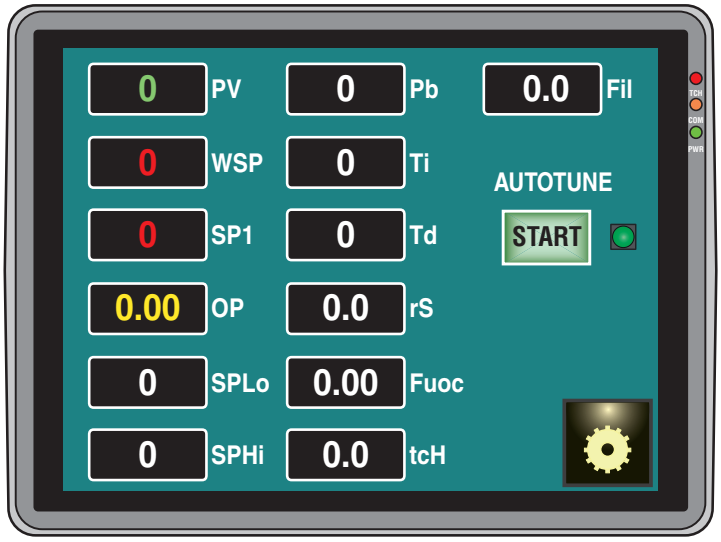
AL-d - Alarm delay

Range: 0 oFF (delay not used);
1... 9999 seconds.

Note: The alarm goes ON only when the alarm condition persists for a time longer than AL-d time but the reset is immediate.

From the alarms setting page, tapping the PWD key, it is possible to access the password change page (see chapter **5.4.3**).

5.5.8 PID parameters setting (PID)



This page is structured in 2 areas.

– The left column which shows the current data and the operating parameters (measurement, working Set Point, etc.).

– The central column which collects the actual PID parameters.

In the **left column** are present:

PV Present value;
WSP Working Set Point;
SP1 Current Set Point value;
OP Current output control power;
SPLo Minimum Set Point value;
SPHi Maximum Set Point value.

In the **central column** are present:

Pb - Proportional band

Range: 1... 9999 in engineering units.

Note: Auto-tune function calculate this value.

Ti - Tempo integrale

Range: OFF Integral action excluded;
1... 9999 secondi;
inF Integral action excluded.

Note: Auto-tune function calculate this value.

Td - Tempo derivativo

Range: oFF Derivative action excluded;
1... 9999 secondi.

Note: Auto-tune function calculate this value.

rS - Manual reset (integral pre-load)

It allows to drastically reduce the undershoot due to a hot restart. When your process is steady, the instrument operates with a steady power output (e.g.: 30%).

If a short power down occurs, the process restarts with a process variable close to the set point while the instrument starts with an integral action equal to zero. Setting a manual reset equal to the average power output (in our example 30%) the instrument will start with a power output equal to the value it will use at steady state (instead of zero) and the undershoot will become very little (in theory equal to zero).

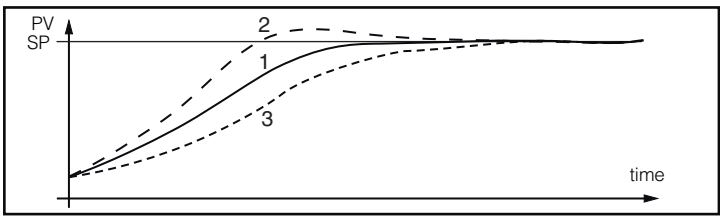
Range: -100.0... +100.0%.

Fuoc - Fuzzy overshoot control

This parameter reduces the overshoot usually present at instrument start up or after a set point change and it will be active only in this two cases.

Setting a value between **0.00** and **1.00** it is possible to slow down the instrument action during set point approach.

Setting **Fuoc** = **1** this function is disabled.



Range: 0... 2.00.

Note: Fast auto-tune calculates the **Fuoc** parameter while the oscillating one sets it equal to 0.5.

tcH - Cycle time of the heating output

Range: 1.0... 130.0 seconds

FiL - Digital filter on the measured value

Range: oFF No filter inserted;
0.1... 20.0 s.

Note: This is a first order digital filter applied on the measured value. For this reason it will affect the measured value but also the control action and the alarms behaviour.

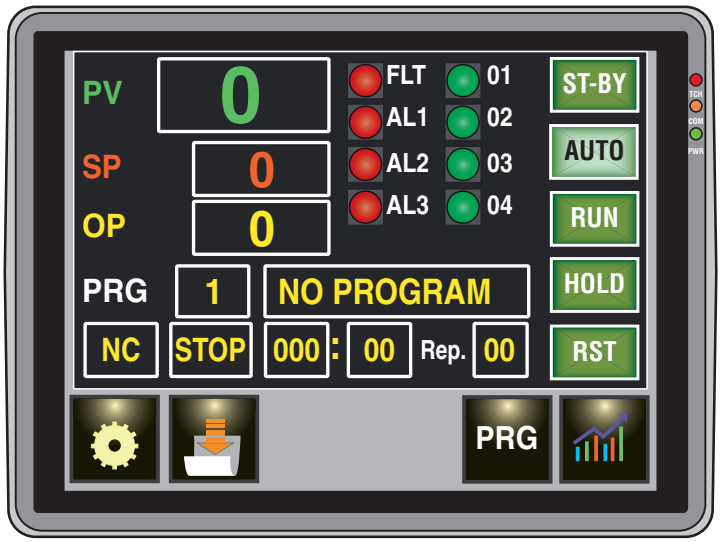
START *button - Autotuning manual start*

Range: oFF The instrument is not performing the autotuning;
on The instrument is performing the autotuning;

Tap on the START button to enable/disable the autotuning.

Through the PID parameters setting page is possible (tapping on the PWD button) it is possible to access the password change page (see chapter **5.4.3**).

6. THE STATUS PAGE (initial page)



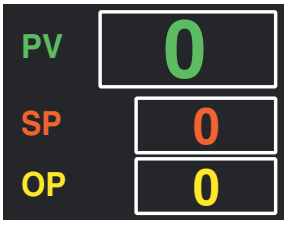
This page is the page normally used by the machine operator and collects all the most important operating status information.

From this page it is also possible to create and/or modify a thermal profile, select a previously created thermal profile, start the execution of the selected thermal profile and view the Set Point/measurement trend over time.

The page is divided into homogeneous blocks:

"Data" block

The 3 elements of this block allow to see the current measurement (**PV**), the current set point (**SP**) and the output power (**OP** in **%**) implemented by the controller.



Tapping the set point window it is possible to change its value while the present value and the output power can only be read.

"Alarms status" block

Each indicator displays the status of the relative alarm.

Note: **FLT** (Fault) Foints out an input probe fault.

"Outputs status" block

Each indicator displays the status of the relative output.

FLT
AL1
AL2
AL3

"Running program status" block

In this block can be seen:

– At the top the number and the name of the running program,

– On the lower line can be seen:

1. **The program status** (RUN, HOLD o RST);
2. **The segment in execution**
   (e.g.: **R1** indicates that the instrument is executing the **1st Ramp** while **S3** indicates that the **3rd Soak** is in progress);

   Note: Alla fine del programma e per il tempo programmato in questa area verrà visualizzata la scritta END (fine programma).
3. **The time remaining to the end of the current repetition** (in minutes : seconds);
4. **The number of repetitions still to be performed**.

"Actions" block

ST-BY Forces the instrument to Stand-by mode aborting any program or any Autotuning in progress;

AUTO Puts the controller/programmer in Automatic mode;

RUN Starts the selected Thermal profile;

HOLD Temporarily suspends the execution of the running Thermal profile;

RST Aborts the execution of the running Thermal profile.

"Functions" block

The button functions are described at paragraph "5.3 Entering the Configuration mode" a pagina 7.

and are programmer functions buttons and are described hereafter.

displays the trend page.

The **RED** line represents the Set Point trend while the **GREEN** one represents the temperature Measurement over the time.

7. THERMAL PROFILES MANAGEMENT

7.1 Introduction to programs structure (thermal profiles)

This system operates with 2 distinct memory areas:

– The first, called "*stored programs area*", stores up to 20 programs (thermal profiles) with a maximum of 24 segments each.

– The second, called "*local program area*", contains the program data that will be executed tapping RUN in the status page.

The program structure is identical whether you are talking about the stored programs or whether you are looking at the local program.

The programs are made up of some "*general*" parameters followed by the *segments* parameters.

When viewing (without modifying) a program, the system uses 2 types of pages:

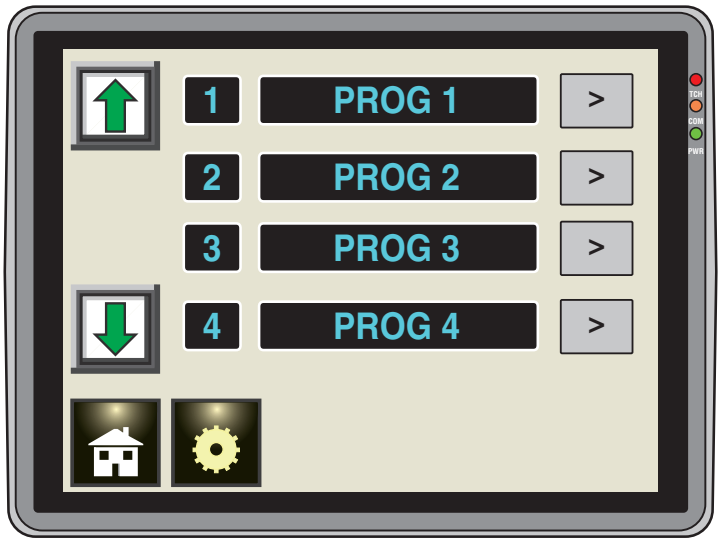
– The **general data page**

– One or more summary pages of the **segments** parameters.

During a program changing, in addition to the two pages described above, the system uses a specific page in which the segments parameters of a single pair (a ramp and the subsequent soak) are collected.

7.2 How to Edit (create or modify) a stored program

Tapping on the button causes the displaying of the "**Program Selection**" page.

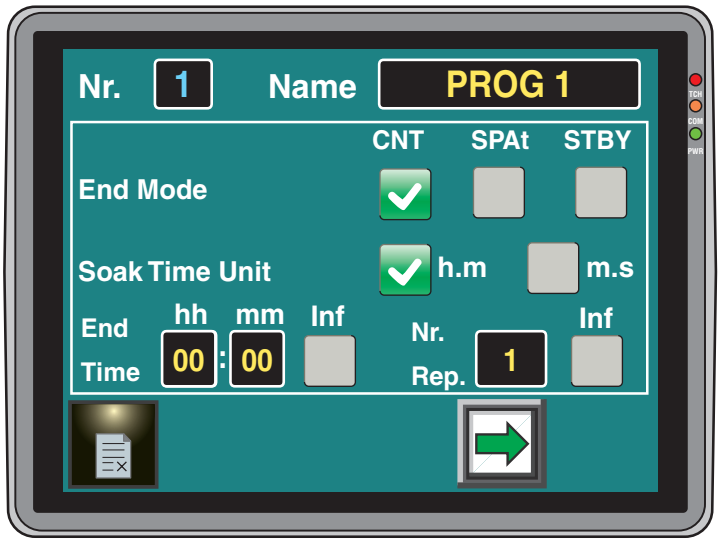


Using the buttons and it is possible to to scroll the stored programs list complete of program number and its assigned name.

e.g.: Program 3 PROG 3.

The > button allows to select/enter the program you wish to operate on, then the system switches to displaying the "*General*" data page relating to the selected program:

In order to modify the values assigned to the various parameters, it is necessary to tap on the EDIT button. at this point the system displays the following page:



Where the following parameters can be set.

Program name

Range: 1... 12 Alpha-numeric characters;

Note: The program number cannot be changed.

Instrument behaviour at program execution end

Range: cnt Continue (the instrument uses the set point of the last soak until a RESET command is detected);

SPAt Goes to SP1 Set Point;

St.bY At program end the instrument immediately goes in Standby mode, the outputs are switced in OFF status and it acts as an indicator.

Time unit of the soaks

Range: hh.nn Hours and minutes

nn.SS Minutes and seconds.

Note: During program execution, this parameter **can not** be changed.

Time of the End program indication

Range: oFF Function not used;

00.01... 99.59 minuti e secondi;

inF Indefinitely ON.

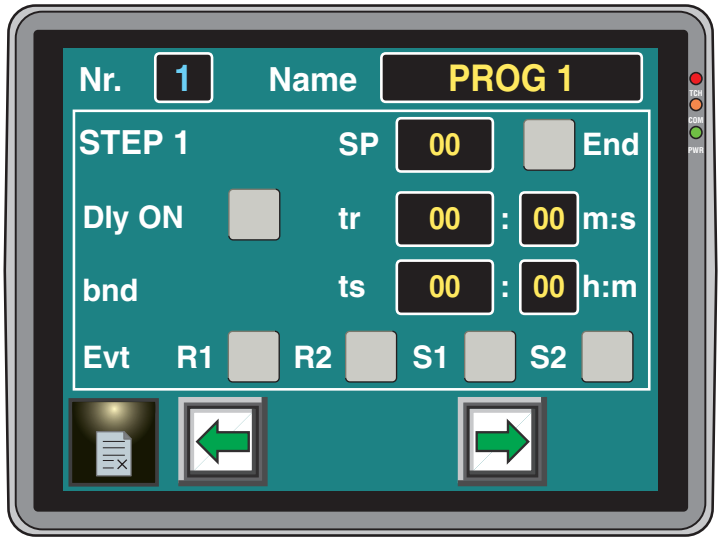
Note: Selecting **inF** the end program indication goes OFF only when a RESET command or a new RUN command is detected.

Number of program executions

Range: 1... 999 repetitions;
inF Indefinitely.

Note: Setting **inF** the program will be repeated until a RESET is detected.

Once the variables described above are set, press the button to access the next page.



Where there are:

SP - Set Point of the first soak

Range: From SPLo to SPHi.

End - Program end

Note: Defines the program end. In other words, the **last step that will be performed** is **the one that precedes** the step with the **End** field **enabled**.

Dly ON - Program start with first step in stand-by

Notes: 1. This parameter is available only for step 1 and allows to define a first step during which the instrument remains in stand-by (delayed start).

2. If this function is activated, the **ts** parameter is replaced by **dly** which represents the delay.

tr -Time of the first ramp

Range: 0 Step transfer;
00:01... 900:59 time units per minute.

Nota: The time units used are those selected for the soaks.

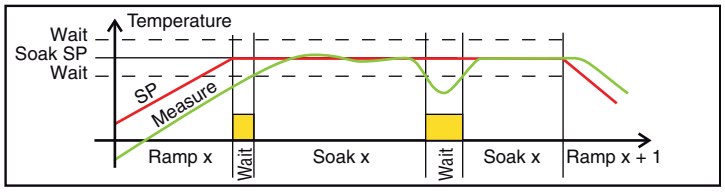
ts - Time of the first soak

Range: 0.00... 99.59 time units.

bnd - Wait band of the first soak

Range: OFF;
1... 9999 engineering units.

Note: The wait band suspends the time counting when the measured value goes out of the defined band (guaranteed soak).



R1, R2, S1,S2 - Events status of the first group

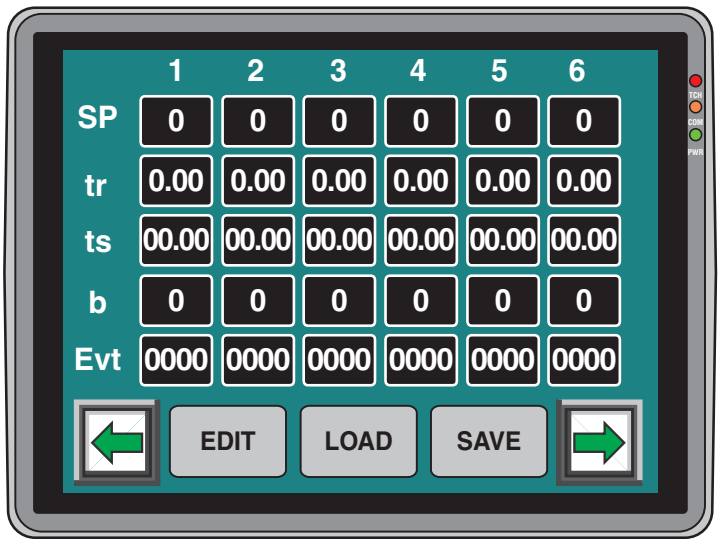
Range: 0000... 1111 where:
0 Event OFF;
1 Event ON.

Note: **R1** and **R2** are 2 events assocated to the current ramp, **S1** and **S2** are 2 events assocated to the current soak.

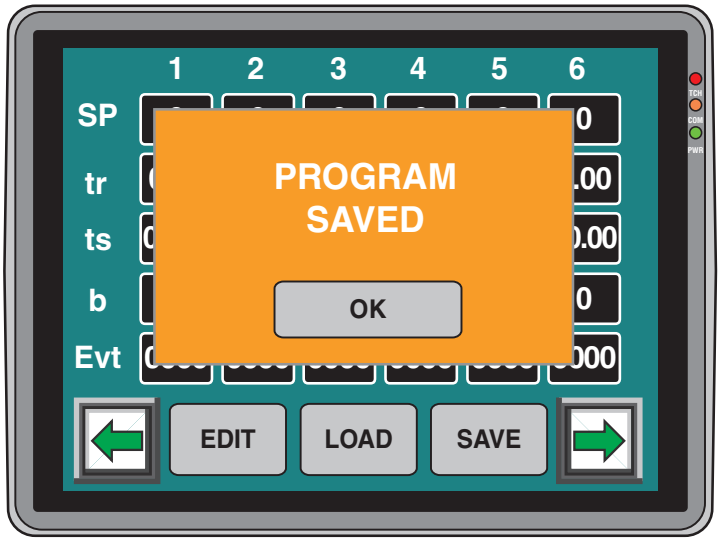
After setting the variables described above, tap on the button to go to the next program STEP.

After having set all the desired "**n**" **STEPS**, at step **n + 1** select **End** and press .

The system switches to the summary page of the scheduled program steps.



To store the data in the selected program, tap on the SAVE button, the system will confirm the saving:



Tap on **OK**.

To change a value, 2 ways are available

1. Tap on EDIT, the system restarts the editing phase.

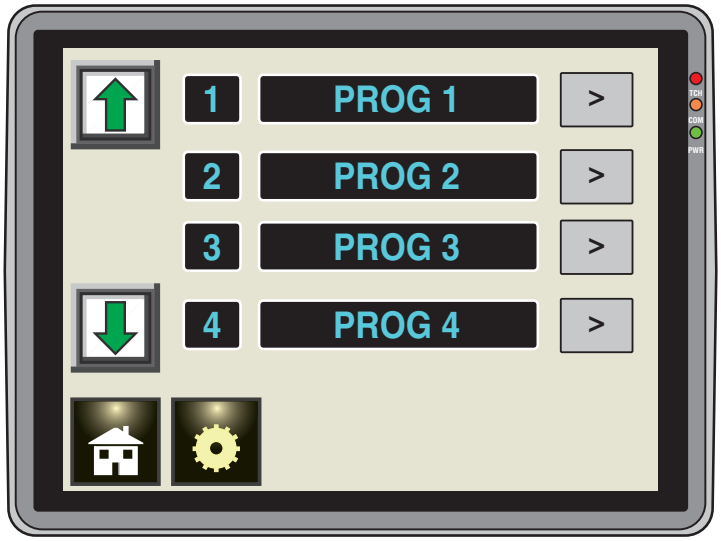
2. From the summary page tap on the step that is to be changed, the system automatically switches to the program step page that is to be changed.

To transfer the data of the selected program to the local program (which will be executed when tapping RUN in the status page) touch LOAD.

To exit the program editing page, first tap to return to the *general program data page* and then the button.

7.3 How to see a stored program data

Tapping the button displays the "*Program selection*" page.

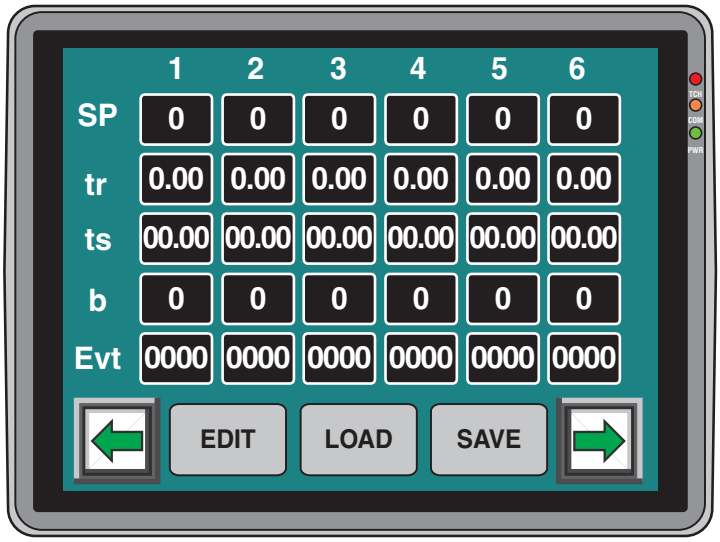


Using the buttons and it is possible to to scroll the stored programs list complete of program number and its assigned name.

e.g.: Program 3 PROG 3.

The > button allows to select/enter the program you wish to operate on, then the system switches to displaying the "*General*" data page relating to the selected program:

Tap on the button to switch to the program summary page.



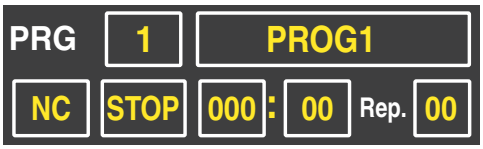
To transfer the data of the selected program to the local program (which will be executed when tapping RUN in the status page) touch LOAD.

To exit the program editing page, first tap to return to the *general program data page* and then the button.

7.4 How to Edit (create or modify) a Local program

As mentioned, the local program is the thermal profile that will run when RUN button is pressed on the status page.

If one of the stored programs has been copied to the local program, the Main page will show the number and name of the stored program which has been transferred.



If no program has been transferred or if some values of the transferred program has been changed, the main page will display the message "*Local Prog.*".

To change the values of the Local program, tap PRG.

As already mentioned, the structure of the stored and local program are identical so the system shows the "*General*" information page.

The rest of the settings follow what seen for the stored programs.

Notes: 1. Program changes are automatically stored and therefore is not required, at the end of the parameter setting, to tap on any button.

2. The name of the loaded program, whatever it is can not be changed.

8. GENERAL NOTES

8.1 Proper use

Every possible use not described in this manual must be consider as a improper use.

This instrument is in compliance with EN 61010-1 “Safety requirements for electrical equipment for measurement, control and laboratory use”; for this reason it could not be used as a safety equipment.

Ascon Tecnologic S.r.l. and its legal representatives do not assume any responsibility for any damage to people, things or animals deriving from violation, wrong or improper use or in any case not in compliance with the instrument features.

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

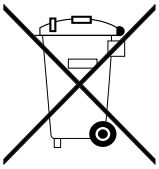
8.2 Maintenance

This instrument does not requires periodical recalibration and it have no consumable parts so that no particular maintenance is required.

Sometimes it is advisable to clean the instrument.

1. **SWITCH THE EQUIPMENT OFF** (power supply, relay output, etc.).
2. Using a vacuum cleaner or a compressed air jet (max. 3 kg/cm^2) remove all deposits of dust and dirt which may be present on the case and on the internal circuits being careful not to damage the electronic components.
3. To clean external plastic or rubber parts use only a cloth moistened with:
   - Ethyl Alcohol (pure or denatured) [C_2H_5OH] or
   - Isopropyl Alcohol (pure or denatured) [$(CH_3)_2CHOH$] or
   - Water (H_2O).
4. Make sure that there are no loose terminals.
5. Before turning ON the instrument make sure it is perfectly dry.
6. Apply the power supply to the instrument.

8.3 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

This product is under warranty against manufacturing defects or faulty materials that are found within 18 months from delivery date. The warranty is limited to repairs or to the replacement of the instrument.

The tampering of the instrument or an improper use of the product will bring about the immediate withdrawal of the warranty 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. ACCESSORIES

10.1 Power supply

10.1.1 NDR-75-24

If the programmer model with 100 ... 240 VAC power supply has been chosen, a power supply unit with 24 VDC output voltage must be provided to supply voltage to the operator panel.

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