Process Indicator

mL-PI8 96x48 1/8 DIN

mL-PI8 *Rev A*

96 x 48 1/8 DIN

Universal Input Process Indicator with Smart Output Module System

- *4 digits Process Display (High brightness LED)*
- *Universal Process Input (TC, RTD, mV⎓ , V⎓ , mA⎓)*
- *Two relay outputs*
- *Dual or Multi Point Calibration for DC voltage & DC current Inputs*
- *Smart Output Module System*
- *Programmable Alarm Functions*
- *Process control or re-transmission with 0/4...20 mA Current output*
- *RS-485 Serial Communication With Modbus RTU Protocol*

NOTE

REV A. As of March, 2022: The mL-PI8 Revision A has been upgraded to include the following options as standard features:

- Two Relays (Additional 3A Relay now STD)
- Gasket for NEMA4X Installation
- High Bright LED Display

ABOUT INSTRUCTION MANUAL

Instruction manual of mL-PI8 Process Indicator consists of two main sections. Explanation of these sections are below. Also, there are other sections which include order information and technical specifications of the device. All titles and page numbers in instruction manual are in "**CONTENTS**" section. User can reach to any title with section number.

Installation:

In this section, physical dimensions of the device, panel mounting, electrical wiring, module mounting in the device, physical and electrical installation of the device to the system are explained.

Operation and Parameters:

In this section, user interface of the device, how to access to the parameters, description of parameters are explained.

Also in these sections, there are warnings to prevent serious injury while doing the physical and electrical mounting or using the device.

Explanation of the symbols which are used in these sections are given below.

This symbol is used for safety warnings. User must pay attention to these warnings.

This symbol is used to determine the dangerous situations as a result of an electric shock. User must pay attention to these warnings definitely.

This symbol is used to determine the important notes about functions and usage of the device.

~ Vac,

⎓ Vdc

≂ Vdc or Vac can be applied

CONTENTS

1.Preface

The mL-PI8 series process indicators are designed for measuring temperature and any process value. They can be used in many applications with their universal process input, alarm functions and serial communication unit.

Some application fields which they are used are below:

Application Fields

Glass

Plastic

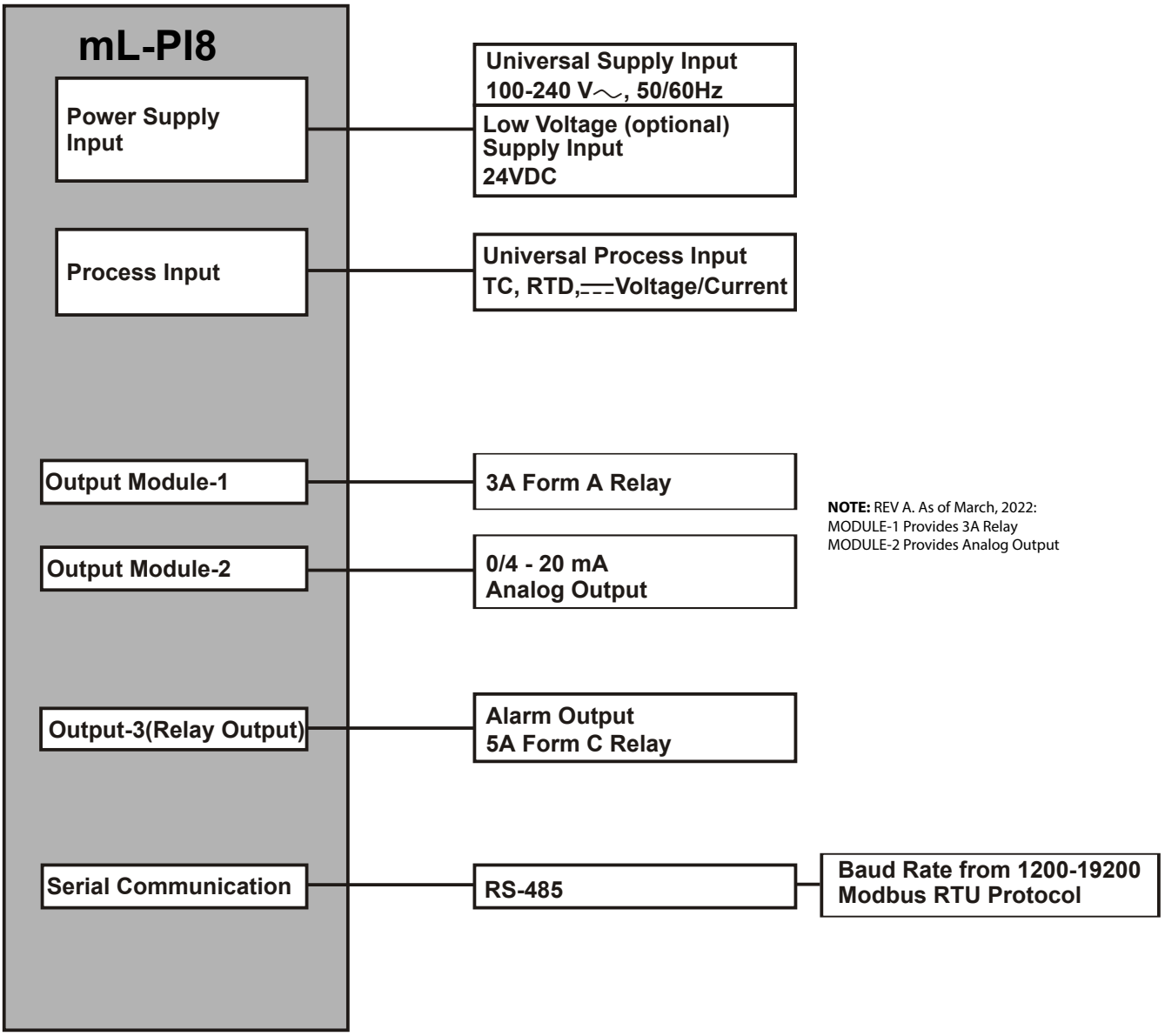
Petro-Chemistry

Textile

Automotive

Machine production industries

1.1 General Specifications



NOTE: REV A. As of March, 2022:
MODULE-1 Provides 3A Relay
MODULE-2 Provides Analog Output

1.2 Ordering Information

ORDERING INFORMATION	
Model Number	**Description**
mL-PI8 (Rev-A)	Process Indicator 1/8 DIN Case Universal Input. Selectable: TC, RTD, mV, VDC, or mA 100 to 240VAC (-15%; +10%) 50/60Hz 2 Relay Outputs 1- (5A @ 250VAC with Resistive Load) (Form C) 1- (3A @ 250VAC with Resistive Load) (Form A) RS-485 Serial Communication with Modbus RTU Protocol Analog Output 0/4 - 20mA Gasket to provide NEMA4X seal
Options (add to end of model number)	
24VDC	24VDC (-15%; +10%) Power Input
Accessories	
mL-cable-485	RS485 Serial Cable

1.3 Warranty

KEP warrants that the equipment delivered is free from defects in material and workmanship. This warranty is provided for a period of two years. The warranty period starts from the delivery date. This warranty is in force if duty and responsibilities which are determined in warranty document and instruction manual performs by the customer completely.

1.4 Maintenance

Repairs should only be performed by trained and specialized personnel. Cut power to the device before accessing internal parts.
Do not clean the case with hydrocarbon-based solvents (Petrol, Trichlorethylene etc.). Use of these solvents can reduce the mechanical reliability of the device. Use a cloth dampened in ethyl alcohol or water to clean the external plastic case.

2.Installation

Before beginning installation of this product, please read the instruction manual and warnings below carefully.

In package ,
- **One piece unit**
- **Two pieces mounting clamps**
- **One piece instruction manual**
- **One piece gasket**

A visual inspection of this product for possible damage occurred during shipment is recommended before installation. It is your responsibility to ensure that a qualified mechanical and electrical technicians install this product.

If there is danger of serious accident resulting from a failure or defect in this unit, power off the system and separate the electrical connection of the device from the system.

The unit is normally supplied without a power switch or a fuse. Use power switch and fuse as required.

Be sure to use the rated power supply voltage to protect the unit against damage and to prevent failure.

Keep the power off until all of the wiring is completed so that electric shock and trouble with the unit can be prevented.

Never attempt to disassemble, modify or repair this unit. Tampering with the unit may results in malfunction, electric shock or fire.

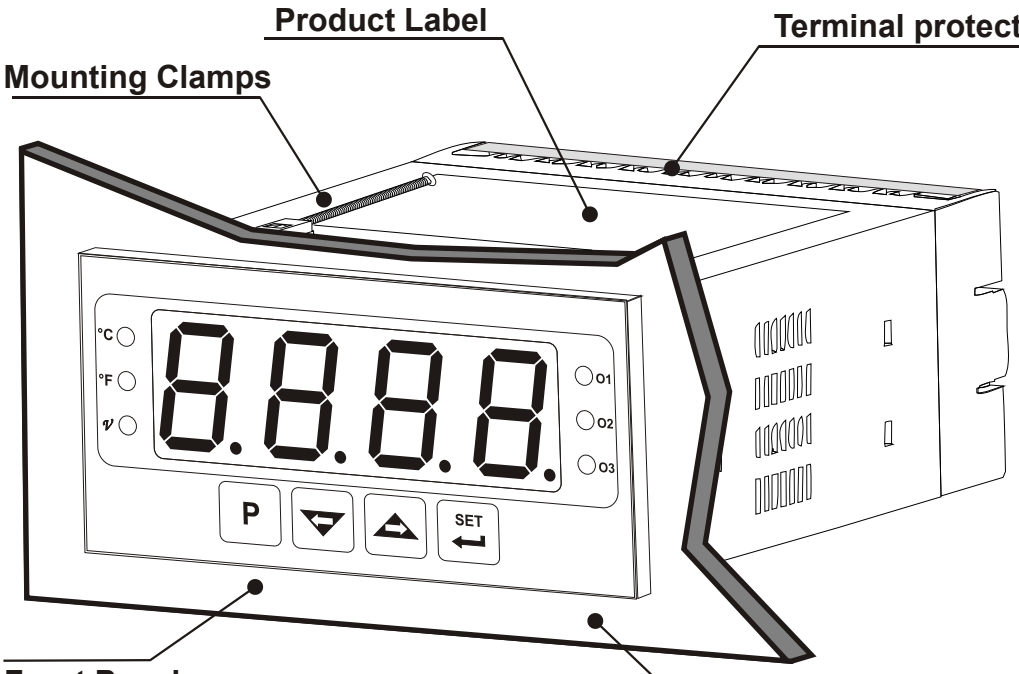
Do not use the unit in combustible or explosive gaseous atmospheres.

During installation into a panel cut-out on a metal panel be cautious of metal burrs that can cause injury to hands and/or arms, you must be careful.

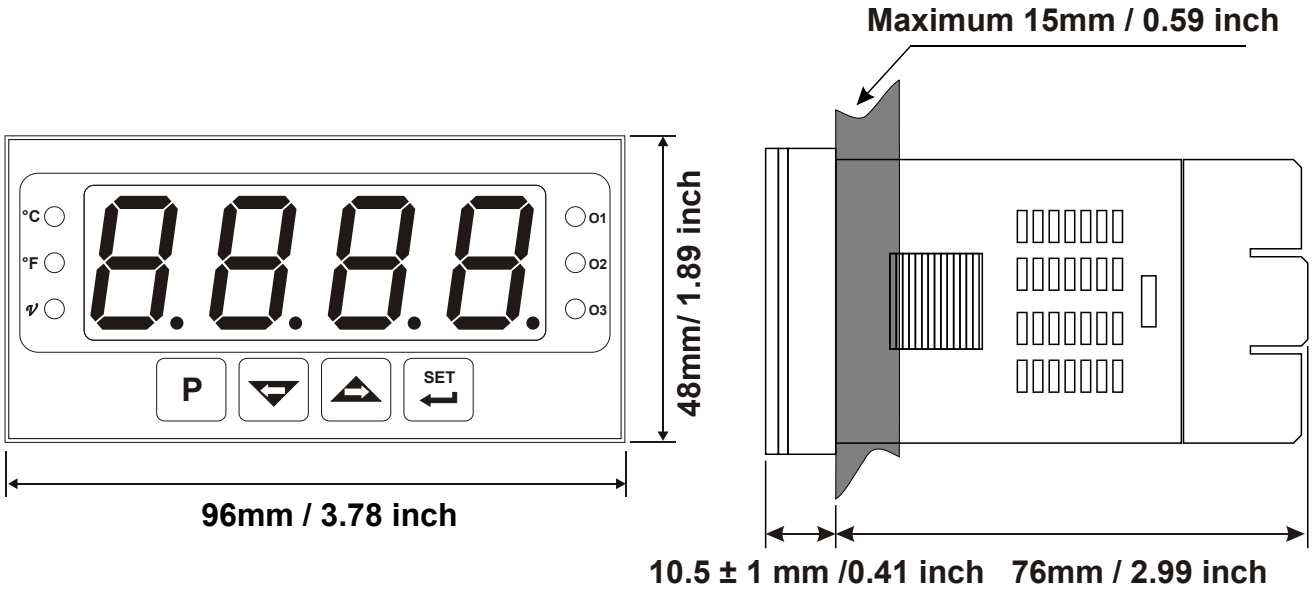
Mounting of the product on a system must be done with it's mounting clamp. Do not mount the device with inappropriate mounting clamps. Use the mounting clamps that are provided. Be sure that device will not fall during installation.

It is your responsibility if this equipment is used in a manner not specified in this instruction manual.

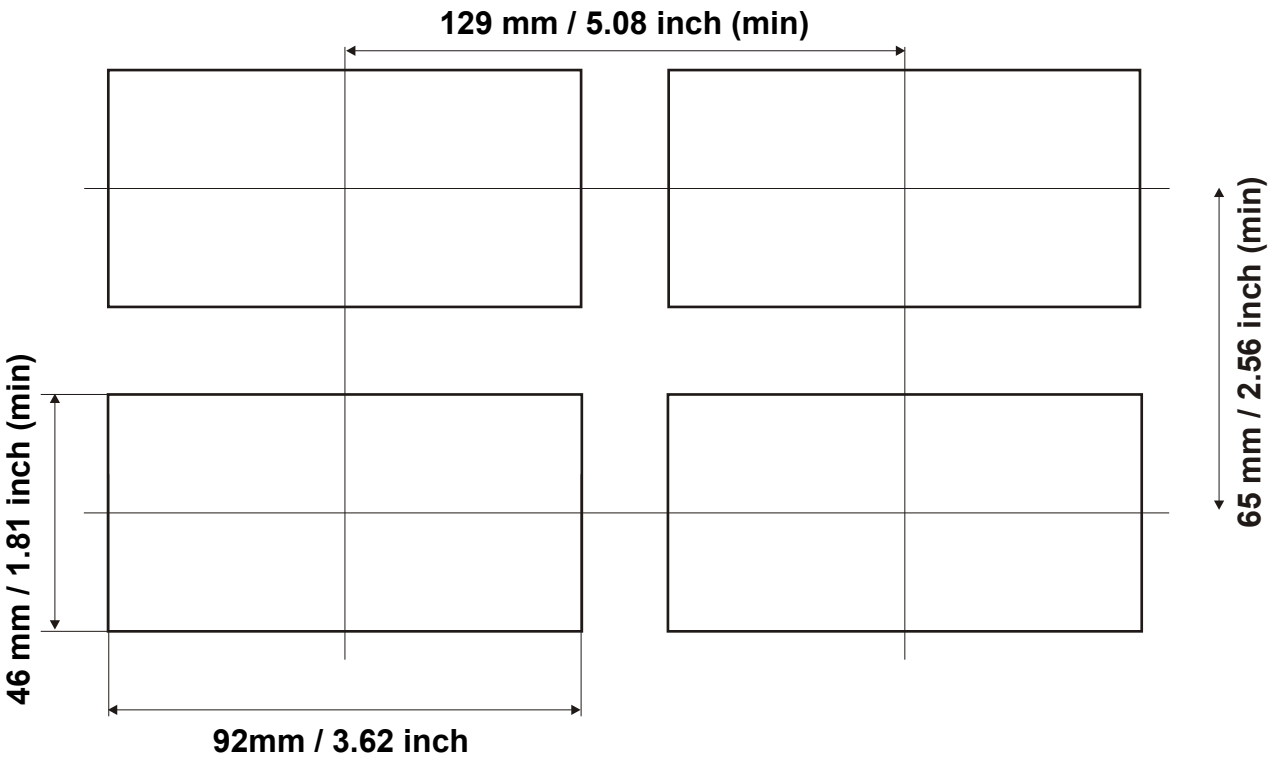
2.1 General Description



2.2 Dimensions



2.3 Panel Cut-Out



2.4 Environmental Ratings

Operating Conditions

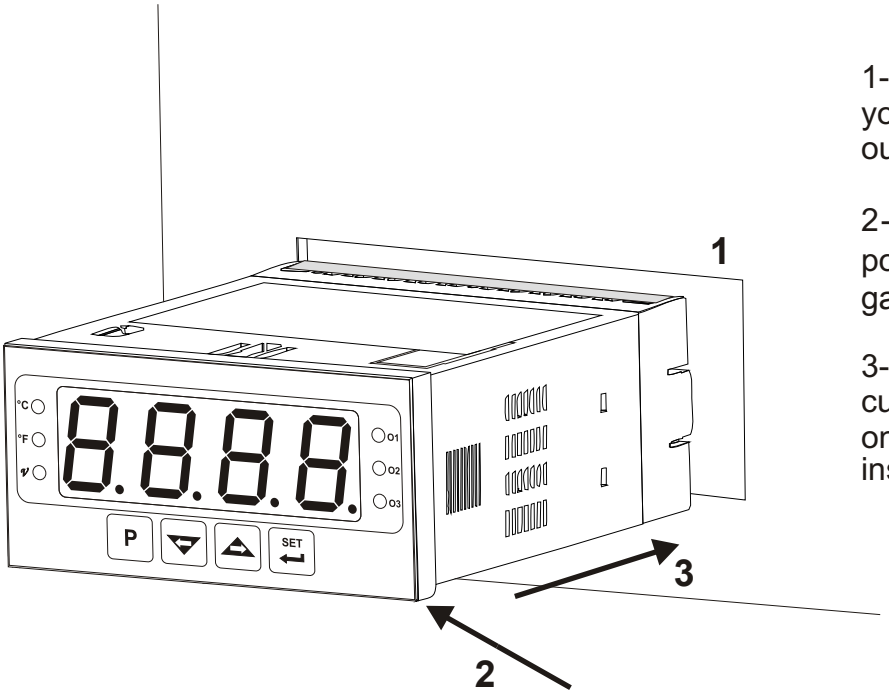
Operating Temperature : 0 to 50 °C

Max. Operating Humidity : 90% Rh (non-condensing)

Altitude : Up to 2000m.

Forbidden Conditions:
Corrosive atmosphere
Explosive atmosphere
Home applications (The unit is only for industrial applications)

2.5 Panel Mounting



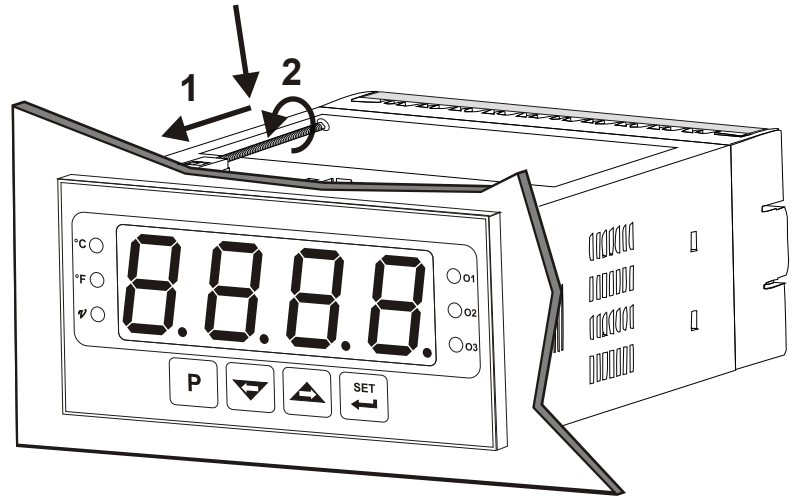
1-Before mounting the device in your panel, make sure that the cut-out is of the right size.

2-Check front panel gasket position (Note: panel sealing gasket is included)

3-Insert the device through the cut-out. If the mounting clamps are on the unit, put out them before inserting the unit to the panel.

During installation into a metal panel, care should be taken to avoid injury from metal burrs which might be present. The equipment can loosen from vibration and become dislodged if installation parts are not properly tightened. These precautions for the safety of the person who does the panel mounting.

2.6 Installation Fixing Clamp



The unit is designed for panel mounting.

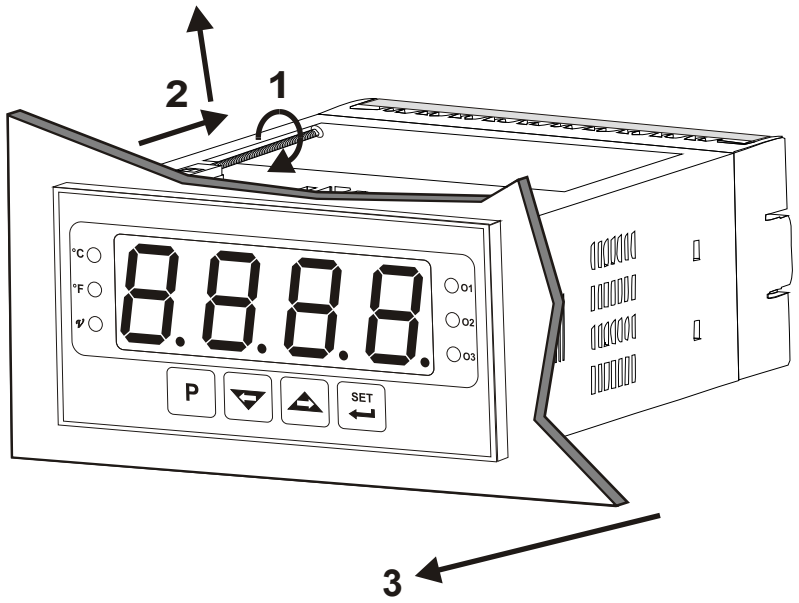
1-Insert the unit in the panel cut-out from the front side.

2- Insert the mounting clamps to the holes that located top and bottom sides of device and screw up the fixing screws until the unit completely immobile within the panel

Mounting of the unit to a system must be done with it's own fixing clamps. Do not do the mounting of the device with inappropriate fixing clamps. Be sure that device will not fall while doing the mounting process.

2.7 Removing from the Panel

Before starting to remove the unit from panel, power off the unit and the related system.



1-Loosen the screws.

2-Pull mounting clamps from top and bottom fixing sockets.

3-Pull the unit through the front side of the panel

3.Electrical Wirings

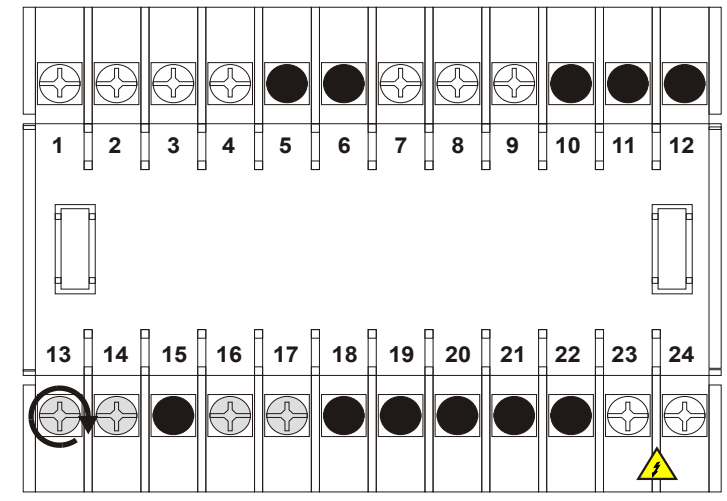
You must ensure that the device is correctly configured for your application. Incorrect configuration could result in damage to the process being controlled, and/or personal injury. It is your responsibility, as the installer, to ensure that the configuration is correct.
Parameters of the device has factory default values. These parameters must be set according to the system's needs.

Only qualified personnel and technicians should work on this equipment. This equipment contains internal circuits with voltage dangerous to human life. There is severe danger for human life in the case of unauthorized intervention.

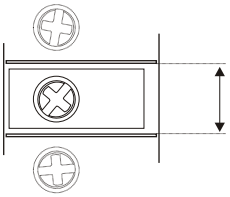
Be sure to use the rated power supply voltage to protect the unit against damage and to prevent failure.

Keep the power off until all of the wiring is completed so that electric shock and trouble with the unit can be prevented.

3.1 Terminal Layout and Connection Instructions



0.5 Nm

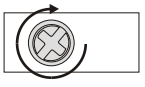


6 mm / 0.236 inch
Wire Size:
18 AWG / 1 mm²
Solid /Stranded

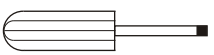
24 screws terminal M3

Optional Connections

Empty terminals



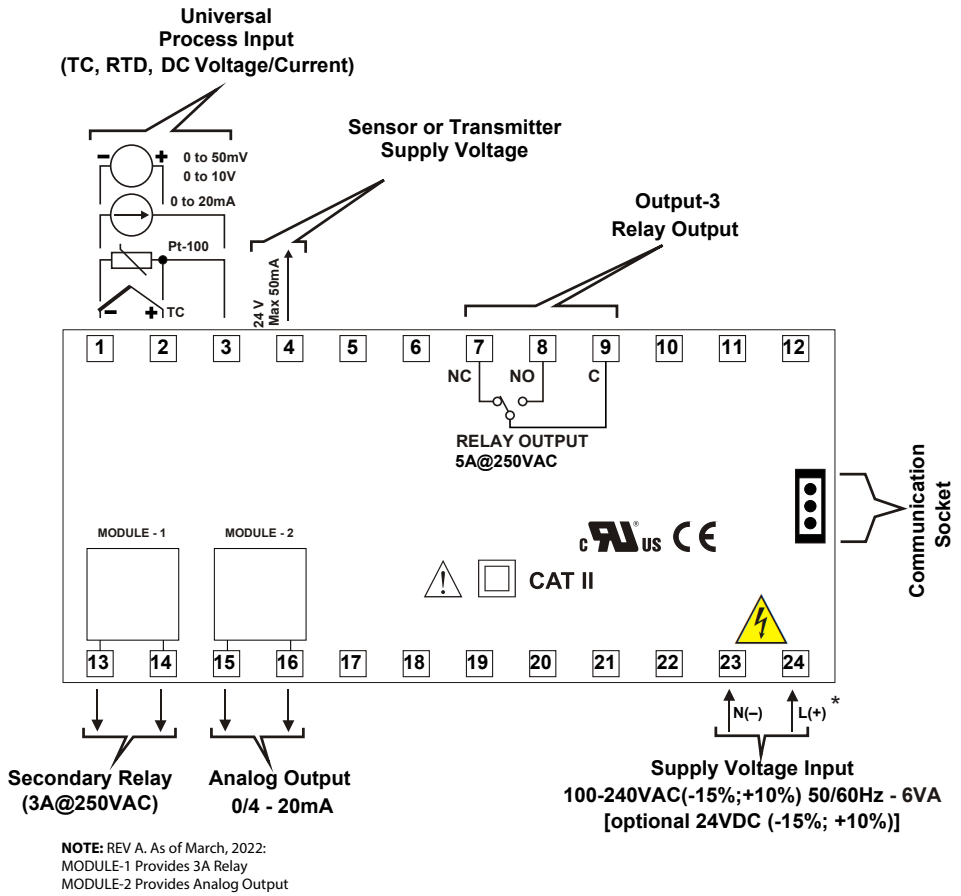
Torque 0.5 Nm



Screw driver 0.8x3mm

3.2 Electrical Wiring Diagram

Electrical wiring of the device must be the same as 'Electrical Wiring Diagram' below to prevent damage to the process being controlled and personnel injury.



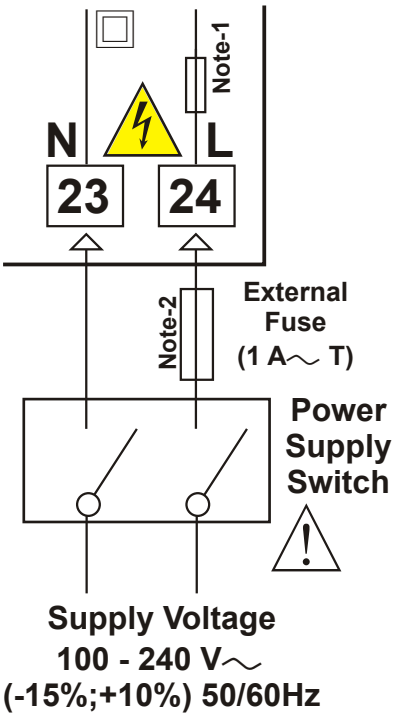
NOTE: REV A. As of March, 2022:
MODULE-1 Provides 3A Relay
MODULE-2 Provides Analog Output

* External Fuse is recommended (1A T)

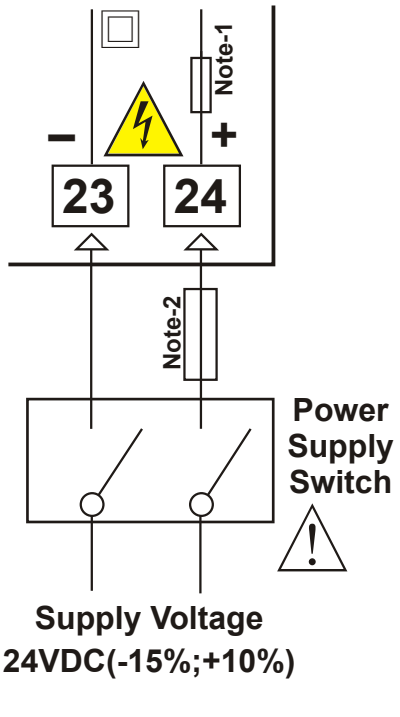
Process input is in CAT II class.

3.3 Supply Voltage Input Connection of the Device

Connection of Universal Supply Voltage Input



Connection of 24VDC Option



Note-1 : There is an internal 33R fusible flameproof resistor in 100-240 V~ 50/60Hz supply voltage input

Note-2 : External fuse is recommended.

Make sure that the power supply voltage is the same indicated on the instrument.
Switch on the power supply only after all the electrical connections have been completed.
Supply voltage range must be determined in order. While installing the unit, supply voltage range must be controlled and appropriate supply voltage must be applied to the unit. Controlling prevents damages in unit and system and possible accidents as a result of incorrect supply voltage.

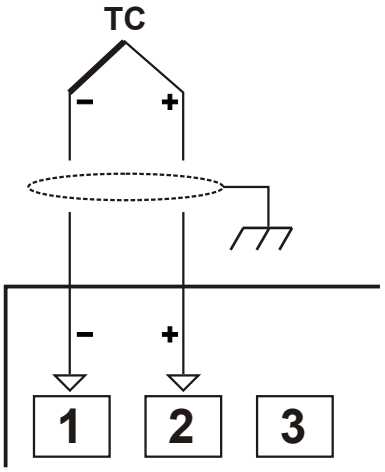
There is no power supply switch on the device. So a power supply switch must be added to the supply voltage input. In accordance with the safety regulations, the power supply switch shall bring the identification of the relevant instrument. Power supply switch shall be easily accessible by the user.
Power switch must be two poled for separating phase and neutral. On/Off condition of power switch is very important in electrical connection. On/Off condition of power switch must be signed for preventing the wrong connection.

If an external fuse is used, it must be on phase connection in ~ supply input.

The instrument is protected with an internal fuse (Please refer to Note1 for information). In case of failure it is suggested to return the instrument to the manufacturer for repair.

3.4 Process Input Connection

3.4.1 TC (Thermocouple) Connection

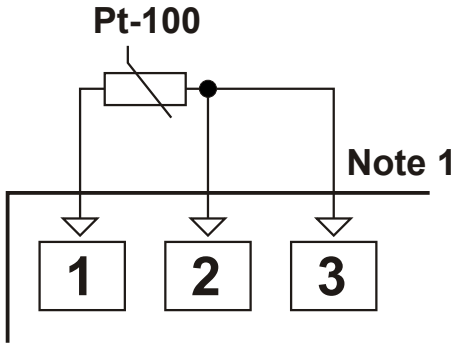


Connect the wires with the polarity as shown in the figure at left.

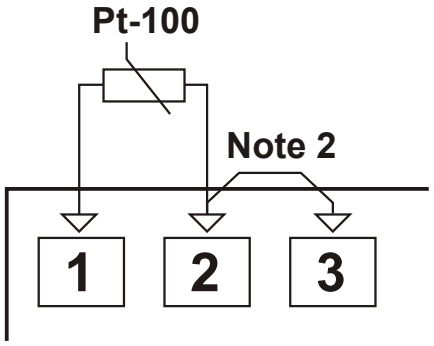
Always use compensation wire corresponding to the thermocouple used. If present, the shield must be connected to a proper ground.

Input resistance is greater than 10M

3.4.2 RTD Connection



3-wire Pt-100 connection
(with line compensation)
(Max. Line impedance is 10)



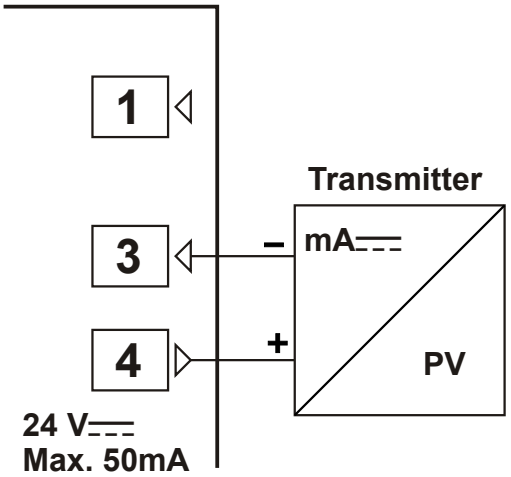
2-wire Pt-100 connection
(without line compensation)

Note 1 : In 3-wire system, use always cables of the same diameter (min 1mm²) Always use wires of the same gauge and type whether a 2-wire or 3-wire system.
Note 2 : Install a jumper between terminals 2 and 3 when using a 2-wire RTD.
Note 3 : If the distance is longer than 10 meters, use 3-wire system

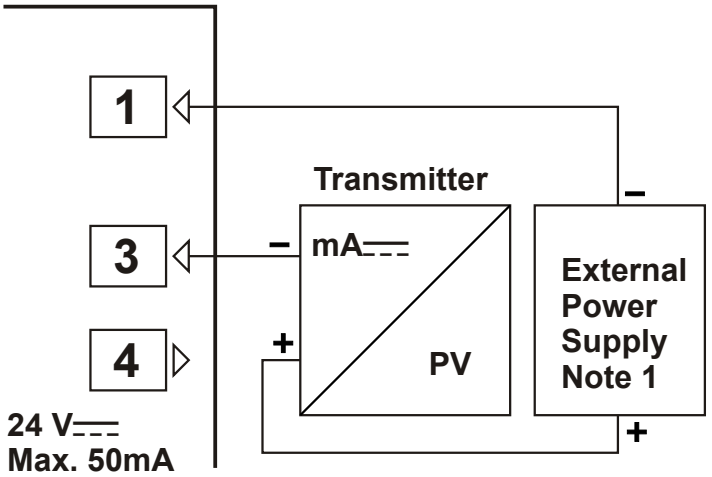
Input resistance is greater than 10M

3.4.3 Process Input Connection of Serial Transmitters with Current Output (Loop Powered)

Transmitter connection by using supply voltage on the device



Transmitter connection by using external supply voltage source.

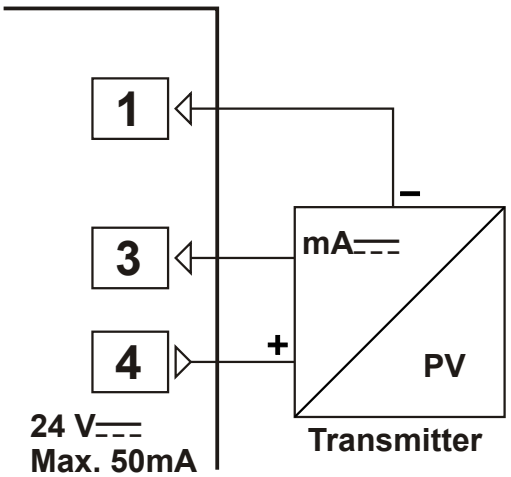


Note 1 : External power supply must be selected according to supply voltage range and required current for transmitter.

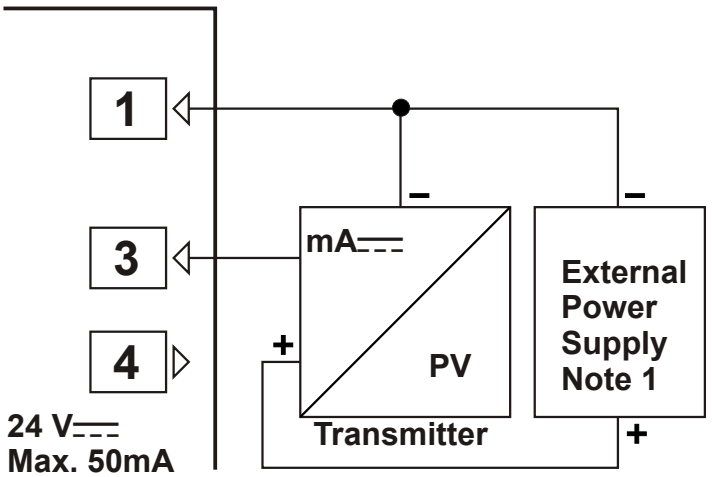
Input resistance is 70 (terminals 1 to 3).

3.4.4 Process Input Connection of 3-Wire Transmitters with Current Output

Transmitter connection by using supply voltage on the device



Transmitter connection by using external supply voltage source.

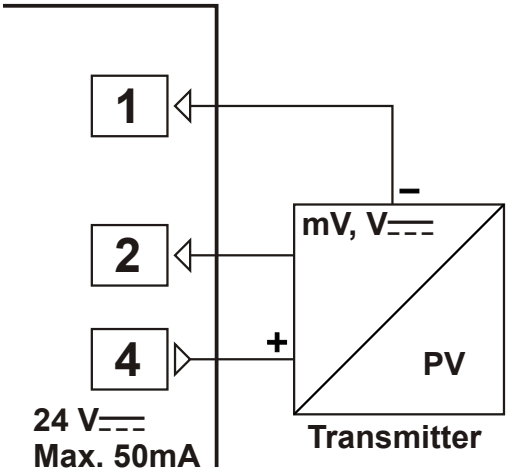


Note 1 : External power supply must be selected according to supply voltage range and required current for transmitter.

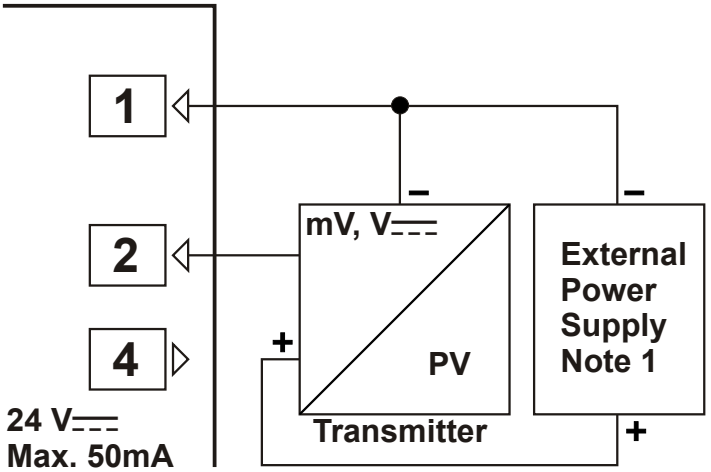
Input resistance is 70 (terminals 1 to 3).

3.4.5 Connection of Transmitters with Voltage Output to Process Input

Transmitter connection by using supply voltage on the device



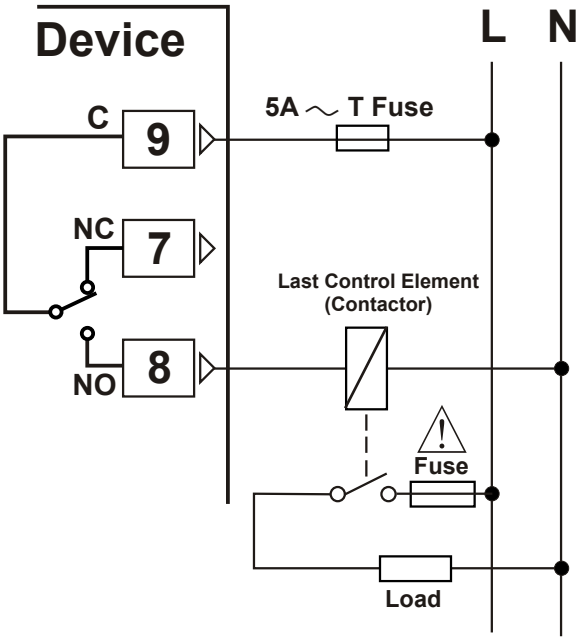
Transmitter connection by using external supply voltage source.



Note 1 : External power supply must be selected according to supply voltage range and required current for transmitter.

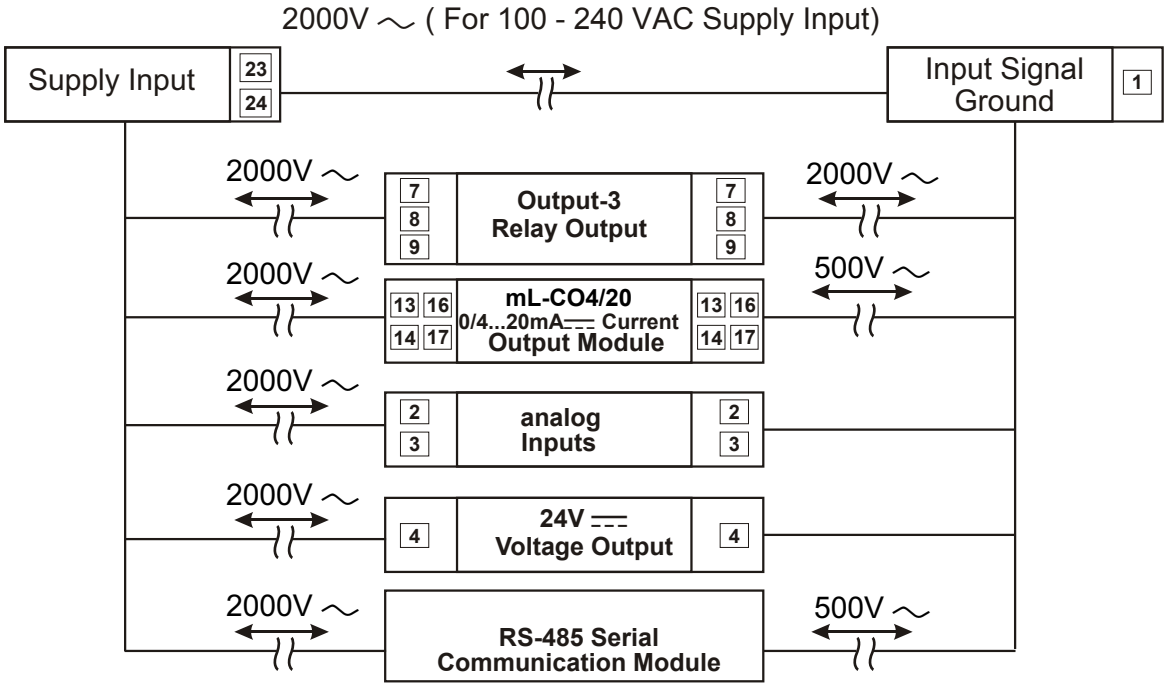
Input resistance is greater than 10M for **0...50mV⎓ (terminals 1 to 2)**
Input resistance is 43K for **0...10V⎓ (terminals 1 to 2)**

3.5 Relay Output Connection



Fuses must be selected according to the application.

3.6 Galvanic Isolation Test Values of mL-PI8 Process Indicator and Output Modules



4.Definitions and Specifications of Modules

mL-PI8 Process Indicator is a modular product which is designed to operate with additional analog and digital output units.

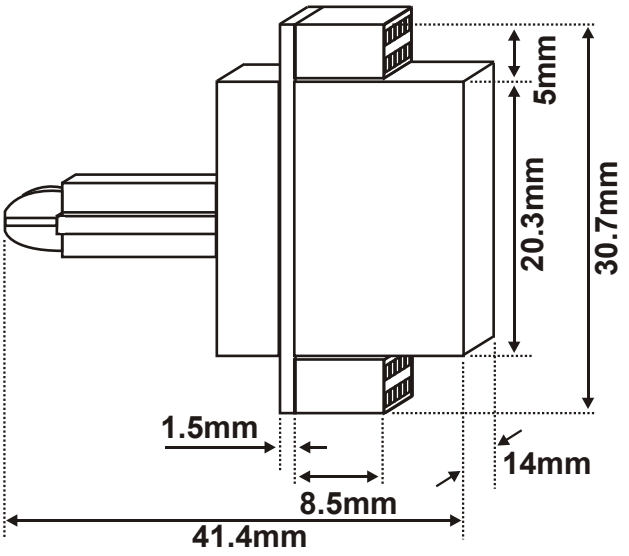
The mL-PI8 is equipped with two output modules:

Module-1 for 3A Relay (Form A)

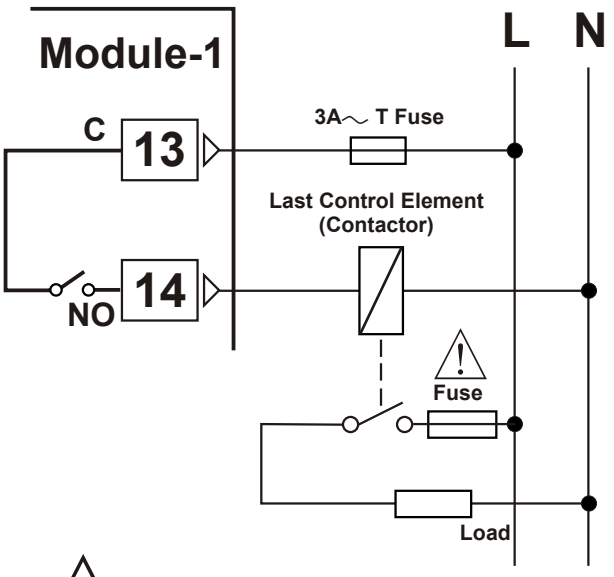
Module-2 for Analog Output (0/4 - 20mA)

4.1 Output Modules

Dimensions of Output Modules



4.1.1 Relay Output Module Connection



Fuses must be selected according to the application.

4.1.2 0 / 4 ...20mA⎓ Current Output Module (mL-CO4/20)

mL-CO4/20 0/4...20mA⎓ Current Output Module is plugged in to Module-2 to use functions which are defined for current or voltage output. (It is defined as Analog Output Module in some sections)

Specifications of mL-CO4/20 0/4...20mA⎓ Current Output Module

Output : 0/4...20mA⎓ current output
Accuracy : 1%

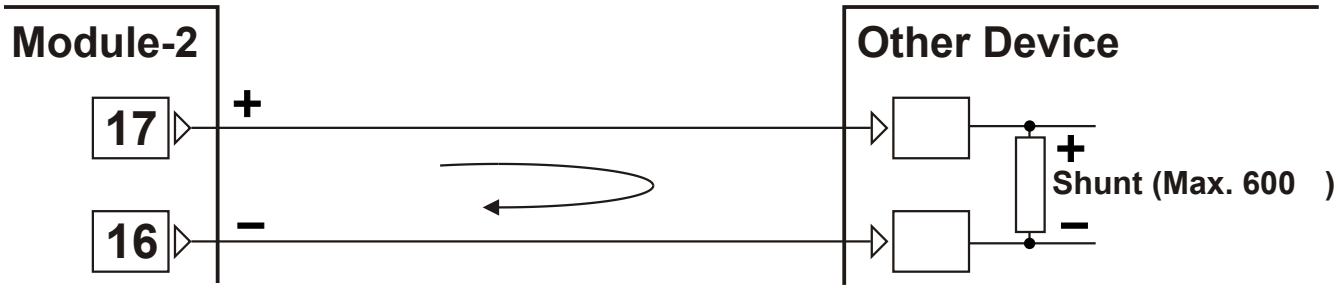
Note : To get 0...10V⎓ **,** 500 resistor with 0.05% tolerance must be connected in parallel as a shunt resistor to module output (Please refer to Section 5.1.5 for detailed information)
Maximum load impedance : 600
Dimensions : 14x30.7x41.4mm

Applications of mL-CO4/20 0/4...20mA⎓ Current Output Module

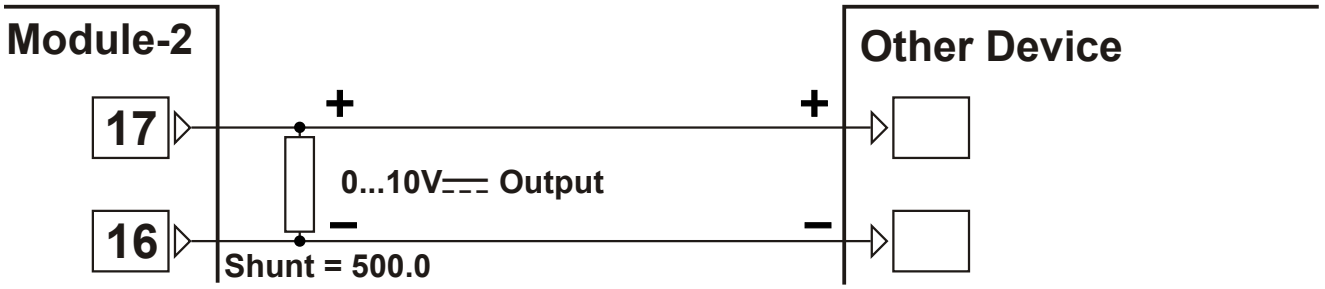
Process value, difference between process and set value or set value can be retransmitted to the system as 0...20mA⎓ or 4...20mA⎓ output. Retransmission is explained in parameters section.

Detailed information about the functions of mL-CO4/20 Current Output Module are given in parameters section.

4.1.3 mL-CO4/20 0/4... 20 mA⎓ Current Output Module Connection

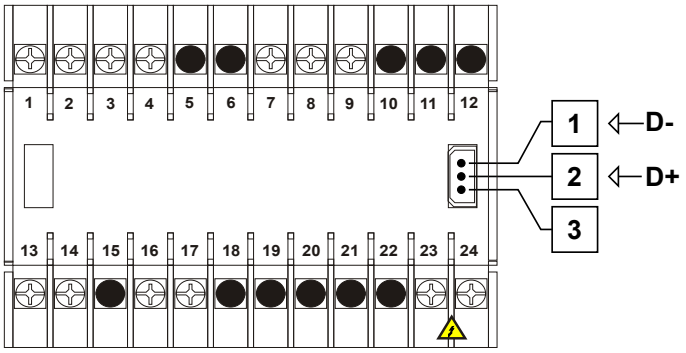


4.1.4 How to Get 0...10V⎓ with mL-CO4/20 Current Output Module

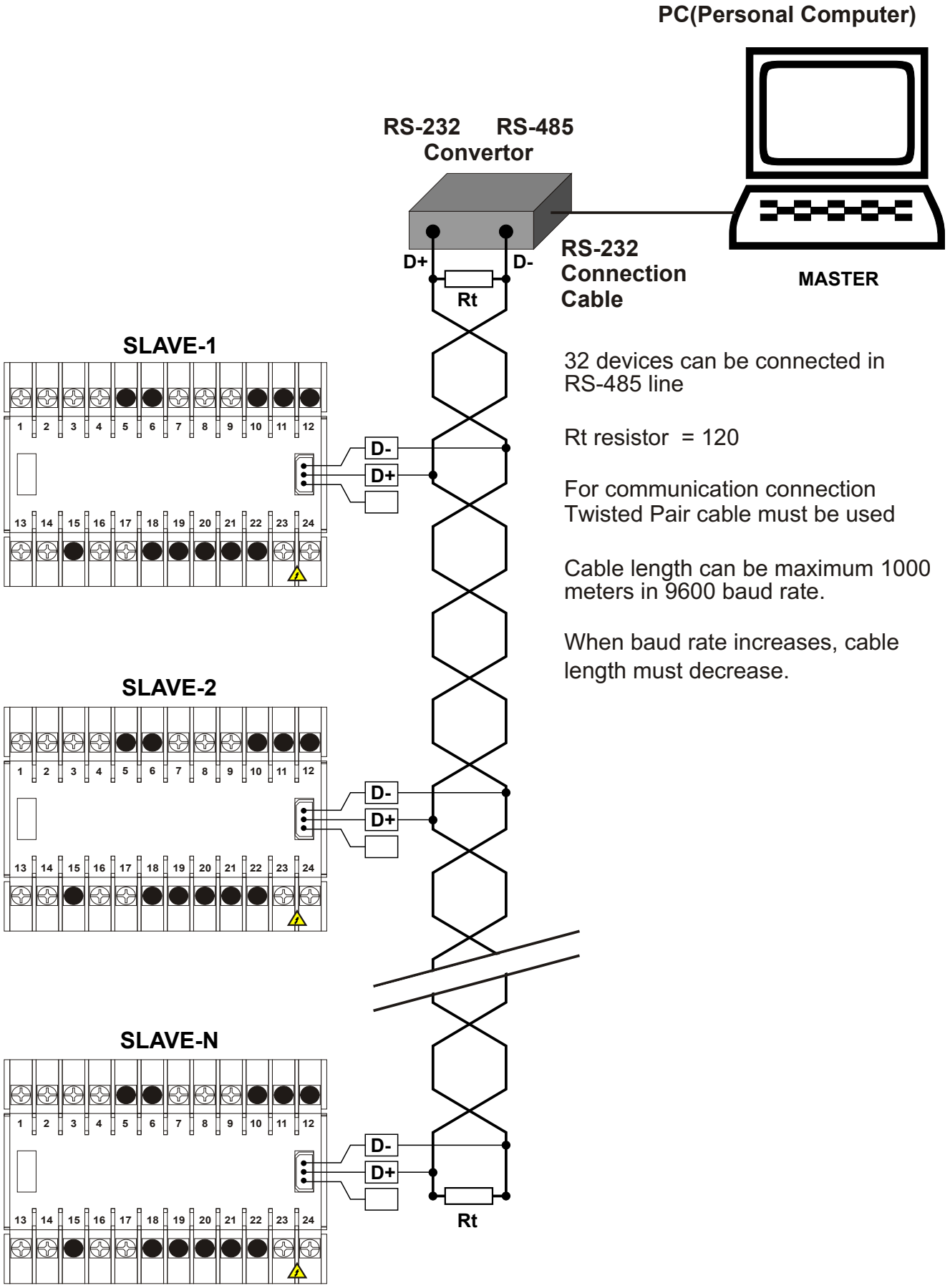


5.Connections for RS-485 Serial Communication

RS-485 Terminal Definitions



5.1 Connection for RS-485 Serial Communication



32 devices can be connected in RS-485 line

Rt resistor = 120

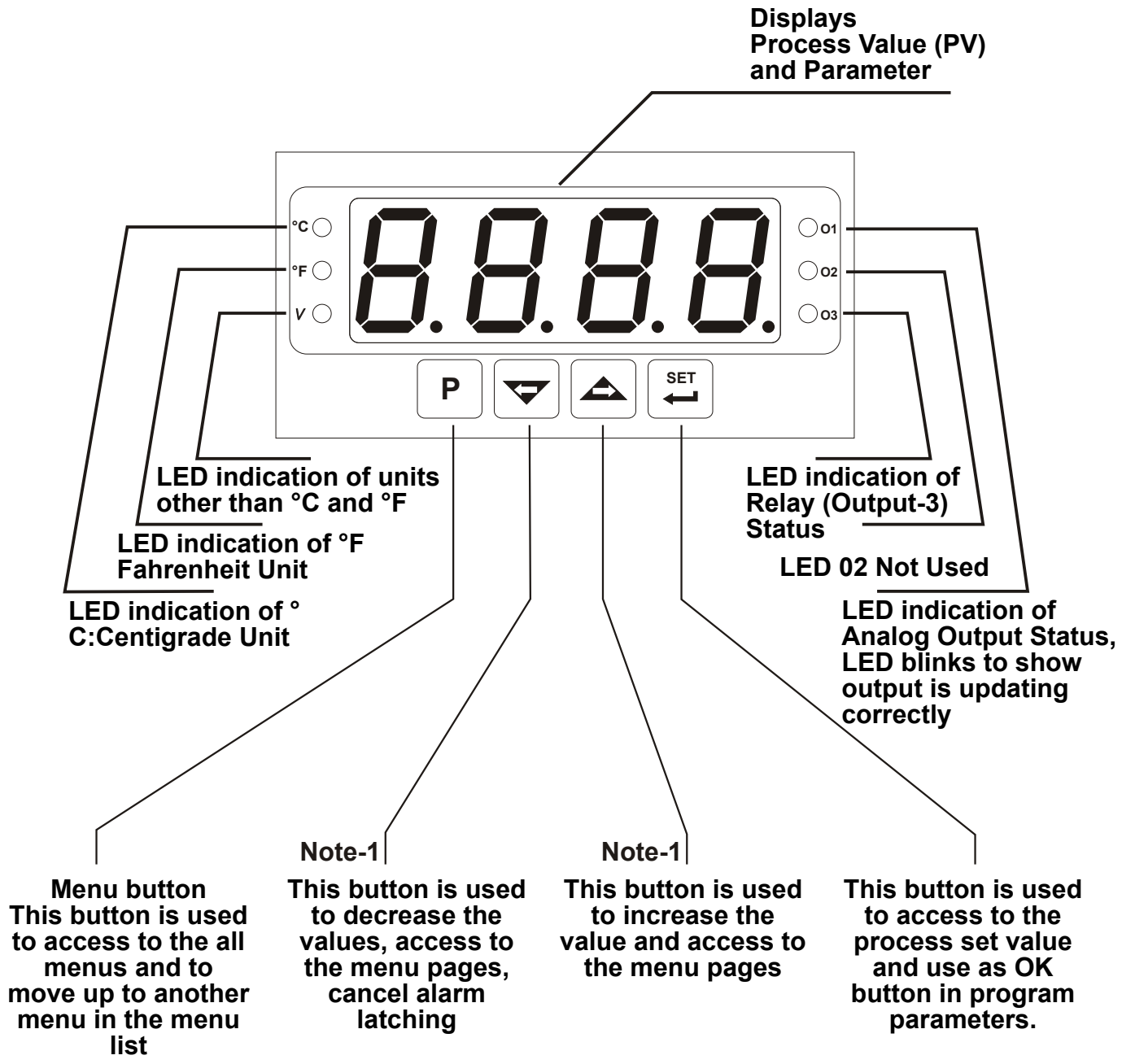
For communication connection Twisted Pair cable must be used

Cable length can be maximum 1000 meters in 9600 baud rate.

When baud rate increases, cable length must decrease.

6.Definition of Front Panel and Accessing to the Parameters

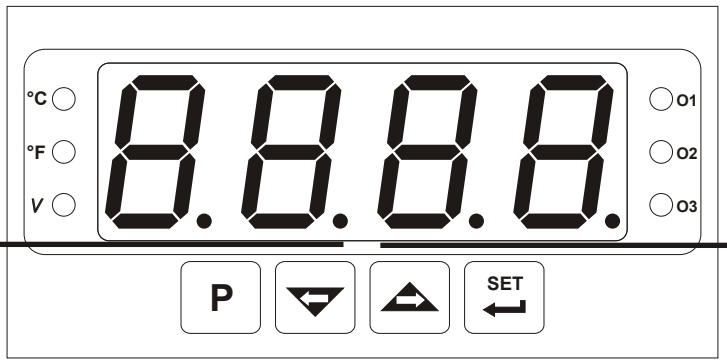
6.1 Definition of Front Panel



Note-1: If increment or decrement button is pressed for 5 seconds continuously, increment and decrement number become 10, if increment or decrement button is pressed for 10 seconds continuously, increment and decrement number become 100.

6.2 Observation of Optional Modules and Software Revision on the Displays

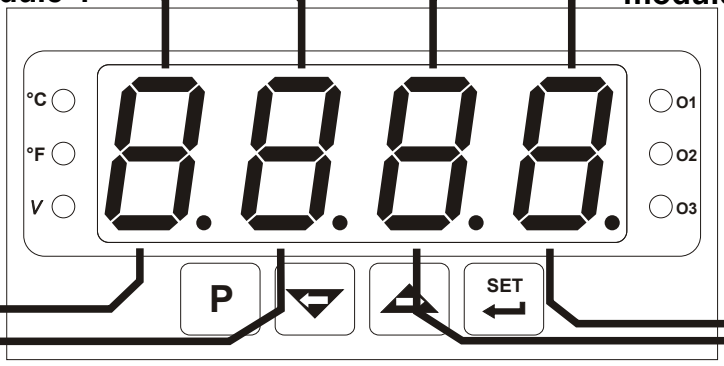
There are two sockets for plugging optional modules to the device. These modules are recognized by the device automatically. When the power is applied to the device all led indicators and display segments are momentarily illuminated for testing. Software revision number of the controller on the bottom display and module definition codes on the top display are momentarily illuminated. Module definiton codes and how to observe these codes of optional modules in Module-1 and Module-2 socket are explained below :



“ rU” **Revision** **Revision number**

Optional Input/Output module code for Module-1

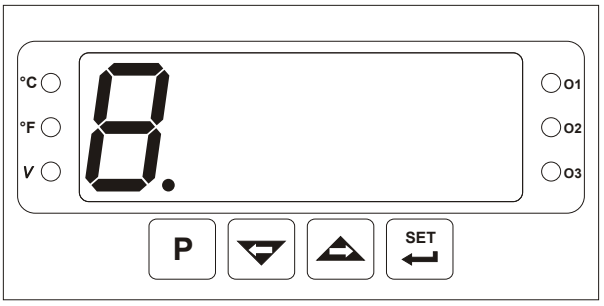
Optional Input/Output module code for Module-2



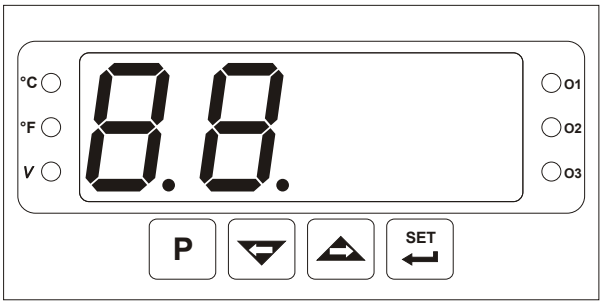
0/4...20mA⎓Current Output Module (mL-CO4/20)

There is no module in Module-2 socket

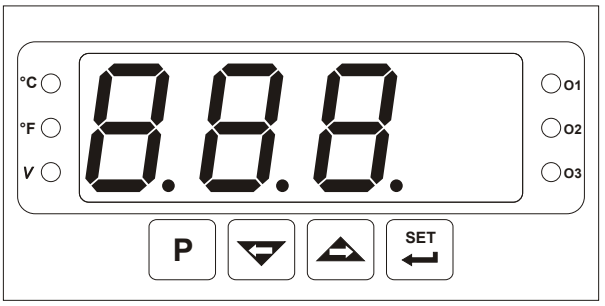
When power is on, display of the indicator is like below:



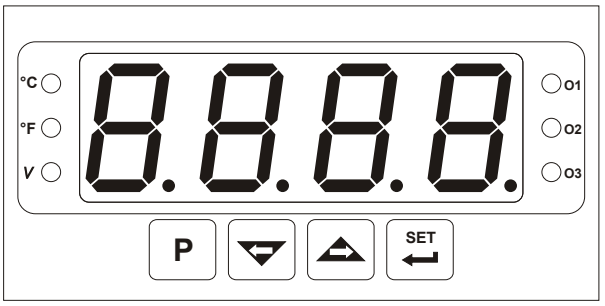
First segments of top and bottom displays are tested



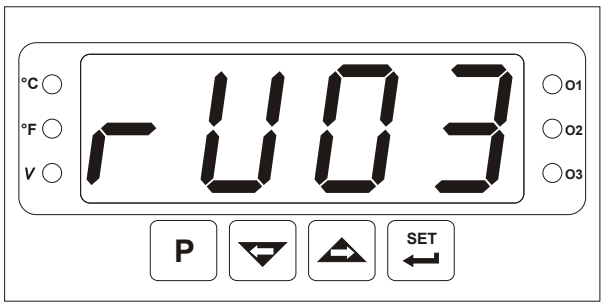
Second segments of top and bottom displays are tested.



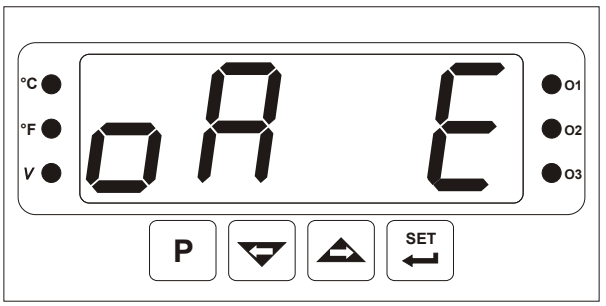
Third segments of top and bottom displays are tested.



Fourth segments of top and bottom displays are tested.



Revision number is shown. Revision number is “03”.



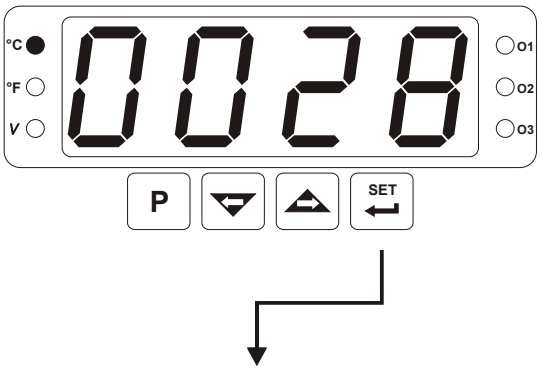
On display which modules are plugged in Module-1 and Module-2 socket is shown. All leds are energised. Above, there is Analog Output on Module-1, Modue-2 is empty (Not Used)

Main operation screen is shown

If there is an unexpected situation while powering up the device, turn power off to the device and inform qualified personnel.

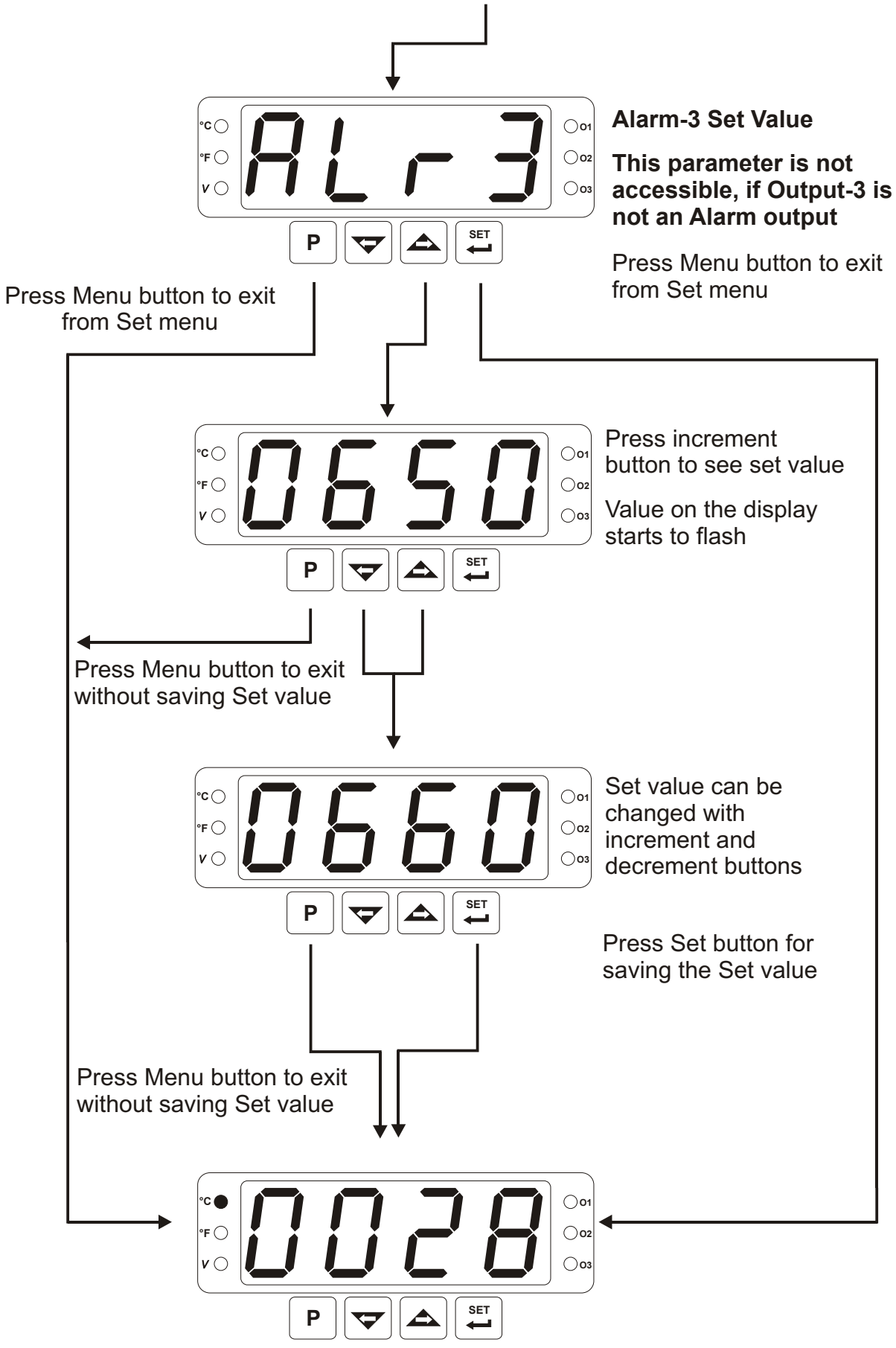
6.3 Adjustment of Alarm Set Values

If standard output (Output-3) is configured as alarm output, this is how to access these alarm set values::



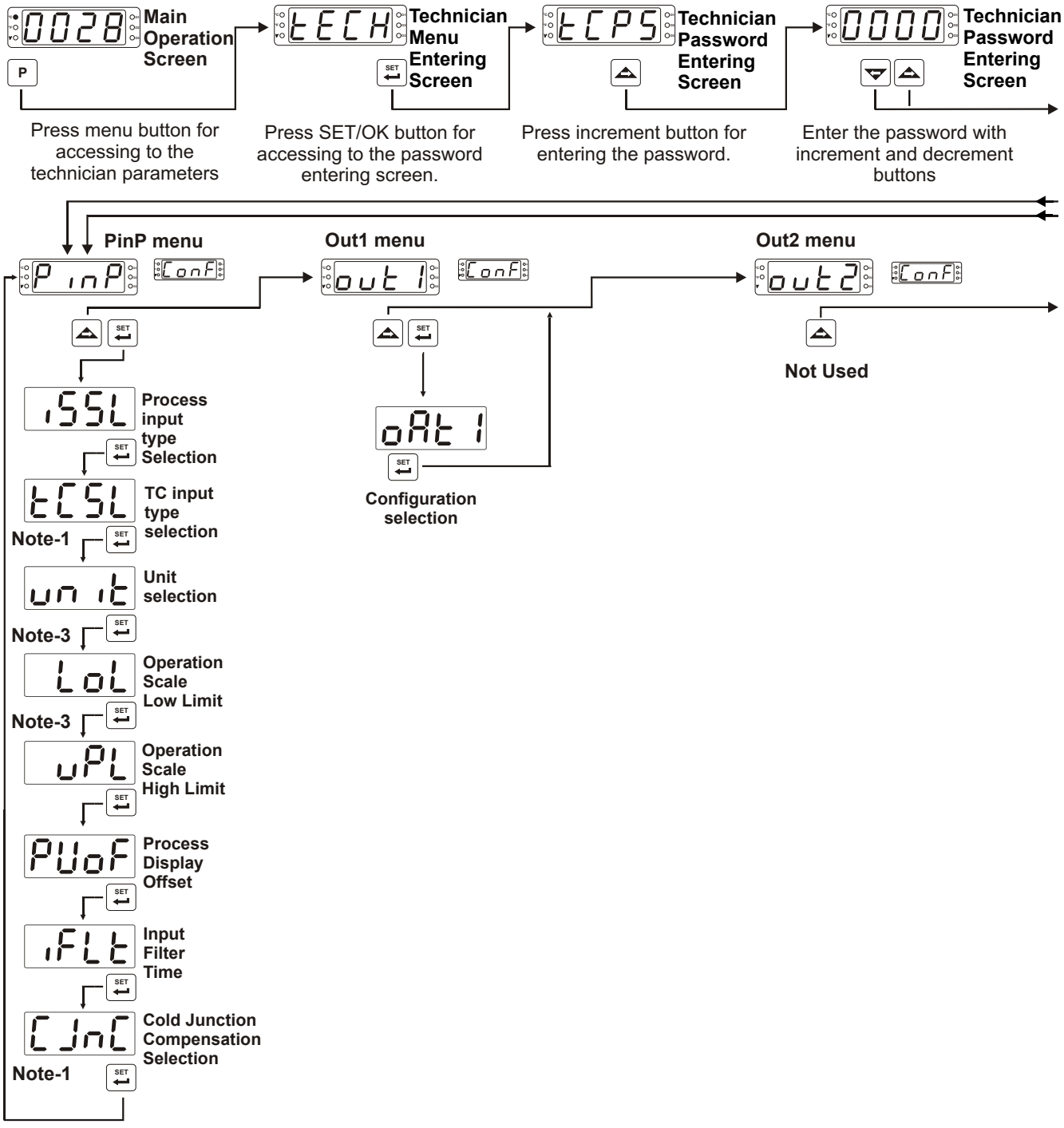
Operation Screen

Continue to Alarm 3 on next page



Operation Screen

6.4 Easy Access Diagram for Technician Parameters



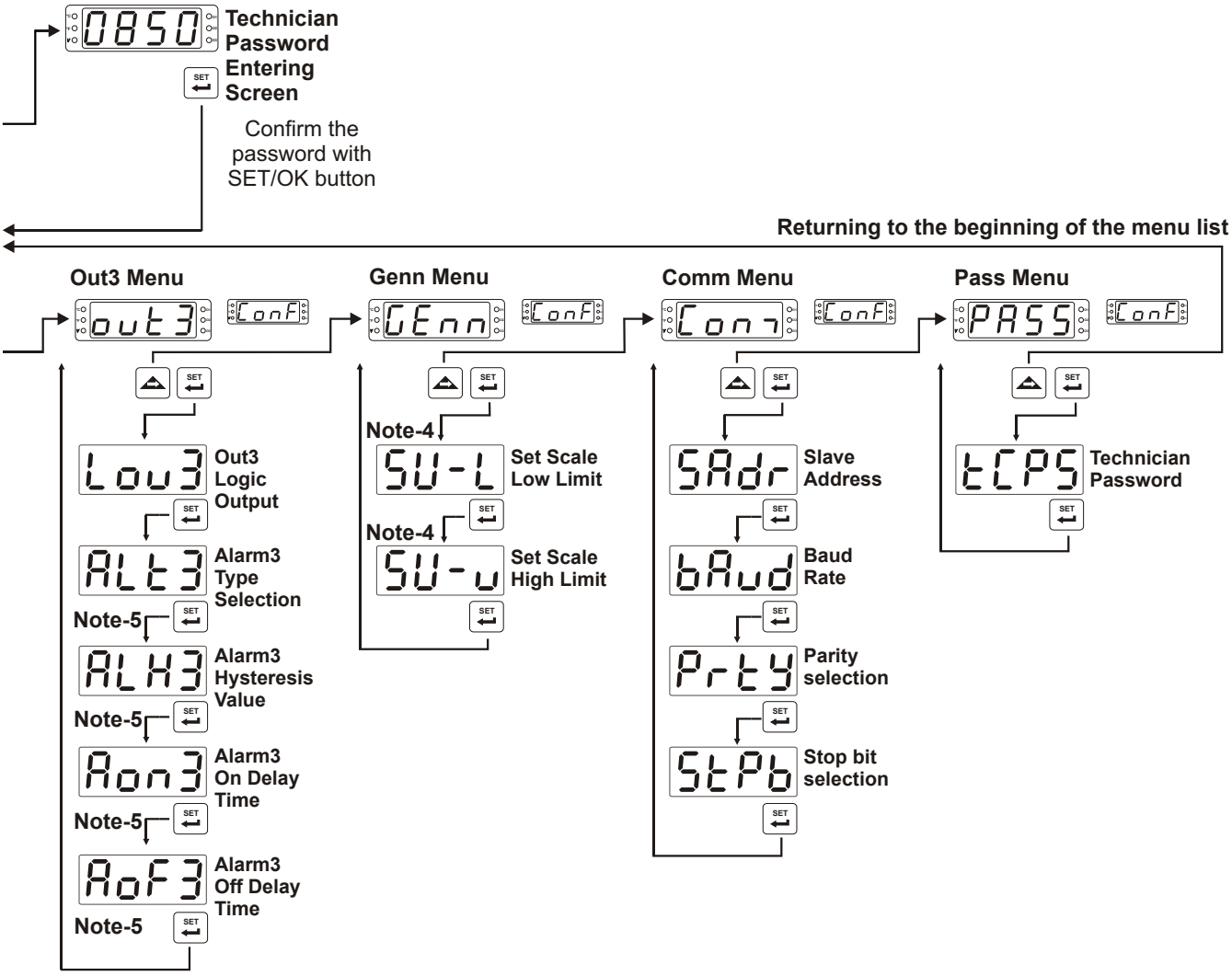
Note-1 : According to the iSSL parameter selection, another parameter can be observed instead of tCSL parameter and CJnC parameter can not be observed.
Note-2 : It can be observed if logic output function Lou1 is selected 0000 as alarm output.

Note-3 :

LoL is analog output zero process variable and below which the blinking warning display uuuu appears

uPL is analog output full scale process variable and above which the blinking warning display nnnn appears

6.4 Easy Access Diagram for Technician Parameters



Note-4 :

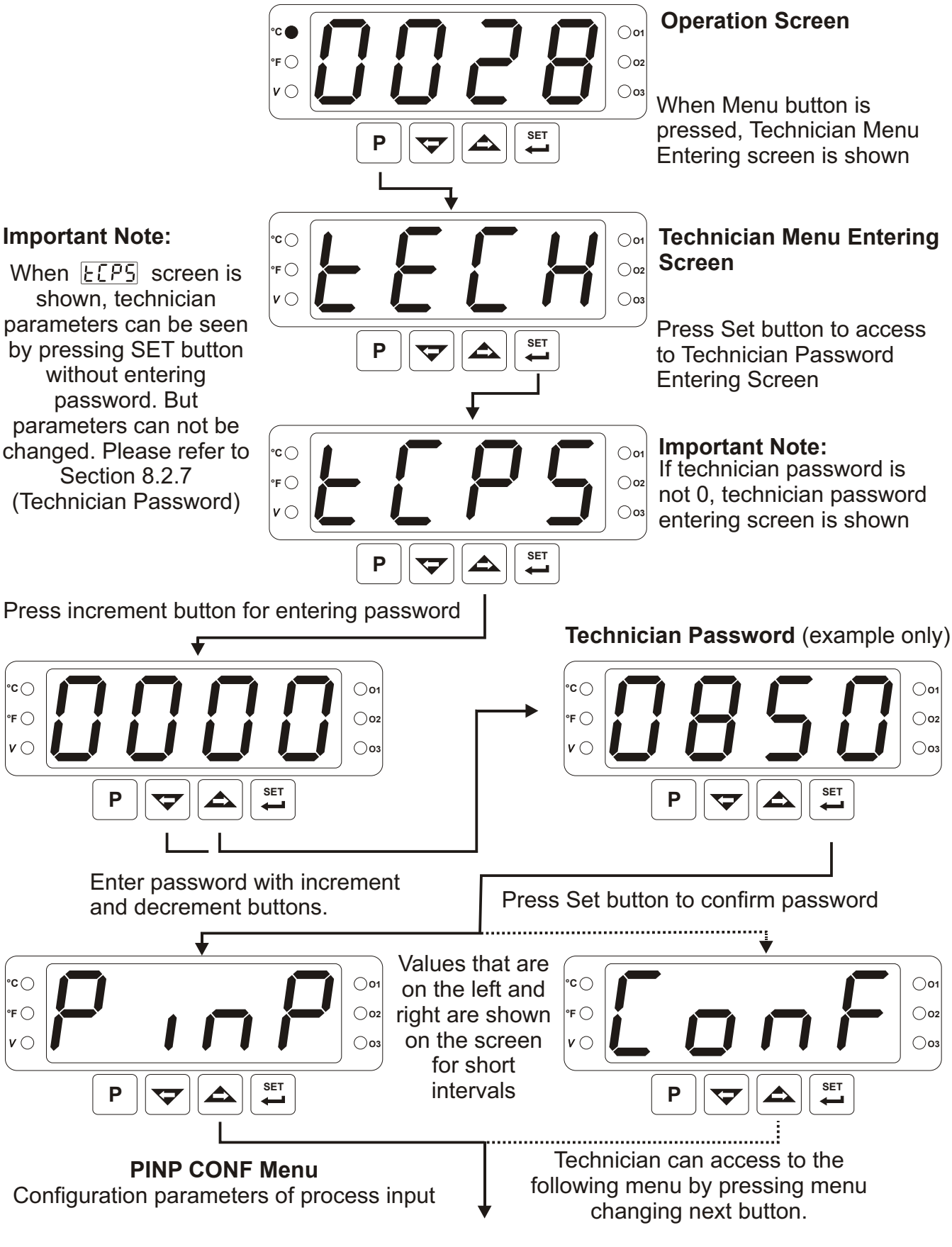
SU-L defines the operators minimum permitted setpoint value for the process variable

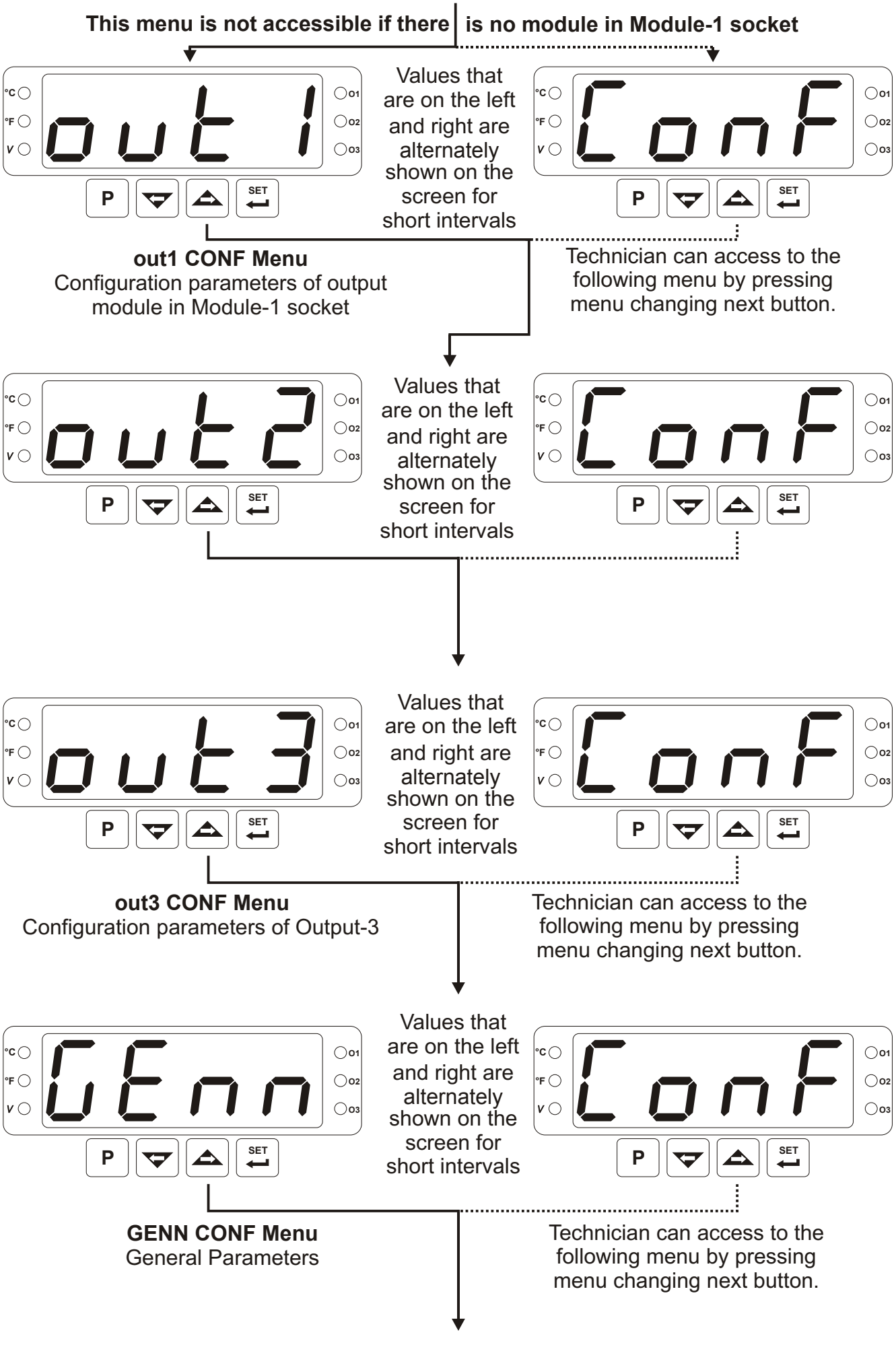
SU-u defines the operators maximum permitted setpoint value for the process variable

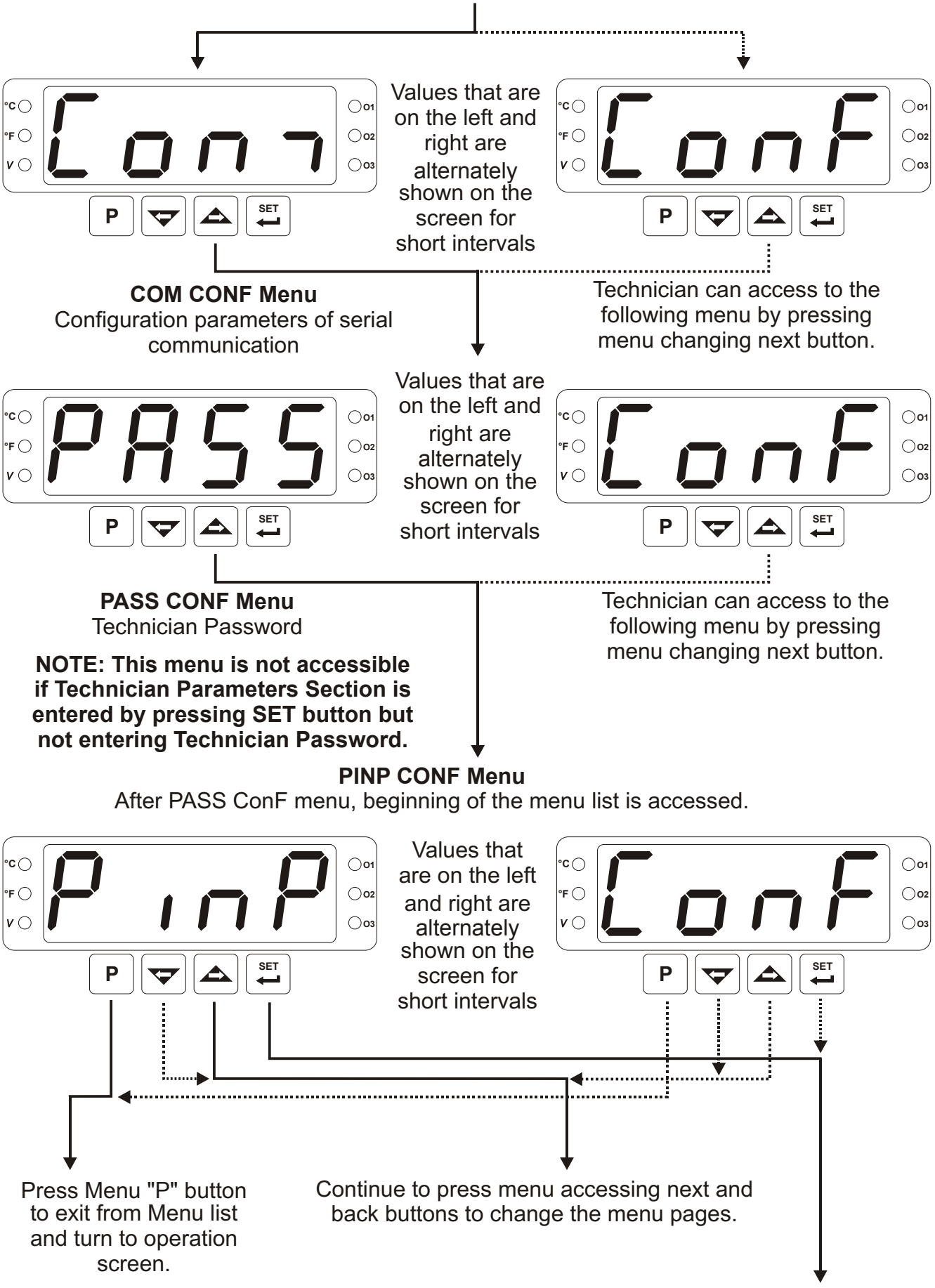
Note-5 : It can be observed if logic output function Lou3 is selected 0000 as alarm output

6.5 Accessing to the Technician Menu

The parameters have been divided into groups (sub-menus) according to their functions. Every group has a title and the first user must determine the title (menu) for accessing to the parameters. Refer to the parameters section for detailed information about parameters.



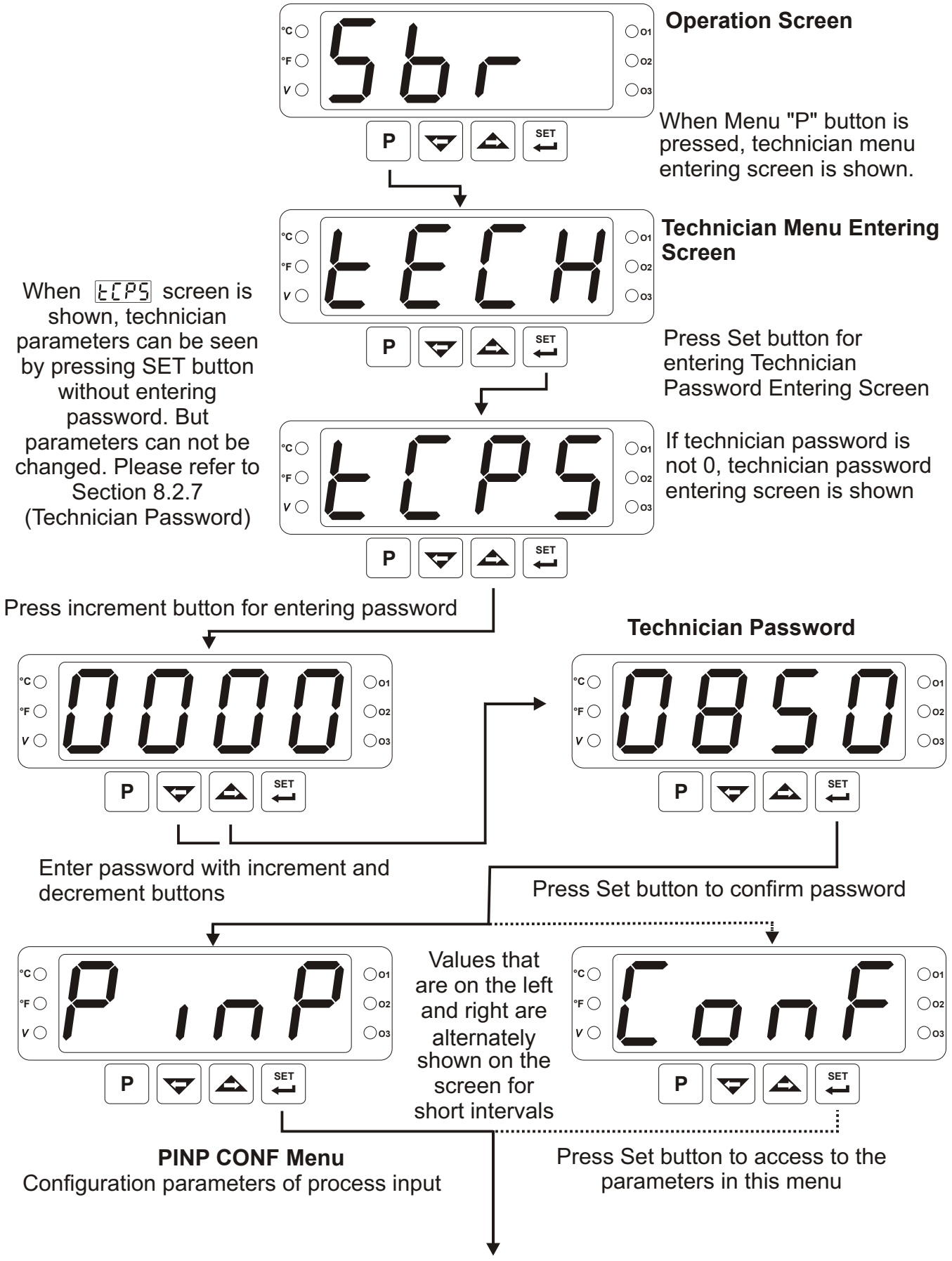

This menu is not accessible if there is no module in Module-1 socket
out 1
CONF
Values that are on the left and right are alternately shown on the screen for short intervals
out1 CONF Menu
Configuration parameters of output module in Module-1 socket
Technician can access to the following menu by pressing menu changing next button.
out2
CONF
Values that are on the left and right are alternately shown on the screen for short intervals
out3
CONF
Values that are on the left and right are alternately shown on the screen for short intervals
out3 CONF Menu
Configuration parameters of Output-3
Technician can access to the following menu by pressing menu changing next button.
GENN
CONF
Values that are on the left and right are alternately shown on the screen for short intervals
GENN CONF Menu
General Parameters
Technician can access to the following menu by pressing menu changing next button.
°C
°F
V
O1
O2
O3
P
SET

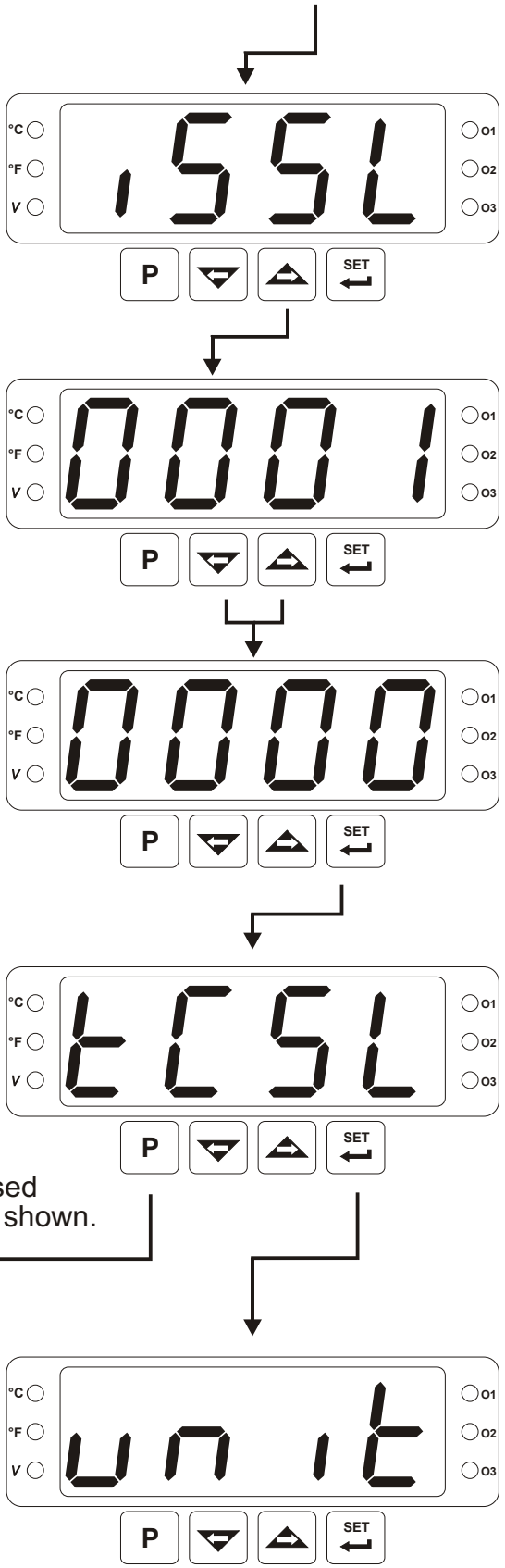


By pressing Set button, user accesses to the menu page and to all parameters in this menu page.

6.6 Changing and Saving Parameters

Example-1 : To change Process Input Type parameter `inSL` in **"**PınP Conf" menu, user must access to PınP ConF menu first.





Process Input Type Selection

Press increment button to access to the parameter

Value on the display starts to flash

Selection of Process Input Type

iSSL is 0001 means, input type is RTD.

Parameter can be changed with increment and decrement buttons

Value on the display starts to flash

Process Input Type Selection

TC input type is selected

Press Set button to confirm the parameter and access to the next parameter

TC Input Type Selection

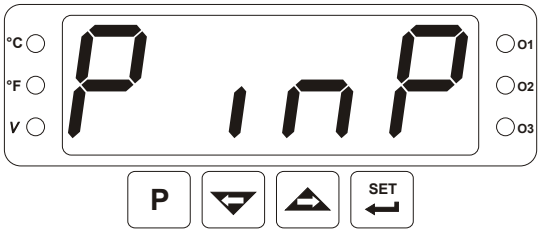
If Menu "P" button is pressed again, operation screen is shown.

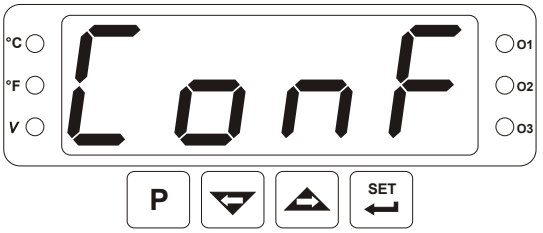
Press Set button to access to the next parameter

Unit Selection

PINP CONF Menu

Press Menu "P" button to access to the menu pages

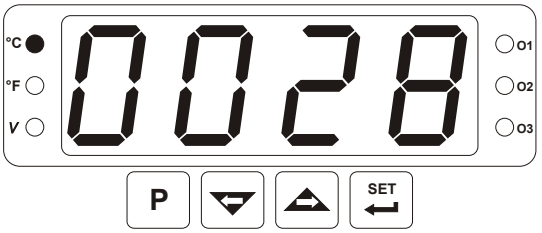




Values that are on the left and right are alternately shown on the screen for short intervals

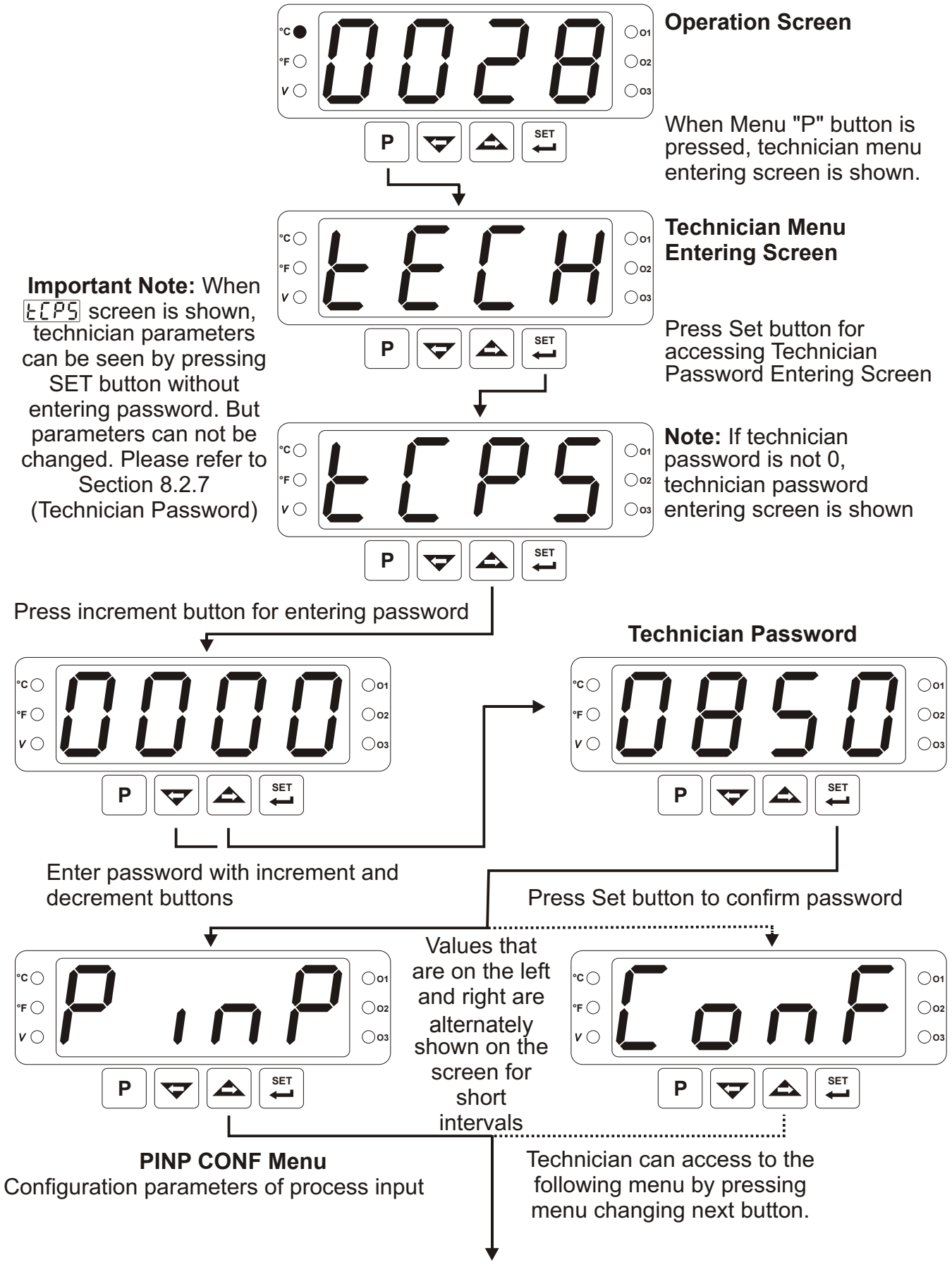
Press menu changing next or menu changing back button to access to the other menus

If Menu "P" button is pressed again, operation screen is shown.



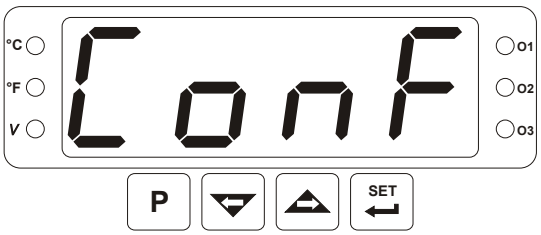
Operation Screen

EXAMPLE-2 : To change Alarm Type parameter AL t3 in "out3 Conf" menu, user must access to out3 Conf menu first.



This menu is not accessible if there is no module in Module-1 socket

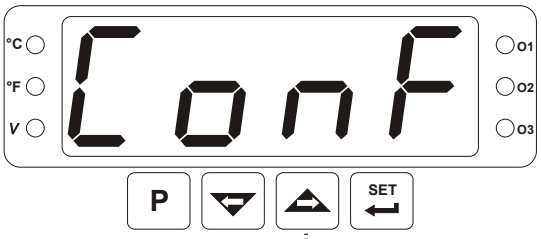
Values that are on the left and right are alternately shown on the screen for short intervals

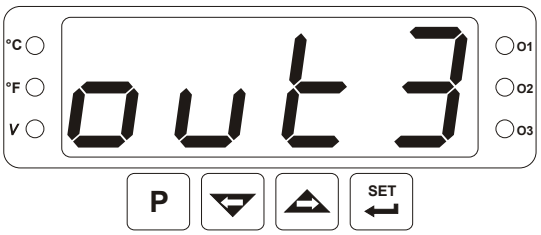


out1 CONF Menu
Configuration parameters of output module in Module-1 socket

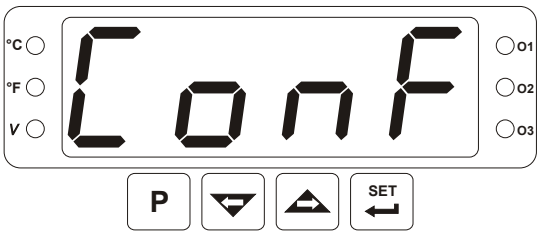
Technician can access to the following menu by pressing menu changing next button.

Out 2 is not used on this model



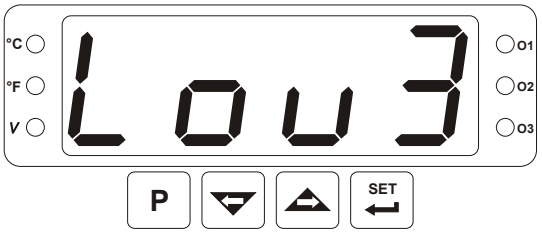


Values that are on the left and right are alternately shown on the screen for short intervals



out3 CONF Menu
Configuration parameters of Output-3

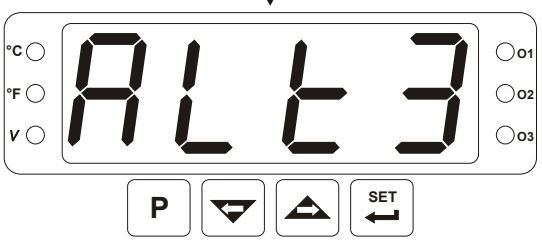
Press Set button to access to the parameter



Logic Output Function Selection

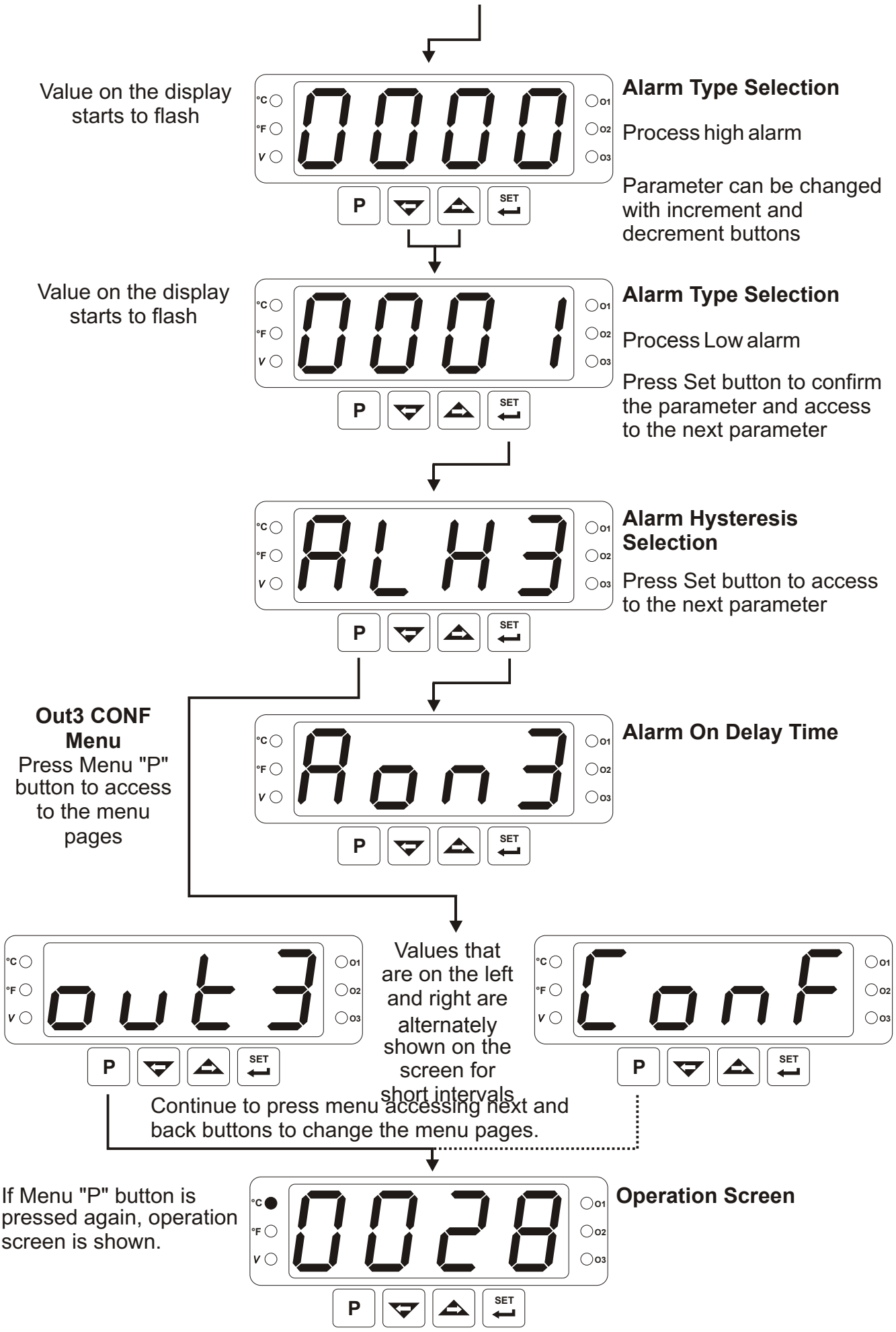
Logic Output Function Selection must be 0000

Press Set button to access to the next parameter



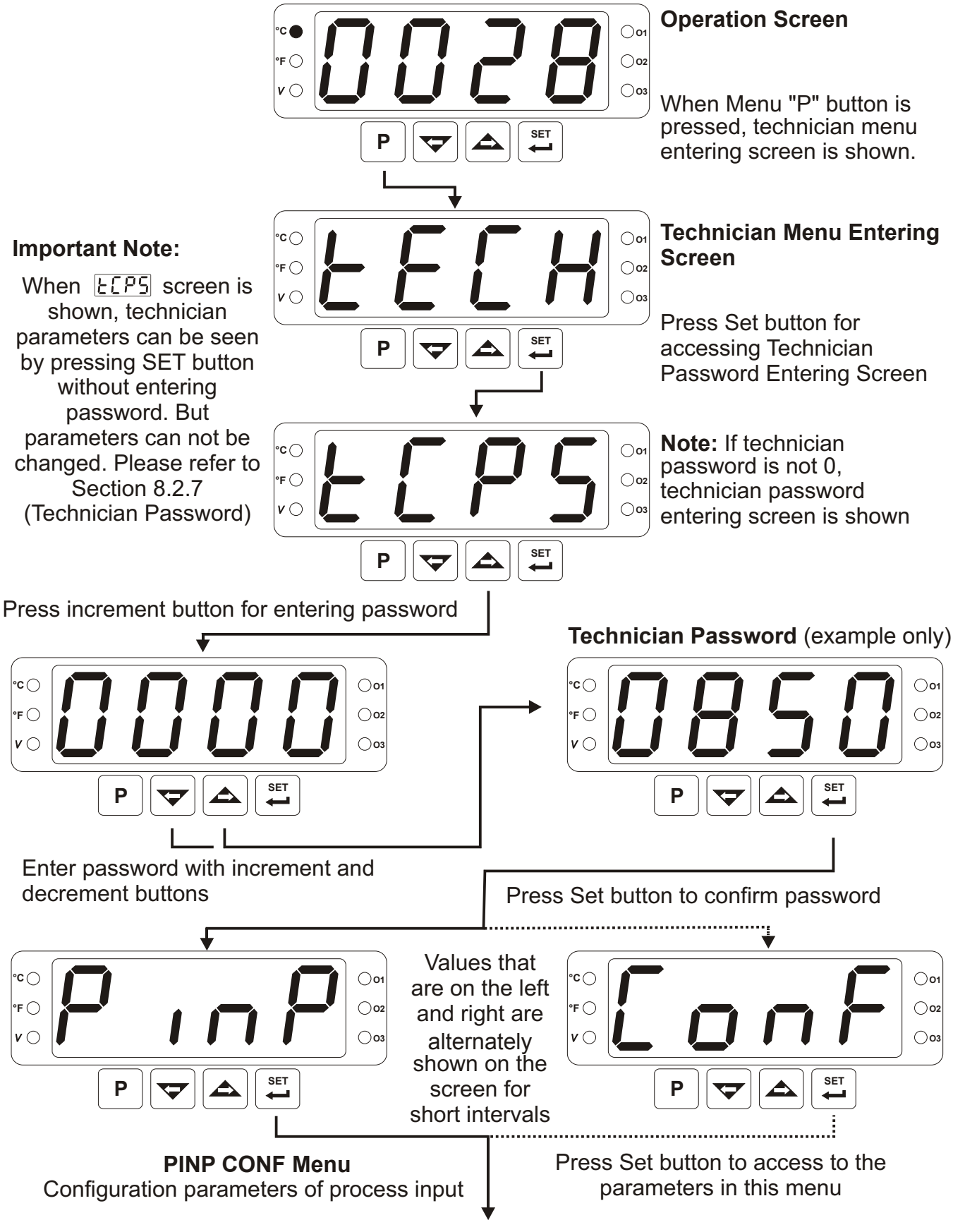
Alarm Type Selection

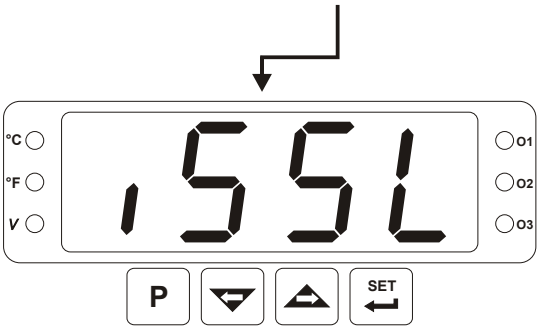
Press increment button to access to the parameter


Value on the display starts to flash
0000
Alarm Type Selection
Process high alarm
Parameter can be changed with increment and decrement buttons
Value on the display starts to flash
0001
Alarm Type Selection
Process Low alarm
Press Set button to confirm the parameter and access to the next parameter
ALH3
Alarm Hysteresis Selection
Press Set button to access to the next parameter
Out3 CONF Menu
Press Menu "P" button to access to the menu pages
Aon3
Alarm On Delay Time
out3
Values that are on the left and right are alternately shown on the screen for short intervals
ConF
Continue to press menu accessing next and back buttons to change the menu pages.
If Menu "P" button is pressed again, operation screen is shown.
0028
Operation Screen
P
SET

Example-3 : To change ⎓ Voltage/Current Input Calibration Type parameter uCAL in **"**PınP Conf" menu

uCAL Parameter is on "PınP ConF" menu. For accessing to this parameter, technician must access to "PınP ConF" menu first. In this example, changing input type of a device from thermocouple to ⎓Voltage/Current and dual point calibration selection is shown.

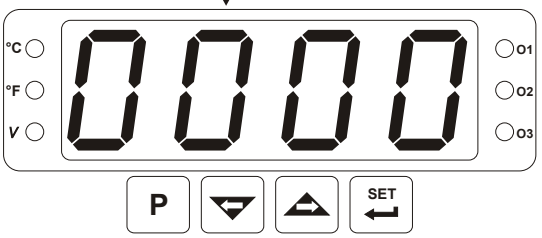




Process Input Type Selection

Press increment button to access to the parameter

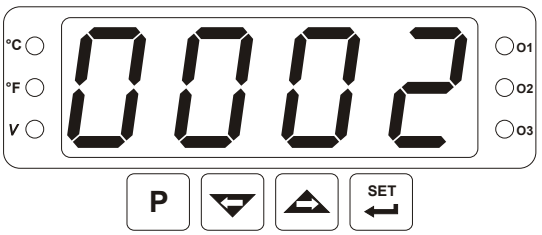
Value on the display starts to flash



Process Input Type Selection

Parameter can be changed with increment and decrement buttons

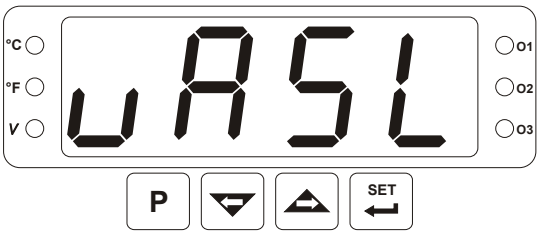
Value on the display starts to flash



Process Input Type Selection

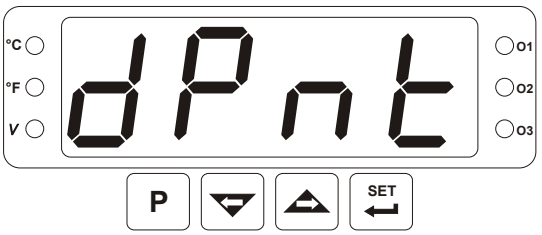
For accessing to uCAL Parameter, iSSL parameter must be 0002 . If it is not 0002 change the parameter as 0002 with increment button

Press Set button to confirm the value and access to the next parameter



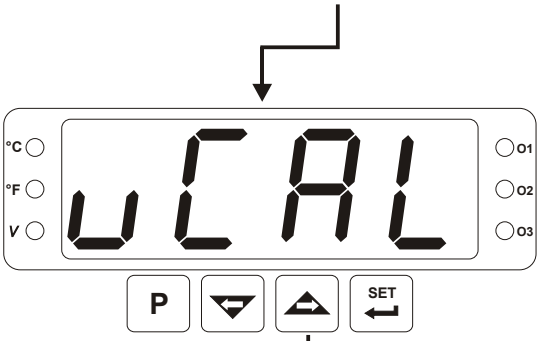
⎓Voltage / Current Input Type Selection

Press Set button to access to the next parameter



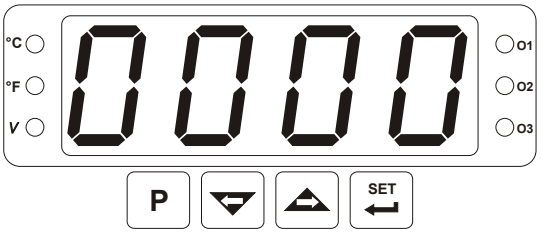
Decimal Point Position

Press Set button to access to the next parameter



⎓Voltage/Current Input Calibration Type Selection

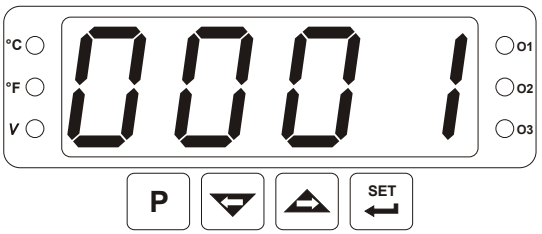
Press increment button to access to the parameter



Value on the display starts to flash

⎓Voltage/Current Input Calibration Type Selection

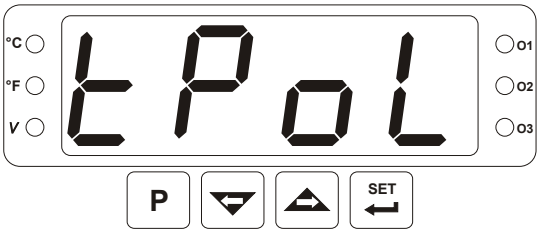
Parameter can be changed with increment and decrement buttons



Value on the display starts to flash

⎓Voltage/Current Input Calibration Type Selection

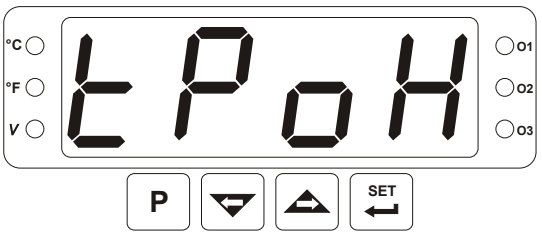
Press Set button to confirm the value and access to the next parameter



Minimum value for selectable dual point calibration (zero)

Press Set button to access to the next parameter

Press Menu button to access to menu pages



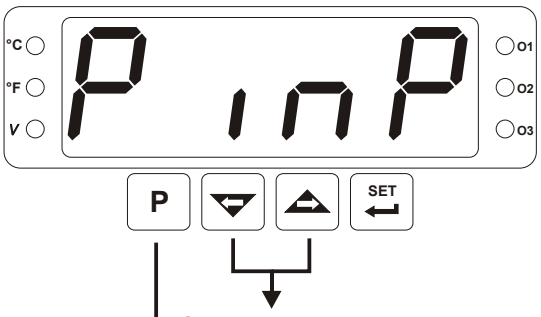
Maximum value for selectable dual point calibration (full scale)

NOTES

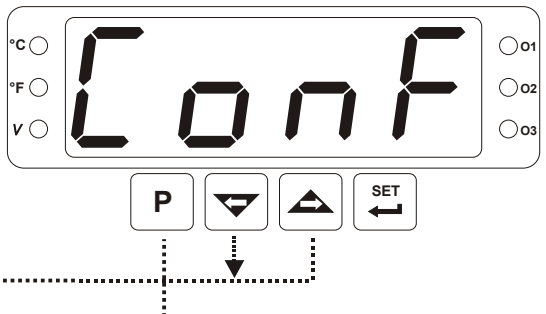
tPoL is analog input zero process variable

tPoH is analog input full scale process variable

PINP CONF Menu
If Menu button is pressed again, operation screen is shown.

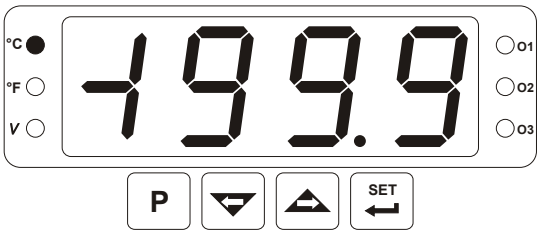


Values that are on the left and right are alternately shown on the screen for short intervals



Continue to press menu accessing next and back buttons to change the menu pages.

If Menu "P" button is pressed again, operation screen is shown.



Operation Screen

7. Parameters

Parameters are divided into two groups. These are Alarm Set and Technician parameters. Technician parameters are groupped into subgroups according to their functions. The subgroups are named as menu pages.

7.1 Alarm SET Parameters

ALr3 If OUTPUT-3 relay output module is configured as alarm output, this parameter defines the set value of the alarm output.

ALr3 Set value can be adjusted from minimum value of set scale
SU-L to maximum value of set scale SU-u

NOTES

SU-L defines the operators minimum permitted setpoint value for the process variable

SU-u defines the operators maximum permitted setpoint value for the process variable

7.2 Technician Parameters

P inP
ConF

7.2.1 Process Input Type and Relevant Parameters with Process Input

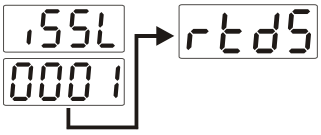
inSL — Defines the process input type.

- 0000 TC input type selection
- 0001 RTD input type selection
- 0002 ⎓ Voltage/Current input type selection.

inSL → tCSL (active when inSL = 0000)

Defines type and scale of the thermocouple for TC input. It is active if TC input type is selected.

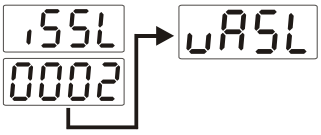
- 0000 L (-100°C;850°C) or (-148°F;1562°F)
- 0001 L (-100.0°C;850.0°C) or (-148.0°F;999.9°F)
- 0002 J (-200°C;900°C) or (-328°F;1652°F)
- 0003 J (-199.9°C;900.0°C) or (-199.9°F;999.9°F)
- 0004 K (-200°C;1300°C) or (-328°F;2372°F)
- 0005 K (-199.9°C;999.9°C) or (-199.9°F;999.9°F)
- 0006 R (0°C;1700°C) or (32°F;3092°F)
- 0007 R (0.0°C;999.9°C) or (32.0°F;999.9°F)
- 0008 S (0°C;1700°C) or (32°F;3092°F)
- 0009 S (0.0°C;999.9°C) or (32.0°F;999.9°F)
- 0010 T (-200°C;400°C) or (-328°F;752°F)
- 0011 T (-199.9°C;400.0°C) or (-199.9°F;752.0°F)
- 0012 B (44°C;1800°C) or (111°F;3272°F)
- 0013 B (44.0°C;999.9°C) or (111.0°F ; 999.9°F)
- 0014 E (-150°C;700°C) or (-238°F;1292°F)
- 0015 E (-150.0°C;700.0°C) or (-199.9°F;999.9°F)
- 0016 N (-200°C;1300°C) or (-328°F;2372°F)
- 0017 N (-199.9°C;999.9°C) or (-199.9°F;999.9°F)
- 0018 C (0°C;2300°C) or (32°F;3261°F)
- 0019 C (0.0°C;999.9°C) or (32.0°F;999.9°F)



Defines type and scale of sensor for RTD input. It is active if RTD input is selected.

0000 Sensor type : PT-100
Scale: -200°C to 650°C (If unit is °C)
Scale: -328°F to 1202°F (If unit is °F)

0001 Sensor type : PT-100
Scale: -199.9°C to 650.0°C (If unit is °C)
Scale: -199.9°F ile 999.9°F (If unit is °F)



Defines input range and scale of ⎓Voltage/Current input.It is active if ⎓Voltage/Current is selected.

0000 0...50mV⎓ (-1999 ; 9999)

0001 0...5V⎓ (-1999 ; 9999)

0002 0...10V⎓(-1999 ; 9999)

0003 0...20mA⎓ (-1999 ; 9999)

0004 4...20mA⎓ (-1999 ; 9999)

Defines point position for displays. It is active if ⎓Voltage/Current input is selected.

0000 No point

0001 000.0

0002 00.00

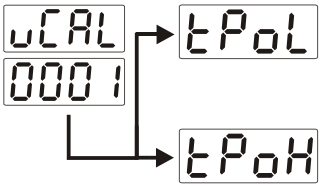
0003 0.000

It is active when ⎓Voltage/Current input is selected. It determines calibration type.

0000 Fixed dual point calibration is done. It does not allow to adjust minimum and maximum value of calibration points. It can be adjusted from -1999 to 9999.

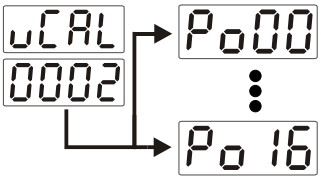
0001 It allows to do selectable dual point calibration. (i.e. zero and full scale)

0002 It allows to define 16 calibration points.



tPoL* It defines minimum value (zero) for selectable dual point calibration. It is active if ⎓Voltage/Current input is selected. It can be adjusted from -1999 to 9999.

tPoH* It defines maximum value (full scale) for selectable dual point calibration. It is active if ⎓Voltage/Current is selected. It can be adjusted from -1999 to 9999.



In multi point calibration, calibration points are defined with these parameters. It is active if ⎓Voltage /Current is selected. It can be adjusted from -1999 to 9999.

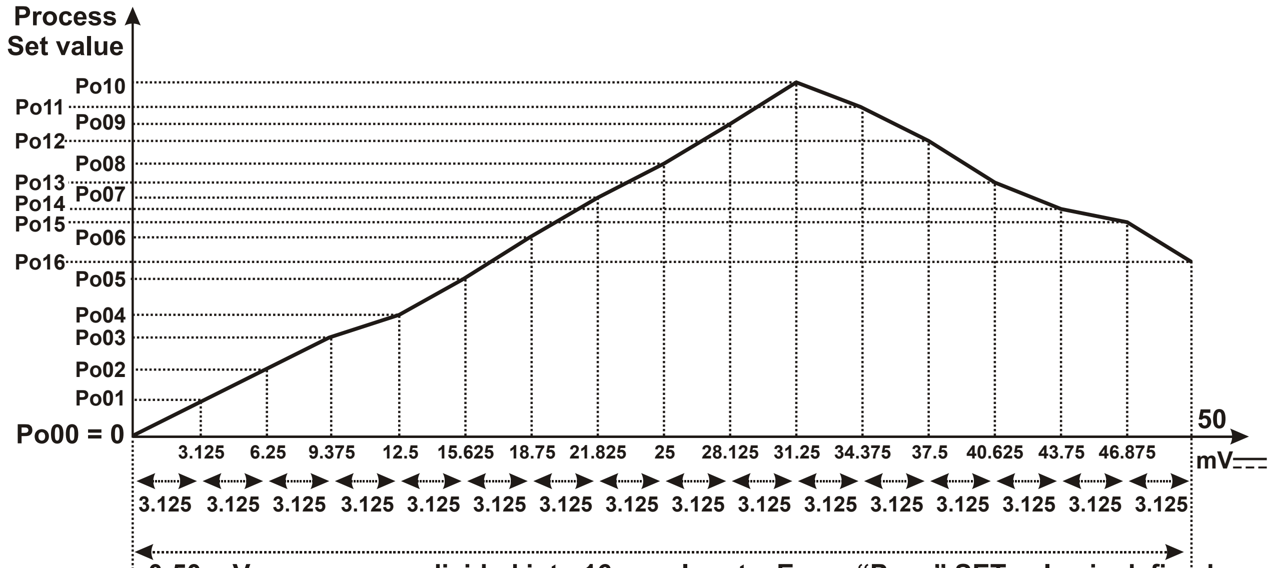
In multi point calibration operation, defined scale is divided into 16 calibration points.

For example : uASL is, 0000 (0-50 mV⎓).

***NOTES**

tPoL is analog input zero process variable

tPoH is analog input full scale process variable



0-50 mV⎓ range are divided into 16 egual parts. Every "Poxx" SET value is defined 50 / 16 = 3.125 mV⎓ range.

iSSL 0002 → CoEF

Coefficient value for ⎓Voltage/Current input. Process value is multiplied with this value.

It is active if ⎓Voltage/Current input is selected. It can be adjusted from 1.000 to 9.999. (default = 1.000)

unit

Unit selection

- °C — Unit is °C
- °F — Unit is °F
- U — Unit is U. It is active if ⎓Voltage/Current input is selected (iSSL 0002)
- - — No unit. It is active if ⎓Voltage/Current input is selected (iSSL 0002)

LoL

Minimum value of operating scale. It can be changed according to input type and scale of the process. (zero for analog out)

uPL

Maximum value of operating scale. It can be changed according to input type and scale of the process. (full scale for analog out)

PUoF

Display offset for process value. It can be adjusted -10% to +10% of scale. The defined value is added to process value.

iFLt

Defines filter time for input signal. It can be adjusted from 0.0 to 900.0.

iSSL 0000 → CJnC

It is active if process input is selected TC input. It decides if cold junction compensation is active or not.

- YES — Cold junction compensation is active.
- no — Cold junction compensation is not active.

out 1
ConF

7.2.2 MODULE-1 Configuration Parameters

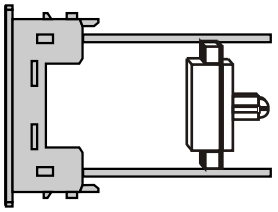
Module-1 configuration parameters are arranged automatically by the device according to the module type in Module-1 socket. These parameters are not accessible if there is no module in Module-1 socket.

Lou 1 **It determines logic output function of the output module in Module-1 socket**

oAt 1 **Configuration of analog output module**

out1 ConF

These parameters are active if mL-CO4/20 (0/4...20 mA⎓ Current Output) module is plugged in Module-1 socket.



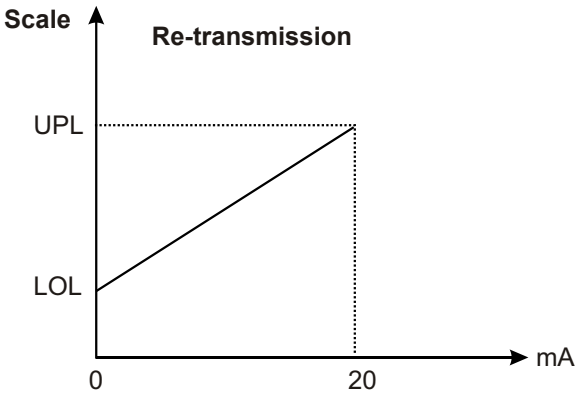
mL-CO4/20

out 1
ConF

oAt 1 Configuration of analog output module in Module-1 socket.

0000 0...20mA output or 0...10V⎓ according to Section 5.1.5 is selected.

0001 4...20mA output or 2...10V⎓ according to Section 5.1.5 is selected.



7.2.3 OUTPUT-3 Configuration Parameters

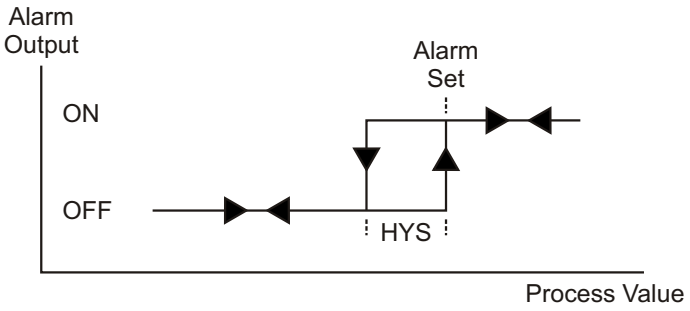
It determines logic output function of Output-3

- 0000 Alarm output
- 0001 Sensor break alarm output
- 0002 Output is active when the process value is out of the band which is defined with minimum value of operating scale LoL and maximum value of operating scale uPL

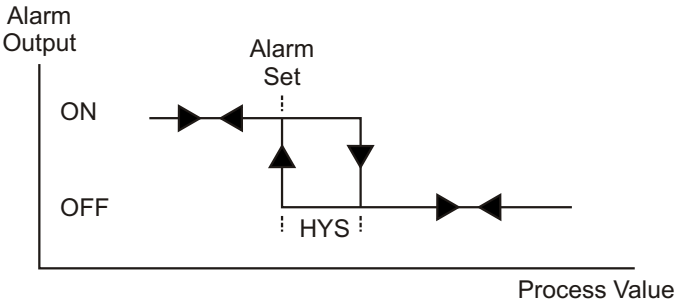
It determines alarm type. It is active if logic output function of Output-3 is alarm output.

- 0000 Process high alarm
- 0001 Process low alarm

Process high alarm



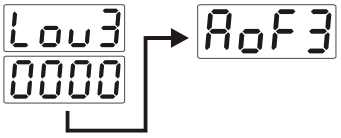
Process low alarm



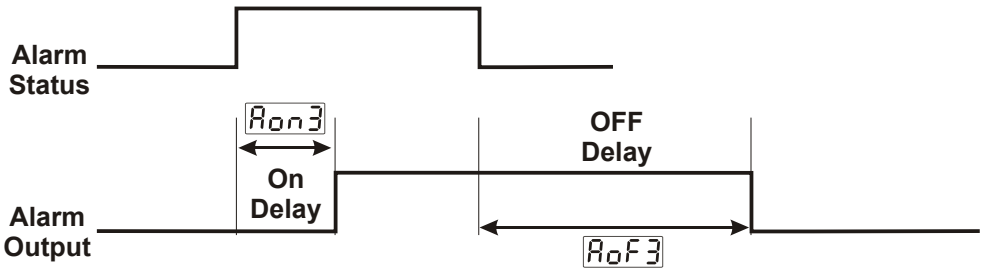
Alarm- 3 hysteresis value. It is active if logic output function of Output-3 is alarm output.

It can be adjusted from 0% to 50% of process input scale
(uPL - LoL)

Alarm on delay time. It can be adjusted from 0 to 9999 seconds. It is active if logic output function of Output-3 is alarm output.



Alarm off delay time. It can be adjusted from 0 to 9998 seconds. When the value is greater than 9998, LtCH is seen on the display. It means alarm latching output is selected. It is active if logic output function of Output-3 is alarm output.



GEnn
ConF

7.2.4 General Parameters

SU-L Minimum value for process set and alarm set values. It is named as low limit of set scale.
It can be adjusted from low limit of input selected with ,SSL parameter to SU-u parameter.
Please refer to Section 8.2.1 Process Input Type and Relevant Parameters with Process Input for ,SSL parameter

SU-u Maximum value for process set and alarm set values. It is named as high limit of set scale.
It can be adjusted from SU-L to high limit of input selected with ,SSL Parameter.
Please refer to Section 8.2.1 Process Input Type and Relevant Parameters with Process Input for ,SSL parameter

Note: Operator entry of alarms are restricted to be between SU-L and SU-u

Con1
ConF

7.2.5 Parameters for Configuration of Serial Communication

SAdr **Communication Accessing Address**

Communication accessing address of device. It can be adjusted from 1 to 247.

bAud **Communication Baud Rate**

0000 1200 Baud Rate

0001 2400 Baud Rate

0002 4800 Baud Rate

0003 9600 Baud Rate

0004 19200 Baud Rate

PrtY **Parity Selection for Communication**

0000 No parity

0001 Odd Parity

0002 Even Parity

StPb **Stop Bit Selection for Communication**

0000 1 Stop Bit

0001 2 Stop Bits

PASS
ConF

7.2.6 Technician Password

tCPS It is used for accessing to the technician parameters.
It can be adjusted from 0 to 9999.

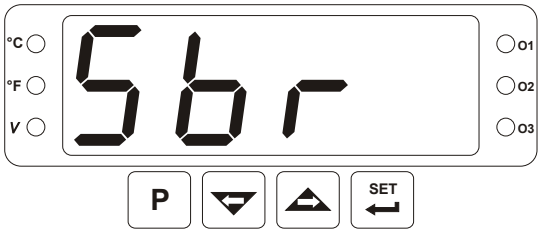
If it is 0000; there is no password protection while entering to the technician parameters.

If it is different from "0" and user wants to access to the technician parameters;
1- If user does not enter tCPS password correctly:
It turns to operation screen without entering to operator parameters.

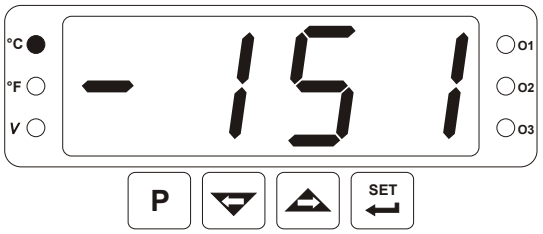
2- When tCPS in top display and 0000 in bottom display, if user presses SET button without entering tCPS password (For observing parameters)
User can see all menus and parameters except Operator and Technician Password menu ("Pass Conf") but parameters can not be changed.
(Please refer to Section 9. Failure Messages (4) in mL-PI8 Process Indicators)

3- Consult factory if password is lost and unit is locked.

8..Failure Messages in mL-PI8 Process Indicator



1 - Sensor failure in analog inputs. Sensor connection is wrong or there is no sensor connection.

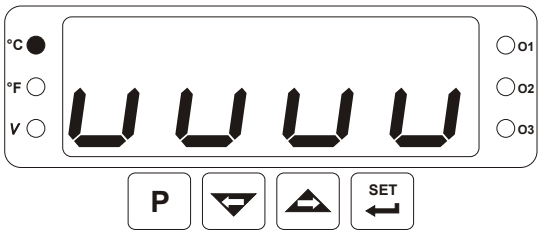


2 - If display blinks : If analog input value is less than minimum value of operating scale LoL then display starts to blink. (out of range - below zero)

In "PınP Conf" Menu suppose that;

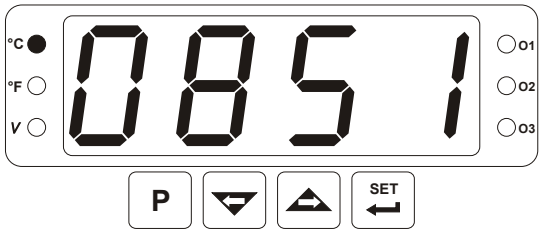
iSSL 0000 ; tCSL 0002 ; unit °C ;
LoL -200 ; uPL 0900 are defined.

Adjust LoL - 150



If analog input value is less than minimum value of operating scale LoL , then display starts to blink.

Please refer to Section 8.2.1 for detailed information about this parameter.

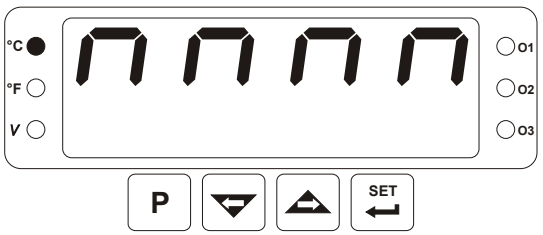


3 - If display blinks : If analog input value is greater than maximum value of operating scale uPL , then display starts to blink.

In "PınP Conf" Menu ;

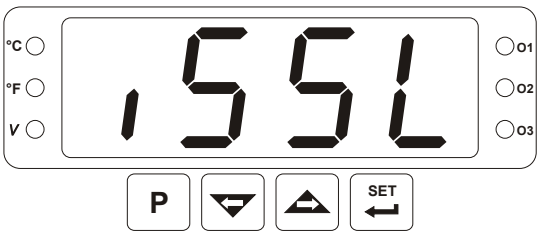
iSSL 0000 ; tCSL 0002 ; unit °C ;
LoL -200 ; uPL 0900

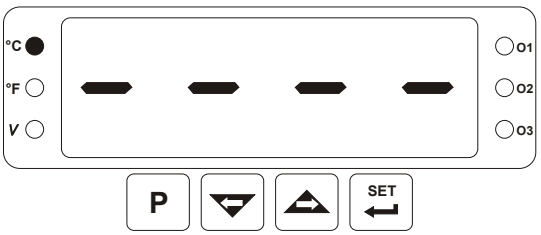
Adjust uPL 0850



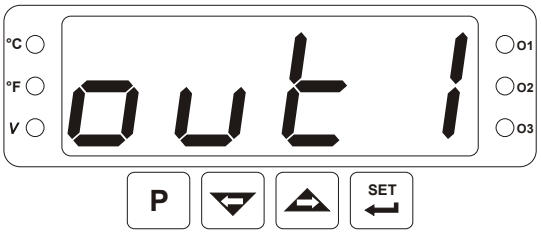
If analog input value is greater than maximum value of operating scale uPL then display starts to blink. (out of range - above full scale)

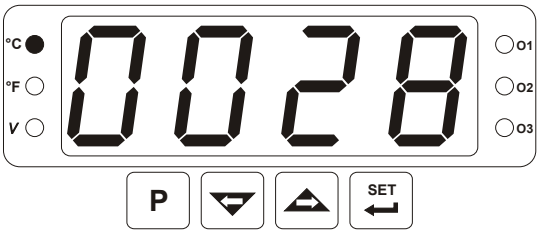
Please refer to Section 8.2.1 for detailed information about this parameter.





4 - If technician password is different from “0” and user accesses to the parameter by Set button without entering the technician password and wants to change a parameter, the warning message is shown on the display as shown on the left. Device does not allow to do any changes without entering the password correctly.





5 - If user does not do anything for 120 seconds while device is on Set or Technician menus, device returns to operation screen.

9. Specifications

Device Type	: Process Indicator
Housing&Mounting	: 96mm x 48mm x 86.5mm 1/8 DIN 43700 plastic housing for panel mounting. Panel cut-out is 92x46mm. Type-1 Enclosure Mounting.
Protection Class	: NEMA 4X (IP65 at front, IP20 at rear).
Weight	: Approximately 0.21 Kg.
Environmental Ratings	: Standard, indoor at an altitude of less than 2000 meters with none condensing humidity.
Storage/Operating Temperature	: -40 °C to +85 °C / 0 °C to +50 °C
Storage/Operating Humidity	: 90 % max. (None condensing)
Installation	: Fixed installation
Over Voltage Category	: II
Pollution Degree	: II, office or workplace, none conductive pollution : Continuous
Operating Conditions	
Supply Voltage and Power	: 100 - 240 V ~ (-15% / +10%) 50/60 Hz. 6VA (standard) 24 V ⎓ (-15% / +10%) 6W (optional)
Process Inputs	: Universal input TC, RTD, ⎓Voltage/Current
Thermocouple Input Types	: Selectable by parameters L (DIN43710) , J ,K ,R ,S ,T ,B ,E ,N (IEC584.1)(ITS90) , C (ITS90)
Thermoresistance (RTD) Input Types	: PT 100 (IEC751) (ITS90)

⎓ Voltage Input Types	: Selectable by parameters 0...50mV ⎓, 0...5V ⎓, 0...10V ⎓
⎓ Current Input Types	: Selectable by parameters 0...20mA ⎓, 4...20mA ⎓
Accuracy	: ± 0.25% of full scale for thermocouple, thermoresistance and voltage, ± 0.70% of full scale for current.
Cold Junction Compensation	: Automatically ± 0.1°C/1°C.
Line Compensation	: Maximum 10 . (RTD lead wire compensation)
Sensor Break Protection	: Upscale
Sampling Cycle	: 3 samples per second
Input Filter	: 0.0 to 900.0 seconds
Control Form	: Programmable ON / OFF.
Standard Relay Output	: 5A@250V~ at resistive load (Programmable control or alarm output) (Electrical Life : 100,000 Operation (Full Load))
Secondary Relay Output	: Form A Relay Output (3A@250V~at resistive load)
Analog Output	: 0/4...20 mA Current Output
Standard Communication Module	: mL--410 RS-485 Communication Module
Optional Communication Module	: mL--400 RS-232 Communication Module
Communication Protocol	: MODBUS-RTU
Process Display	: 20.3 mm Red 4 digit LED display
Led Indicators	: O1 / 2 / 3 (Outputs) LEDs, °C / °F / V unit LEDs
Approvals	: UL Recognized Component (File No : E 254103), EAC, CE

10. Other Informations

Company Information:

KEP
10 Industrial Way East
Eatontown, NJ 07724

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