ProSense Digital Process Meter
User Manual

CE

This product manual covers the following part numbers:

LPD5-A-AC
LPD5-A-DC

ProSense Digital Process Meter
User Manual

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ProSense Digital Process Meter
User Manual

1 - Introduction

The numerical displays for series LPD5-A-AC and LPD5-A-DC, are industrial displays with analog input for the control processes. All the models are manufactured in 5 digits, with one display side.

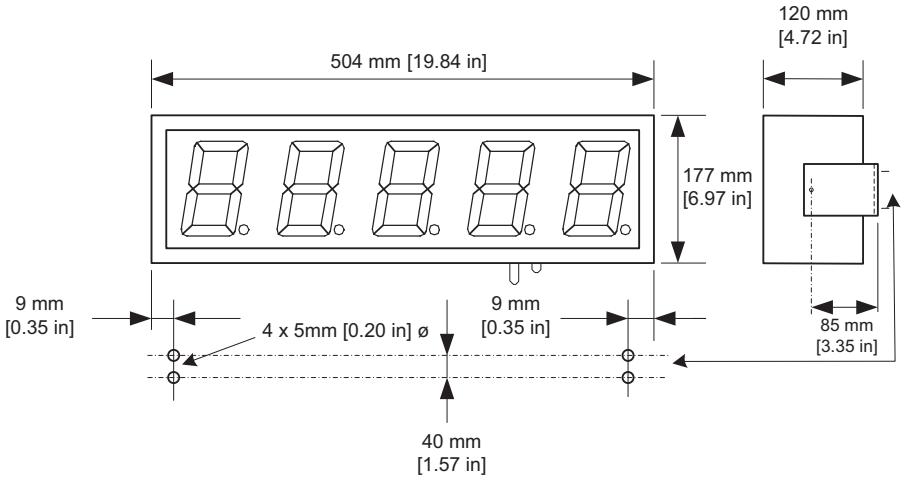
The large digit display size of 100mm, with a legible distance from 50m, is one of the main characteristics.

All the equipment is provided completely calibrated, with the data stored in non-volatile memory, eliminating the use of trimming potentiometers.

2 - Technical Specifications

Technical Specifications		
Supply Voltage	100 to 240 VAC 50 to 60Hz or 19 to 36VDC	
Consumption	17W	
Display	7 segments, 100mm high + decimal point	
LED	Red LED sunlight readable. Viewing distance: max 50 meters	
Parameter Memory	Eeprom	
Environmental Conditions	***Operation temperature***	-20 to 60ºC (-4 to 140ºF)
	Storage temperature	-30 to 70ºC (-22 to 158ºF)
	Humidity	5-95% RH non condensing
	Sealing	IP65
Input Signal	***Configuration***	Differential asymmetrical
Voltage Input	***Range***	± 10VDC
	Resolution	0.5 mV
	Input impedance	1 MΩ
Current Input	***Range***	± 20 mA DC
	Resolution	5µA
	Input impedance	12.1 Ω
Output Excitation	24VDC @ 100mA	
Accuracy to 22° ±5°C	***Maximum error***	± (0.1% of reading + 3 digits)
	Temperature coefficient	100ppm/°C
	Warm up time	5 minutes
Conversion Method	***Technique***	Sigma-Delta
	Resolution	16 bits
	Rate	25 samples/s
Display	***Over-range 5 digits***	-OuE / OuE
	Parameter error. IP1 > IP2	E0
	Non input signal or polarity inverted	E2
	Over-range input signal	E3

2.1 - Dimensions and Mounting



3 - Installation

The installation is not a particularly delicate one, but some important considerations must be taken into account.

The display must not be anchored to places subject to vibrations, nor should it be installed in places which generally surpass the limits specified in the display characteristics, both in terms of temperature and humidity.

The degree of protection of displays is IP65 meaning that they are dust-tight and protected from low pressure water jets from any direction.

In the electrical installation, proximity to lines of high intensity circulation and high voltage lines must be avoided, as well as proximity to High Frequency generators and U/F converters for motors.

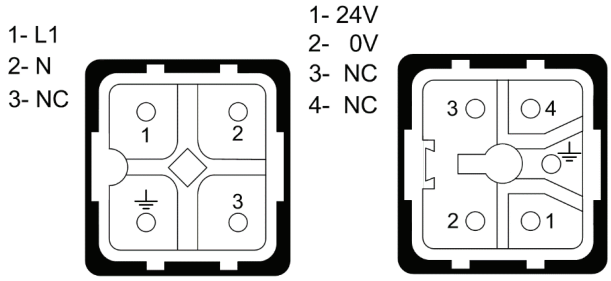
3.1 - Power Supply

The power supply must be 100 to 240 VAC, 50 to 60 Hz or 19 to 36 VDC.

The power supply conductor section will be in line with consumption and the ground conductor will be a minimum section of 1.5m^2.

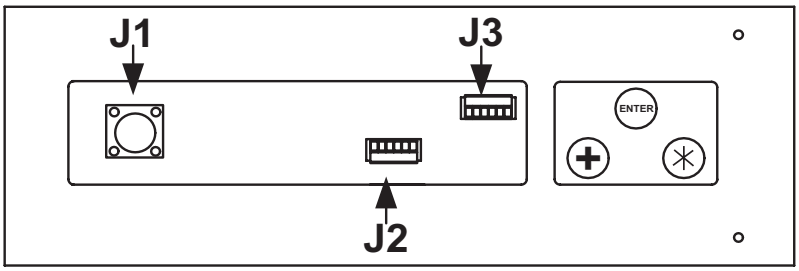
The power supply connector for 100 to 240 VAC has 4 contacts and is situated in the lower part of the unit. Connect the power wires following the schema below.

The power supply connector for 19 to 36 VDC has 5 contacts and is situated in the lower part of the unit. Connect the power wires following the schema below.



LPD5-A-AC LPD5-A-DC

3.2 - Position of the Buttons and Connectors



The signal connectors are situated in the lower part of the unit.

Connector J2: Analog inputs.

Connector J3: Relay output.

The J1 power lead connector is placed in the lower part of the unit.

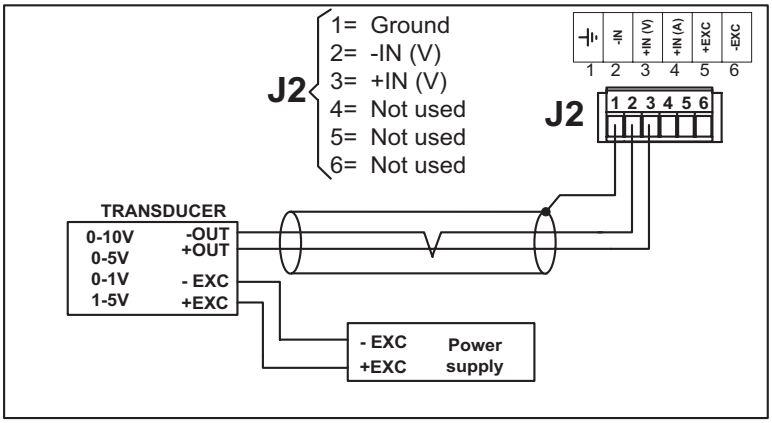
The buttons for configuration of the equipment are located in the lower part. They are identified with the symbols +, * and the text “ENTER”.

3.3 - Analog Input Connection

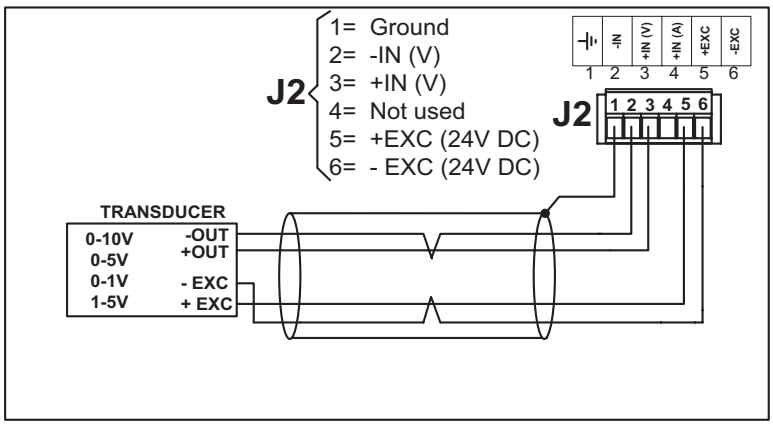
In all the mountings, the connection of the inputs must be done using braided and insulated cable. The screen must only be connected to terminal 1 of the input connector.

Terminals 5 and 6 of J2 are output power. Terminals 5 and 6 of J2 must NEVER be connected to a power supply.

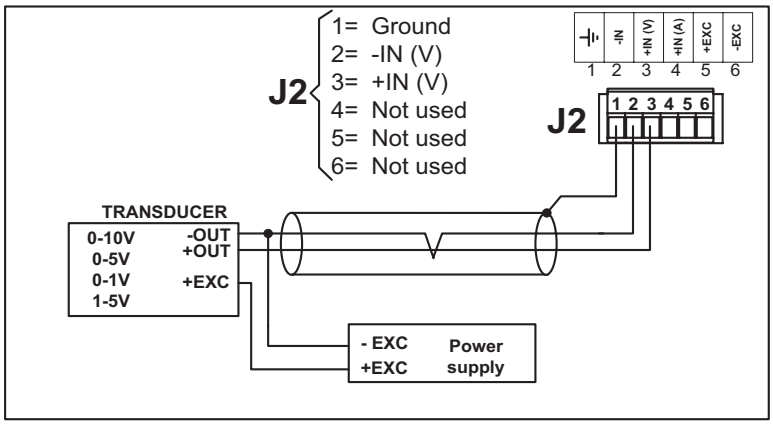
3.3.1 - Voltage Input. 4-Wire Connection. External excitation



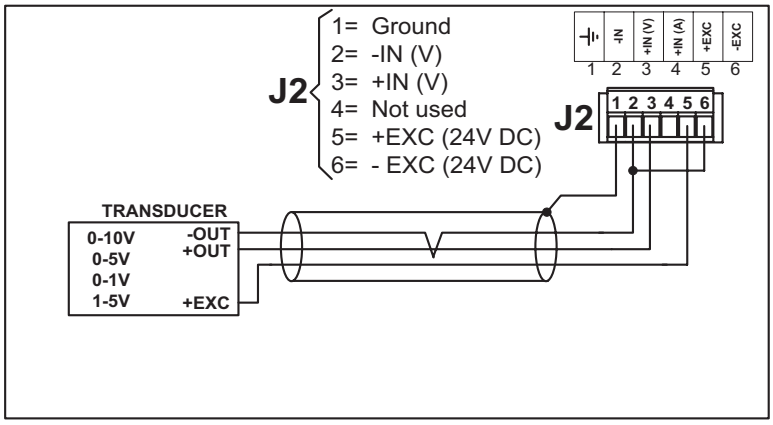
3.3.2 - Voltage input. 4-wire connection. Internal excitation



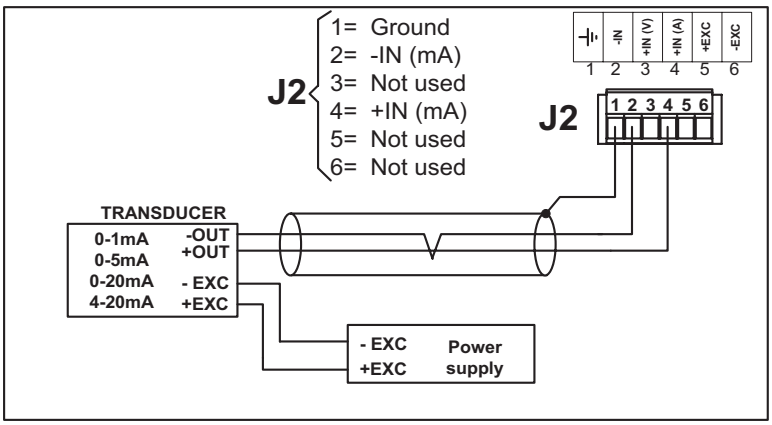
3.3.3. - Voltage input. 3-wire connection. External excitation



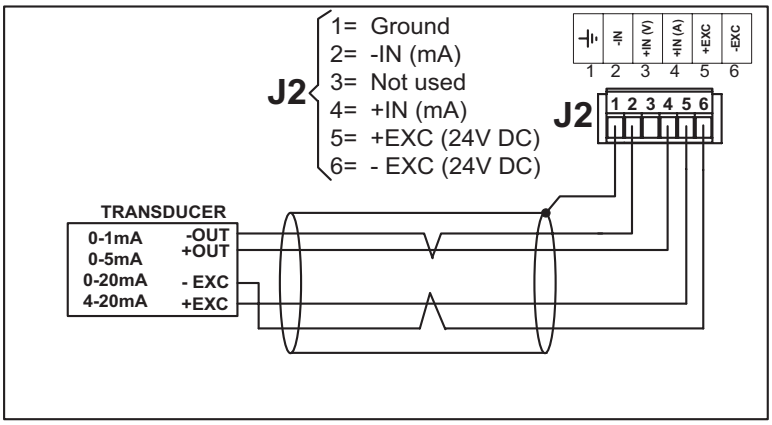
3.3.4. - Voltage input. 3-wire connection. Internal excitation



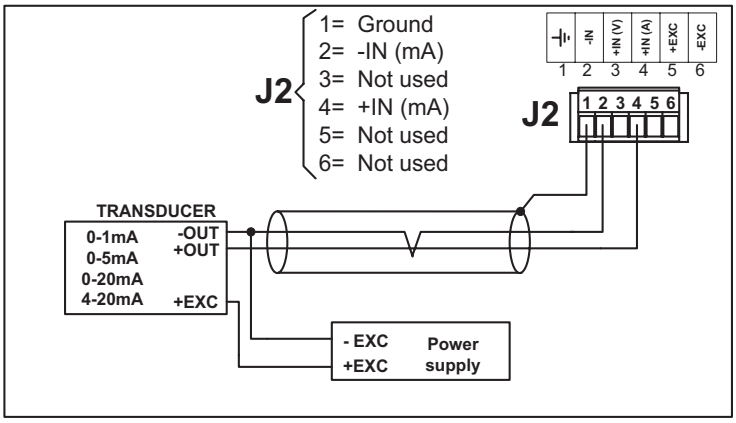
3.3.5. - Current input. 4-wire connection. External excitation



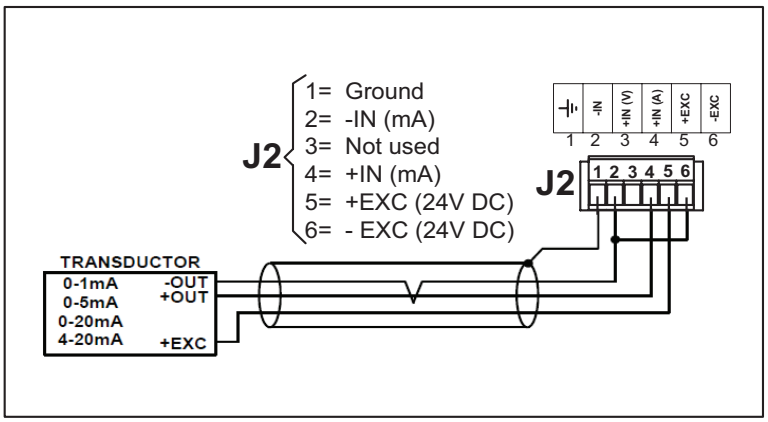
3.3.6. - Current input. 4-wire connection. Internal excitation



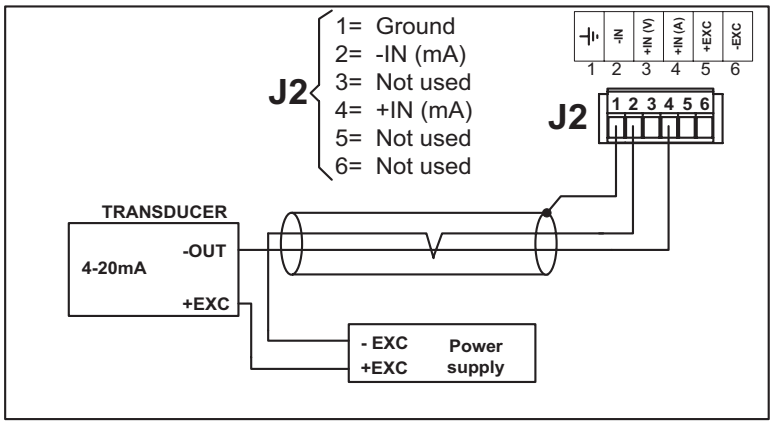
3.3.7. - Current input. 3-wire connection. External excitation



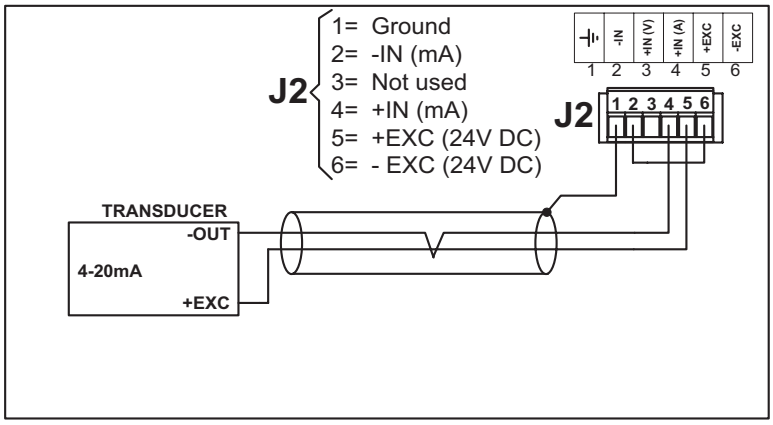
3.3.8. - Current input. 3-wire connection. Internal excitation



3.3.9. - Current input. 2-wire connection. External excitation



3.3.10. - Current input. 2-wire connection. Internal excitation



4 - Operation

4.1 - Programming Parameters

4.1.1 - Enter to Modify Parameters

In order to enter the sequence to modify the parameters, the Advance key "*" must be pressed and held for three seconds. After this, the first parameters will be displayed. The keys allow the user to move through the menu.


Advance key: Enter the parameter / Change the selected digit.

ENTER key. Validate the parameter value.


Increase key. Increase the value of the selected digit. / Change parameter.

4.1.2 - Configuration of the Analog Inputs

In addition to modifying the type of input (voltage or current), the range of the display must be programmed in order to adjust the value read to the value desired. The programming of the range is done by programming two points of the line. Each point is defined by a value from the analog input (IP1 and IP2) and a representation value in the display (dP1 and dP2). See Fig. 4.1. The maximum precision is achieved by programming the two points at the outer ends of the process.

In the processes in which the display value must vary in inverse relation to the input signal, one must assign the high display value to the low input value and the low display value to the high input value. See Fig.4.2

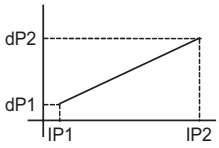


Fig 4.1

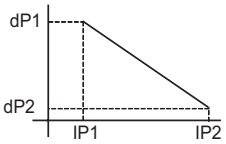


Fig. 4.2

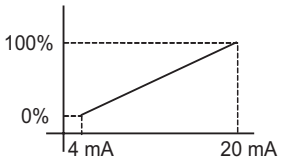
The programming of the input values may be done in two ways: Entry by keys directly of the value (SCL) or by making the display read the input value and validating it through the keys. (tEA)

Programming through the keys (SCL): To be able to use this method, it is necessary to know the transducer specifications in the points IP1 and IP2 beforehand.

Programming by reading (tEA): To be able to use this method, it is necessary to have made the connection from the transducer to the display. When the values of IP1 and IP2 are shown, the current value read by the transducer is displayed instead of the last value programmed. Pressing ENTER validates the parameter.

Examples:

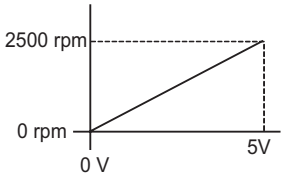
4-20mA humidity sensor



Programming Parameters

IP1	4.00	IP2	20.00
dP1	0	dP2	100

Speedometer dynamo 5V/2500 rpm



Programming Parameters

IP1	0.00	IP2	5.00
dP1	0	dP2	2500

4.1.3 - Error Codes

E0	Input parameter error: IP2 must be greater than IP1
E2	Low level input signal. Wire broken or polarity error. Input signal must be > 0.9 of IP1 or >-0.2 if IP1 is >1
E3	High level input signal. Input signal must be <1.1 of IP2
E4	Overrun while teaching process: -OuE / OuE: Overrun

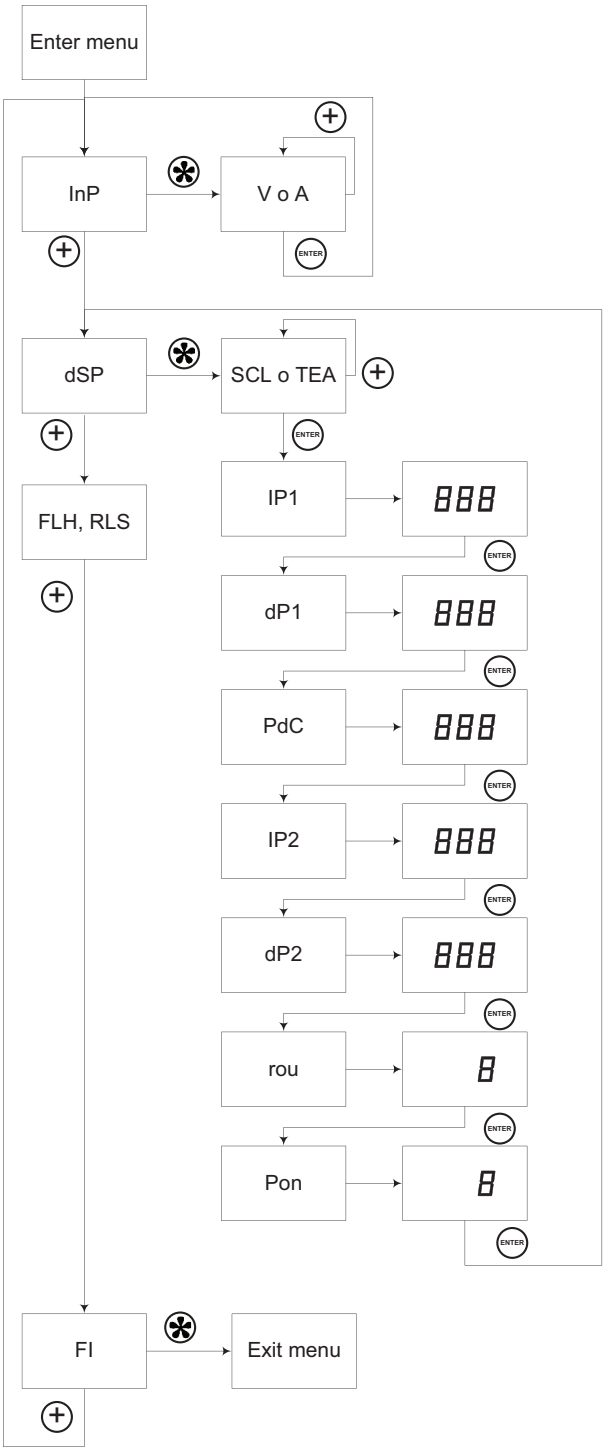
4.1.4 - Automatic Decimal Point

Using this function, the decimal point is not static, but moves showing the maximum number of decimals in every case depending on the IP-dP parameters, always using all the digits available in the display.

4.1.5 - Function of Each Parameter

The parameters in the display are organized in 5 groups:

- Parameter InP: Input of the display.
- Parameter dSP: Displaying characteristics.
- Parameter FLH: Flashing of the digits. Only in displays without relays options.
- Parameter rLS: Alarms of the display. In digits with relays options.
- Parameter FI: Exit from menu.



4.1.5.1. Parameter InP

Input type menu. Upon pressing "*", the last type of input selected is displayed.

- -V- Voltage input selected. Press +* to select current as input.
- -A- Input current selected. Press + to select voltage as input.

Press ENTER to save

4.1.5.2. Parameter dSP

Display scale adjustment menu. Upon pressing "*", one can select the direct input of values (DSP) or input through read values (TEA)

SCL

Upon pressing ENTER, one has direct access to the input of scale values.

tEA

Upon pressing ENTER, one has direct access to the entry of input values 1 and 2 from the value read by the analogue input.

IP1

Value of input 1. After 2 seconds, the last value programmed of input 1 is displayed (SCL mode) or the current value of the input (tEA mode), and is able to be modified. Upon pressing ENTER, the value is validated and the following parameter is accessed.

DP1

Display value corresponding to input 1. After 2 seconds, the last value programmed of display 1 is shown, and modification is permitted. Upon pressing ENTER, the value is validated and the following parameter is accessed. If the decimal point is in automatic mode, its position is modified pressing "+" until the last digit of the display is passed through. In that moment, the digit that flashes is the one where the decimal point is placed, as well as the digital point. Pressing "+" its position is modified.

PdC

Position of the decimal point. After 2 seconds, the last value programmed is shown and is permitted to be modified. To select automatic decimal point mode, press "*" until all the digits flash. Upon pressing ENTER, the value is validated and the following parameter is accessed.

IP2

Value of input 2. After 2 seconds, the last value programmed of input 1 is displayed (SCL mode) or the current value of the input (tEA mode) and modification is permitted. Upon pressing ENTER, the value is validated and the following parameter is accessed.

dP2

Value of the display corresponding to input 2. After 2 seconds, the last value programmed of display 2 is shown and may be modified. Upon pressing ENETR, the value is validated and the following parameter is accessed. If the decimal point is in automatic mode, its position is modified pressing "+" until the last digit of the display is passed through. In that moment, the digit that flashes is the one where the decimal point is placed, as well as the digital point. Pressing "+" its position is modified.

rou

This parameter defines the rounding of the last 2 digits of the display. It is used to eliminate oscillations in the value. Valid values:

1. Do not round.
2. Round the value in multiples of 2.
5. Round the value in multiples of 5.
10. Round the value in multiples of 10.

Pon

Averaging of the display. The higher the value, more immune is the display to small variations at the input.

4.1.5.3. Parameter FLH

This parameter makes the digits flash in the conditions the user programs the alarms.

The parameter “FLH” (Flash) admits the following values

0	The digits don’t flash
1	The digits flash when the alarm 1 is activated
2	The digits flash when the alarm 2 is activated
3	The digits flash if any alarm is activated
4	The digits flash when both alarms are activated

To program the alarms, see 4.3 “Alarms configuration”

4.2 - Alarms Configuration (Flash and Relays)

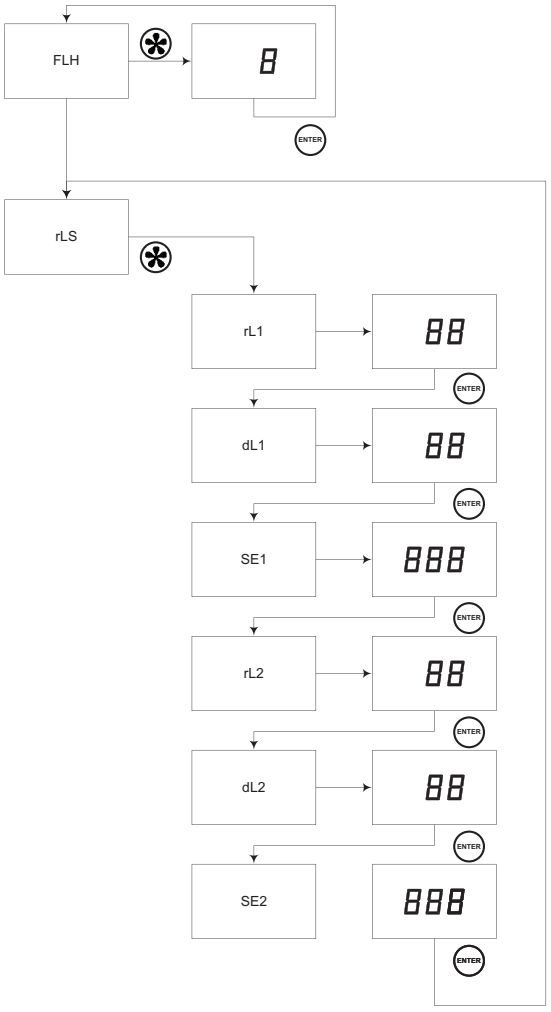
The display allows the user to program 2 alarms that can be used by the flash and relays functions. The trigger of the alarm can be delayed with a timer or by a hysteresis value. The activation of the alarm may be programmed so that it acts above or below the programmed setpoint.

The displays with the relay output option may generate control and alarm signals for their use by other units. The Flash function allows the digits to flash if one of the relays is activated.

The configuration of the alarms is accessed by two ways:

If the display has relays option, the alarm configuration is accessed through the parameter rLS. Otherwise, it is accessed through the parameter FLH.

The parameter map is the following if the display includes the relay option.



4.2.1 - Alarm 1 Parameters

In order to configure the alarm, parameters rL1., dL1 and SE1 must be accessed.

rL1

Alarm 1 configuration. After 2 seconds, the last value programmed is displayed and permitted to be modified. Upon pressing ENTER the value is validated and the next parameter is accessed. Each one of the two digits has a distinct function.

Left Digit	Control Bit	Right Digit	Activation
0	ON if Value > Setpoint 1	0	Delay
1	ON if Value < Setpoint 1	1	Hysteresis
2	Always OFF		

dL1

Delay time (in seconds) or hysteresis (2 less significant digits) value of alarm 1. After 2 seconds, the last value programmed is displayed and permitted to be modified. Upon pressing ENTER the value is validated and the next parameter is accessed.

SE1

Set point value of alarm 1. After 2 seconds, the last value programmed is displayed and permitted to be modified. Upon pressing ENTER the value is validated and the next parameter is accessed.

4.2.2 - Alarm 2 Parameters

In order to configure the alarm 2, parameters rL2., dL2 and SE2 must be accessed.

rL2

Alarm 2 configuration. After 2 seconds, the last value programmed is displayed and permitted to be modified. Upon pressing ENTER the value is validated and the next parameter is accessed. Each one of the two digits has a distinct function.

Left Digit	Control Bit	Right Digit	Activation
0	ON if Value > Setpoint 1	0	Delay
1	ON if Value < Setpoint 1	1	Hysteresis
2	Always OFF		

dL2

Delay time (in seconds) or hysteresis (2 less significant digits) value of alarm 2. After 2 seconds, the last value programmed is displayed and permitted to be modified. Upon pressing ENTER the value is validated and the next parameter is accessed.

SE2

Set point value of alarm 2. After 2 seconds, the last value programmed is displayed and permitted to be modified. Upon pressing ENTER the value is validated and the next parameter is accessed.

4.2.3 - Relay Output Specifications

SPDT contact.

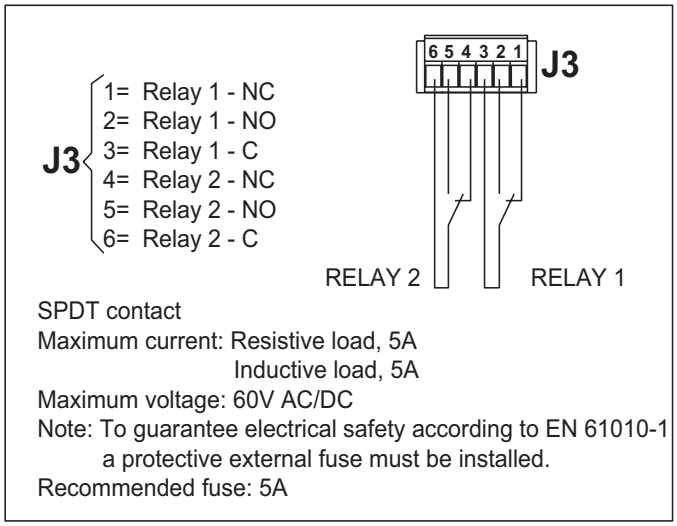
Maximum current:

Resistive load 5A

Inductive load 5A

Maximum voltage: .....60V AC/DC

4.2.4 - Wiring the Relay Output



SPDT contact
Maximum current: Resistive load, 5A
Inductive load, 5A
Maximum voltage: 60V AC/DC
Note: To guarantee electrical safety according to EN 61010-1 a protective external fuse must be installed.
Recommended fuse: 5A

On the Web: www.automationdirect.com

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