PRESYS®

Digital Indicator for Load Cell DMY-2030-CC

Technical Manual

EM0359-00

CAUTION!

In case of failure, the instrument can present an AC voltage level in its metal box, which for safety reasons must always be connected to an effective ground point. To this end a suitable terminal is provided on the back of the box identified as GND. Never connect this terminal to the neutral terminal of power supply.

It is recommended the use of an external fuse (2 A) on the power input of the instrument. There is an internal fuse.

Operation of relays - Important Note!

When the instrument has relay module for alarm or control, you must follow the instructions in this manual in the maintenance section on the snubber use.

The snubber is a protection against noise coming from the opening / closing of the relay contacts, but depending on the application may be necessary to remove this snubber!

CAUTION!

The instrument described in this manual is a device for use in specialized technical area. The user is responsible for the configuration and selection of values for the instrument parameters. The manufacturer warns of the risks of occurrences with damage to both the person and the property resulting from the incorrect use of the instrument. The information and specifications in this manual are subject to change without previous notice.

The warranty conditions are available in our sites:
www.presys.com.br/warranty

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1.0 - Introduction

1.1 - Description

The DMY-2030-CC Indicator monitors one input of mVdc signal, within the range from -30 mV to +30 mV, provided by a load cell. A 10Vdc voltage source, isolated from the output and with short-circuit protection, is provided to power the load cell.

It can communicate with computers by means of an optional communication module RS-232 or RS-422/485.

All configuration data is protected by password and is stored in a non-volatile memory.

According to its modularity design concept, the Indicator accepts up to three output modules. One can make use of one retransmitter output (4-20mA, 1-5V, 0-10V) or one SPST alarm module and up to two SPDT alarm modules (also solid state relay or open collector voltage). The alarm outputs can be configured independently to operate with latch, what requires the acknowledgement of the operator, by means of the front panel Keys, in order to deactivate the outputs after the process variable returns to normal condition. The outputs are electrically isolated from inputs.

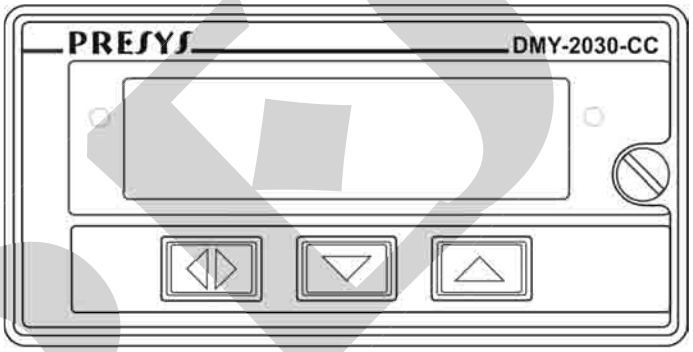


Fig. 1 - DMY-2030-CC Indicator front panel

The front panel has a high visibility display configurable up to 4 ½ digits to show the process variable. The leds are used as a visual indication of alarms. During configuration, the display shows mnemonics and parameter values.

It accepts 75 to 264Vac or 100 to 360Vdc (with any polarity) power supply.

The instrument has extruded aluminum case which avoids electrical noise, electromagnetic interference, radiofrequency interference, etc., and its robust construction makes it tough enough for the most hostile environment.

1.2 - Order Code

DMY - 2030 - CC - ____ - ____ - ____ - ____ - ____ - ___
A B C D E F

Field A Output 1

0	Not used
1	4 to 20 mA
2	1 to 5 V
3	0 to 10 V
4	SPST Relay
5	Open collector voltage
6	Solid state relay

Field B Output 2

0	Not used
1	SPDT Relay
2	Open collector voltage
3	Solid state relay

Field C Output 3

Same code of Output 2

Field D Power Supply

1	75 to 264 Vac 50/60Hz or 100 to 360 Vdc (any polarity)
2	24 Vdc
3	12 Vdc
4	Others, under consult

Field E Communication

0	Not used
1	RS-232
2	RS-485
3	RS-422

Field F Case Protection Grade

0	General usage, protected place
1	Front aspersion-proof
2	Weather-proof

Note 1 - The input type, indication and relay usage as alarms are, among other things, items that the user can program through the front keys (if wanted, specify these information so that all the configuration can be made by PRESYS).

Note 2 - Other hardware and software features can be available under previous consult.

Code Example:

1) DMY-2030-CC - 0 - 1 - 0 - 1 - 0 - 0

This code defines a DMY-2030-CC indicator with one SPDT relay which can be used as a high, low or deviation alarm, 75 to 264Vac or 100 to 360Vdc power supply, protected field usage.

1.3 - Technical Specifications

Input:

- One input for -30 to +30 mVdc. Input impedance of 10 MΩ.

Outputs:

- One 4 to 20mA, 1 to 5Vdc or 0 to 10Vdc analog retransmitter optional module galvanically isolated up to 300Vac from power supply and input.
- Alarm with a SPST relay rated for 3A at 220Vac. It is possible to use one optional alarm module by replacing the retransmitter output.
- Alarms with SPDT relays rated for 3A at 220Vac. It is possible to use up to 2 optional alarm modules.
- Logic signal, open collector transistor, 24Vdc, 40mA max. with isolation.
- Solid state relay rated for 2A at 250Vac with isolation.
- 10Vdc voltage source module to power the load cell.

Load cell voltage source:

10 Vdc/100 mA maximum, isolated from outputs, with short-circuit protection.

Serial Communication:

RS-232 or RS-485, with 50Vdc isolation, as an optional module connected to the CPU board. MODBUS® - RTU Communication Protocol.

Indication:

Standard indication within the -9999 to 19999 range.

Configuration:

By front panel push-buttons and internal jumpers (for outputs).

Sampling rate:

64ms sampling rate, for the indication of input in -9999 to 19999 range. The display is updated each 0.2 second.

Accuracy:

±0.1% of full scale for the mV input.

±0.5% of full scale for analog retransmitter output and 750Ω maximum load.

Thermal stability:

±0.005% / °C of span with reference of 25°C ambient temperature.

Power supply:

Universal 75 to 264Vac or 100 to 360Vdc (any polarity), 10W nominal; 24Vdc, 12Vdc and other values are optional.

Operating Ambient:

0 to 50°C temperature and 90% maximum relative humidity.

Dimensions:

1/8DIN (48 x 96mm) with 162mm depth, panel cut of 45 x 92mm.

Weight:

0.5kg approx.

Warranty:

One-year warranty.

2.0 - Installation

2.1 - Mechanical Installation

The DMY-2030-CC Indicator front panel has 1/8DIN size (48 x 96mm).
It is fixed by the rails which press it against the back side of the panel.
After preparing a 45 x 92mm cut in the panel, remove the rails from the Indicator and slide its rear through the cut until its front reaches the panel. Place the rails again in the Indicator from the back of the panel and tighten the screws as shown in figure 2.

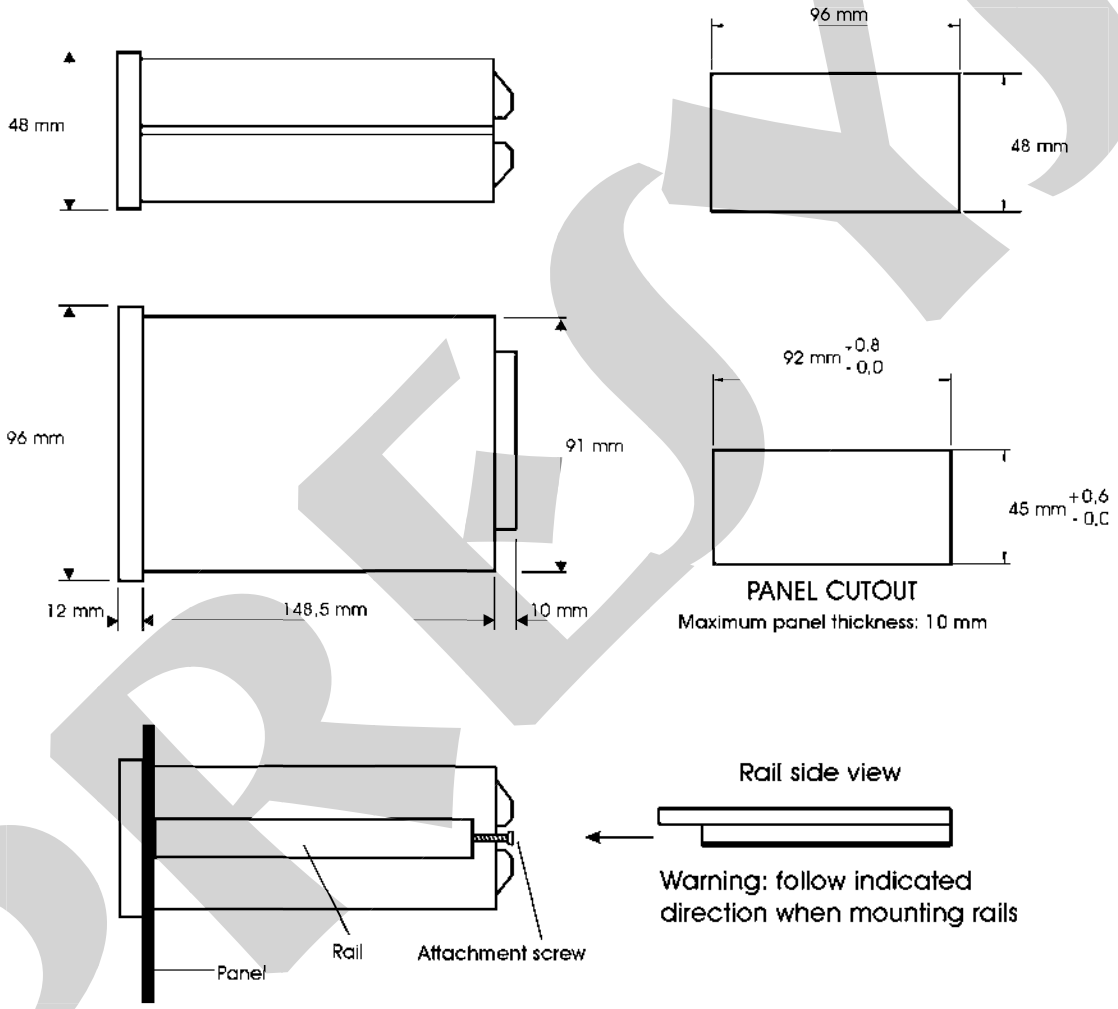


Fig. 2 - Dimensional drawing, panel cutout and side view

2.2 - Electrical Installation

DMY-2030-CC Indicator may be powered by voltage between 75 and 264Vac or 100 to 360Vdc, any polarity. Remember that the internal circuit is powered whenever the instrument is connected to the external power supply.

Input and output signals must be connected to the instrument only when it is turned off.

Figure 3 shows the instrument rear terminals for connection of power supply, ground, communication, process input and output signals.

Signal wiring must be kept far away from power wires.

Due to its metal case the instrument ground should be connected to earth ground. Never connect the ground to neutral terminal.

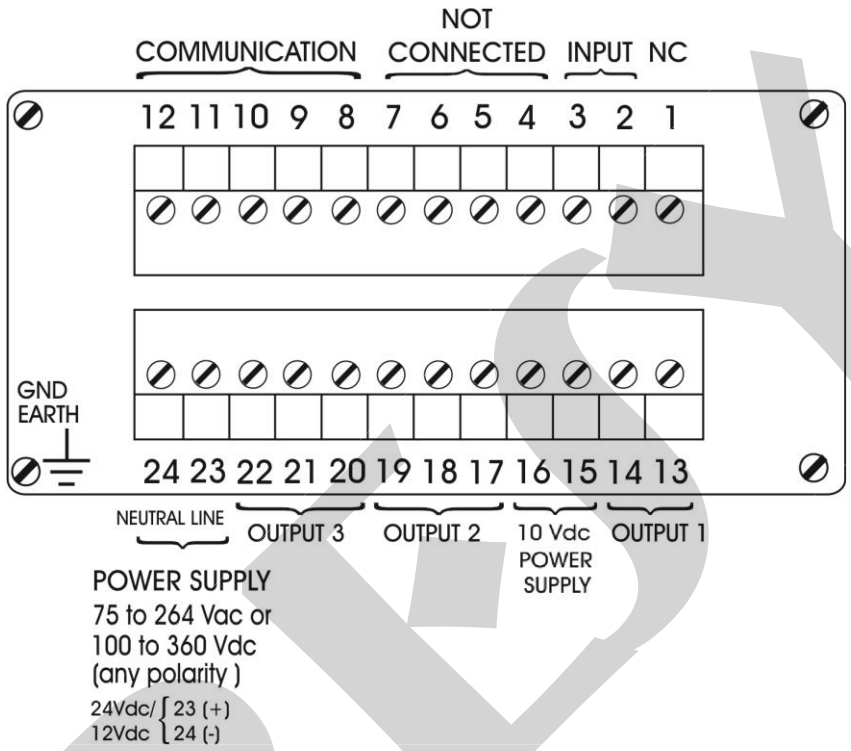


Fig. 3 - Indicator terminals

2.3 - Input Signal Connection

The Indicator input can receive a mV signal applied to terminals 2(+) and 3(-).

The input is enabled by software configuration (see section 3.2 on Configuration).

In order to avoid noise in the wiring, use twisted pair cable and cross sensor connection wire inside a metallic tube or use shielded cable. Make sure to connect only one shield wire end either to board terminal or to sensor ground, as shown in the next items.

WARNING: GROUNDING TWO SHIELD WIRE ENDS MAY CAUSE NOISE IN THE INDICATOR.

2.3.1 - Millivolt Input

Voltage signal in the range -30 to +30 mVdc is applied to terminals 2(+) e 3(-).The connections are shown in figure 4.

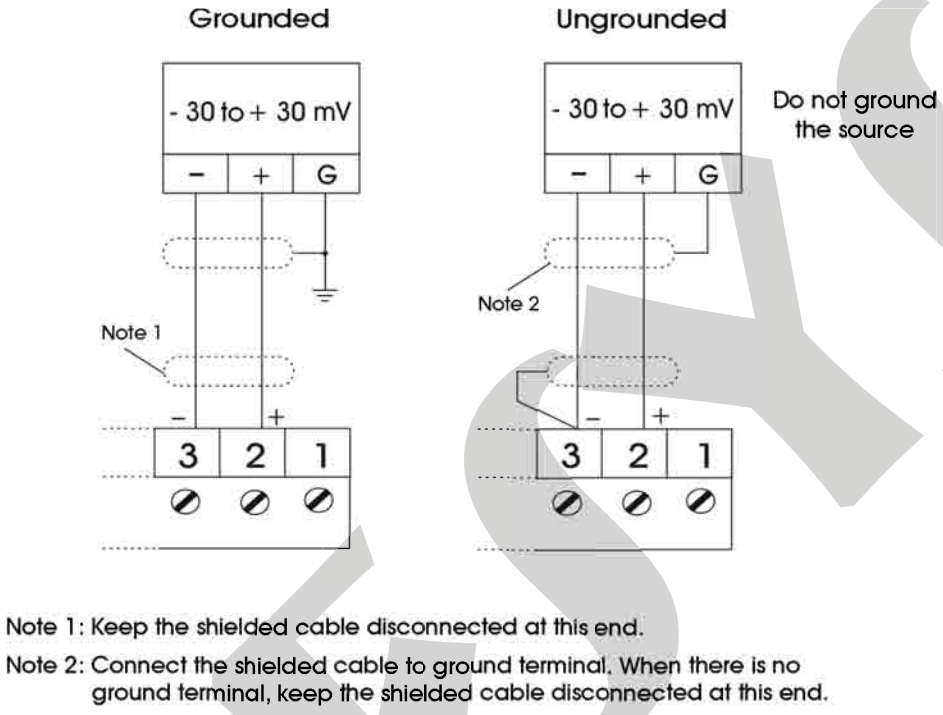
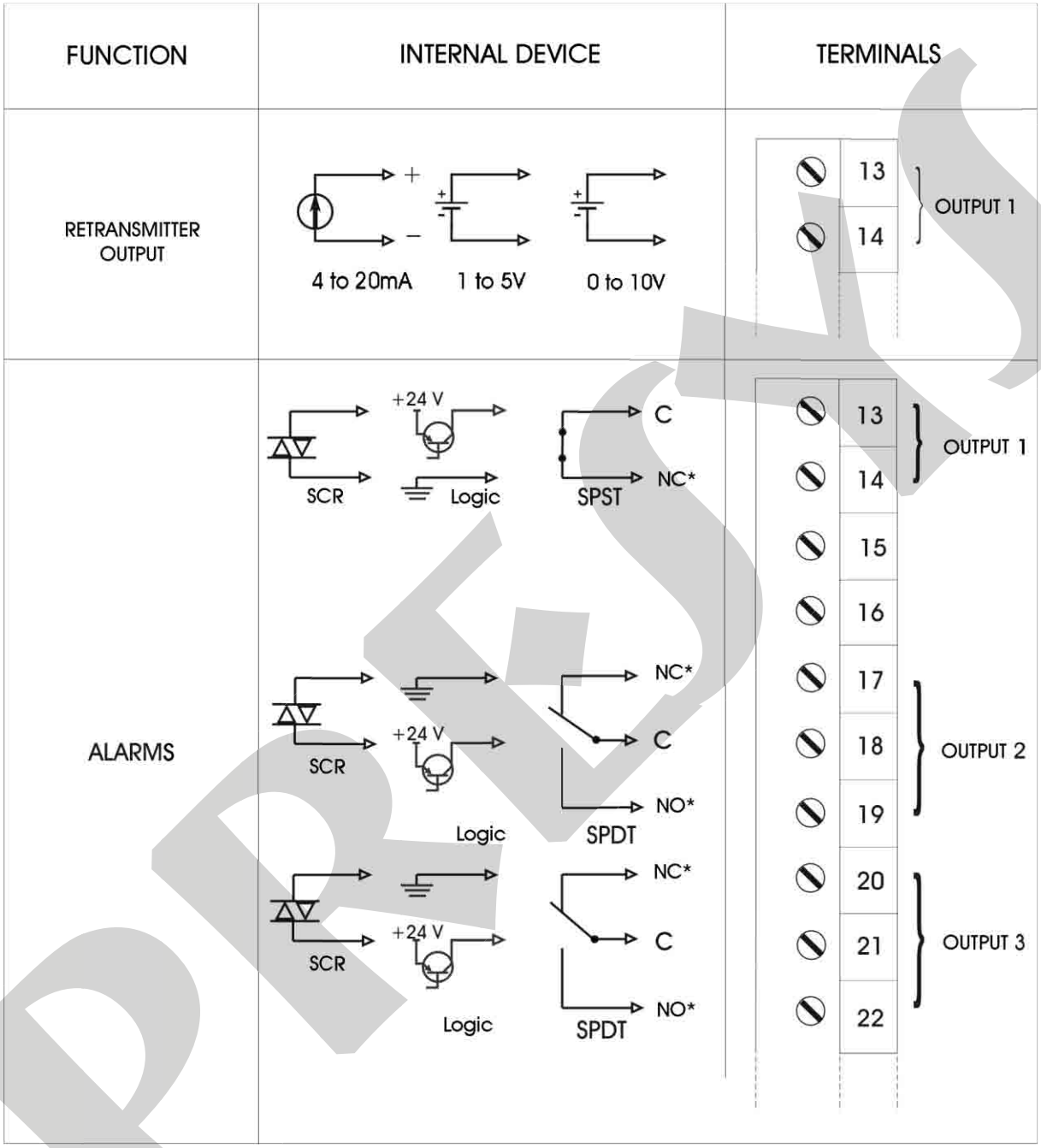


Fig. 4 - Voltage signal connection

2.4 - Output Signal Connection

The Indicator can have up to three optional output modules: outputs 1 to 3. Output 1 is used as a retransmitter output (4 to 20mA, 1 to 5Vdc or 0 to 10Vdc) or alarm (SPST relay, open collector voltage and solid state relay). Outputs 2 and 3 are used only as alarm outputs (SPDT relay, open collector voltage and solid state relay). Figure 5 shows the Indicator output types.

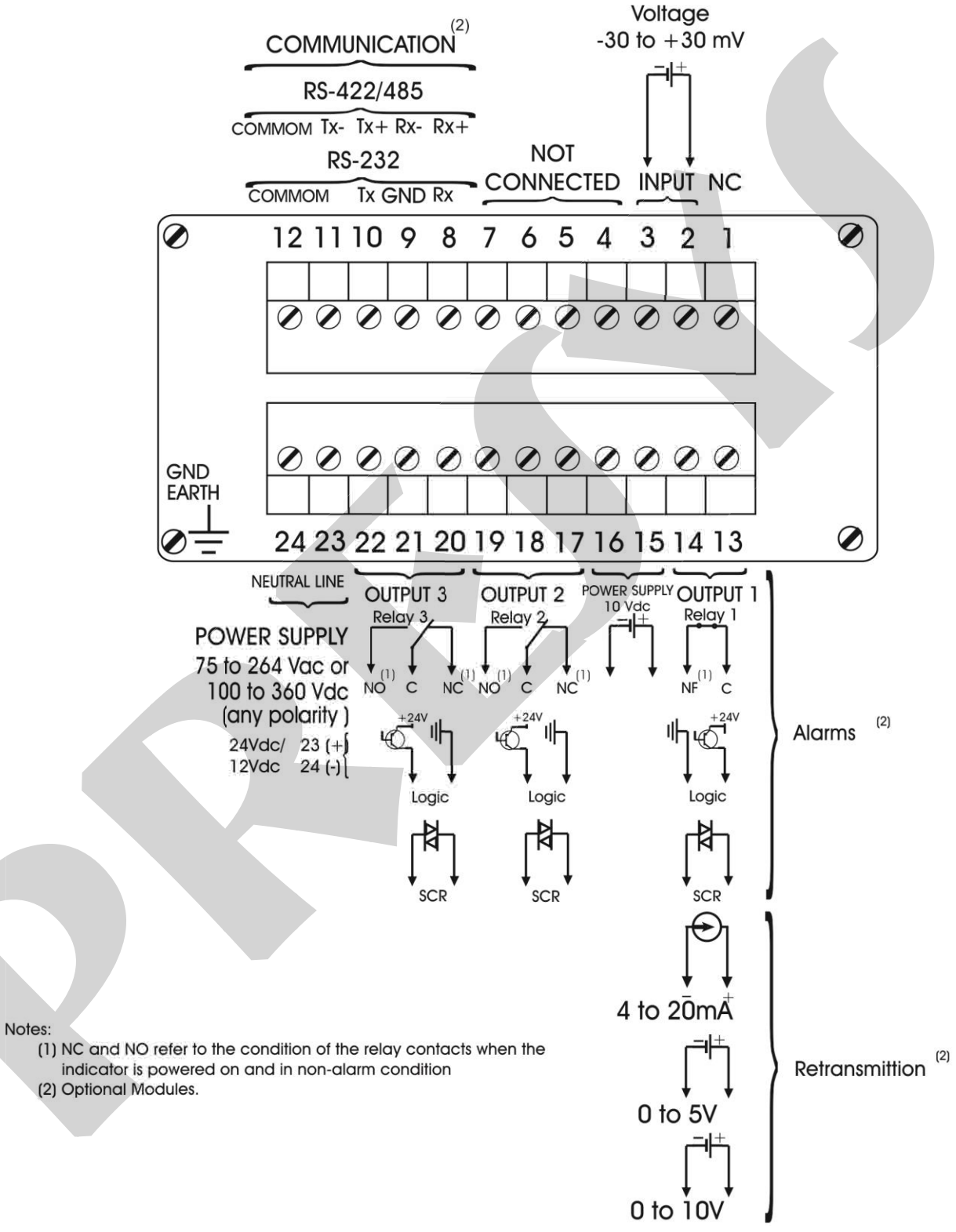
Note that the output terminals will present the corresponding signals only if the optional modules are installed and the output is correctly configured. Refer to section 3.2 on Configuration e 4.3 on Installation of Optional Modules for further details.



(*) Relay contact states presented for SAFE option selected (see section 3.2 on Configuration), instrument powered on and non-alarm condition. Position of the contacts are changed in alarm condition (with SAFE option selected) or when the instrument is turned off.

Fig. 5 - Output Connection

2.5 - Connection Diagram



Notes:
(1) NC and NO refer to the condition of the relay contacts when the indicator is powered on and in non-alarm condition
(2) Optional Modules.

2.6 - Communication

DMY-2030-CC Indicator communicates with computers through RS-232 or RS-485 and with use of a MODBUS protocol communication software, when the optional communication module is installed and the communication parameters are configured.

Specific information on communication and signal connection is described in the communication manual.

2.7 - Engineering Units

A label with several Engineering Units is supplied with each Indicator. Select the one corresponding to the variable shown on the display and stick it to the front panel of the Indicator.

3.0 - Operation

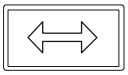
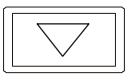
3.1 - Normal operation

The DMY-2030-CC Indicator has two modes of operation: normal operation and configuration mode.

During normal operation, the Indicator monitors the inputs, verifies alarm conditions and activates the outputs when necessary.

Configuration mode is used to select and configure all the Indicator parameters.

The normal operation mode, in which the Indicator is to be found most of the time, is called level zero. In this level, the three front panel keys have the following functions:

Key		Function
ENTER		Changes information shown on the display. When the display shows the process variable (PV), it goes to the maximum peak value (MAX), if enabled. Next, it goes to the minimum peak value (MIN), to the setpoints of alarms 1 to 3 (SP1, SP2 and SP3), if enabled, to the CONF mnemonic (which allows one to enter the configuration level) and to the process variable again. Allows the acknowledgment of alarms configured with latch function, after the alarm condition returned to normal state.
UP		When CONF is shown, the display changes to PASS and it requires the password for changing from level zero to level one. Gives access to the maximum and minimum peak values or allows the reset of these values. When the process variable is shown, it presents the mnemonics of the alarms which require acknowledgment. Increases the setpoint value of the alarm shown.
DOWN		Resets the indication and the values of maximum and minimum peaks and the registered peak values. Stores the value of the maximum or the minimum peak depending on which value is shown. Decreases the alarm setpoint value shown.

The information sequence presented on the display is shown in figures 6 and 7 according to the configuration of the maximum and minimum peak register option (REG option in the GENERAL configuration level):

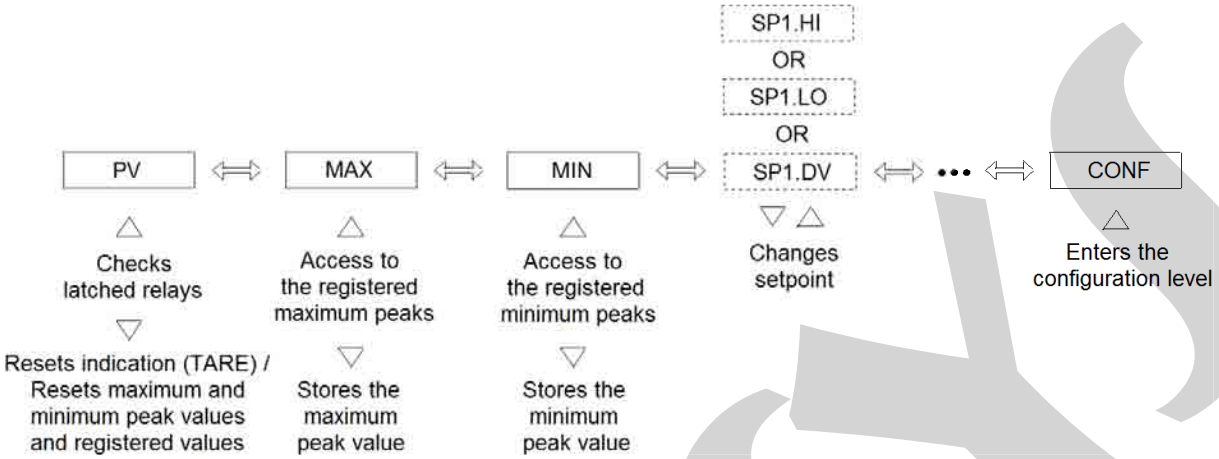


Fig. 6 - Information in the operation level when the peak register option is enabled.

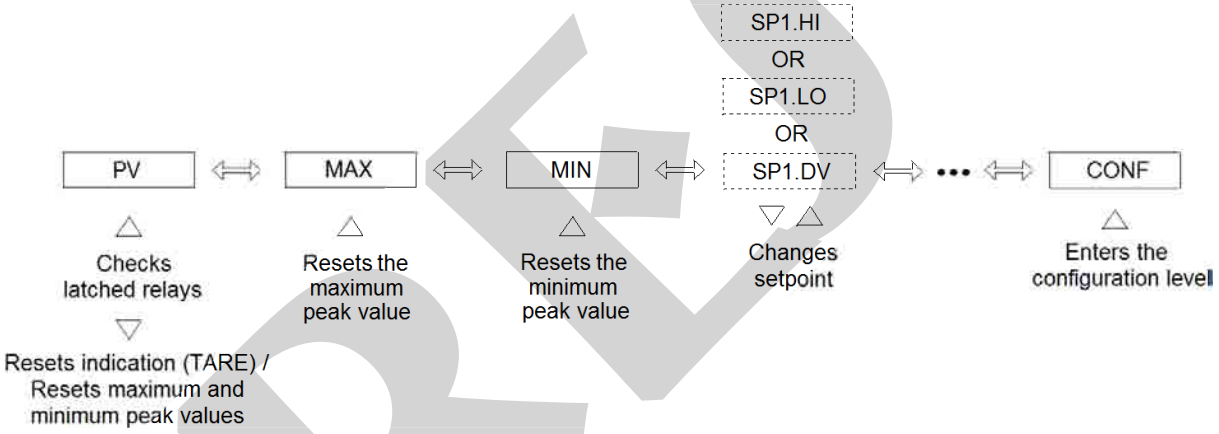


Fig. 7 - Information in the operation level when the peak register option is disabled.

The values of the maximum and minimum peaks of the process variable detected in the input can be seen in the operation level: the MAX and MIN mnemonics indicate the maximum and minimum values, respectively.

The instrument allows the storage of five maximum and five minimum peak values in its memory.

When the process variable indication is shown, the DOWN key can be used to reset the value indicated (TARE function). Such adjustement is stored in the indicator memory.

The value of the peak exhibited by MAX or MIN can be reset by pressing the UP key, in case the REG option is disabled. When the process variable is shown and REG is enabled, one must press DOWN to reset the maximum and minimum peak values and apply the TARE function.

In order the see the registered maximum (minimum) peak values, when the REG option is enabled, one must press the UP key when the value associated to MAX (MIN)

is shown. In this way, one accesses a menu with five registers indicated by the mnemonics MAX.1 to MAX.5 for the maximum peaks (MIN.1 to MIN.5 for the minimum peaks). The first register of the menu, MAX.1 (MIN.1), refers to the most recently stored value. When pressing the DOWN key for the maximum peak, the value of each register is displaced to the next one, that is, MAX.1 receives the new value, while the previous value of MAX.1 goes to MAX.2, the previous value of MAX.2 goes to MAX.3, and so on. For the minimum peak, a similar process follows.

The registered values for both the maximum and the minimum peaks are reset when the DOWN key is pressed during the exhibition of the process variable (the same key used to apply the TARE function).

The normal operation and configuration modes present a "timer" which make the display return to the process variable if it shows any other kind of information and no key is pressed for 1 minute. It does not apply to the Calibration level (Calib. mnemonic). See item 3.2 on Configuration.

3.2 - Configuration

In order to access the configuration mode the operator is required to provide a password which avoids a non-authorized person to change any critical parameters of the process. When UP is pressed, while CONF is shown in the normal operation mode, the PASS warning is displayed and the user should press the UP, DOWN and ENTER keys (exactly in this order) to access the configuration levels. If the user provides an incorrect sequence of keys or if it takes more than 15 seconds for the password to be given, the display returns immediately to the normal operation level. This procedure is shown in figure 8.

Note: In the diagrams below, the rectangles represent
the display appearance after pressing the keys.

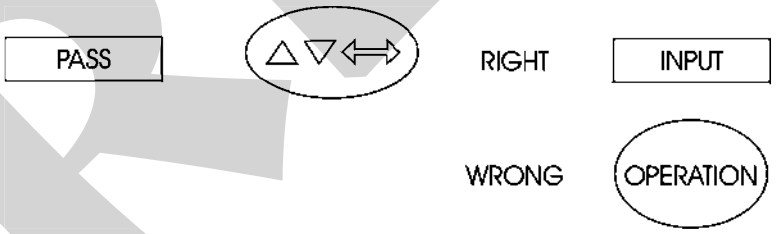


Fig. 8 - Key sequence password

All configuration parameters are stored in the non-volatile memory and determine the normal operation of the instrument. With these parameters the user can adjust the instrument to his needs, when it is necessary to change the configuration from factory.

Configuration parameters are distributed in eight hierarchical levels shown in figure 9.

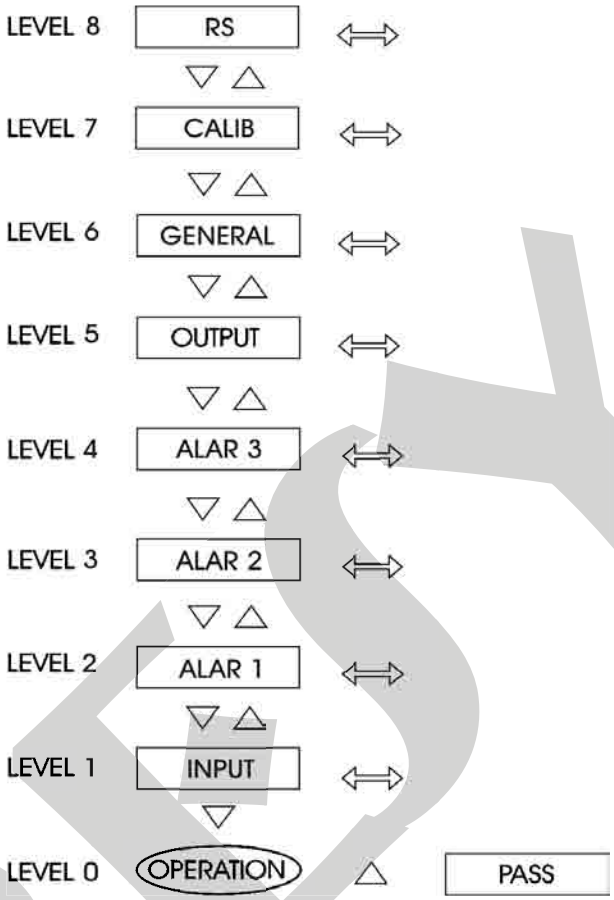


Fig. 9 - Parameter levels diagram

In order to move through the levels and access the parameters of any one of them, use the front panel keys which have the following functions:

Key	Description
UP	Moves to higher levels
DOWN	Moves to lower levels
ENTER	Enters the level

The Indicator allows the user to know what kind of input, alarms or output are configured without need to access a specific parameter level. The mnemonics corresponding to the level and to the configuration chosen move on the display continuously, as soon as one reaches one of the levels (except Calib. and RS).

Inside each level, the front panel keys have the following functions:

Key	Description
UP	Moves the options in increasing direction
DOWN	Moves the options in decreasing direction
ENTER	Confirm or advance options inside a level, if the display does not show ESC. When ESC is shown, it returns one or more positions.

When accessing any parameter of a configuration level, the Indicator directly shows the option or value corresponding to the current configuration of the parameter. In case a value is presented, use the UP and DOWN keys to change each digit and press ENTER to move to the next one. When configuring the options of a parameter, the UP and DOWN keys are used to move through the options and the ENTER key, to confirm the choice.

The hierarchical levels are presented in sequence. The options of each level are explained step by step with all their corresponding parameters.

Level 1 - Input

The mV input is configured by means of the parameters of the input level indicated below:

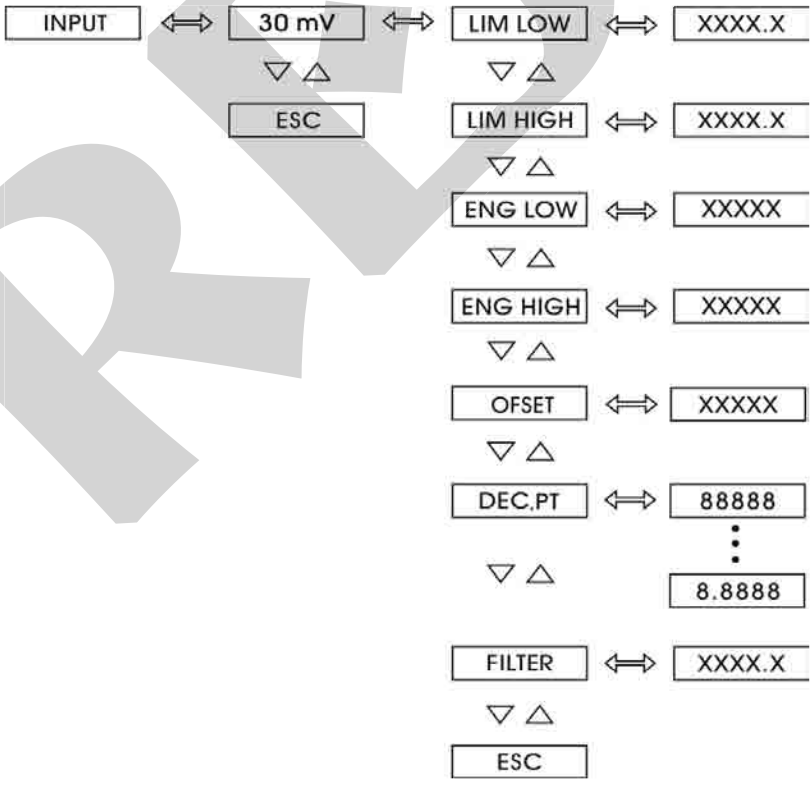


Fig. 10 - INPUT level options

The table below refers to the ranges of the parameters shown in figure 10.

Mnemonic	Parameter	Range	Factory Value	Units
LIM LOW	input signal associated to Eng Low	-100.0 to 100.0	0.0	%
LIM HIGH	input signal associated to Eng High	-100.0 to 100.0	100.0	%
ENG LOW	display indication associated to the input zero scale	-9999 to 20019	0.0	EU*
ENG HIGH	display indication associated to the input full scale	-9999 to 20019	100.0	EU
OFFSET	constant added to display indication	-9999 to 30000	0	EU
FILTER	time constant of 1st order digital filter	0.0 to 25.0	0.0	seconds

(*) EU – Engineering Unit

The input scale is configured by choosing the 30 mV mnemonic. Define two points P1 (Lim Low, Eng Low) and P2 (Lim High, Eng High), as shown in figure 11. Lim Low (given in %) corresponds to the electrical signal value associated with the display indication Eng Low, and Lim High (%) corresponds to the to the electrical signal value associated with the display indication Eng High. The Lim Low and Lim High parameters are associated with the porcentage of full scale, that is, -100.0% and 100% correspond to -30mV and 30mV, respectively.

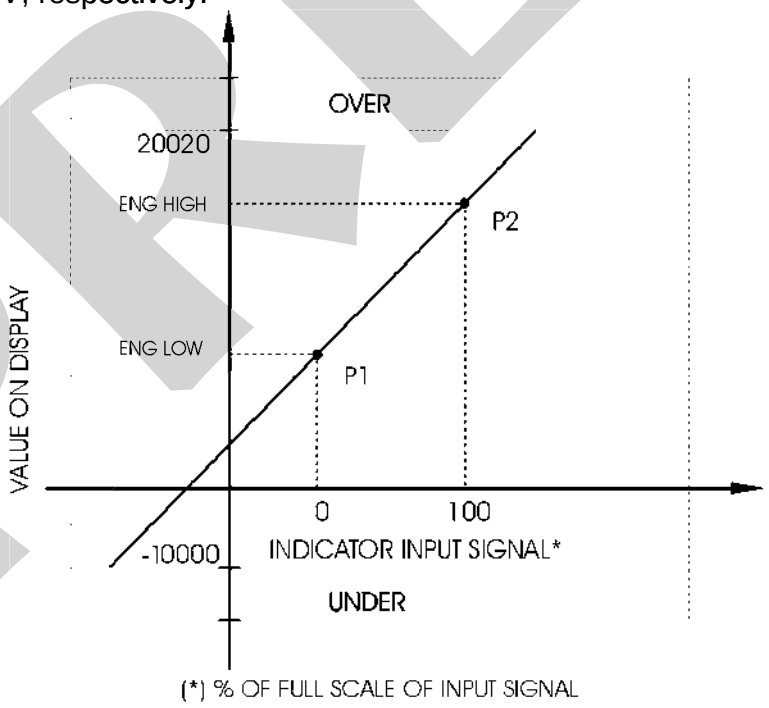


Fig. 11 - Configuration of the 30 mV input

DEC.PT - sets the decimal point position for the visualization of Engineering units in the display. There are up to four decimal places.

OFSET (as is shown in the display) - allows the user to enter an off-set value in Engineering Units to be added to the measured variable.

FILTER - this parameter provides the time constant of a first order digital filter associated to the selected input (range from 0.0 to 25.0 s). In order to disable the filter, set the parameter to zero.

Levels 2, 3 and 4 - Alarms

The Indicator accepts up to three alarm modules: relays 1, 2 and 3. The alarm conditions of alarms 2 and 3 can also be visualized by the couple of leds on the front panel, LED 1 and LED 2, respectively.

The ALAR.1 mnemonic corresponds to the configuration of relay 1 (output 1), ALAR.2 to relay 2 (output 2), and ALAR.3 to relay 3 (output 3). The connectors on the Power Supply Board corresponding to each one of the relays are listed below:

Relay	Board Connectors
1	MOD1 (Output 1)
2	MOD3 (Output 2)
3	MOD4 (Output 3)

Refer to section 4.3 on the Installation of Optional Modules for further details.

Each module can be configured as a high alarm (HI mnemonic), low alarm (LO), or deviation alarm of the process variable from the setpoint (DEV), or be disabled (NO mnemonic).

When configuring the high or low alarm it is necessary to set its setpoint SP and hysteresis HYST. The deviation alarm requires the configuration of the setpoint SP, the deviation parameter DV to determine the values above and below the setpoint where the alarm is activated (SP-DESV and SP+DESV), and the hysteresis HYST (in U.E., from 0 to 30000) to define the band (between SP-DESV+HIST and SP+DESV-HIST) of return to the normal or non-alarm condition. One can also use the LATCH and DELAY functions for each alarm.

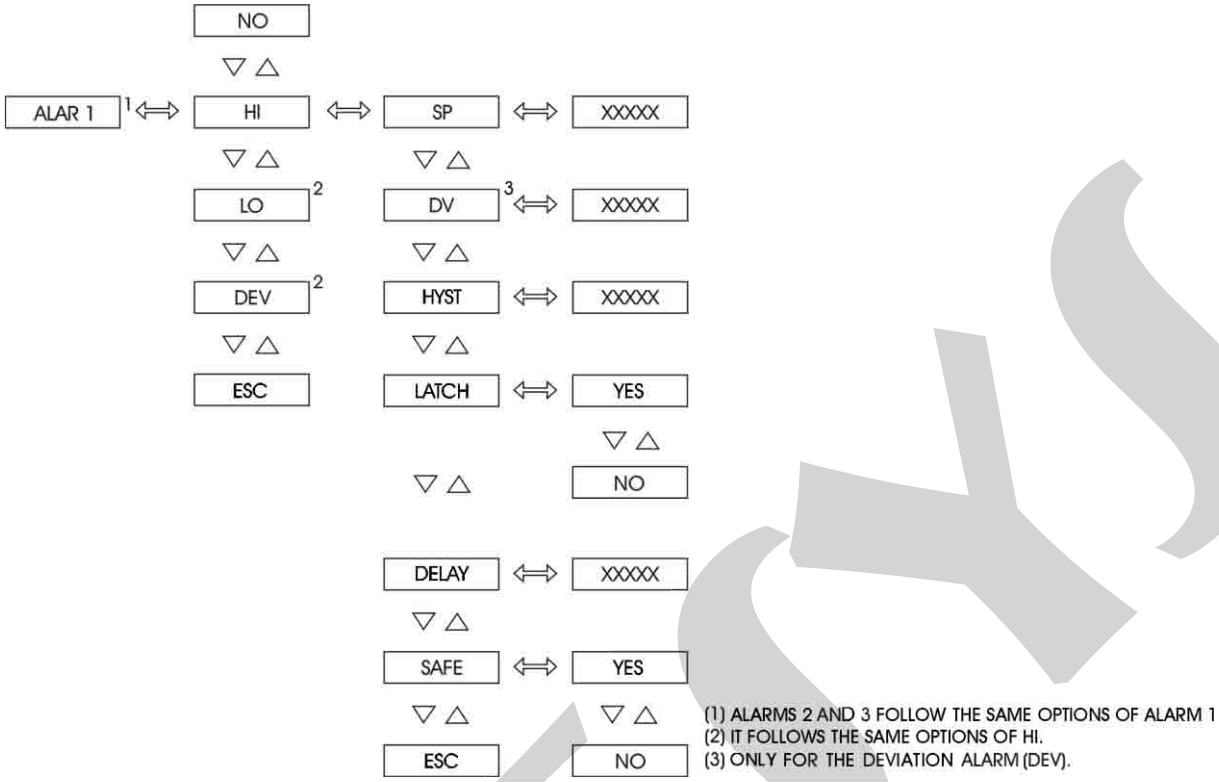


Fig. 12 - Alarm levels options

The table below refers to the ranges of the parameters shown in figure 12.

Mnemonic	Parameter	Range	Factory Value	Units
SP	alarm setpoint	-9999 to 20019	50.0	EU
HYST	alarm hysteresis	0 to 250	1.0	EU
DV	deviation from the setpoint	0 to 20019	100.0	EU
DELAY	delay for activating the relay	0.0 to 3000.0	0.0	s

LATCHED - configures the relay to be deactivated only after the alarm condition ends and the operator acknowledges this alarm. The acknowledgment of the alarm condition is performed within the normal operation mode by pressing the UP key until it is shown the mnemonic corresponding to the relay one is looking for. Note that it will be shown only the relays configured with latch operation which require acknowledgment in order to return to normal state. After reaching the relay, press the ENTER key. If there is no alarm condition for this relay, it will change its state. Continue pressing the UP key to return to operation mode.

DELAY - causes the relay to be activated only after a certain time interval defined by the user. Figure 13 below illustrates the delay operation for a high-alarm.

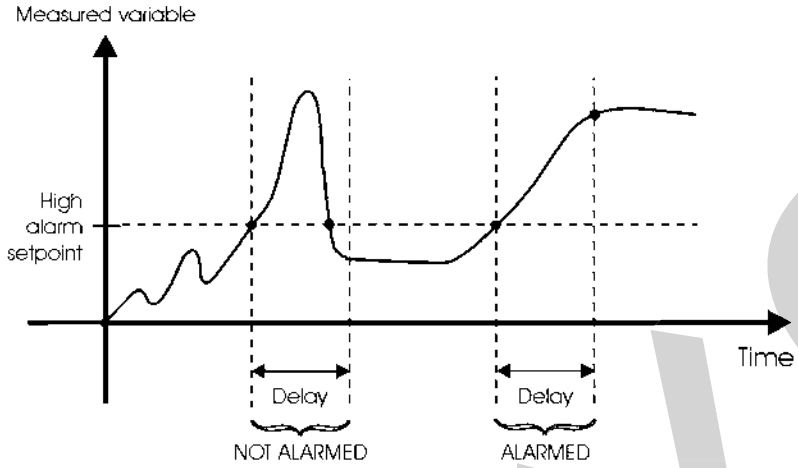


Fig.13 - Relay with delay

The alarm configuration levels presents the SAFE option which determines the safely condition of the relay. In the safety condition the relay coil is energized in non-alarm condition, and de-energized in alarm condition or in the case of na energy failure. When using an open collector module, enabling the SAFE function makes the output to present +24V in non-alarm condition and 0V in alarm condition.

Once the alarms are configured, the user can see or set the values of their setpoints in the normal operation level. The setpoint mnemonics of alarms 1 and 2, for example, have codes which are explained below:

Mnemonic	Description
SP1.Hi	High-alarm setpoint for relay 1
SP1.Lo	Low-alarm setpoint for relay 1
SP1.Dv	Deviation-alarm setpoint for relay 1
SP2.Hi	High-alarm setpoint for relay 2
SP2.Lo	Low-alarm setpoint for relay 2
SP2.Dv	Deviation-alarm setpoint for relay 2

Before configuring alarm 1, disable the retransmitter output. Otherwise the ERR.05 message will be shown.

Level 5 - Output

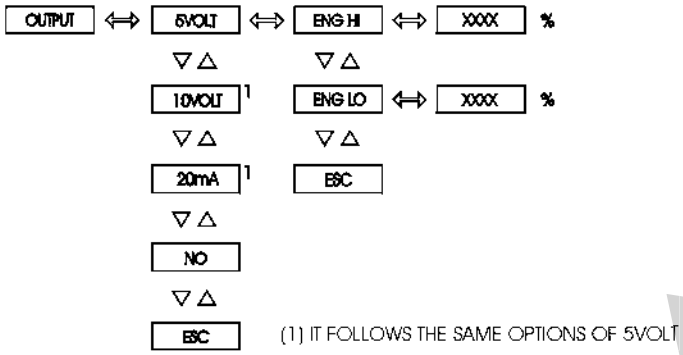


Fig. 14 - OUTPUT level options

The table below refers to the ranges of the parameters shown in figure 14.

Mnemonic	Parameter	Range	Factory Value	Units
ENG LOW	display indication associated to the output zero scale	-9999 to 20019	0.0	EU
ENG HIGH	display indication associated to the output full scale	-9999 to 20019	100.0	EU

Select the range of the retransmitter output as 4-20mA, 1-5V or 0-10V. The relationship between Engineering Unit (input signal indication on the display) and the signal from the output terminals is defined in the same way as mentioned for the 30 mV input scale configuration. Define two points as illustrated in figure 15. Eng Low is the indication on the display given in Engineering Units associated to zero scale of the output signal, and Eng High is the indication on the display given in Engineering Units associated to full scale of the output signal.

The Analog Output Module must be installed in MOD1 connector (Output 1) on the Power Supply Board and have the jumpers placed properly: no jumpers for 4-20mA output, jumper 1 for 1-5V and jumper 2 for 0-10V.

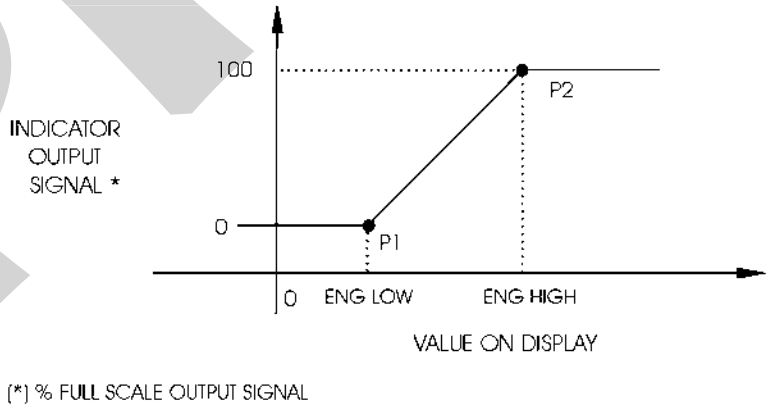


Fig. 15 - Analog output configuration

Before configuring the retransmitter output, disable alarm 1. Otherwise the ERR.05 message will be shown.

Nível 6 - General

Level 6 presents the options: TIME, TARE and REG (see figure 16).

TIME – The instrument detects quick changes in the indication when crossing the zero, from positive to negative values, or vice-versa, causing the peak values (MAX or MIN) to be frozen at the values presented 1 s before the crossing detection. These values remain frozen along the time interval given by the TIME parameter (from 0.0 to 10.0 s) and at the end of this period they are updated again.

TARE – allows the use of one or two points for tare, selected by the ONE and TWO options. To disable the tare function, choose the NO option, what makes the tare points to be reset. When choosing the TWO option, the indication can be reset at two points, each one in a different interval of the reading range. These intervals correspond to input signals below 0mV and to signals greater than or equal to 0mV. Therefore, one can reset one point of the indication at an input signal S1 less than 0mV and another one at an input signal S2 greater than 0mV. In this way, input signals between S1 and S2 will be indicated as zero in the display.

Indication values between -2 and +2 are also presented as zero in the display when the TARE option is configured as ONE.

REG – allows the user to register five maximum and five minimum peaks and to check their values in the operation level.

When the REG option is enabled, a maximum or minimum peak is registered by pressing the DOWN key during the exhibition of the value corresponding to MAX or MIN, respectively. By pressing the UP key it is possible to check the peak values already registered. There is access to a menu containing a list of five registers. For the maximum peaks, these registers are indicated by the MAX.1 to MAX.5 mnemonics, and for the minimum ones, are designated by MIN.1 to MIN.5. The MAX.1 and MIN.1 registers refer to the last values registered. When a peak is stored, the value of each register is displaced to the next one, such that the first register can receive the new value.

The maximum and minimum peak values are reset by pressing the DOWN key during the exhibition of the process variable (key used for the TARE) and, in case the REG option is disabled, all the registered peak values are also reset. For the REG option disabled, one can reset the maximum or minimum peak when it is exhibited in the operation level and the UP key is pressed.

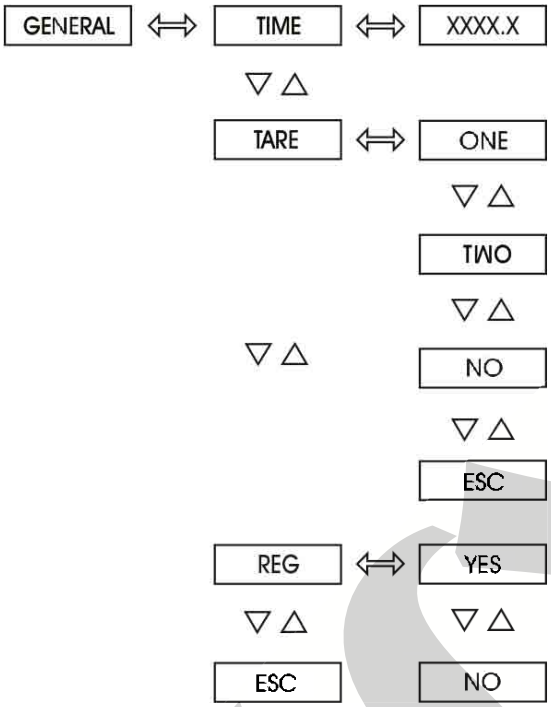


Fig. 16 – GENERAL level options

Level 7 - Calibration

Level 7 is described in section 4.4 on Calibration.

Level 8 - RS

See the communication manual.

4.0 - Maintenance

4.1 - Indicator Hardware

The Indicator maintenance requires the user to have access to the hardware of the instrument. The Indicator hardware consists of three main boards: Display Board, CPU Board and Power Supply Board. The three-board-system is fixed to the aluminum case by a screw on the right side of the front-panel. Loosen this screw and pull the Indicator front-panel in order to remove the instrument from case.

The Display Board is located in the Indicator front-panel. The front-panel has four internal staples in its four corners which keep together CPU and Power Supply Boards. The CPU and Power Supply Board are fixed by a spacer:

i) Remove the screw which fixes the spacer placed near the edge of the CPU and Power Supply Boards.

ii) Turn the Indicator so that the display is on the opposite side for reading.

iii) Displace carefully the holder at the right top corner of the front-panel so that the Power Supply Board can be loosen.

iv) Move the Power Supply Board to the right and open the boards according to Figure 17.

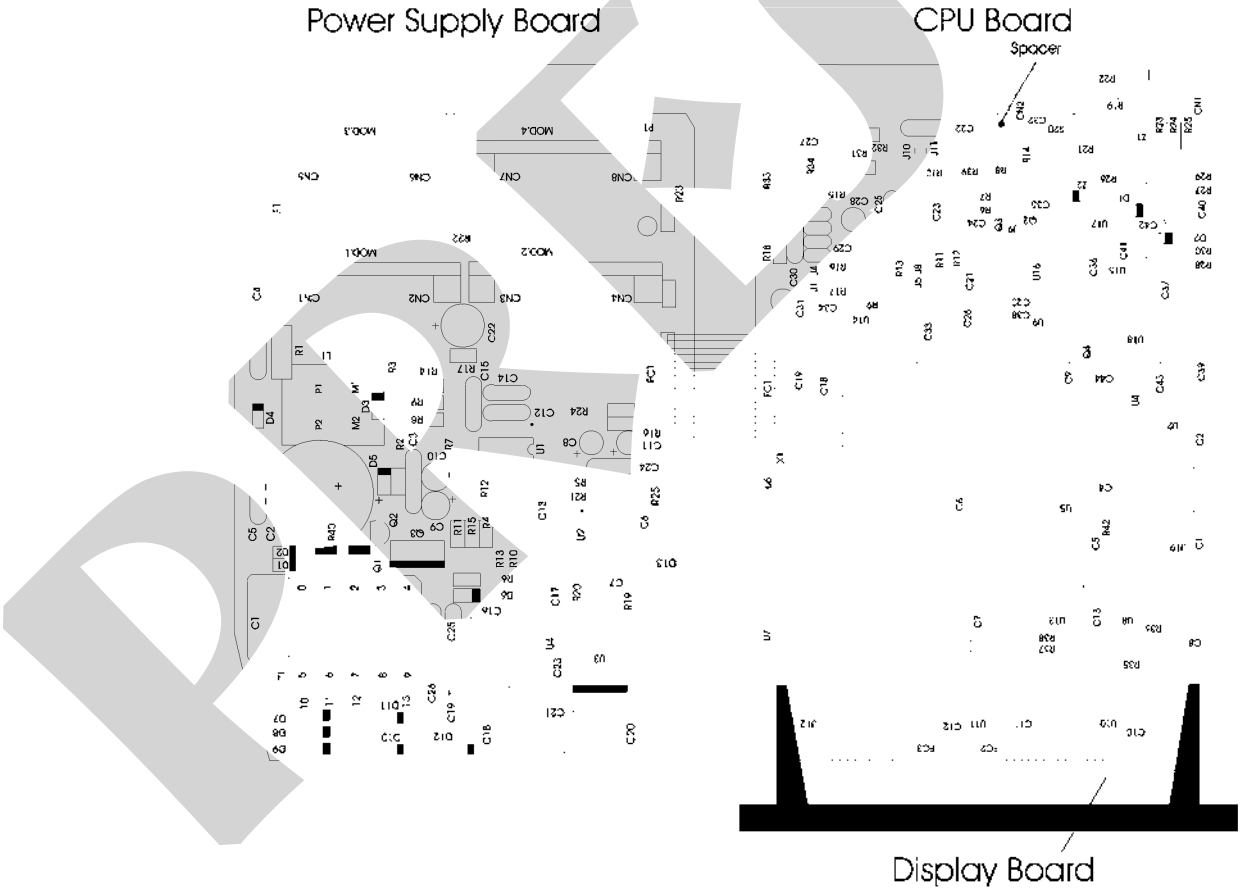


Fig. 17 - Indicator Hardware

4.2 - Snubber Use for Relay

Relay modules are provided with circuits for eliminating electrical arch (RC snubber). The snubbers are put in parallel with the relay contacts, by placing the jumpers J1 and J2 localized on the back of the relay board. When the jumpers are not placed, the relay contacts are kept without snubbers. The relay module is sent from factory with the jumpers not placed.

Note the position of the jumpers in the following figure. The jumpers may be localized on the front or the back side of the board, depending on its version.

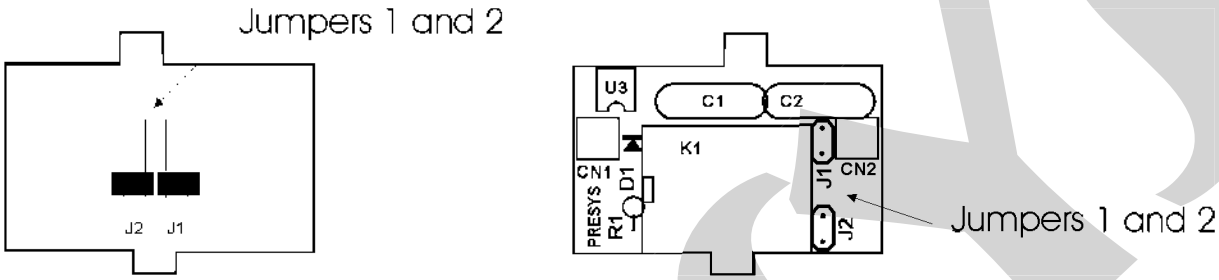


Fig. 18 - Jumpers for selection of snubbers on the relay board

Alarm and control relays are extremely critical in control and safety of industrial processes. In order to ensure the expected relay behavior, consider the following two loading conditions.

- High currents circulating through the relay contacts (from 20 mA to 3 A). When the relay switches high currents there is the occurrence of electrical arch which damage quickly the relay contacts. Besides, electrical noise is generated. In these conditions, it is recommended to use the RC snubbers which come with the relay module (placed jumpers).
- Low currents circulating through the relay contacts (less than 20 mA). The relays could not function properly when the jumpers are placed. In this case, the snubbers maintain a 4.5 mAac/9.0 mAac current when connected to a 120 Vac/220 Vac circuit. This current is enough, in certain casses, to power a horn or alarm lamps, preventing their deactivation. In this situation, there is no need to use the snubbers and the jumpers must be removed.

4.3 - Installation of Optional Modules

DMY-2030-CC Indicator accepts up to three output devices and communication, which must have the corresponding optional modules installed in the instrument. Open the Indicator as shown in section 4.1 in order to access three connectors in the Power Supply Board and one connector in the CPU board. (Refer to Figure 19).

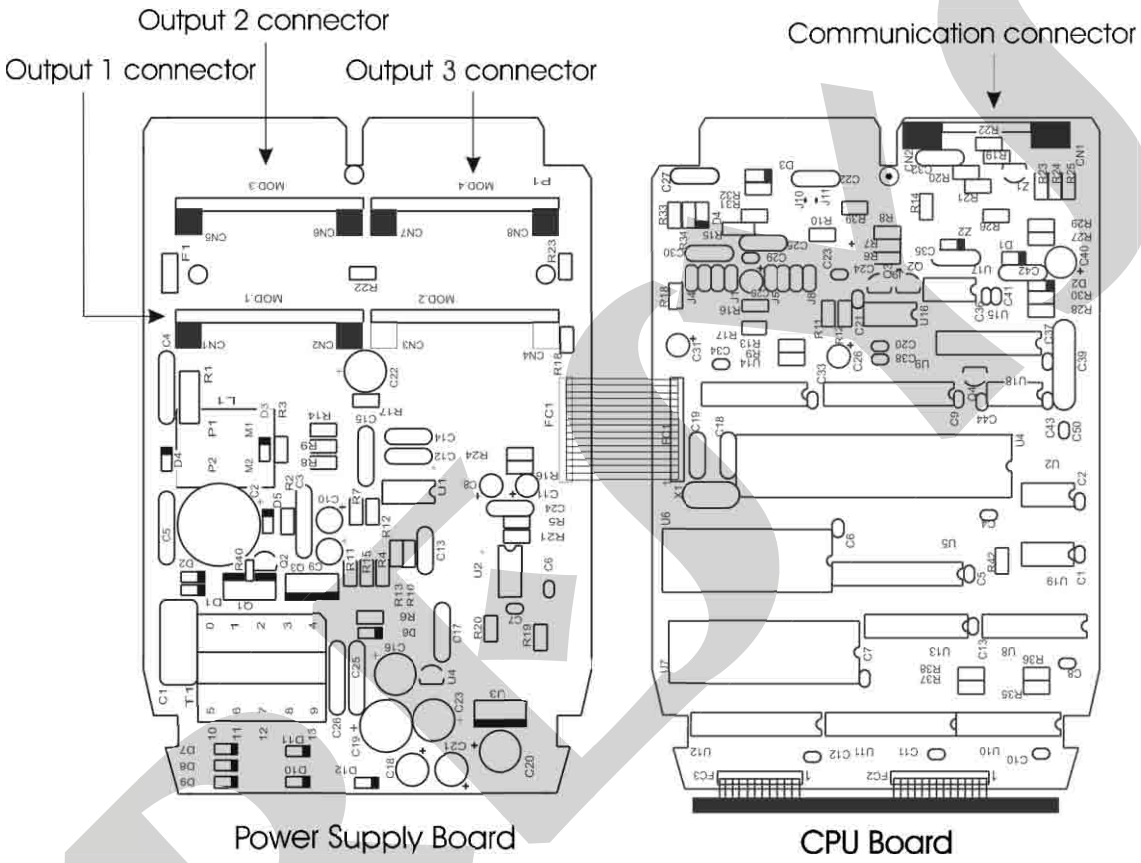


Fig. 19 - Optional module connectors

The connectors in the Power Supply Board are called MOD 1, MOD 3 and MOD 4, and are associated, in this order, to output 1, output 2 and output 3 signals, in the Indicator output terminals as shown in Figure 3. The connector for the communication module is placed in the CPU Board and has no label. Any optional module must be always installed with the component side in the direction of the Display Board, as shown in figure 20.

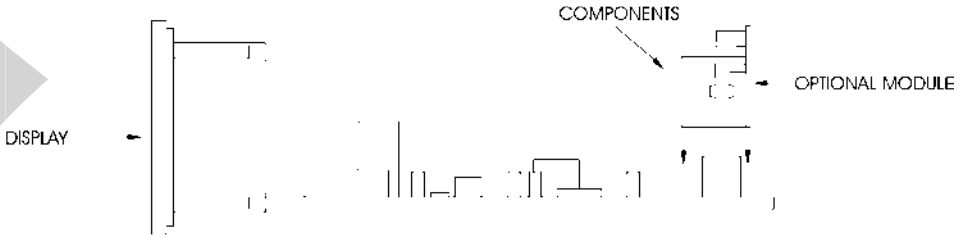


Fig. 20 - Installation of optional modules

Output 1 - Retransmitter (optional module code: MSAN-20)

When it is required output 1 to be a retransmitter output (4 to 20mA, 1 to 5V or 0 to 10V) connect the optional analog output module in the connector called MOD 1.

The optional analog output module has two connectors for installation of jumpers: J1 and J 2, as shown in figure 21.

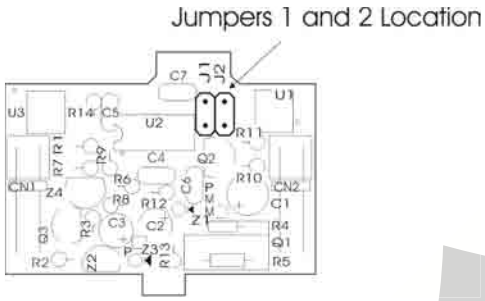


Fig. 21 – Place of jumpers in analog output board

In order to configure the optional analog output module as a retransmitter output for 4 to 20mA, 1 to 5V or 0 to 10V, install the jumper according to table 1.

Retransmitter Output Type	Jumpers	
4 to 20 mA*		
1 to 5 V	J1	
0 to 10 V		J2

Table 1 - Jumper for retransmitter output type configuration

(*) In case of 4 to 20mA current retransmitter output, keep the jumper out of the instrument or put it on only one pin of the connector.

Output 1 – Alarm Output

If output 1 is required to operate as alarm, connect the optional module in the connector called MOD 1. The output type depends on the optional module installed in MOD 1: SPST relay, solid state relay or open collector voltage. The alarm output type and the optional module code are listed in table 2.

Alarm Output Type	Optional Module Code
SPST Relay	MALRE - 20
Solid State Relay	MALRS - 20
Open Collector Voltage	MSD - 20

Table 2 - Alarm output types for output 1

Outputs 2 and 3 – Alarm Outputs

Outputs 2 and 3 are used as alarms when the optional modules corresponding to connectors MOD 3 and MOD 4 are installed. There are three types of alarm output available: SPDT relay, solid state relay and open collector voltage. The Alarm output type and the optional module correspondence are shown in table 3.

Alarm Output Type	Optional Module Code
SPDT Relay	MALRE - 20
Solid State Relay	MALRS - 20
Open Collector Voltage	MSD - 20

Table 3 – Alarm output types for outputs 2 and 3

Note: The module connected at MOD.2 is the 10Vdc voltage source used to power the load cell. Do not remove it.

4.4 - Calibration

DMY-2030-CC Indicator is accurately calibrated in factory and does not need periodic calibration in normal conditions. When calibration is required, follow this procedure below.

- Disconnect the process signals of I/O terminals.
- Before calibrating the instrument, keep it turned on for at least 30 minutes for warm up.

This section contains two parts: input calibration and output calibration.

Input Calibration

The accuracy and precision of the calibrator used for generating references must be at least two times better than the specifications of the Indicator.

The following tables list the references related to the type of input to be calibrated. The left column shows the mnemonics presented on the display during the calibration process.

To perform the calibration, enter level 7 of Calibration. The calibration level has a password system which avoids someone to enter this level accidentally and damage any calibration parameter. **The password for entering this leve is number 5.**

Figure 22 shows input and output calibration options in level 7 of Calibration.

Once the correct password is provided, select the 30mV mnemonic in the INPUT option. The display shows the mnemonics related to the references required for the calibration process. The references must be applied before selecting the corresponding mnemonic shown on display. When the reference is stable, start the calibration by pressing ENTER. At this moment the Indicator begins the calibration process while the mnemonic CAL blinks on the display

While the display is blinking the reference must remain connect to the input channel being calibrated.

When the display stops blinking and presents the mnemonic corresponding to the reference, the calibration process of the first calibration point will be finished.

Change to the next reference and press DOWN to select another point. Between any two calibration points wait 1 minute at least. After this time is elapsed, press ENTER to start calibrating this point.

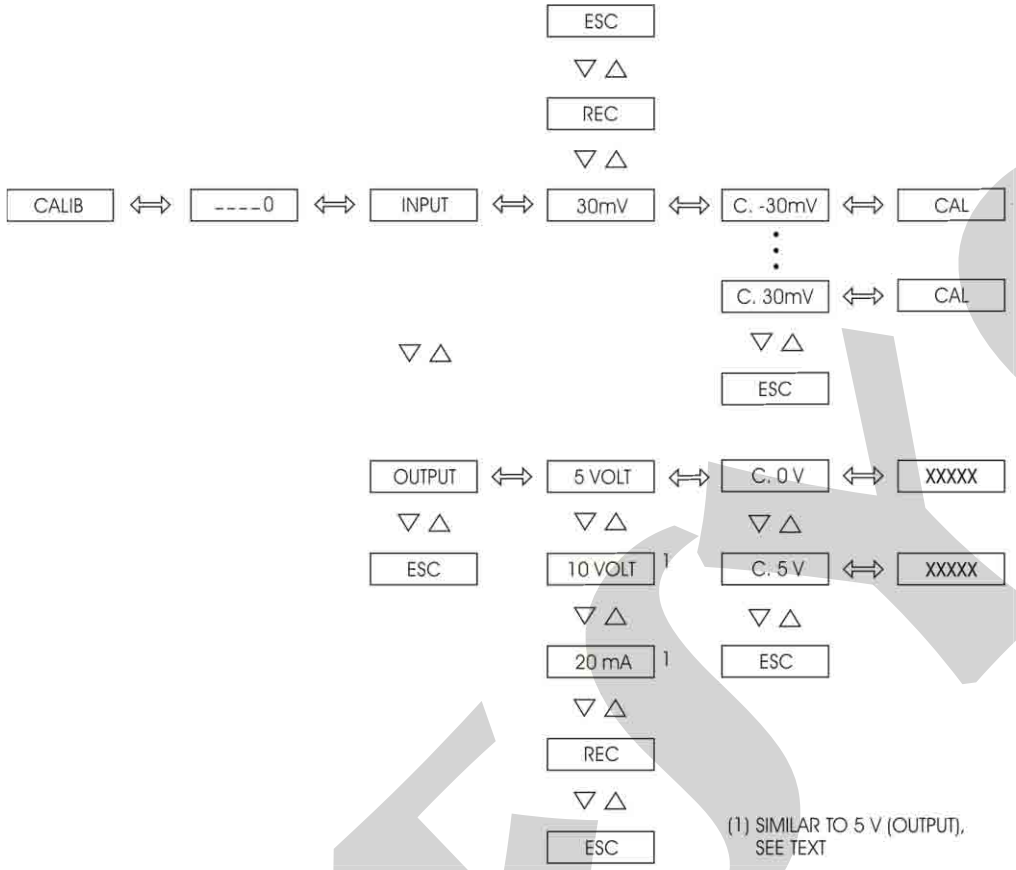


Fig. 22 – CALIBRATION level options

After performing all references on the table related to the input type to be calibrated, the calibration process will be finished.

It is possible to calibrate only one point without rendering invalid the other points already calibrated, in case the calibration of this point was not carried out properly.

In order to return to normal operation move back through the hierarchical levels until reaching level zero.

Calibration of voltage input (-30 to +30 mV)

For the voltage input calibration connect a voltage source to terminals 2(+) and 3(-).It is required 6 voltage references listed in table 4.

Reference	Mnemonic
-30.000 mV	C.-30m
-18.000 mV	C.-18m
-6.000 mV	C.-6m
6.000 mV	C.6m
18.000 mV	C.18m
30.000 mV	C.30m

Table 4 – References for the -30 to +30 mV input calibration

Output Calibration

The retransmitter output is calibrated by using na external calibrator.

Be sure that the configuration of the internal jumper on the optional Analog Output board complies with the output type (no jumpers for 20 mA output, jumper 1 for 5 V and jumper 2 for 10 V).

Enter level 7 of Calibration and select the output to be calibrated. Choose the type of output (0 to 20mA, 0 to 5V or 0 to 10V) and press ENTER.

The display will show the mnemonic related to the first point of calibration. There are only two points for output calibration.

For current output, the mnemonics are related to 0 and 20mA electric signals. For voltage output, the mnemonics are related to 0 and 5V or 0 and 10V signals.

Press ENTER after the display shows the mnemonic for the first or second point of calibration so that it changes to the value associated with the output signal. Then use the UP and DOWN keys to increase or decrease this value so that the measured value of the output signal corresponds to the electric level indicated by the mnemonic. When the required output signal is reached, press ENTER. **During the first point calibration (0mA, 0V) be careful not to saturate the output signal.**

Finally, return to normal mode by moving down through the levels until reaching level zero.

Return to factory calibration

The Indicator stores the factory calibration parameter values on the non-volatile memory, which may be recovered at any time.

In case the instrument shows an improper performance due to incorrect calibration, use the REC option (figure 22).

REC - is the option that allows to recover the factory calibration.

Enter level 7 of Calibration, and choose the INPUT or the OUTPUT option. Select the REC option and press ENTER in order to recover the values from factory.

4.5 - Hardware Maintenance Instructions

Before sending the instrument to the factory, check the following probable causes of a malfunctioning Indicator.

Instrument with error indication on display

After turning the instrument on, it tests RAM and E2PROM integrity.

When at least one of these components presents some problem the display shows the following error codes:

Err. 01 - RAM error
Err. 02 to Err.04 - E2PROM error
Err. 05 - incompatibility between configurations of alarm 1 and output 1

In case of RAM error, turn the instrument off and on to check if the error message is displayed again. If the error remains, return the instrument to factory.

When there is E2PROM error, press the ENTER key and configure the instrument again. Turn the instrument off and on to check if the error message is displayed again. If the error remains, send the instrument back to the factory.

The Err.05 error message, shown in the configuration levels, indicates that the retransmitter output (alarm 1) must be disabled before alarm 1 (retransmitter output) can be configured.

Instrument with the display off

Check if the power supply voltage is provided to terminals 23 and 24 of the Indicator.

Verify the integrity of fuse F1 of 2 A placed in the Power Supply Board as shown in figure 17. Due to its package it is necessary to check the fuse continuity in order to detect if it is broken.

Instrument malfunction

Check if the Indicator is configured correctly by software and hardware (internal jumpers).

Examine if the optional modules are connected in the right spots.

Check if the voltages on flat-cable 1 as shown in figure 23 are close to the values in table 5 and if they reach the CPU Board.

Test Points on flat-cable 1	Voltage
Between point 1(-) and point 2(+)	5 V
Between point 9(-) and point 8(+)	8 V
Between point 9(-) and point 1(+)	0 V
Between point 9(-) and point 10(+)	- 8 V
Between point 9(-) and point 13(+)	24 V
Between point 12(-) and point 11(+)	5 V

Table 5 – Inspection points of voltage on flat-cable 1

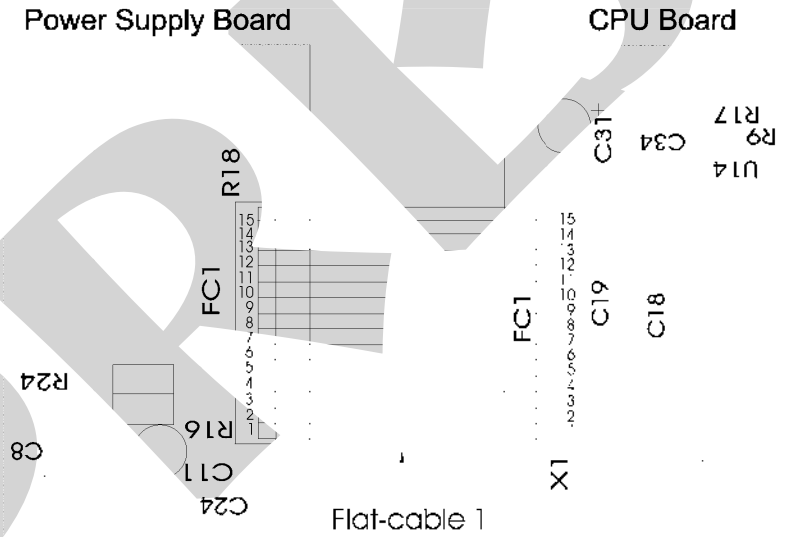


Fig. 23 – Voltage test points of the Indicator

If the cause of the problem is not discovered, the Indicator must be sent to the factory.