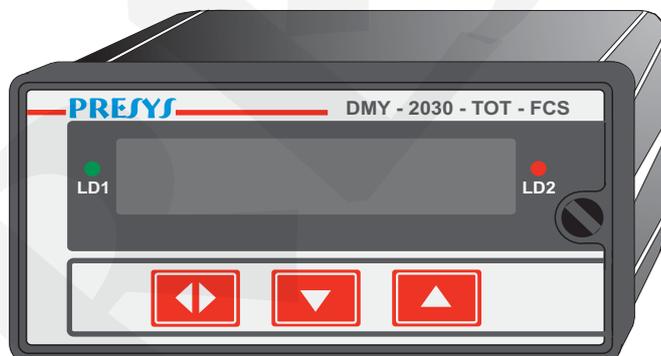
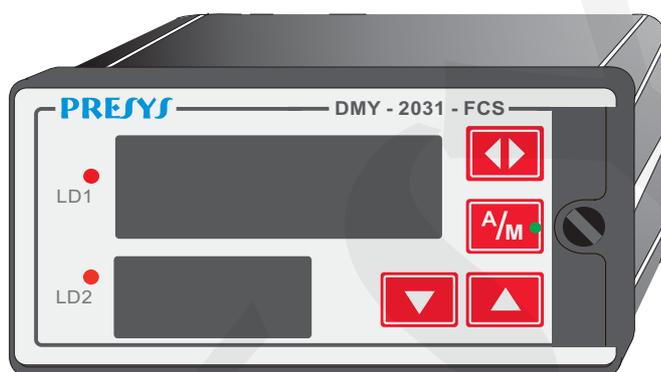


Counters



TECHNICAL MANUAL

WARNING!!

Avoid electric shock risk on touching the equipment:

- Use only suitable power cable with earth connection;
- Never power the equipment to the mains socket with no earth connection.

WARNING!!

High voltage is present inside this equipment. It can cause great damages and injuries.

Do not make any repairment service inside the equipment without removing the plug from the supply.

WARNING!!

Much electromagnetic noise can cause instability to the equipment.

The equipment is provided with electromagnetic interference filters that protect not only the mains but also the equipment itself against noise. These filters have no function if the unit is not earthed properly.

WARNING!!

High temperatures are achieved in this equipment.

Risk of fire and explosion are present in case safety measures are not taken. Sign by means of warnings the hazardous areas at high temperatures.

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1.0. Introduction

1.1. General

Presys DMY-2031-FCS and DMY-2030-TOT-FCS counters can be used to count parts or boxes by means of pulses received from any sensor. DMY-2031-FCS counts up to 9999 and, at the same time, shows on the lower display the setpoint or preset value.

DMY-2030-TOT-FCS counts up to 99999999, approximately one hundred million counts. Besides, it provides functions as preset and totalization. The totalization value is stored in a non-volatile memory and enables the reset after reaching the preset value.

Both models were designed for high reliability in industrial applications, with options for front aspersion-proof or weather-proof case.

Each input has a 24 Vd.c. voltage source to power the frequency sensor, isolated from the outputs and protected against short-circuit. Other voltage source values are available under previous consult.

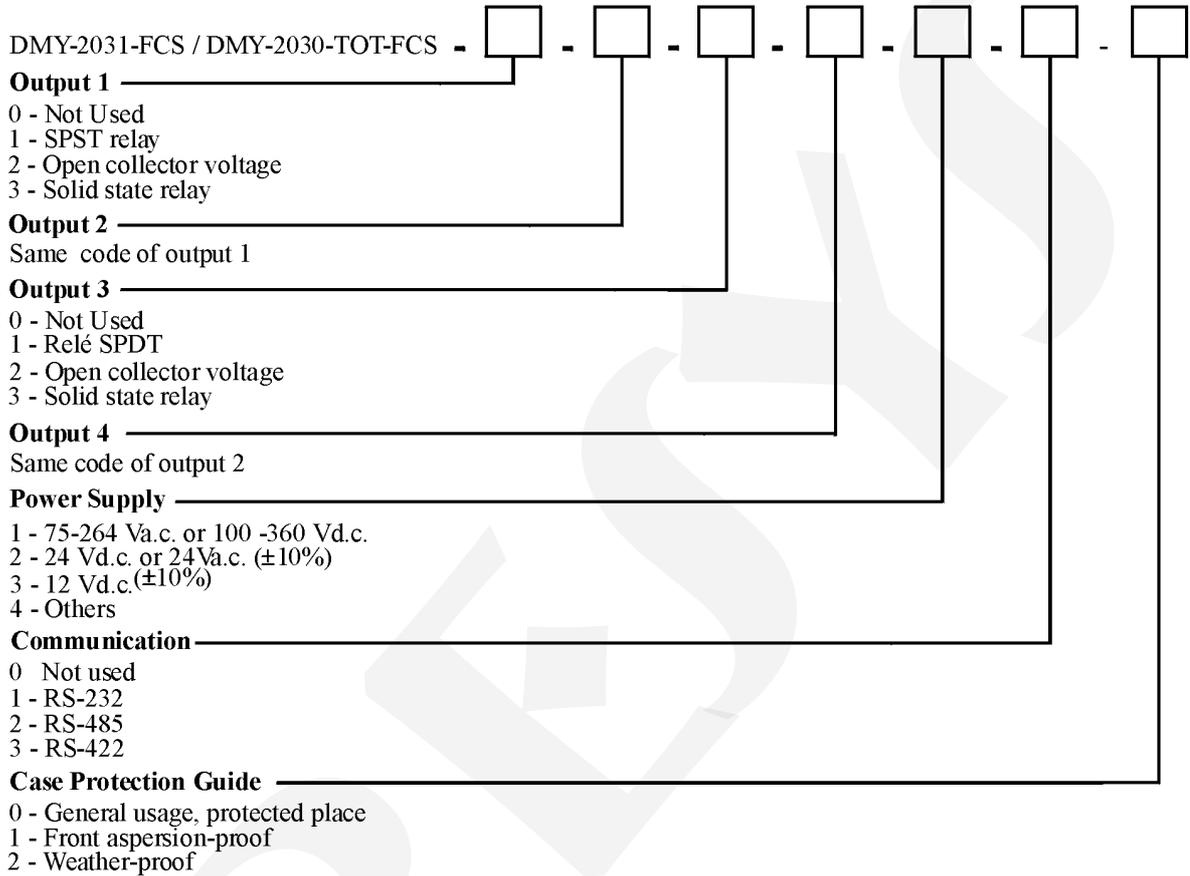
The counter input accepts pulses with amplitude between 300 mV_{pp} and 30 V_{pp} (volt peak-to-peak) *auto-range*. The frequency input ranges from 0 Hz to 500 Hz.

The indication on the display is user-configurable and allows the process variable to be shown in engineering unit (EU).

They can communicate with computers by using the optional RS-232 or RS-422/485 communication module.

They accept 75-264 Va.c. or 100-360 Vd.c. (no polarity) power supply.

1.2 - Order Code



Code example:

1) DMY-2031-FCS - 0 - 0 - 1 - 1 - 1 - 0 - 0

This code defines a DMY-2031-FCS Counter with two SPDT relays which can be used as high and low alarms, 75-264 Va.c. or 100-360 Vd.c. electric power supply, protected field usage.

1.3 - Technical Specifications:

Inputs:

Two frequency inputs for signal up to 500 Hz, from 300 mVpp to 30 Vpp (volt peak-to-peak) *autorange* and 70 Vd.c. max. DIN 19234 compliance for intrinsically safe NAMUR sensors.

Outputs:

Up to four SPST and SPDT relays rated 3 A at 220 Va.c.
Logic Signal, open collector signal, 40 mA/24 Vd.c. maximum with isolation.
Solid State Relay, 2 A/250 Va.c. with isolation.

Serial Communication:

RS-232 or RS-485 with 50 Vd.c. isolation.

Indication:

DMY-2031-FCS: 14 mm and 9 mm red led displays with four digits.
DMY-2030-TOT-FCS: 9 mm red led displays with eight digits.
The displays can be configured together with decimal point.

Totalization:

DMY-2031-FCS: 0 to 9999 counts.
DMY-2030-TOT-FCS: 0 to 99999999 counts.
Counts can be configured together with decimal point.

Configuration:

By front panel push buttons; serial communication and internal jumpers.

Sensors Power Supply:

24 Vd.c./50 mA maximum, isolated for output, with short circuit protection.

Power Supply:

75-264 Vc.a. 50/60 Hz or 100-360Vd.c. (10 W nominal); 24 Va.c./d.c. ,12 Vd.c. or other values.

Operating Ambient:

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

Dimensions:

1/8DIN (48x96x170 mm) HxWxD, (45x92 mm) HxW panel cutout.

Weight:

0.5 kg nominal.

Warranty:

One year warranty.

2.0. Process Input Signal Connections

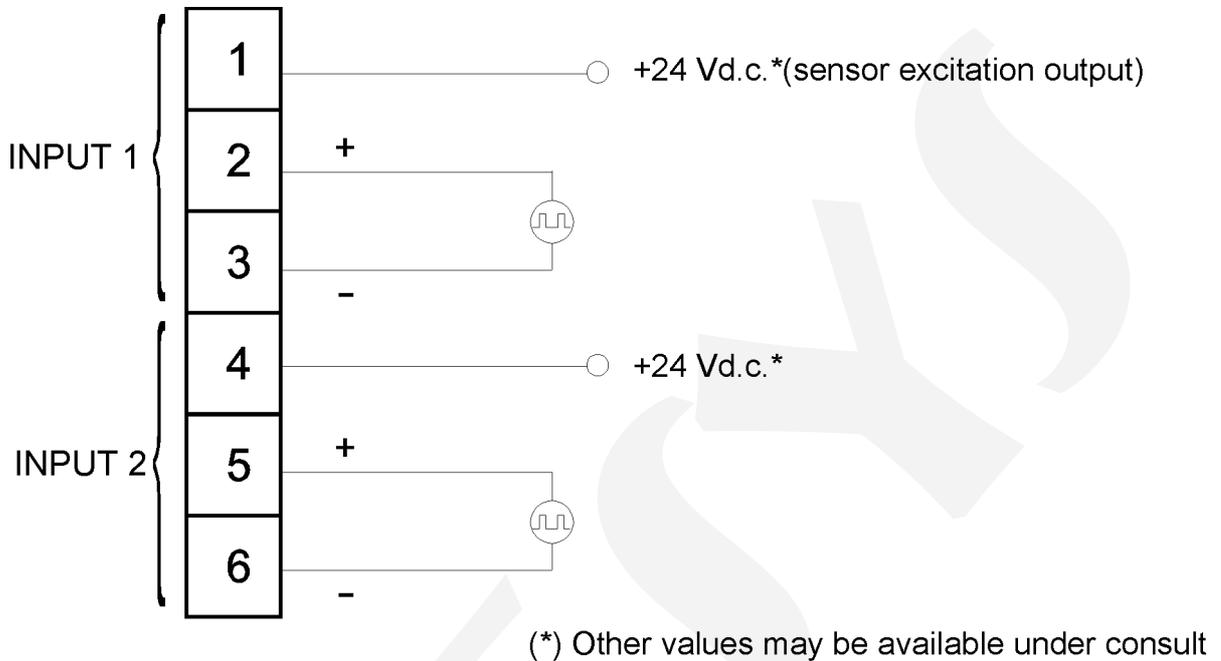


Fig. 1 - Input Signal Connections

The signal input pulses must be applied to terminals 2(+) and 3(-) for input 1 and to terminals 5(+) and 6(-) for input 2. The counters accept pulses with amplitude between 300 mVpp and 30 Vpp (volt peak-to-peak) *autorange*. The frequency input ranges from 0 Hz to 500 Hz .

Terminal 1 is a voltage source for the frequency sensor connected to input 1, when it is necessary to power the sensor. The voltage level is 24 Vd.c. in relation to terminal 3. Terminal 4 is the voltage source for the sensor connected to input 2, with 24 Vd.c. in relation to terminal 6. The voltage level may be changed under consult. Terminal 7 has no use.

The inputs allow the connection of a 2-wire intrinsic safety NAMUR type sensor directly to the terminals (+) and (-) without the need of an external resistor. The sensor power supply voltage level and the internal resistor value R_v comply with DIN-19234: 550-1100 Ω and 8.2V (7.7-9.0V). If necessary, specify the type of sensor together with the order code.

Inputs specified to be used with NAMUR sensor should not be used with other types of sensor since the input impedance is different, according to the DIN-19234 specifications.

3.0. Hardware Configuration

3.1. Input Configuration

The inputs are configured by software and hardware.

There is an internal jumper configuration associated to each input: J1 for input 1 and J2 for input 2. When the jumper is plugged, the instrument is configured to receive pulses with amplitude from 3.5 Vpp to 30 Vpp.

This configuration is useful to eliminate unstable indications due to the plant electrical noise. The factory sets each jumper in a false position, so that the instrument input operates within 300 mVpp to 30 Vpp range. In case one notices an unstable indication, usually, when the input is open or when the sensor does not send pulses, plug the jumper of this channel.

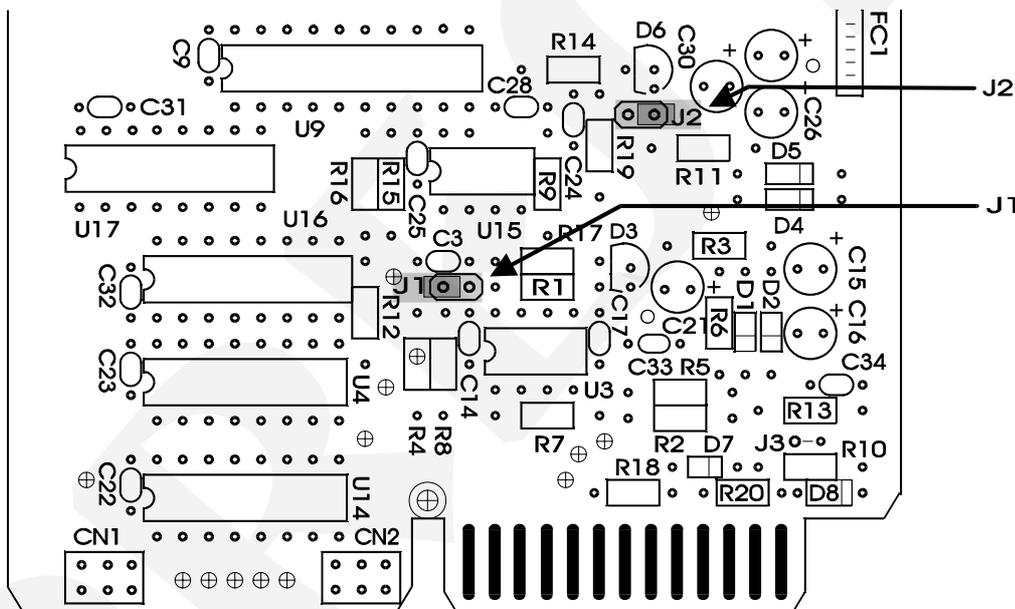


Fig.2 - Position Jumpers J1 and J2

3.2. 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 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.

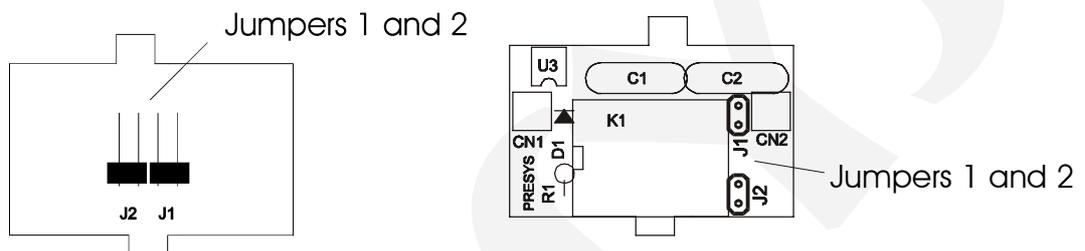


Fig. 3 - Jumpers for selection of snubbers on the relay board

Alarm relays are extremely critical in control and safety of industrial processes. In order to ensure the expected relay behaviour, 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 mAa.c./9.0 mAa.c. current when connected to a 120 Va.c./220 Va.c. circuit. This current is enough, in certain cases, 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.

3.3. Optional Module Connection

DMY-2031-FCS and DMY-2030-TOT-FCS counters accept up to four output signals besides the communication. The corresponding optional modules must be installed in the instrument in order to operate correctly. Open the counter to have access to the four optional module positions in the Power Supply Board and to the communication module-in position in the CPU board (refer to Figure 4).

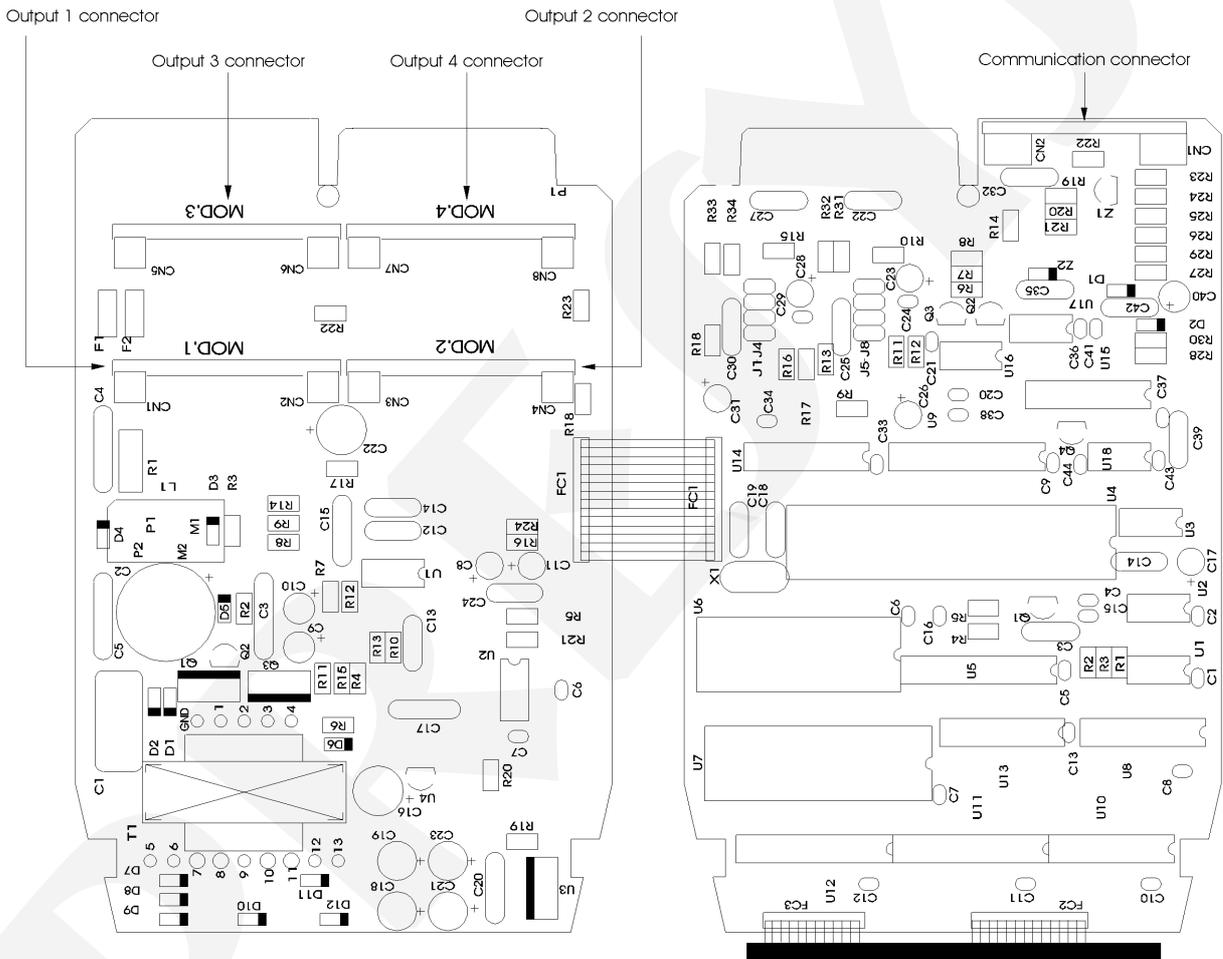


Fig. 4 - Optional module connectors

The positions in the Power Supply Board are called MOD 1, MOD 2, MOD 3 and MOD 4, and are associated, in this order, with the signals of output 1, output 2, output 3 and output 4 of the Counter terminals shown in Figure 4. The connection of the communication module is in the CPU Board and has no label. Any optional module must be always installed with the component side towards the Display Board, as shown in Figure 5.

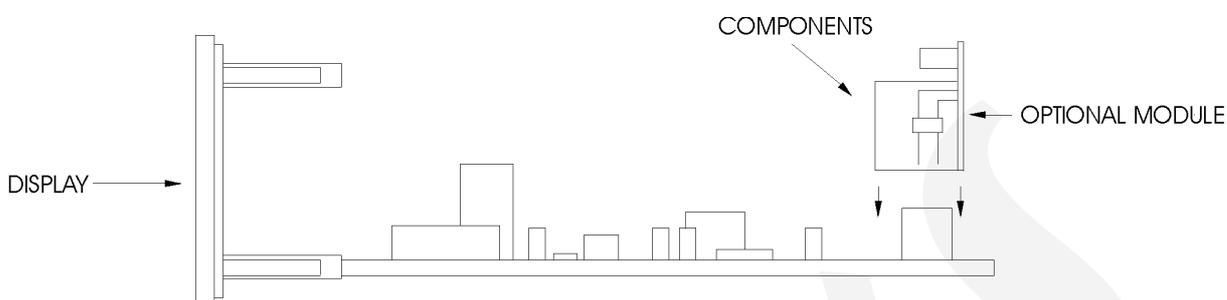


Fig. 5 - Installation of optional modules

Outputs 1 and 2 as alarm outputs

If output 1 or output 2 is required to operate as alarm, connect the optional module in the connectors called MOD 1 and MOD 2, respectively. The output type depends on the optional module installed in MOD 1 and MOD 2: SPST relay, the solid state relay and the open collector voltage. The alarm output type and the optional module code are listed in table 3.

Alarm Output Type	Optional Module Code
SPST Relay	MALRE - 20
Solid state relay	MALRS - 20
Open collector voltage	MSD - 20

Table 3 - Types of alarm output for outputs 1 and 2

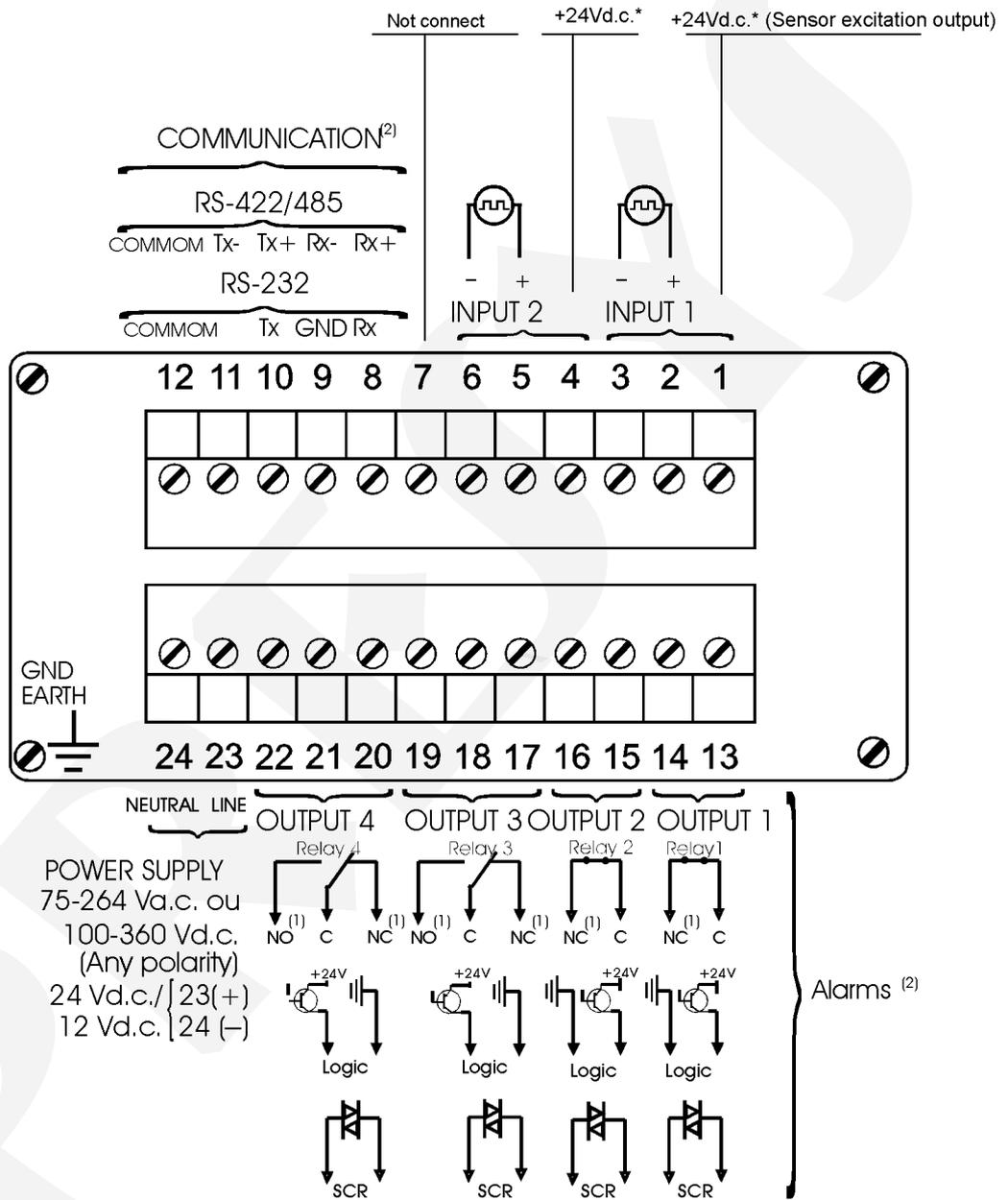
Outputs 3 and 4 as alarm outputs

Outputs 3 and 4 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 4.

Alarm Output Type	Optional Module Code
SPDT Relay	MALRE - 20
Solid state relay	MALRS - 20
Open collector voltage	MSD - 20

Table 4 - Alarm output types for outputs 3 and 4

3.4. Connection Diagram



Notas:

(1) NC and NO refer to the condition of the relays contacts when the counter is powered and non-alarm condition with SAFE option enabled

(2) Options Modules

4.0. Operation

DMY-2031-FCS and DMY-2030-TOT-FCS Counters have two modes of operation: normal operation and configuration mode.

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

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

4.1. Normal Operation

The normal operation mode, in which the Counter is most of the time, is called level zero. In this level, DMY-2030-TOT-FCS counter shows the count for channel 1 or 2 in an eight-digit display, while DMY-2031-FCS counter shows, in upper four-digit display, the count for channel 1 or 2 and, in lower four-digit display, the maximum count value (TRIP / Preset Setpoint).

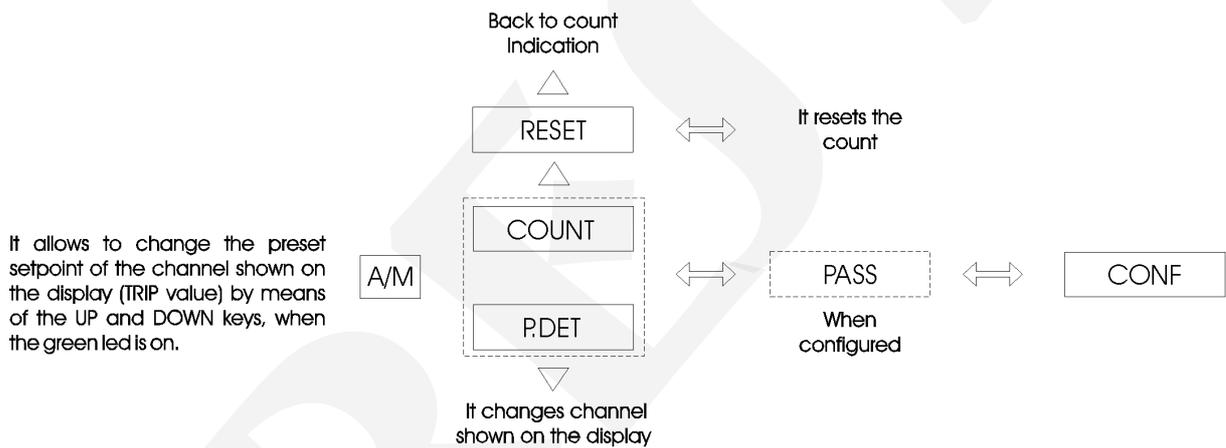


Fig. 6 - DMY-2031-FCS Operation Level

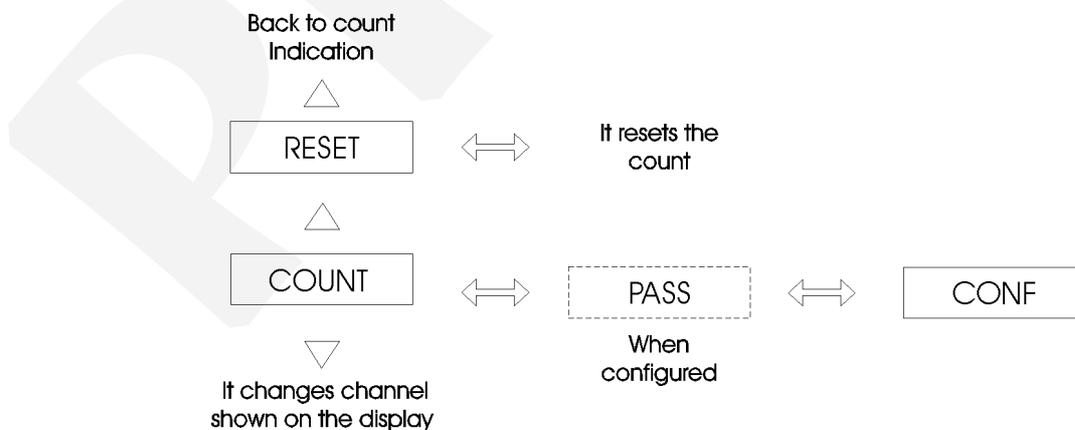
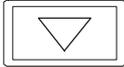
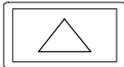
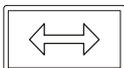


Fig. 7 - DMY-2030-TOT-FCS Operation Level

In operation level, the front panel keys have the following functions:

Key	DOWN		It changes the channel shown on the display. If the display shows channel 1 (2), after pressing DOWN, the display will show the measured variable of channel 2 (1).
Key	UP		It presents the RESET mnemonic. This option can be selected by pressing ENTER. Return to display the counts (no reset) by pressing UP again.
Key	ENTER		It changes from level zero to level 1 or asks the password, depending on the configuration.
Key	A/M *		It allows to change the preset setpoint of the channel shown on the display (TRIP value) by means of the UP and DOWN keys, when the green led is on.

(*) Only for DMY-2031-FCS Counter.

In order to have access to the configuration levels described in the following sections, one should change the display to the CONF option.

4.2. 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 configuration.

So, when ENTER is pressed in the normal operation mode, one of the following events can happen, depending on the current configuration:

- i) To enter level 1 (GENERAL) of configuration mode directly. It indicates the instrument is not configured with a password system.
- ii) To display the PASS warning, indicating that the instrument is provided with a password system (a key sequence or a value), according to Figure 8.

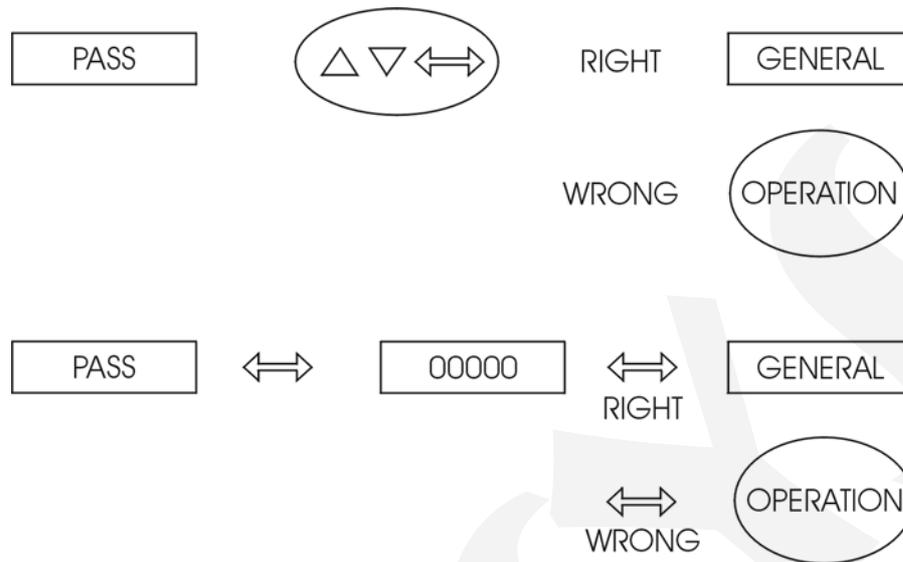


Fig. 8 - Password via key sequence or value

In case of a key sequence password, the user should press the UP, DOWN and ENTER keys (exactly in this order) to access the configuration levels.

For a value password, the user must press the ENTER key for a second time in order to view the number 0000 in DMY-2031-FCS display (00000 for DMY-2030-TOT-FCS) with the right end digit blinking. The position which is blinking indicates the digit in the four/five-digit number to be changed by the user with the UP and DOWN keys. Move to the digits on the left by pressing ENTER. After entering all digits, press ENTER again. If the password is correct, level 1 is accessed; otherwise, it returns to the normal operation (see Figure 8).

The user can choose both password systems, key and value. In this case, if the user provides an incorrect sequence of keys, the display goes immediately to the value password system.

The password number may be chosen by the user (personal) or the number 2030 for DMY-2030-TOT-FCS (2031 for DMY-2031-FCS). Note that the number 2030 (2031) is always accepted by the value password system, which helps the user in case he forgets the personal password. To configure a number for password or for any other parameter use the Counter front panel keys with the following functions:

UP	key	Increases the value being set
DOWN	key	Decreases the value being set
ENTER	key	Changes position to the left digit

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

The Configuration parameters are distributed in six hierarchical levels shown in Figure 9.

Counters DMY-2030-TOT-FCS / DMY-2031-FCS

In order to change the level and access its parameters, use the front panel key which have the following functions:

ENTER	key	Enters the level configuration
UP	key	Moves to higher levels
DOWN	key	Moves to lower levels

Warning: In the diagrams below, the rectangles represent the display after the ENTER, UP or DOWN key is selected.

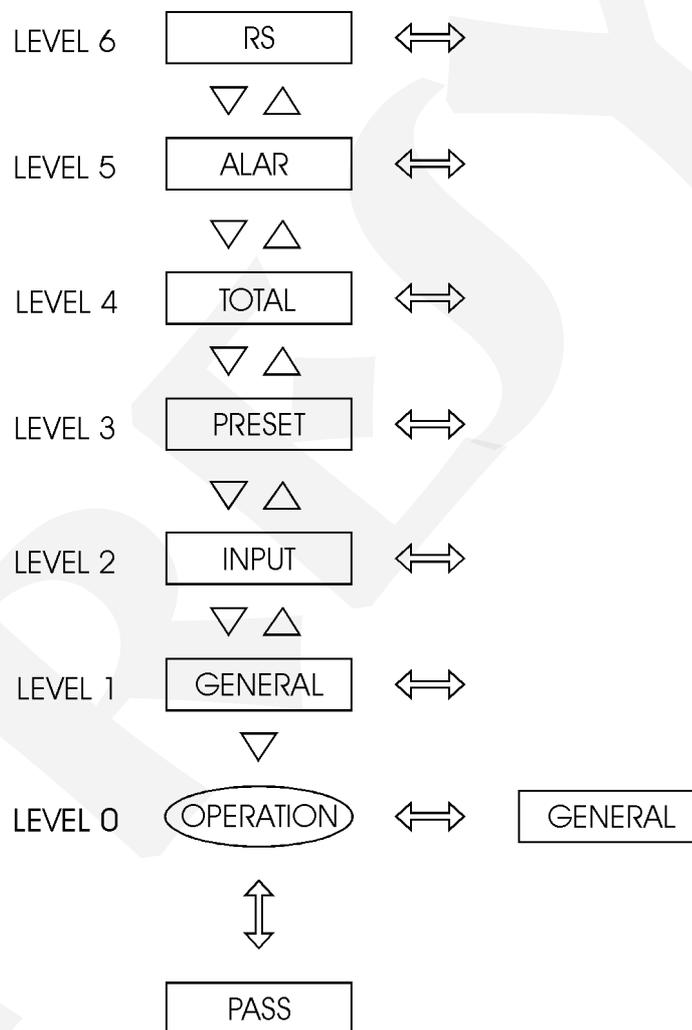


Fig. 9 - Parameter levels diagram

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

Counters DMY-2030-TOT-FCS / DMY-2031-FCS

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

UP	key	Moves the options in one direction
DOWN	key	Moves the options in the opposite direction
ENTER	key	Confirm or advance options inside a level, if the display does not show ESC. When ESC is shown, it goes back one or more positions.

Level 1 - General

Level 1 presents the options: **TAG**, **SFT.V**, **PASS** and **INDIC** (see Figure 10).

TAG - consists in a numeric identification for the instrument. The procedure to enter the tag or any other parameter is the same as described previously for the password (refer to value password for the functions of the ENTER, UP and DOWN keys).

SFT.V - shows software version.

PASS - allows the user to enable or disable the password system for accessing the configuration mode. The password system may be chosen as key sequence, a value (number chosen by the user and number 2030 for DMY-2030-TOT-FCS; number chosen by the user and number 2031 for DMY-2031-FCS) or both. Press UP, DOWN and ENTER keys in this order to get the password by key.

INDIC - is an option for the visualization of the measured variables on the display. It allows the user to view the values of channels 1 and 2 only by pressing the UP and DOWN keys, or it sets the instrument to change between both channels. In the former case choose NO for option TWO, and for the latter case, choose YES (automatic scan mode) for option TWO and provide the exhibition times (given in seconds) for viewing each channel.

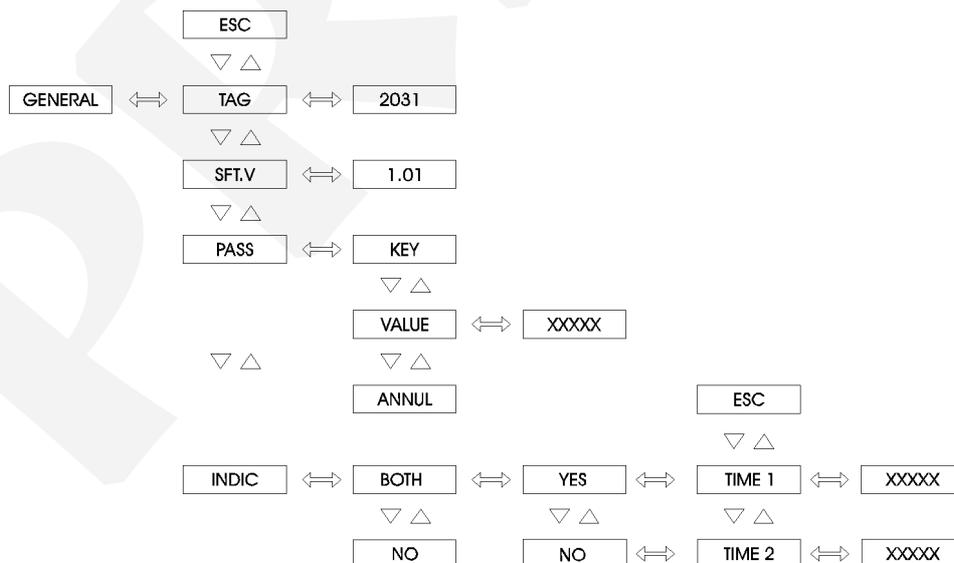


Fig. 10 - GENERAL level options

Counters DMY-2030-TOT-FCS / DMY-2031-FCS

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

Mnemonic	Parameter	Range DMY-2031-FCS	Range DMY-2030-TOT-FCS	Factory Value	Units
TAG	instrument identification	_____	_____	2031/ 2030FCS	_____
SFT.V	software version	_____	_____	1.01	_____
VALOR	user password	-999 to 9999	0 to 30000	0	_____
TIME1	channel 1 exhibition time	1 to 3000	1 to 3000	5	second
TIME2	channel 2 exhibition time	1 to 3000	1 to 3000	1	second

Level 2 - INPUTS

Level 2 - INPUT allows to configure the display indication in relation to the number of pulses counted, to select count at the rising edge or falling edge and to configure the maximum pulse totalization/count on display. It is also possible to disable any input.

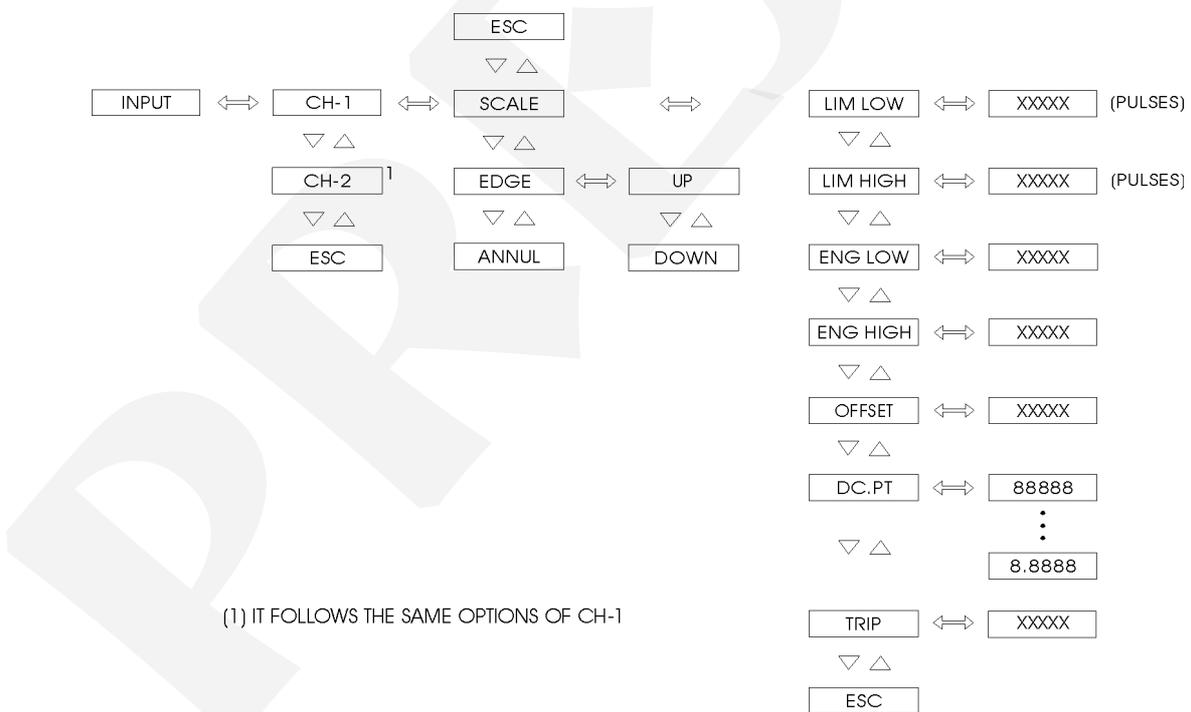


Fig. 11 - INPUT level options

EDGE - selects the count in rising edge or falling edge.

SCALE - configures the display indication according to the number of pulses at the input. Two points must be defined: P1(LIM_LOW, ENG_LOW) and P2 (LIM_HIGH, ENG_HIGH), as shown in figure 12.

LIM_LOW and LIM_HIGH: Number of pulses. Range: 0 to 9999 for DMY-2031-FCS and 0 to 99999999 for DMY-2030-TOT-FCS, with LIM_LOW < LIM_HIGH.

ENG_LOW and ENG_HIGH: Display indication associated to LIM_LOW and LIM_HIGH values, respectively. Range: 0 a 9999 EU for DMY-2031-FCS and 0 to 99999999 EU for DMY-2030-TOT-FCS.

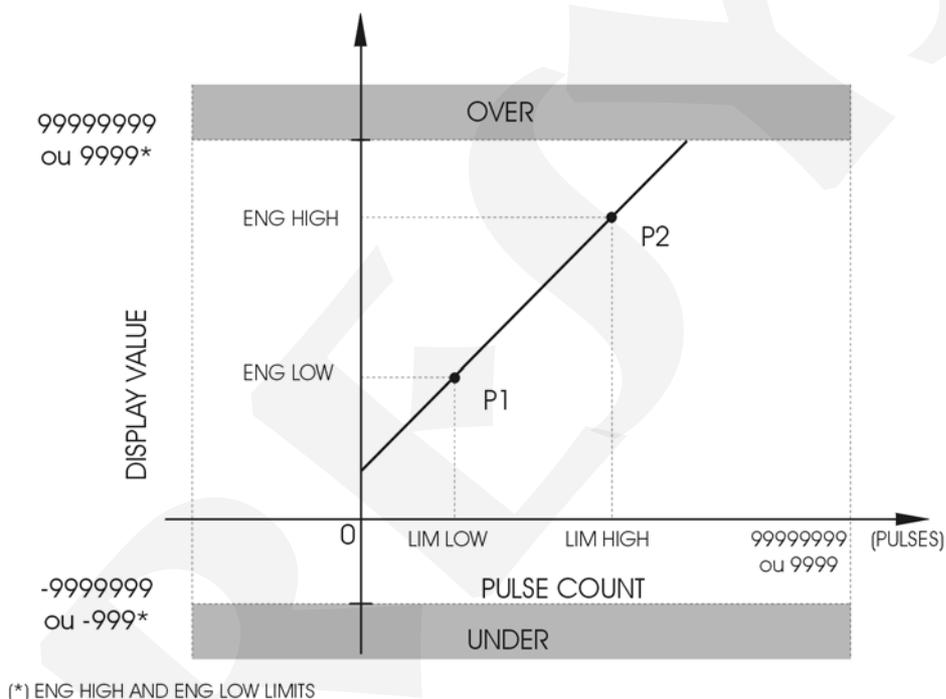


Fig. 12 - Input Configuration

DEC.PT: sets the decimal point for visualization in Engineering Unit (EU).

TRIP: configures the maximum value of the totalization/count shown on the display, in Engineering Unit (EU). When the pulse indication reaches the TRIP value, the preset alarms are activated. After detecting an additional pulse, the display indication is automatically reset to the beginning of the indication range.

Range:

(ENG_LOW + OFFSET + 1) to (ENG_HIGH + OFFSET) for ENG_HIGH > ENG_LOW or (ENG_HIGH + OFFSET + 1) to (ENG_LOW + OFFSET) for ENG_LOW > ENG_HIGH.

In adjusting the values of ENG_HIGH, ENG_LOW and OFFSET, the value of TRIP is adjusted automatically as necessary to the extremes of its adjustable range.

ANNUL: disables the reading of the corresponding input. In operation level, the NONE mnemonic is indicated if input 1 is disabled. However if input 2 is disabled, it is not shown. In order to enable the input again, just confirm one of the parameters LIM_LOW, LIM_HIGH, ENG_LOW or ENG_HIGH in SCALE option from INPUT level.

Level 3 - PRESET

PRESET level allows to set preset setpoint for each channel. The pulse totalization limit value (preset setpoint) is configured at the TRIP parameter in the INPUT level, and automatic or manual mode is configured at MODE option. In DMY-2031-FCS, when **A/M** key is pressed, in operation mode, the green led is turned on and the preset setpoint (TRIP) of the shown channel can be changed by the user via the UP and DOWN keys.

RELAY: allows to select one or more relays, which can operate when the indication exceeds the preset setpoint value. After the relays choice, they can not be configured as alarm (or vice-versa). The normal state of the relay (closed or open) is determined by the SAFE condition in ALARMS level. In this level, it is also possible to associate the operation of led 1 and led 2 to the preset relays of preset by means of option DPEN of LED1 and LED2.

In automatic mode, when the indication reaches the preset setpoint value (TRIP value), one or more relays are activated during a time interval specified by parameter PULSE. DELAY parameter, in PRESET level, causes each relay to be activated only after a certain time interval defined by the user.

In manual mode, the relays are activated when the totalization value reaches the preset setpoint value (or after the time interval defined in DELAY parameter, in PRESET level) and deactivated only after the totalization is manually reset, in operation mode, by pressing the UP key (RESET mnemonic is shown on display) followed by the ENTER key.

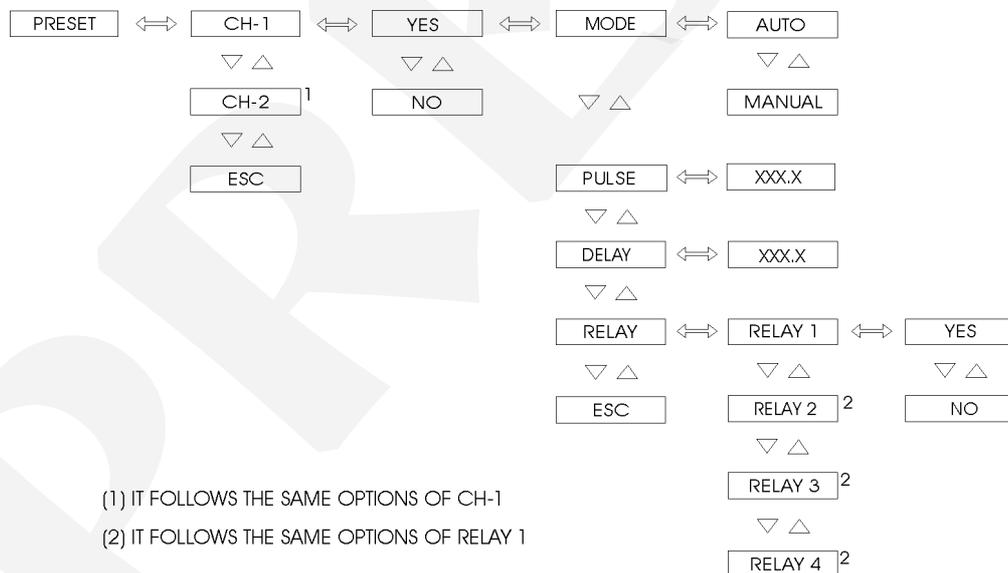


Fig. 13 - Opções do nível PRESET

The table below refers to the ranges of the parameters shown in Figure 13.

Counters DMY-2030-TOT-FCS / DMY-2031-FCS

Mnemonic	Parameter	Range for DMY-2031-FCS	Range for DMY-2030-TOT-FCS	Factory Value	Units
DELAY	delay for activating the relay after indication reaches the preset setpoint (TRIP)	0.0 a 999.9	0.0 a 9999999.9	0.0	s
PULSE	Period of time that the relays stay activated	0.1 a 999.9	0.1 a 9999999.9	0.1	s

Note: In manual mode, the PULSE parameter has no function.

Nível 4 - Totalization

TOTAL level shows the total count accumulated for each channel (TOTAL.1 and TOTAL.2), independently of the channel be reset or not. This count can be reset at the RESET option in TOTAL level. Refer to figure 14.



Fig. 14 - TOTAL level options

Level 5 - Alarms

The Counters have up to seven alarm devices: four of them are the outputs 1, 2, 3 and 4 used as alarm outputs and called relay 1, relay 2, relay 3 and relay 4, respectively. The other three are the couple of leds, LED 1 and LED 2, and the display which can operate independently of the relays. In this case, the INDEP option is selected. If the DEPEN option is selected for the leds and display, their operation is associated with the relays.

Each alarm module can perform up to four types of alarm: low-alarm for channel 1, high-alarm for channel 1, low alarm for channel 2 and high-alarm for channel 2. When configuring the seven independent alarm indications, there are up to 28 setpoint alarms (SP).

Once the alarm configuration is established (CONF option), it is possible to view or change only the values of alarm setpoints. Press the UP key while CONF option is shown in order to have a quick access to the setpoints of all alarms already configured. The mnemonics of the alarm setpoints are formed in a similar way as the two examples below:

S1.H.r1 Channel 1 high-alarm setpoint associated with relay 1.

S2.L.L1 Channel 2 low-alarm setpoint associated with led 1.

DELAY - causes each relay to be activated only after a certain time interval.

Counters DMY-2030-TOT-FCS / DMY-2031-FCS

SAFE - provides safety to relays. The safety condition means the relays are powered on when the instrument is on and there is no alarm condition, and the relays are powered off when in alarm condition or in case of power failure.

The table below refers to the ranges of the parameters shown in Figure 15.

Mnemonic	Parameter	Range for DMY-2031-FCS	Range for DMY-2030-TOT-FCS	Factory Value	Units
SP	alarm setpoint	0 to 9999	0 to 99999999	25.0 - low alarm 75.0 - high alarm	EU
DELAY	delay for activating the relay	0.0 to 3000.0	0.0 to 3000.0	0.0	second

Counters DMY-2030-TOT-FCS / DMY-2031-FCS

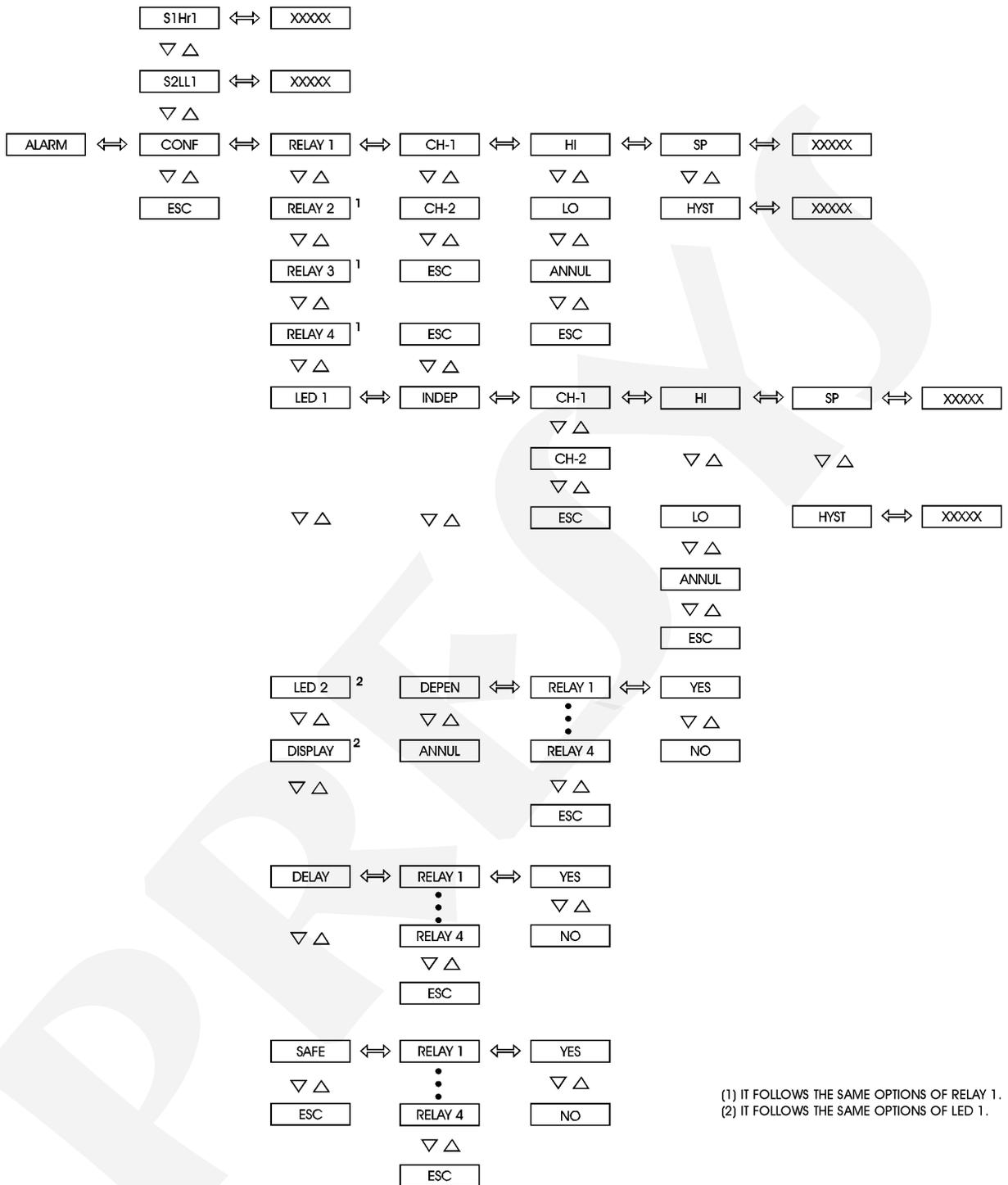


Fig. 15 - ALARM level options

Nível 6 - RS

Refer to the communication manual.

PRESYS

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