OPERATOR'S MANUAL

PROGRAMMABLE COUNTER
SERIE DAN-900

Model : DAN-984

COUNTER / RATE
COUNTER / COUNTER

NOTE : This operator's manual must be used also to program models DAN-985-I and DAN-985-V

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PRELIMINARY NOTES

It is advisable to do a detailed reading of this Manual before mounting the instrument. This Operator's Manual contains all the technical specifications : electrical as well as mechanics, both necessary to do a correct installation and also a good use of the instrument. At the same time the user will acquire the knowledge needed to obtain the best performances of the product.
It is also recommended realize the first programming (paragraph 3 & 4) on the table before to install the unit, because if it is necessary change or place a Jumper, then the unit is totally accessible (paragraph 1 & 2). All the Access Codes and parameters will remain stored in the internal memory, therefore when the programming is finished please consider to use the OPERATOR ACCESSIBLE CODES (paragraph 2.6) installing the J1 Jumper. It avoid that the Access Codes or the Operating Modes can be changed accidentally or by not authorised personnel.

UNPACKING.- Check that inside the present cardboard box, there are the following :
1 Instrument Model DAN-984 or DAN 985-I or DAN-985-V
1 Operator's Manual.

If there are some doubts or enquiries about the present instrument, please contact with your Local Distributor or with **FEMA ELECTRÓNICA S.A.**

When the shipment is arrived remove the Packing List and verify that you have received all equipment . Then inspect the box and the instrument, and if there is evidence of damage caused by bad handling during the transport, it is advisable to make a careful inspection of all damages making a note of all of them and to pass on this information directly to the Transport Company.
If this occurs but with insured material, ask the Transport Company for instructions about submitting a claim.

INSTALLATION

PRECAUTIONS.- The installation and the future use of this unit must be done by suitable qualified personnel. The unit has not AC (mains) switch, neither internal protection fuse, it will be in operation as soon as power is connected. The installation must incorporate an external main switch with a protection fuse of :

50 mA operating at 230 Vac
100 mA operating at 115 Vac.

and also the necessary devices to protect the operator and the process when using the unit to control a machine or process where injury to personnel or damage to equipment or process, may occur as a result of failure of the unit.
See the paragraph 2, SENSOR INPUT CONFIGURATION AND WIRING and check the Jumpers are correctly installed.

SAFETY PRESCRIPTIONS.- The unit has been designed and tested under UNE 20553 rules and is delivered in good condition. This operator's manual contains useful information for electrical connections. Do not make wiring signal changes or connections when power is applied to the unit. Make signal connections before power is applied and, is reconnection is required, disconnect the AC (mains) power before such wiring is attempted.

Install the unit in places with a good ventilation to avoid the excessive heating. And far from electrical noise source or magnetic field generators such as power relays, electrical motors, speed controls etc...
The unit cannot be installed in open places. Do not use until the installation is finished.

POWER SUPPLY.- The power supply must be connected to the adequate terminals (see the connection instructions). The characteristics of the power supply are showed on the side label. Please make sure that the unit is correctly connected to a power supply of the correct voltage and frequency.
Do not use other power supply otherwise permanent damage may be caused to the unit.
Do not connect the unit to power sources heavily loaded or to circuits which power loads in cycle ON-OFF or to circuits which power inductive loads.

SIGNAL WIRING.- Certain considerations must be given when install the signal input and control wires. If the wires are longs can act like an antenna and introduce the electrical noise to the unit, therefore :

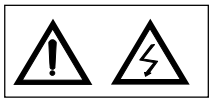
Do not install the signal input or control wires in the same conduit with power lines, heaters, solenoids, SCR controls etc....and always far from these elements.

When shielded wires are used, connect the shield to the common terminal and leave unconnected the other end of the shield and do not connect to the machine ground.

EXCITATION VOLTAGE.- The unit supply the Excitation voltage for sensors, through the terminals 3 & 4. Do not connect these terminals to other external power supply, permanent damages may result to the unit.

SAFETY CONSIDERATIONS

PRESCRIPTIONS.- Before starting any operation of adjustment, replacement, maintenance or repair, the unit must be disconnected from any kind of power supply.



Keep the unit clean , to assure good functioning and performance.
To prevent electrical or fire hazard, do not expose the unit to excessive moisture.
Do not operate the unit in the presence of flammable gases or fumes, such as environment constitutes a definite safety hazard. The unit is designed to be mounted in a metal panel.

If the unit shows signs of damage, or is not able to show the expected measures, or has been stored in a bad conditions or a protection failure can occur, then do not attempt to operate and keep the unit out of service.

IN CASE OF FIRE

1.- Disconnect the unit from the power supply.
2.- Give the alarm according to the local rules.
3.- Switch off all the air conditioning devices.
4.- Attack the fire with carbonic snow, do not use water in any case.

WARNING : In closed areas do not use systems with vaporized liquids.

CONNECTIONS

All wiring connections are made using push-in cable connectors. There is a separate connector block for power supply, input signals and each relay output. Please make sure that each connector block is connected on the adequate place.

PANEL MOUNTING

PANEL MOUNTING.- The instrument size case is 1/8 DIN. The internal electronic circuit can be inserted or removed by the front part and is held on to the case by the two lateral lugs, which must be put in their corresponding holes placed on each case side.
Verify that the panel cut-out is correctly according to the dimensions indicated on page 17 with a minimum depth of 135 mm. (5.31").
Install the fixation clips of blue colour in the lateral guides of the unit by its rear part and then slide and press them firmly against the panel, until the unit is totally hold on.
Plug the terminals blocks in their corresponding places. See paragraph 1.4 on page 4.

WARRANTY.

FEMA ELECTRÓNICA S.A. warrants this product free of defects in workmanship for **ONE** (1) year from the date of shipment.
This Warranty is VOID if the unit shows evidence of damages as a result of misapplication, accident, misuse or if the product had been tampered or repaired by personnel or companies without the official authorization of **FEMA ELECTRÓNICA S.A.** This Warranty is VOID also for damages caused by defective or inappropriate applications.
During the Warranty period if the instrument is found to be defective it will be repaired or replaced at the discretion of **FEMA ELECTRÓNICA S.A.** Before sending back the unit, please fill in the rear Cover of this Manual, and send the instrument and the Manual (or one copy of it), free of charge and properly packed with a description of the anomaly or defect found in the product, directly to your Local Distributor or to the following address :

FEMA ELECTRÓNICA S.A.
Altimira 14, Talleres 14, Nave 2
Centro Industrial Santiga
P.O. Box 49
E 08210 BARBERA DEL VALLES
(BARCELONA, Spain)

LIMITATION OF LIABILITY : **FEMA electrónica, s.a.** shall not be responsible for any damage or loss to other equipment however caused, which may be experienced as a result of the installation or use of this product. **FEMA ELECTRÓNICA S.A.** liability shall not exceed the purchase price paid of the product upon which liability is based. In no event shall **FEMA ELECTRÓNICA S.A.** be liable for consequential, incidental or special damages.

1.- GENERAL DESCRIPTION

All functions and options are selectable and programmable using the push-buttons and LED indicators located on the top of the front part.
The unit, microprocessor based, consists in two internal counters which can be programmed to operate in two different modes.

Mode 1 : Counter A, operates as a RATE (tachometer, flowmeter etc..) and counter B operates as a TOTALIZER.
Mode 2 : Both counters operate as totalizers.

The instrument has two independent inputs, Channel 1 and Channel 2.

1.1.- FRONT DESCRIPTION

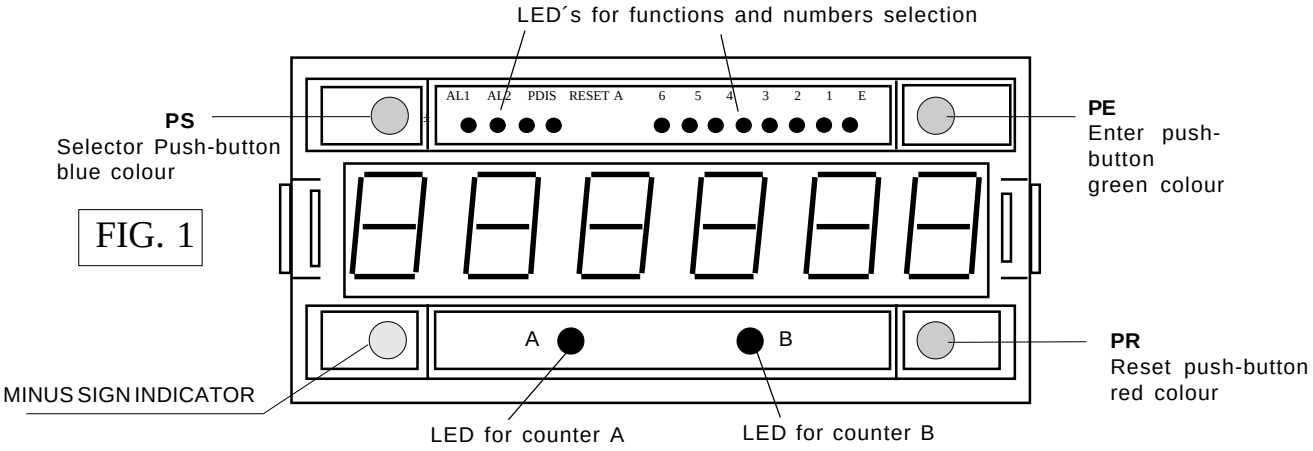


FIG. 1

1.2.- PUSH-BUTTONS

PS :Selector push-button. Each time it is pressed, the LED switched on is displaced one position to the left and allows to select the number to be entered or the function to be activated.

PE : ENTER push-button, introduces the number selected on the display or activates the function programmed.

PR :Reset push-button, activates the RESET function according to the Mode programmed.

RESET A : Allows RESET counter A, only when the LED is lighted up using the push-button PE (enter).

1 to 6 : Allow to select the number to be entered on the display to achieve the desired code for Response Modes, Set-point values, Scale factor, relays timed and Command Codes.

1, 2, 3 and 6 : When not other numbers have been entered on the display, a second function is available for these LED´s:
1 To display the Set-point 1 value or programme a new one.
2 To display the Set-point 2 value or programme a new one.
3 To display the Scale factor value or programme a new one.
6 Followed by Led ± allows the access to the TEST function

E : ENTER function. Must be used always when a code or a value is performed for record it in the memory. All codes expressed inside brackets must use this function to record them.

± : This is the toggle to change the display reading from counter A to counter B and reverse.

A : Denotes that display reading correspond to counter A.

B : Denotes that display reading correspond to counter B.

1.3.- LED INDICATORS

MINUS SIGN INDICATOR : While is switched on, the value showed on the display is negative.

AL1 - AL2 :While is switched on, the corresponding relay is activated.

PDIS : Is lighted-up only when Jumper J1 located on the upper board is closed. This means that can not be changed nor the programmed Command codes neither the operate Mode.

1.4.- REAR DESCRIPTION

CONNECTIONS

All connections, Power supply, signal inputs, Control signals and Relay Outputs are made using Push-in cable connectors. See fig. 2 for wiring connections

UPPER CONNECTIONS

One 3 way green connector for Relay Output 1. Set-point 1 is provided with a form relay C.

One 3 way green connector for Relay Output 2. Set-point 2 is provided with a form relay C.

LOWER CONNECTIONS

One 2 way orange connector for Power Supply (terminals 1 & 2).

One 5 way green connector for : Pulse inputs (terminals 5 & 6); Excitation voltage output for sensors (terminals 3 & 4) and remote RESET (terminals 7 & 3).

Channel 2 can be used also as a Control Input to inhibit the input pulses or as an **UP/DOWN** control, depending on the Response Mode programmed. See RESPONSE MODES.

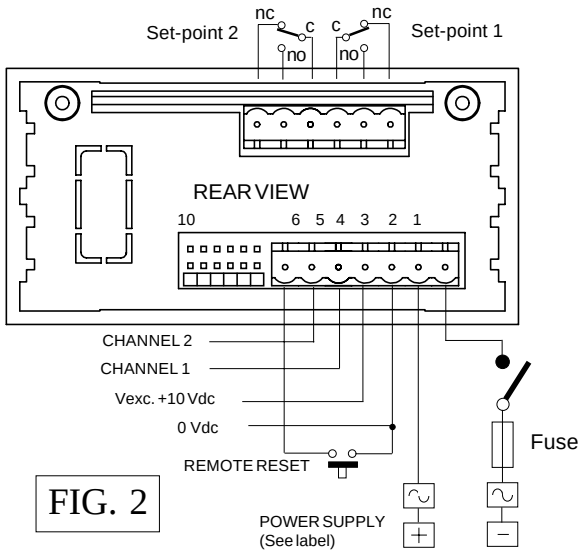


FIG. 2

2.- SENSOR INPUT CONFIGURATION AND WIRING

2.1.- SENSOR INPUT CONFIGURATION

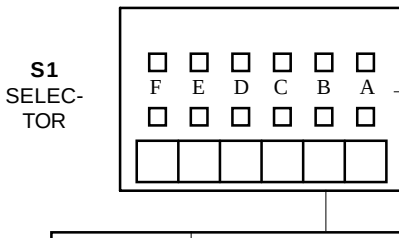
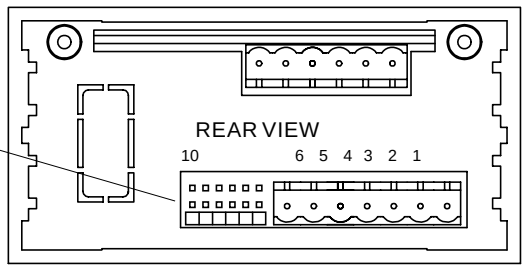


FIG. 3



SENSOR TYPE	CLOSE JUMPERS	
	CHANNEL 1	CHANNEL 2
PICK-UP	E	NOT POSSIBLE
NAMUR	D - F - B	C
NPN	D - F - A	A
PNP	D - F - A - B	A - C
mechanical closure	D - F - A	A

Select the Sensor used in each Channel,closing the Jumpers indicated on the Table.

■ = Jumper installed

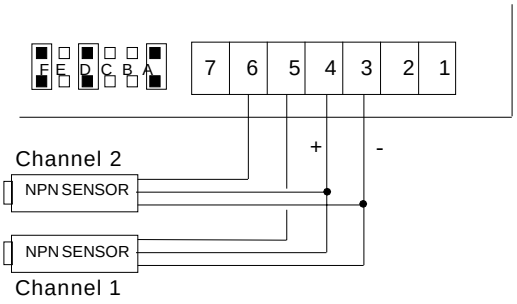
□ = Jumper NOT installed

When a sensor type NAMUR is used for Channel 1, for Channel 2 must be used also the same type.
This kind of sensor is not compatible with other types.

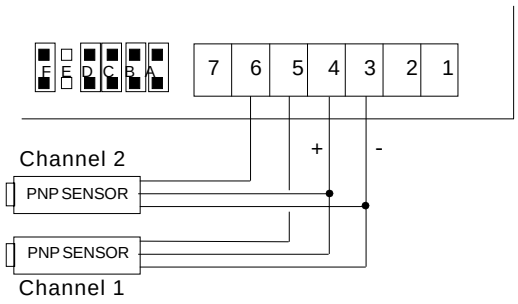
2.2.- SENSORS AND REMOTE RESET WIRING.

Connection examples for the most used sensors are indicated below.

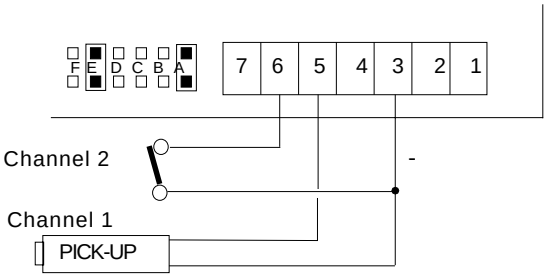
NPN sensors for both Channels



PNP sensors for both Channels

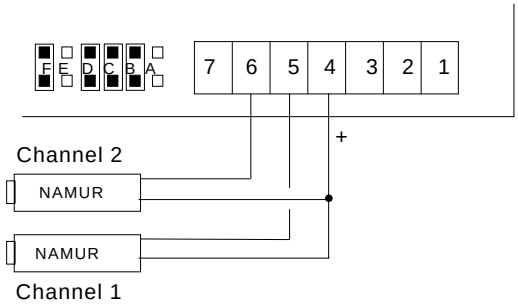


PICK-UP sensor for Channel 1
and mechanical closure for Channel 2

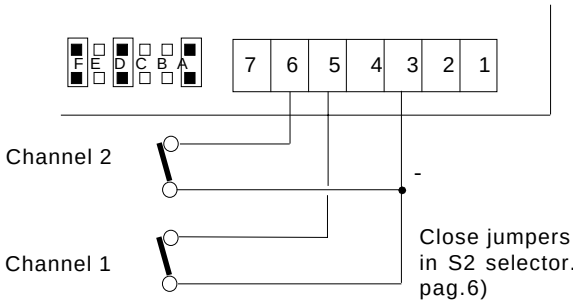


Close jumper "K" in S2 selector
(fig.4 pag.6)

NAMUR sensors for both Channels

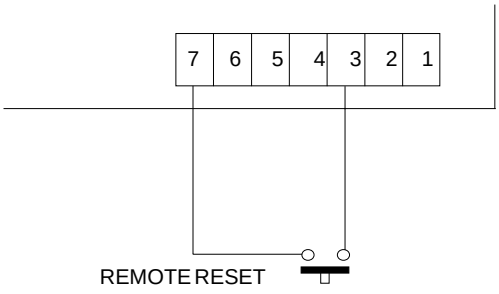


Mechanical closure for both Channels

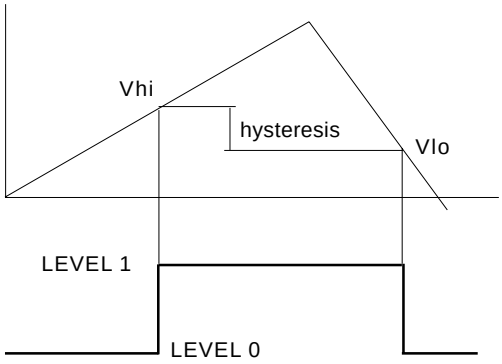


Close jumpers "J" & "K"
in S2 selector. (fig.4
pag.6)

Remote RESET wiring



2.3.- INPUT TRIGGER LEVELS SELECTION



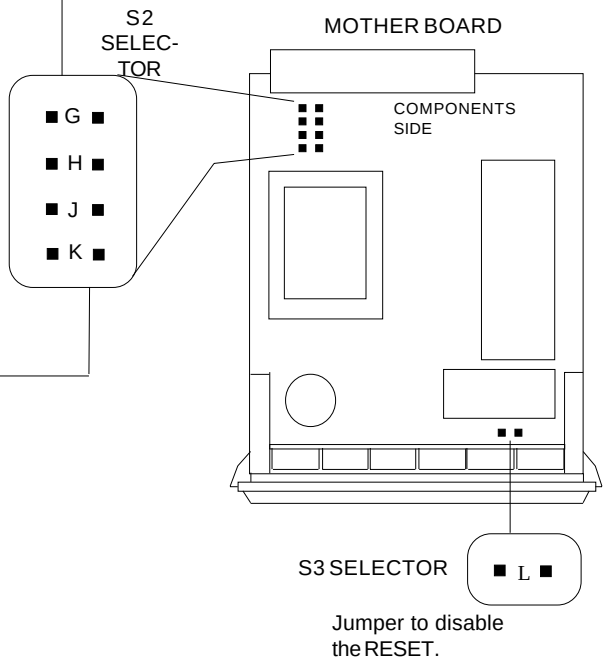
Usually the signals to be counted or to be used as signal controls are produced by electronic devices such as proximity switches, photocells, pulse generators or
mechanical closures
The electronic sensors with NPN and PNP outputs or NAMUR type can be used if the minimum output level is not lower than the indicated on table below.

	ON (Vhi)	OFF (Vlo)
LOW LEVEL	3.75	1.5
HIGH LEVEL	7.5	5.5

INPUT TRIGGER SELECTION

MINIMUM TRIGGER LEVEL Vdc	FOR : CHANNEL 1	CHANNEL 2
Low >3.75	Close H	Close G
High >7.5	------	------

FIG. 4



2.4.- FREQUENCY SIGNAL SELECTION

The unit is provided with damping capacitors for switch contact debounce. Limits count frequency to 100 Hz. maximum and input pulse widths to 5 msc. minimum.
To obtain a good protection select the adequate jumpers as indicated on table below.

FREQUENCY SELECCION

FREQUENCY INPUT	FOR : CHANNEL 1	CHANNEL 2
to 100 Hz	Close J	Close K
to 10 KHz	None	None

2.5.- FRONT PANEL RESET DISABLE

The RESET function using the push-button located on the front part, at low right corner, can be disabled opening the jumper "L" located on the mother board. See fig. 4
It can be disabled also using some Access Codes.

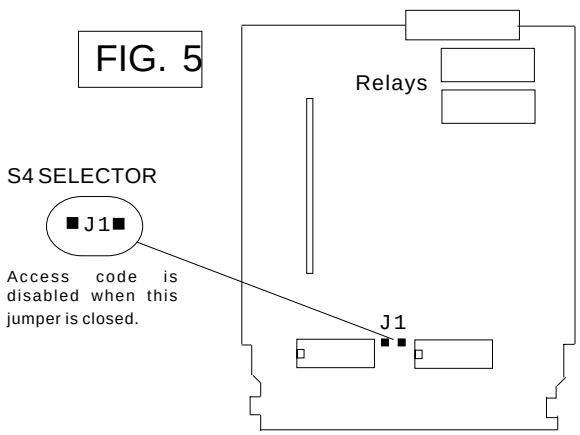
2.6.- DISABLING THE ACCESS CODE

When the programming is finished, the "ACCESS CODE" can be disabled closing the jumper "J1" located on the upper board. See fig 5.
The led "PDIS" will be ligthed up while this jumper is closed, indicating that the ACCESS CODE is disabled and only some functions could be accessible for the operator.

See OPERATOR ACCESSIBLE FUNCTIONS, code [66 X] pages 12 and 16.

UPPER BOARD (RELAYS & LED´s)

FIG. 5



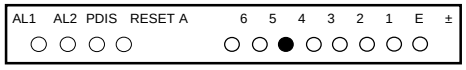
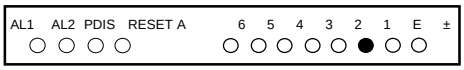
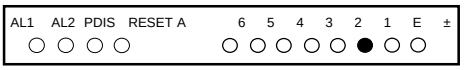
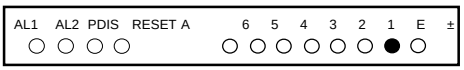
3.- PROGRAMMING PROCEDURE

3.1.- PROCEDURE FOR ACCESS CODES

1.- Open the upper lid and appears the Led's to select the numbers or functions to be introduced.
2.- Press the push-button PS the necessary times until the led corresponding to the number to be introduced (1 to 6) is ligthed up, then press the PE push-button and the number selected will appear on the left side of the display.
3.- Repeat the procedure for the second digit, the number appears at the right of the first number.
4.- Repeat the procedure for the third digit, the number will appear at the right of the display.
5.- Repeat the procedure to select the Led marked with the letter "E", and press PE.

The access codes are specified by the format : [XX X], the brackets means the ENTER function. If point 5 is forgotten then the memory does not change.
If any push-buttons are not pressed during a period of 8 sc. approximately, then the display returns to the operate mode.

EXAMPLE : enter the code for Operating Mode [41 1].

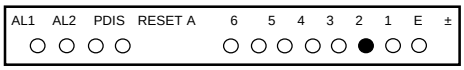
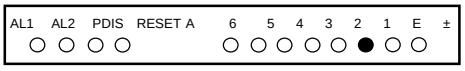
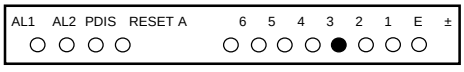
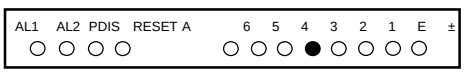
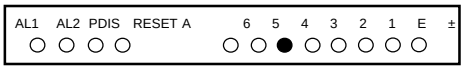
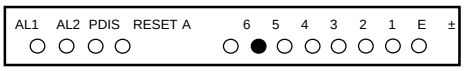
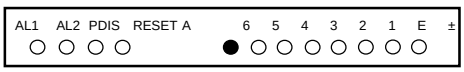
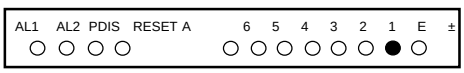
PRESS	UNTIL THE DESIRED LED IS LIGHTED-UP	PRESS	ON THE DISPLAY APPEARS
PS		**PE**	
PS		**PE**	
PS		**PE**	
PS		**PE**	DISPLAY RETURNS TO OPERATING MODE

3.2.- PROCEDURE FOR ENTER A NEW SET-POINT VALUE

On this procedure the LEDS's marked 1 to 6, correspond to the position of the digit on the display beginning for the right side. The LED marked 1 correspond to the digit located on the right part of the display (the least significant digit). Proceed as follows :

1.- Select using the push-button PS the LED marked 1 or 2, the corresponding value of the Set-point appears on the display and press the PE push-button..
2.- Select using the PS push-button the LED corresponding to the digit to be changed and press the PE push-button, the digit increases one count each time the PE push-button is pressed or keep pressed and the digit start to count up until appears the number desired. Repeat this point for the digits until the new value is completed on the display.
3.- Select using the PS push-button the LED marked E and press the PE push-button, the new value is entered in the memory and the unit returns to the operating mode.

EXAMPLE : Programming of the number 1364,56 as a new value of the Set-point 1. The decimal point has its own codes, therefore it will be programmed independently.

PRESS	UNTIL THE DESIRED LED IS LIGHTED-UP	PRESS	ON THE DISPLAY APPEARS
PS		**PE** (The actual value)	
PS		**PE** Until number 6 appears	
PS		**PE** Until number 5 appears	
PS		**PE** Until number 4 appears	
PS		**PE** Until number 6 appears	
PS		**PE** Until number 3 appears	
PS		**PE** Until number 1 appears	
PS		**PE**	DISPLAY RETURNS TO OPERATING MODE

3.3.- PROGRAMMING THE RELAYS TIMED

The procedure is similar to the explained on paragraphs 3.1 and 3.2. Enter the adequate Access Code (53 or 55) then the actual time value appears on the display. At this point the time value would be modified. (See paragraph 3.2).

RELAY FOR SET-POINT 1

[53] Available only when Access Code [52 5] is programmed.

RELAY FOR SET-POINT 2

[55] Available only when Access Code [54 5] is programmed.

It is the time during which the relay is activated. The value can be programmed from 0,01 sc. to 599,99 sc.
The decimal point is fixed and its position can not be modified.

PRESS	UNTIL THE DESIRED LED IS LIGHTED-UP	PRESS	ON THE DISPLAY APPEARS
PS	AL1 AL2 PDIS RESET A 6 5 4 3 2 1 E ±	**PE**	5
PS	AL1 AL2 PDIS RESET A 6 5 4 3 2 1 E ±	**PE**	53
			DISPLAY SHOWS THE ACTUAL TIME

From this point follow out with the procedure indicated on paragraph 3.2

3.4.- PROCEDURE FOR A NEW SCALE FACTOR

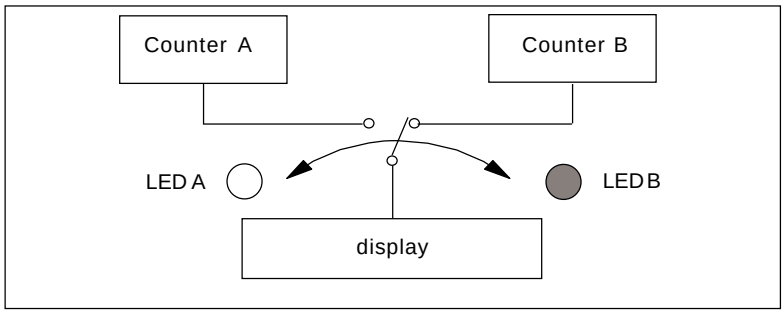
[3] This is the Access Code for the Scale Factor, select the LED marked with the number 3 using the PS push-button and then press the PE push-button and the actual Scale Factor value appears on the display. The Scale Factor has 5 digits maximum and can be programmed from -5.9999 to 5.9999. (Positive only for Rate Scale Factor).The decimal point is fixed and its position can not be modified.
The Set-up factory value is 1.0000
To enter the Access Code and programme the new Scale Factor value, use the same procedure indicated on paragraphs 3.1 and 3.2.
The Scale Factor can be programmed independently for counter A or counter B and the new value is automatically assigned to the counter displayed.
Remember that for change the display reading from counter A to counter B or reverse, is necessary select the LED marked ± and press the PE push-button.

3.5.- DISPLAY TEST

[6 ±] When this code is entered using the procedure indicated on paragraph 3.1, the unit start the self-test which allows the user check if all the segments of the digits are operative. It can be performed at any time and not interferes with the normal counter operation.
For start the self-test proceed as follows.
When the code [6±] is entered, the number displayed disappears and the display starts the first step of the self-test. All the decimal points are displayed, then the 9's, then the 8's, etc.. until 0's are shown.
The second step starts displaying number 010101 together with the negative LED, then 212121, followed by 232323 etc.. until 898989 is shown.
After a few seconds the display returns to the operating mode

3.6.- CHANGING THE DISPLAY FROM COUNTER A TO COUNTER B AND REVERSE

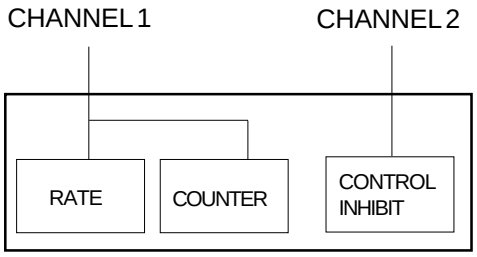
[±] Select the LED marked ± using the PS push-button and each time that the PE push-button is pressed the value displayed change from Counter A value to Counter B value or reverse.
When counter A value is displayed then the LED marked A is lighted.
When counter B value is displayed then the LED marked B is lighted.



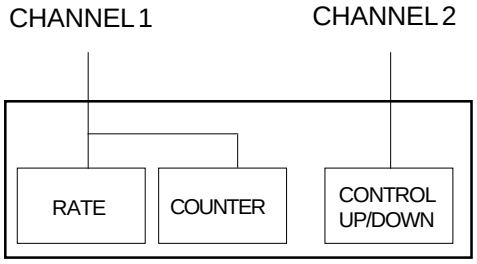
4.- OPERATING MODE 1, code [41 1]

RATE / COUNTER

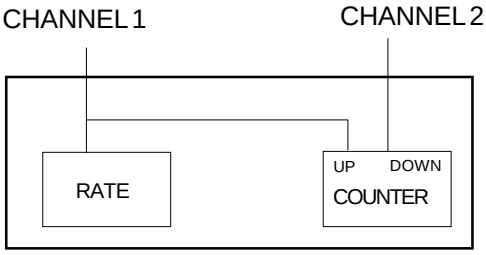
RESPONSE MODES



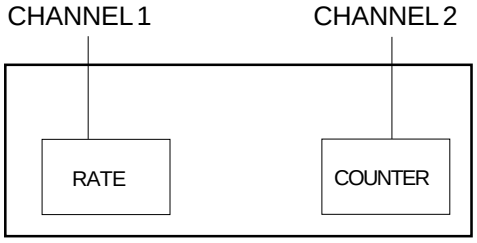
ACCESS CODE [43 1]



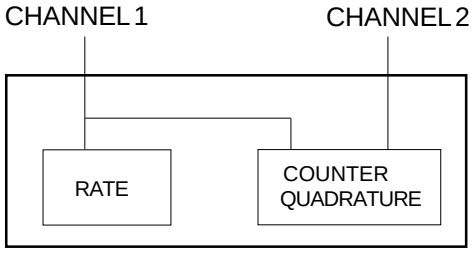
[43 2]



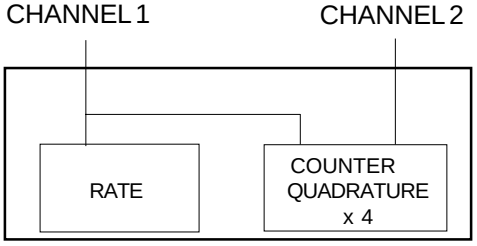
[43 3]



[43 4]

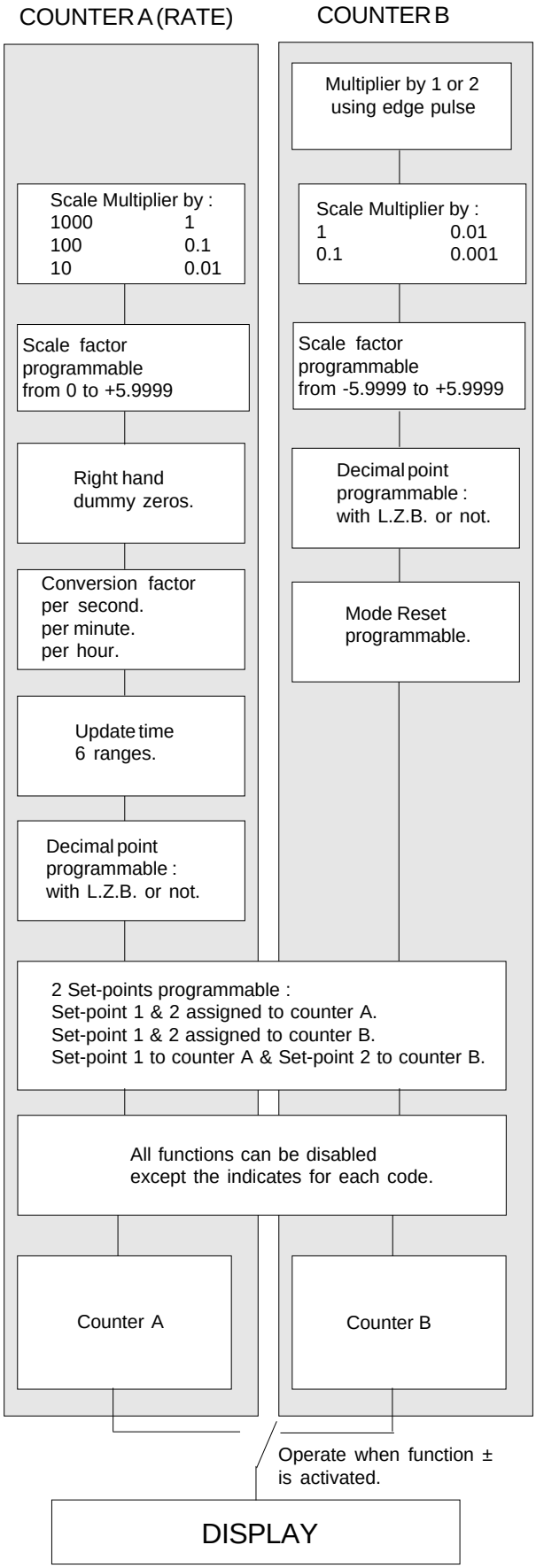


[43 5]



[43 6]

PROGRAMMABLE FUNCTIONS



4.1.- PERSONALIZING THE UNIT

This chapter describes the codes to programme the different possibilities of the unit, explaining all the different Operating Mode, Response Mode and Access Code.
To enter the codes follow the procedure explained on paragraph 3.1.

4.1.1.- CONFIGURATE THE UNIT

[41 1] This code configures the unit as follows : Instrument A as a RATE and Instrument B as a COUNTER.
[41 -1] Load the Set-up factory codes. (See page 18).

4.1.2.- MANUAL RESET ACTUATION :

The RESET function using the front push-button or the remote RESET can be programmed as follows :

[42 1] Reset the relay output assigned to counter A (RATE).
[42 2] Reset the relay output assigned to counter B and the count value.
[42 3] The two foregoing codes simultaneously.

4.1.3.- RESPONSE MODES

[43 1] Pulses per channel 1 to both counters, A and B. Channel 2 operates as Inhibit control for counter B when it is connected to positive or negative, depending on if it was selected previously as PNP or NPN status (see figure 3).
[43 2] Pulses per channel 1 to both counters, A and B. Channel 2 operates as UP/DOWN control for counter B. When it is connected to positive or negative, depending on if it was selected previously as PNP or NPN status (see figure 3), then counter B will count down.
[43 3] Pulses per channel 1 add to counter A and B. Pulses per Channel 2 subtract in counter B.
The pulses by both channels can be simultaneously.
[43 4] Separate channels. Pulses per channel 1 to counter A (RATE) and pulses per channel 2 to counter B.
[43 5] Pulses per channel 1 to both counters, A and B. Channel 2 is quadrature for counter B.
[43 6] Pulses per channel 1 to both counters, A and B. Channel 2 is quadrature multiplied by 4 for counter B.

For best understanding see diagrams for Response Mode on page 9

4.1.4.- COUNT EDGES. Cannot be programmed if code [43 6] is programmed. (Available only for Counter function not for Rate function)

[44 1] Count on falling edge of pulse input (x1).
[44 2] Count on both edges of pulse input (x2).

4.2.- SET-POINTS. Relay outputs assignment, operating and timed programming.

4.2.1.- RELAYS Outputs Assignment

[51 1] Relay output 1 assigned to counter A (RATE). Relay output 2 assigned to counter B.
[51 2] Relay output 1 and relay output 2 assigned to counter B.
[51 3] Relay output 1 and relay output 2 assigned to counter A (RATE). Code [56 1] is automatically programmed. See paragraph 4.3.3.

4.2.2.- SET-POINT 1 Operating mode

Relay output normally OFF and turns ON at Set-point 1 preset. Will return OFF (see the action indicated for each code) :

[52 1] When Relay output 2 turns ON.
Only if [51 2] is programmed.
[52 2] When Relay output 2 turns OFF.
Only if [51 2] is programmed.
[52 3] When Manual reset starts.
(Using front push-button).
[52 4] When Manual reset end.
** (Using front push-button).
[52 5] When terminate the timed output.
Only if [53] is programmed.
[52 6] When count value is lower than the preset value
for Set-point 1.

Relay output normally ON and turns OFF at Set-point 1 preset. Will return ON (see the action indicated for each code) :

[52 -1] When Relay output 2 turns ON.
Only if [51 2] is programmed.
[52 -2] When Relay output 2 turns OFF.
Only if [51 2] is programmed.
[52 -3] When Manual reset starts.
(Using front push-button).
[52 -4] When Manual reset end.
(Using front push-button).
** [52 -5] When terminate the timed output.
Only if [53] is programmed.
[52 -6] When count value is higher than the preset value for Set-point 1.

** When codes [51 1] or [51 2] are programmed, then the relay output 1 turns ON when the count value for counter A (rate) or count value for counter B is higher than the preset value.
When code [51 3] is programmed, then the relay output 1 turns ON when the count value for counter A (rate value) is lower than the preset value.

4.2.3.- SET-POINT 2, Operating mode

Relay output normally OFF and turns ON at Set-point 2 preset. Will return OFF (see the action indicated for each code) :

[54 1] When Relay output 1 turns ON.
Only if [51 2] is programmed.
[54 2] When Relay output 1 turns OFF.
Only if [51 2] is programmed.
[54 3] When Manual reset starts.
(Using front push-button).
[54 4] When Manual reset end.
** (Using front push-button).
[54 5] When terminate the timed output.
Only if [55] is programmed.
[54 6] When count value is lower than the preset value for Set-point 2.

Relay output normally ON and turns OFF at Set-point 2 preset. Will return ON . (see the action indicated for each code) :

[54 -1] When Relay output 1 turns ON.
Only if [51 2] is programmed.
[54 -2] When Relay output 1 turns OFF.
Only if [51 2] is programmed.
[54 -3] When Manual reset starts.
(Using front push-button).
[54 -4] When Manual reset end.
(Using front push-button).
** [54 -5] When terminate the timed output.
Only if [55] is programmed.
[54 -6] When count value is higher than the preset value for Set-point 2.

** The relay output 2 is ON when the count value for counter A (rate) or counter B is higher than the preset value.
When Access Code [54 ±6] is entered, then the Access Codes [56 1] for Reset operating is automatically programmed if [51 1 or 2] are programmed.

4.3.- COUNTER B (COUNTER), PROGRAMMING

4.3.1.- SCALE MULTIPLIER

[45 1] x 1
[45 2] x 0.1
[45 3] x 0.01
[45 4] x 0.001

4.3.2.- DECIMAL POINT AND LEAD ZERO BLANKING

There is a code for each decimal point position with zero blanking or not.

[46 1]	0		[46 -1]	000000	
[46 2]	0.0		[46 -2]	00000.0	
[46 3]	0.00	ZERO BLANKING	[46 -3]	0000.00	ZERO BLANKING
[46 4]	0.000	ENABLED	[46 -4]	000.000	DISABLED
[46 5]	0.0000		[46 -5]	00.0000	
[46 6]	0.00000		[46 -6]	0.00000	

4.3.3.- RESET Operating mode

Manual Reset using the front push-button or remote Reset can be done at any moment and display will hold at reset as long as the front or remote Reset are still activated.

Manual Reset using the front push-button or remote Reset are for momentary actuation and counter stars to count even front or remote Reset are still activated.

[56 1] . . . . . Reset to zero (automatically programmed when [54 -6] is programmed) . . . . . [56 -1]
[56 2] . . . . . Load the Set-point 2 preset on display, count down and relay output 2 turns ON at 0 crossing. . . . . [56 -2]
[56 3] . . . . . Reset to zero automatically when timed relay output 2 is finished . . . . . [56 -3]
Only if [54 5] is programmed.
[56 4] . . . . . Load the Set-point 2 preset on display when timed relay output 2 is finished . . . . . [56 -4]
Only if [54 5] is programmed.
[56 5] . . . . . Reset to zero when relay output 2 turns ON . . . . . [56 -5]
[56 6] . . . . . Load the Set-point 2 preset at zero crossing. . . . . [56 -6]

4.4.- COUNTER A (RATE), PROGRAMMING

4.4.1.- RIGHT HAND DUMMY ZEROS

[61 1] 1 Dummy zero (XXXXX0)
[61 2] 2 Dummy zeros (XXXX00)
[61 3] 3 Dummy zeros (XXX000)
[61 4] No dummy zeros (XXXXXX)

This function can be used to avoid the non stable readings when signal input is unstable.

4.4.2.- CONVERSION FACTOR

[62 1] Rate per second (x 1)
[62 2] Rate per minute (x 60)
[62 3] Rate per hour (x 3600)

The reading corresponds to the input frequency multiplied by indicated time. This function can be used when is used the same Scale Factor for counter and rate.

4.4.3.- UPDATE TIME

[63 1]	Min.= 0.5 sc.	Max. = 1 sc.
[63 2]	Min.= 1 sc.	Max. = 2 sc.
[63 3]	Min.= 2 sc.	Max. = 4 sc.
[63 4]	Min.= 4 sc.	Max. = 8 sc.
[63 5]	Min.= 8 sc.	Max. =16 sc. with maximum input frequency = 7,500 Hz.
[63 6]	Min.= 16 sc.	Max. =32 sc. with maximum input frequency = 3,250 Hz.

4.4.4.- SCALE MULTIPLIER

[64 1]	x 1000
[64 2]	x 100
[64 3]	x 10
[64 4]	x 1
[64 5]	x 0.1
[64 6]	x 0.01

4.4.5.- DECIMAL POINT AND LEAD ZERO BLANKING

There is a code for each decimal point position with zero blanking or not.

[65 1]	0		[65 -1]	000000	
[65 2]	0.0		[65 -2]	00000.0	
[65 3]	0.00	ZERO BLANKING	[65 -3]	0000.00	ZERO BLANKING
[65 4]	0.000	ENABLED	[65 -4]	000.000	DISABLED
[65 5]	0.0000		[65 -5]	00.0000	
[65 6]	0.00000		[65 -6]	0.00000	

4.5.- OPERATOR ACCESSIBLE FUNCTIONS

After the programming disabled had been selected placing the "J1" Jumper, the operator can have some accessible access codes entering one of the following codes before to install the jumper. See paragraph 2.6 on page 6.

Allows the operator the Remote and Front RESET function and besides the specified on the code.		Only the specified function on the code is allowed.
[66 1]	Not other functions are allowed.	[66 -1]
[66 2]	Preset Set-points .	[66 -2]
[66 3]	Scale Factor .	[66 -3]
[66 4]	Scale Factor and preset Set-points .	[66 -4]
[66 5]	Preset Set-points and load a value on the display.	[66 -5]
[66 6]	Preset Set-points, Scale Factor and load a value on the display.	[66 -6]

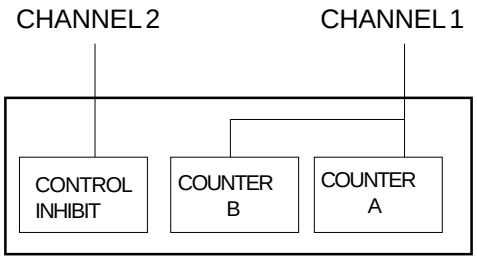
4.6.- MAXIMUM INPUT FREQUENCY : RATE (A) / COUNTER (B)

RESPONSE MODE PROGRAMMED	COUNTING MODE PROGRAMMED [44 1]	[44 2]	[43 6]
Uni or Bi-direccional (Access Codes [43 1] & [43 2])	10 KHz	5 KHz	
Up/Down (Access Code [43 3])	4 KHz	2.5 KHz	
Separate inputs (Access Code [43 4])	8 KHz	4 KHz	
Quadrature (Access Codes [43 5] & [43 6])	5 KHz	4.5 KHz	2.5 KHz

5.- OPERATING MODE 2, code [41 2]

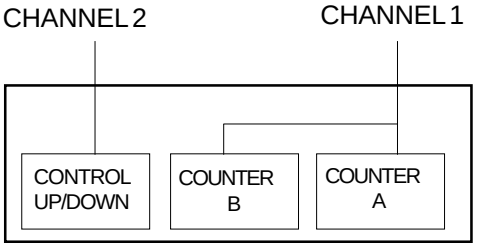
COUNTER / COUNTER

RESPONSE MODES

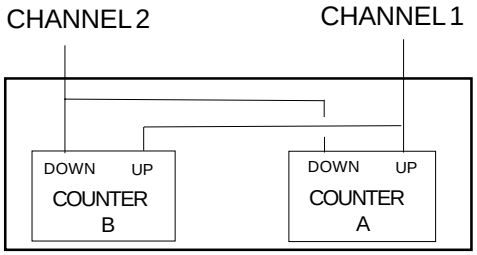


ACCESS CODE

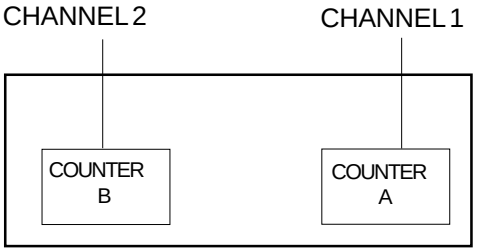
[43 1]



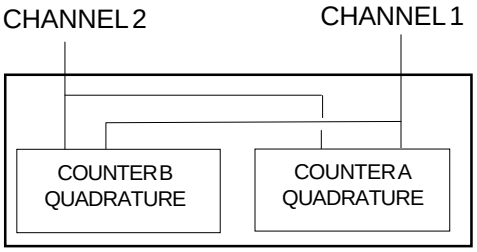
[43 2]



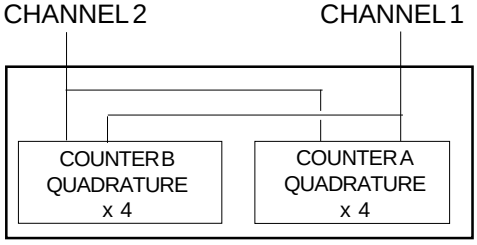
[43 3]



[43 4]

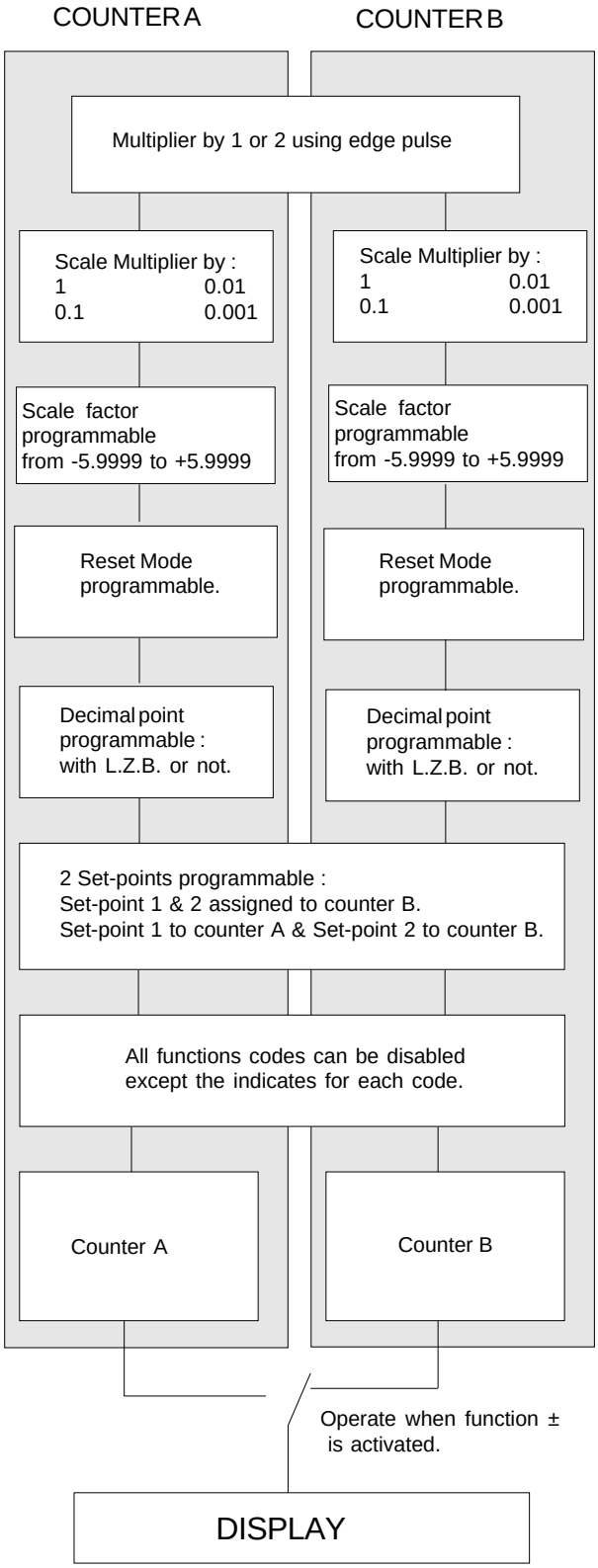


[43 5]



[43 6]

PROGRAMMABLE FUNCTIONS



5.1.- PERSONALIZING THE UNIT

This chapter describes the codes to programme the different possibilities of the unit, explaining all the different Operating Mode, Response Mode and Access Code.
To enter the codes follow the procedure explained on paragraph 3.1.

5.1.1.- CONFIGURATE THE UNIT

[41 2] This code configures the unit as follows : Instrument A as a COUNTER and Instrument B as a COUNTER.
[41 -1] Load the Set-up factory codes. (See page 18).

5.1.2.- MANUAL RESET ACTUATION

The RESET function using the front push-button or the remote RESET can be programmed as follows :

[42 1] Reset the relay output assigned to counter A and the count value.
[42 2] Reset the relay output assigned to counter B and the count value.
[42 3] The two foregoing codes simultaneously.

5.1.3.- RESPONSE MODES

[43 1] Pulses per channel 1 to both counters, A and B. Channel 2 operates as the Inhibit control when it is connected to positive or negative, depending on if it was selected previously as PNP or NPN status (see figure 3).
[43 2] Pulses per channel 1 to both counters, A and B. Channel 2 operate as UP/DOWN control. When it is connected to positive or negative, depending on if it was selected previously as PNP or NPN status (see figure 3), then will count down.
[43 3] Pulses per channel 1 add and pulses per channel 2 subtract in both counters. The pulses by both channels can be simultaneously
[43 4] Separate channels. Pulses per channel 1 to counter A and pulses per channel 2 to counter B.
[43 5] Quadrature counting for both counters.
[43 6] Quadrature counting for both counters multiplied by 4.

For best understanding see diagrams for Response Mode on page 13

5.1.4.- COUNT EDGES. Cannot be programmed if code [43 6] is programmed. (Available for both input Channels)

[44 1] Count on falling edge of pulse input (x1).
[44 2] Count on both edges of pulse input (x2).

5.2.- SET-POINTS. Relay outputs assignment, operating and timed programming.

5.2.1.- RELAYS, Outputs Assignment

[51 1] Relay output 1 assigned to counter A. Relay output 2 assigned to counter B.
[51 2] Relay output 1 and relay output 2 assigned to counter B. Code [61 1] for Reset mode is automatically programmed.

5.2.2.- SET-POINT 1, Operating mode

Relay output normally OFF and turns ON at Set-point 1 preset. Will return OFF (See the action indicated for each code) :

[52 1] When Relay output 2 turns ON. Only if [51 2] is programmed.
[52 2] When Relay output 2 turns OFF. Only if [51 2] is programmed.
[52 3] When Manual reset starts. (Using front push-button).
[52 4] When Manual reset end. (Using front push-button).
[52 5] When terminate the timed output. Only if [53] is programmed.
[52 6] When count value is lower than the preset value for Set-point 1.

Relay output normally ON and turns OFF at Set-point 1 preset. Will return ON (See the action indicated for each code) :

[52 -1] When Relay output 2 turns ON. Only if [51 2] is programmed.
[52 -2] When Relay output 2 turns OFF. Only if [51 2] is programmed.
[52 -3] When Manual reset starts. (Using front push-button).
[52 -4] When Manual reset end. (Using front push-button).
[52 -5] When terminate the timed output. Only if [53] is programmed.
[52 -6] When count value is higher than the preset value for Set-point 1.

Code [52 ±6] automatically programme the code [61 ±1] if code [51 1] had been programmed.

5.2.3.- SET-POINT 2. Operating mode.

Relay output normally OFF and turns ON at Set-point 2 preset. Will return OFF (See the action indicated for each code) :

[54 1] When Relay output 1 turns ON.
Only if [51 2] is programmed.
[54 2] When Relay output 1 turns OFF.
Only if [51 2] is programmed.
[54 3] When Manual reset starts.
(Using front push-button).
[54 4] When Manual reset end.
(Using front push-button).
[54 5] When terminate the timed output.
Only if [55] is programmed.
[54 6] When count value is lower than the preset value for Set-point 2.

Code [54 ±6] automatically programme the code [56 ±1].

Relay output normally ON and turns OFF at Set-point 2 preset. Will return ON (See the action indicated for each code) :

[54 -1] When Relay output 1 turns ON.
Only if [51 2] is programmed.
[54 -2] When Relay output 1 turns OFF.
Only if [51 2] is programmed.
[54 -3] When Manual reset starts.
(Using front push-button).
[54 -4] When Manual reset end.
(Using front push-button).
[54 -5] When terminate the timed output.
Only if [55] is programmed.
[54 -6] When count value is higher than the preset value for Set-point 2.

5.3.- COUNTER B. PROGRAMMING

5.3.1.- SCALE MULTIPLIER

[45 1] x 1 [45 2] x 0.1 [45 3] x 0.01 [45 4] x 0.001

5.3.2.- DECIMAL POINT AND LEAD ZERO BLANKING

There is a code for each decimal point position with zero blanking or not.

[46 1]	0		[46 -1]	000000	
[46 2]	0.0		[46 -2]	00000.0	
[46 3]	0.00	ZERO BLANKIG	[46 -3]	0000.00	ZERO BLANKIG
[46 4]	0.000	ENABLED	[46 -4]	000.000	DISABLED
[46 5]	0.0000		[46 -5]	00.0000	
[46 6]	0.00000		[46 -6]	0.00000	

5.3.3.- RESET Operating mode

Manual RESET using the front push-button or remote reset can be done are at any moment and display will hold at reset as long as the front or remote the Reset are still activated.

Manual RESET using the front push-button or remote reset for momentary actuation and counter stars to count even front or remote Reset are still activated.

[56 1] . . . . . RESET to zero (automatically programmed when [54 ±6] is programmed) . . . . . [56 -1]
[56 2] . . . . . Load the Set-point 2 preset on display, count down and relay output 2 turns ON at 0 crossing. [56 -2]
[56 3] . . . . . Reset to zero automatically when timed relay output 2 is finished. . . . . [56 -3]
Only if [54 5] is programmed.
[56 4] . . . . . Load the Set-point 2 preset on display when timed relay output 2 is finished . . . . . [56 -4]
Only if [54 5] is programmed.
[56 5] . . . . . Reset to zero when relay output 2 turns ON . . . . . [56 -5]
[56 6] . . . . . Load the Set-point 2 preset at zero crossing. . . . . [56 -6]

5.4.- COUNTER A, PROGRAMMING

5.4.1.- RESET Operating mode

Manual RESET using the front push-button or remote reset can be done are at any moment and display will hold at reset as long as the front or remote the Reset are still activated.

Manual RESET using the front push-button or remote reset for momentary actuation and counter stars to count even front or remote Reset are still activated.

[61 1] . . . . . RESET to zero (automatically programmed when [54 ±6] is programmed) . . . . . [61 -1]
[61 2] . . . . . Load the Set-point 1 preset on display, count down and relay output 1 turns ON at 0 crossing. [61 -2]
[61 3] . . . . . Reset to zero automatically when timed relay output 1 is finished . . . . . [61 -3]
Only if [54 5] is programmed.
[61 4] . . . . . Load the Set-point 1 preset on display when timed relay output 1 is finished . . . . . [61 -4]
Only if [54 5] is programmed.
[61 5] . . . . . Reset to zero when relay output 1 turns ON . . . . . [61 -5]
[61 6] . . . . . Load the Set-point 1 preset at zero crossing. . . . . [61 -6]

5.4.2.- SCALE MULTIPLIER

[64 1] x 1
[64 2] x 0.1
[64 3] x 0.01
[64 4] x 0.001

5.4.3.- DECIMAL POINT AND LEAD ZERO BLANKING

There is a code for each decimal point position with zero blanking or not.

[65 1]	0		[65 -1]	000000	
[65 2]	0.0		[65 -2]	00000.0	
[65 3]	0.00	ZERO BLANKING	[65 -3]	0000.00	ZERO BLANKING
[65 4]	0.000	ENABLED	[65 -4]	000.000	DISABLED
[65 5]	0.0000		[65 -5]	00.0000	
[65 6]	0.00000		[65 -6]	0.00000	

5.5.- OPERATOR ACCESSIBLE FUNCTIONS

After the programming disabled had been selected placing the "J1" Jumper, the operator can have some accessible access codes entering one of the following codes before to install the jumper. See paragraph 2.6 on page 6.

Allows the operator the Remote and Front RESET function and besides the specified on the code.

Only the specified function on the code is allowed.

[66 1]	Not other functions are allowed.	[66 -1]	
[66 2]	Preset Set-points .	[66 -2]	
[66 3]	Scale Factor .	[66 -3]	
[66 4]	Scale Factor and preset Set-points .	[66 -4]	
[66 5]	Preset Set-points and load a value on the display.	[66 -5]	
[66 6]	Preset Set-points, Scale Factor and load a value on the display.	[66 -6]	

5.6.- MAXIMUM INPUT FREQUENCY : COUNTER (A) / COUNTER (B)

RESPONSE MODE PROGRAMMED	COUNTING MODE PROGRAMMED		
	[44 1]	[44 2]	[43 6]
Uni or Bi-direccional (Access Codes [43 1] & [43 2])	9 KHz	4.5 KHz	
Up/Down (Access Code [43 3])	5 KHz	2.5 KHz	
Separate inputs (Access Code [43 4])	7.5 KHz	3.5 KHz	
Quadrature (Access Codes [43 5] & [43 6])	4.5 KHz	4 KHz	2.5 KHz

6.- GENERAL SPECIFICATIONS

6.1.- ELECTRICAL

DISPLAY . . . . . 6 digits, Led 7 segments
HEIGHT DIGIT . . . . . 14.2 mm. (0.56").
SYMBOLS . . . . . -999999 to 999999
DECIMAL POINT . . . . . Programmable position.

SIGNAL INPUTS . . . . . Jumper selectable (see fig. 2).

TTL, CMOS, PNP, NPN,
NAMUR, Switches: Max. Input Voltage +28 Vdc.

PICK-UP (Channel 1 only) : Sensitivity : 150 mV peak.
Hysteresis: . . . . . 100 mV.
Input Impedance: . . . . . 26.5 KΩ at 60 Hz.
Max. Input Voltage : . . . ±50 Vpp.

FREQUENCY INPUT

MAXIMUM . . . . . For both counters 10 KHz. (50 µs) or 100 Hz. (5 ms). Jumper Selectable (see fig. 4).
MINIMUM. . . . . 0.03 Hz. (for RATE counter only).
Accuracy & Repeatability : +0.012%. (for RATE counter only).

RESET . . . . . 1- Remote by the rear terminals. (fig. 2).

2- Front push-button, (to desactivate open Jumper **L** in S3 Selector).

3- By programme.

PROGRAMMING
DISABLE . . . . . Programming can be disabled using the
. . . . . Jumper **J1** in S4 Selector (See fig. 5).

INPUT LEVEL . . . . . Vmin = 1.5 Vdc, Vmax = 3.75 Vdc.
Vmin = 5.5 Vdc, Vmax = 7.5 Vdc.
Jumper selectable (fig. 4).

EXCITATION VOLTAGE
OUTPUT . . . . . +10 Vdc. @ 50 mA. max.

MEMORY TYPE . . . . . E^2 Prom non volatile.
CYCLES ON/OFF. . . . 100.000 min.
RETENTION TIME . . . . 10 years min..

RELAY OUTPUT TYPE. . .One form C contact for each Set-point rated at 3 Amps @ 250 Vac or 30 Vdc with resistive load.

POWER SUPPLY . . . . . 230 Vac ± 10 % 50/60 Hz
(Optional 12 Vdc. not isolated).
CONSUMPTION . . . . . 3 VA. @ 230 Vac.

RECOMMENDED FUSE . . . 50 mA for 230 Vac.
100 mA for 115 Vac.

6.2.- MECHANICAL

CONNECTIONS . . . . . Push-in cable connectors.
WIRE CROSS SECTION . . 2.5 mm^2 max. Recommended 1 mm^2 .
CASE MATERIAL . . . . . ABS, DIN 43700, black colour.
WEIGHT . . . . . 310 g. (0.68 lb).
BURN-IN . . . . . 48 h.

6.3.- ENVIRONMENTAL

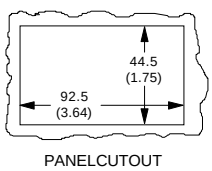
TEMPERATURE
OPERATING . . . . . 0 to +50 ºC. (32 to 122°F)
STORAGE . . . . . -40 to +70 ºC. (-46 to 160 °F)
RELATIVE HUMIDITY. . 90 % at 40°C not condensed.

7.- ERROR MESSAGES

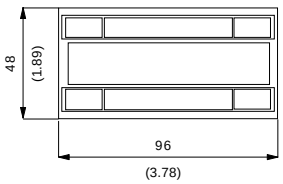
Under deteminated circumstances two different error messages can be displayed caused because the microprocessor has detected an error and programming is disabled. When these messages are displayed proceed as follows, if the problem is still producing the error, the unit must be returned to the Service for repair.

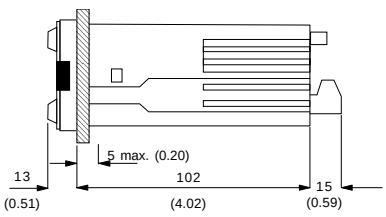
ON DISPLAY	POSSIBLE CAUSE	SOLUTION
Letter P	Data error on power-up.	Select E press PE and check all codes.
Letter E	Data error detected by microprocessor.	Select E press PE and check all codes. Check signal wires for possible noise sources.

8.- MECHANICAL DIMENSIONS. mm. (in)



PANELCUTOUT





9.- FAST GUIDE FOR ACCESS CODES

ACCESS CODE	MODE 1	PAGE.	MODE 2	PAGE.
[41 1]	Configuration for MODE 1	10		
[41 2]			Configuration code for MODE 2	14
[42 X]	RESET actuation	10	RESET actuation	14
[43 X]	Response mode	10	Response mode	14
[44 X]	Count edges	10	Count edges	14
[45 X]	Counter, Scale Multiplier	11	Counter B , Scale Multiplier	15
[46 X]	Counter, Decimal Point & Lead Zero Blanking	11	Counter B, Decimal Point & Lead Zero Blanking	15
[51 X]	Relay outputs assignment	10	Relay outputs assignment	14
[52 X]	Set-point 1 operating	10	Set-point 1, operating mode	14
[53]	Timed relay output 1	8	Timed relay output 1	8
[54 X]	Set-point 2 operating mode	11	Set-point 2 operating mode	15
[55]	Timed relay output 1	8	Timed relay output 2	8
[56 X]	RESET operating mode	11	Counter B, RESET operating mode	15
[61 X]	Rate, Right Hand Dummy Zeros	11	Counter A, RESET operating mode	15
[62 X]	Rate, Conversion Factor	11		
[63 X]	Rate, Time Base	12		
[64 X]	Rate, scale multiplier	12	Counter A, scale multiplier	16
[65 X]	Rate, Decimal Point & Lead Zero Blanking	12	Counter A, Rate Decimal Point & Lead Zero Blanking	16
[66 X]	Operator Accessible Functions	12	Operator Accessible Functions	16
1	Set-point 1, preset	7	Set-point 1, preset	7
2	Set-point 2, preset	7	Set-point 1, preset	7
3	Scale factor, preset	8	Scale factor, preset	8

10.- FACTORY SET-UP PROGRAMMING

Entering Access Code [41 -1] the unit is automatically reprogrammed with the following Access Codes for each Operating Mode

Code	MODE 1 (Counter / Rate) Function	Code	MODE 2 (Counter / Counter) Function
[42 3]	: Reset actuation.	[42 3]	: Reset actuation.
[43 1]	: Counter with Inhibit.	[43 1]	: Counter with Inhibit control.
[44 1]	: Single edge count.	[44 1]	: Single edge count.
[45 1]	: Counter B, multiplier preset 1.	[45 1]	: Counter B, multiplier preset at 1.
[46 1]	: Lead zero blanking for counter B.	[46 1]	: Counter B, lead zero blanking and no decimal point.
[51 2]	: Relay outputs 1 & 2 assigned to counter B.	[51 2]	: Relay outputs 1 & 2 assigned to counter B.
[52 3]	: Set-point 1 operating.	[52 3]	: Set-point 1 operating.
[54 3]	: Set-point 2 operating.	[54 3]	: Set-point 2 operating..
[56 1]	: Manual Reset for counter B.	[56 1]	: Manual Reset for counter B.
[61 4]	: Lead zero blanking for counter A (Rate).	[61 1]	: Manual Reset for counter A.
[62 1]	: Rate Conversion Factor.	[64 1]	: Counter A, multiplier preset at 1.
[63 1]	: Time Base for Rate, preset at 0,5 sc.	[65 1]	: Counter A, lead zero blanking and no decimal point.
[64 4]	: Rate multiplier preset at 1.	[66 1]	: Functions disabled except RESET.
[65 1]	: Rate, lead zero blanking and no decimal point.		
[66 1]	: Functions disabled except RESET.		

Set-point 1 preset at : 500
Set-point 2 preset at : 1000
Scale Factor preset at: 1.0000
Relay outputs timed preset at : 0.1 sc. Access Codes [53] and [55]

11 .- FUNCTIONS, FAST GUIDE

11.1.- FUNCTIONS OF EVERY COUNTER FOR EVERY OPERATING MODE

Herewith are indicated the functions and programmable parameters available for every counter in every operating mode using the Access codes

	MODE 1		MODE 2	
	Counter B	Rate A	Counter B	Counter A
Response Mode (6 options)	x	x	x	x
Front or remote RESET for : Only relay output	x	x	x	x
Only count	x		x	x
RESET operating	x		x	x
Multiplier / divider	x	x	x	x
Multiplier by 2	x		x	x
Scale factor	x	x	x	x
Decimal point programmable	x	x	x	x
Lead zero suppression	x	x	x	x
Relay output assignment	2	2	2	1
Set-point preset programmable	x	x	x	x
Relay output operating programmable	x	x	x	x
Timed relay output programmable	x	x	x	x
Dummy zeros		x		
Conversion Factor		x		
Time Base programmable		x		
Operator accessible functions after programming disabled	x	x	x	x

11.2.- JUMPERS´s CONFIGURATION

Sensor type selection	S1 Selector, located on the rear side.
Signal input level selection	S2 Selector, located on the motherboard.
Signal input frequency selection	S2 Selector, located on the motherboard.
Front Reset disable	S3 Selector, located behind the display.
Programming disable	S4 Selector, located on the upper board.

12.- PROGRAMMING PROCEDURE

12.1.- CONFIGURATE THE UNIT AS A COUNTER

This paragraph and its examples are applicable for instrument A (Counter) operating in Mode 2, and instrument B (Counter) operating in Mode 1 & 2.

For configurate the unit as a Counter a first step is required, to determine if the display reading must be scaled in engineering units which do not fit directly with the input pulses, since the set-up factory value is 1 count by pulse.

The number of pulses can be modified using in combined or individual form, those three different Functions : Scale Factor, Scale Multiplier and/or Count Edges.

Each Counter has available their own Scale Factor and Scale Multiplier. The Count Edge Functions are common for both Counters operating indifferently in Mode 1 or Mode 2 and their programming concern both too.

Also it is possible multiplier the input pulses by 4, using the Response Mode Function [43 6]. For this case it cannot be used also the Count Edge Function [44 2].

The Final Scale Multiplier, "FMF", which can be obtained combining those four Functions, can vary from a minimum value of 0.0000001 to a maximum value of 23.9996. However in order to achieve the highest accuracy this "FMF" should have the maximum significant digits number. The Final Scale Multiplier if it is possible, never should be less than 0.7.

EXAMPLE 1

An incremental Encoder that provides 500 pulses per revolution is coupled to a roll that is 50 cm. in diameter which pulls a sheet of paper and the desired reading is the total amount of meters passed with a resolution of 0.1 mt. First we must calculate the circumference of the roll whose value will correspond to the meters passed by each 500 pulses and following the Scale Factor.

Scale Factor calculation

The Scale Factor must be used as a corrective number by which the input pulses should be multiplied until the desired reading appears in display

Length of the roll circumference = D x π = 50 x 3.1416 = 157.08 cm.

As the desired reading is in meters with one decimal point, for each revolution of the Encoder will correspond a display reading of 15. The remaining 7.08 cm. will be kept in the internal memory and they will be accumulated with the other ones kept in each next revolution. Decimal points must not be considered, since their programming is made by an independent Code.

Scale Factor "Fe" = Desired Reading (+ Decimal numbers kept in memory) / Numbers of pulses.
Fe = 15.708 / 500 = 0.0311416.

With the decimal point programmed the reading after the first revolution should be 1.5; after the second 3.1 and after the tenth 15.7, etc...
However in order to achieve the highest accuracy, the Final Scale Multiplier (FMF) should have the maximum significant digits number, therefore we will use a Scale Multiplier value of 0.01, Code [45 3] for reduce the number of pulses by display unit. The Final Scale Multiplier (FMF) will be :

FMF = 15.708 / (500 x 0.01) =15.708 / 5 = 3.1416

The definite programming for this example will be :
1.- Programme Code [45 3]. Scale Multiplier = 0.01
2.- Programme a Scale Factor [3] with a value = 3.1416
3.- Programme Code [46 2] for achieve a decimal point.

EXAMPLE 2

A Flow-meter that provides 160 pulses by $\mathbf{m^3}$ and the Counter must totalize the total amount of litres flowing though this device. The desired reading must be in litres, then by each 160 pulses provided by the Flow-meter the reading should be 1000 litres.

Scale Factor calculation

The Scale Factor will be 1000 / 160 = 6.25
It is not possible to programme this value of Scale Factor because it is over 5.9999 which is the maximum value allowed for Scale Factor.
Therefore in this case is necessary to search for a different Final Scale Multiplier which increases the number of pulses, so we will use the Count Edge Function [44 2], in order that we can multiplier the pulses by 2. The Final Scale Multiplier will be :

FMF = 1000 / (160 x 2) = 1000 / 320 = 3.125

The definite programming for this example will be :
1.- Programme Code [44 2]. This Count Edge function multiplies by 2, using both edges of count input.
2.- Programme the Scale Factor [3] with a value of 3.1250.

12.2.- CONFIGURATE THE UNIT AS A RATE.

This paragraph and its examples are applicable to Counter A (rate) with the unit programmed in Mode 1.
On the contrary of the usual Counters when operating as a Rates, this instrument does not operate measuring pulses by time unit.
The time format (Rate per second, Rate per minute, Rate per Hour) is simply selected by the programming procedure.
The Update Time for the display readings is programmable from 0.5 sc. to 16 sc. in order to make averages in some applications where the pulse frequency do not be stable. The Update Time selected will not affect to the configuration of the unit.
The Rate configuration only affects the reading display scaling (revolutions, meters, pieces, etc...) and to the time format, and them only depend of the application type in which the unit be used.

There are only two basic types of applications.

A.- Counter and Rate using the same sensor.
In this case the Rate can be programmed with the same scaling parameters as the Counter, except the Rate Conversion Factor which selects the time format in readings per second, per minute or per hour.
NOTE.- If the Count Edges Function is programmed for multiplier by 2 or 4, it is necessary programming the Scale Factor and /or the Scale Multiplier of the Rate for multiplier by the same value. This is due because the Count Edges Function does not affect to the Rate Mode.
The exception is the Conversion Factor, which will be determined by the time format desired for the corresponding reading, per second, per minute or per hour by just programming of Code 62.

B.- Rate and Counter are using two separate sensors.
In this case Counter and Rate must be configurated separately. The programming as a counter has been described on the previous paragraph.
For programming as a Rate only is necessary to know the number of pulses per display unit.

EXAMPLE 1. Application for case A.

Using the example 2 on paragraph 12.1, suppose that the flow provided is 1 m^3 / second.
For this case the unit will be programmed with Codes [43 1] or [43 2] as Response Modes, depending on Channel 2 operates.

As previously the Scale Factor was 6.25 and a Count Edges [44 2] was used to multiplier by 2 the pulses to obtain a Final Scale Multiplier (FMF) value of 3.125. The same value of Scale Factor must be applied to the Rate but remember that for the Rate can not be used the same Count Edge therefore is necessary obtain a new value for the FMF.

As the maximum value for the Scale Factor is 5.9999, a Scale Multiplier value must be used to reduce its value. Therefore we will use a Scale Multiplier value of 10 to obtain the FMF.

FMF x Scale Multiplier = Fe FMF = Fe / Scale Multiplier = 6.25 / 10 = 0.625

Programming this value of Scale Factor (0.625) and this Scale Multiplier, the reading on display will be 1000 litres / second.

The definite programming for this example will be :
1.- Programme Code [64 3]. Multiplier the pulses by 10.
2.- Programme the Scale Factor value of 0.625. The reading will be 1000 litres / second.
3.- If the Code [62 2] is programmed as a Conversion Factor, then the reading on display will be on litres / minute.

EXAMPLE 2.- Application for case B. Using separate sensors for Counter and Rate the unit must be programmed in Code [43 4] as a Response Mode.

Supposing that a roll is drived by a motor which turns at 3000 RPM and provides 5 pulses per revolution, and for each revolution will pass 0.2 meters of material. The reading desired is the speed in meters / minute.

3000 RPM x 5 pulses = 15000 pulses / minute. 15000 / 60 seconds = 250 pulses / second.
3000 RPM x 0.2 mts. = 600 meters / minute. 600 / 250 = 2.4 pulses / meter = Fe

Programming the Scale Factor with this value the reading will be 600 meters / minute, since the calculation has been made taking as a basis the amount of meters passed when motor runs at 3000 RPM.

Therefore the definite programming for this example will be :
1.- Programme the Scale Factor with a value of 2.4

12.3.- FINAL NOTES. Normally, the procedure to configurate and/or programming the instrument are the following.
1.- Configurate the unit.
2.- Programme the Response Mode.
3.- Install Jumpers on Selector S1 for Sensor type selection. On Selector S2 for Input Trigger level and Frequency signal selection.
On Selector S3 if front panel RESET must be disabled.
4.- Calculate the Final Scale Multiplier (FMF) using the Scale Factor, the Count Edges Function and the Scale Multiplier.
For the programming of the Rate can be used also the Conversion Factor.
5.- Programme the decimal point position if it is required.
With these five steps the Counters will be ready to display the desired parameters. The steps 1, 2 and 3 are common for both Counters, whereas the steps 4 and 5 must be programmed for each one of them.
From this point proceed as follow if it is necessary, for :
6.- Relay outputs assignment, their operating mode and also their relays timed if necessary.
7.- Select the Reset actuation and its operating mode.
8.- In the Rate must be programmed the time format with the appropriate read rate for the display reading.
9.- And finally consider the installation of the Jumper J1 to avoid any modification on the set up programming by not authorized personnel.

13.- OTHER PRODUCTS

Digital Panel Meters :

Signal Input

- ☑ DC Voltage and current
- ☑ AC Voltage and current
- ☑ TRMS Voltage and current
- ☑ Process : 4…20 mA
  0…10 Vdc
  Others signals
- ☑ Thermocouples
- ☑ Thermoresistance RTD
- ☑ Resistance
- ☑ Potentiometers
- ☑ Strain Gauge / Load Cells
- ☑ Pulses / frequency
- ☑ BCD Parallel Code
- ☑ RS-232 Serial

Digits

- ☑ 3
- ☑ 3 ½
- ☑ 4
- ☑ 4 ½
- ☑ 6

Digit Size

- ☑ 10 mm LED
- ☑ 12 mm LCD
- ☑ 14 mm LED
- ☑ 100 mm LED

Power Supply

- ☑ 230 Vac
- ☑ 115 Vac
- ☑ 24 Vac
- ☑ 48 Vac
- ☑ 10-30 Vdc Isolated

Options

- ☑ Single Setpoint
- ☑ Dual Setpoint
- ☑ RS-232 Output
- ☑ BCD parallel Output
- ☑ Analog Output

Dimensions

- ☑ 48 x 24 mm.
- ☑ 96 x 24 mm.
- ☑ 72 x 36 mm.
- ☑ 96 x 48 mm.
- ☑ 480 x 180 mm.

Transmitters

Signal Input

- ☑ DC Voltage and current
- ☑ AC Voltage and current
- ☑ TRMS Voltage and current
- ☑ Process : 4…20 mA
  0…10 Vdc
  Others signals
- ☑ Thermocouples
- ☑ Thermoresistance RTD
- ☑ Resistance
- ☑ Potentiometer
- ☑ Load Cells (Strain-Gauge)
- ☑ Pulses / frequency

Signal Output

- ☑ Vdc
- ☑ Idc
- ☑ Pulses

Power Supply

- ☑ 230 Vac
- ☑ 115 Vac
- ☑ 24 Vac
- ☑ 48 Vac
- ☑ 24 Vdc Isolated

TACHOMETERS.
COUNTERS.

MODULAR DISPLAYS FOR PARALLEL BCD CODE.

GALVANIC ISOLATOR AUTOPOWERED.

POWER SUPPLY

FAR-1 : Specially designed to power up Load-Cells.
FAR-2 : Serie of six models for voltage outputs from 5 to 24 Vdc.

14.- CUSTOMER SERVICE CARD

Our company would appreciate receiving any comments you may wish to make after receiving this instrument.

In particular, if you experienced any difficulties during any stage of your purchase, your comments will enable us to serve you better in the future.

Similarly, if there are any additional features you feel you would benefit from by having them included in our range of equipment, please let us know and we will give your suggestions serious consideration.

Please complete the section below and return it to us as soon as possible so that changes can be made without delay.

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E 08210 Barberà del Vallès, Barcelona, España.

Thank you for choosing our products

NAME_____JOB FUNCTION_____

COMPANY_____DPT._____

ADDRESS_____

_____

_____

Post Code_____TEL. NO_____ FAX.NO_____

MODEL _____SERIAL NUMBER_____

Brief application description_____

_____

_____

_____

_____

COMMENTS_____

_____

_____

_____

_____

Signed_____Date_____

15.- OPERATOR´s NOTES

Write down on this leaf all the modifications made by the Operator in the unit, in order to make easier the necessary maintenance and possible repairs. It is also advisable make a note of all the interesting comments about the installation which could be very useful for the users in the future.