INTELLIGENT
PANEL
METERS **Series**

Intelligent Panel Meters

FEMA ELECTRÓNICA

TAS-1-IAC	AC Current
TAS-1-IDC	DC Current
TAS-1-VAC	AC Voltages
TAS-1-VDC	DC Voltages

USER'S MANUAL

Datasheet

1.2- IF THIS IS THE FIRST TIME YOU WORK WITH A TAS-1 METER...

We strongly recommend you to read the following paragraphs. Following ideas need to be clearly understood in order to easily adjust and program the unit.

WHEN POWERING THE INSTRUMENT the meter displays a message indicating the configured signal input range (see page 4).

IF THE TAS-1 DETECTS A STRANGE SITUATION on the instrument status, or sensor break, etc, the instrument will show an error message (see page 8 «messages and errors»).

THE FRONTAL KEYPAD is composed of 5 function/key pads and 1 programming pad. The pads have two functions, acting both as number keys (when a number needs to be entered) and as direct access keys to the following functions :

Key AL	-	Access to the ALARM setpoints
Key HI	-	Value for the HIGH Indication
Key LO	-	Value for the LOW Indication
Key ADJ	-	Access to the automatic «on the field» offset correction and High Level Input Signal correction
Key DP	-	Decimal Point Position

Key PROG - Allows the introduction of the PROGRAMMING codes (4 digit codes, as shown on page 4). These codes, when validated, activate different input signal modes, and advanced configurations for alarms, indication, etc.

«TIME» MESSAGE .- If while introducing a programming code or while reconfiguring the unit parameters (such as the alarm setpoints or others) the user does not interact with the unit for a period of 5 seconds, the TAS-1 will show the message «TIME», cancel the ongoing changes, and roll-back to the previous configuration. This is a security function which disables the situation where a unit would be «hanged» for a long time waiting for the operator to finish a programming.

THE TAS-1 UNITS ARE FULLY CONFIGURABLE. The unit is 100% configurable from the frontal keypad. The programming software also allows an easy configuration from a PC *(PCConnection Cable needed)*.

OPTIONS .- This manual includes description and operating instructions for the basic unit and the additional extra options accepted. These options include Relay Output Contacts, Analog Outputs, RS485 Outputs, Peak/Valley memory, etc. If your instrument does not include these options, they can easily be added.

SIGNAL INPUT RANGES .- To work with an input signal range not indicated in this manual, select the closest input signal range accepted, and change the input/indication parameters with the code 14 11 (see later in this manual). For example, to configure a 0/60 mV input coming from a 10 Amper shunt, we need to :
1.- select the 0/100 mV input signal range
2.- enter on code 14 11 for Editing Adjustments
3.- edit 0=0 and 60=10.000

If later on we need to change the 10.000 value for any other value we can do it directly with the keypad HI.

1.3- FRONTAL VIEW AND REAR VIEW

TAS-1 Frontal View

TAS-1 Rear View

Indication
5 displays 7 segments

Activity Led

Units

Decimal Point

Status Led for alarms 1,2,3 and 4

Leypad Function Led
Red Led - keypad acting as number
Green Led - keypad acting as direct access

6 pads for programming double function

Relay 2 Output

Relay 1 Output

Output for Optional Boards
(See pages 10 to 14)

Input Signal
(3 or 4 pole Terminal depending on the unit)

Connector for PC Configuration
(PCConnector cable needed)

Power

(N)   (L)
(+)   (-)

Note .- The 2 relay outputs and the Optional Boards are OPTIONAL and are NOT INCLUDED with the basic unit.

2.1- CONNECTIONS

TAS-1-VDC **TAS-1-VAC**

+ / −

0/650 Vdc	0/650 Vac
0/100 Vdc	0/100 Vac
0/10 Vdc	

0/1 Vdc	0/1 Vac
0/100 mVdc	0/100 mVac
0/20 mVdc	

TAS-1-IDC **TAS-1-IAC**

| 0/5   Adc | 0/5   Aac |

| 0/100 mAdc | 0/100 mAac |

Relay 2   Relay 1

COMON NC NO NO NC COMON

Relay Outputs

Input Signal

Connector for PC Configuration
(PCConnector cable needed)

Power

Phase (-)
Earth
Neutrum (+)

2.2- PROGRAMMING MENU

Prog

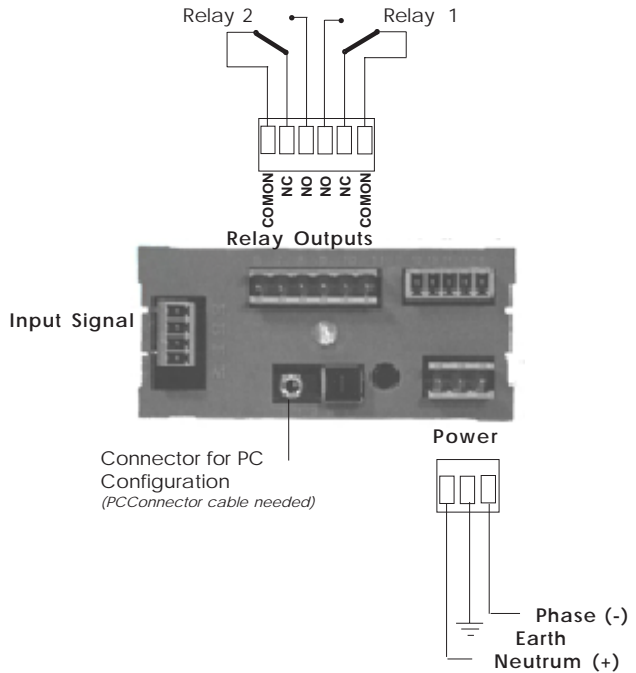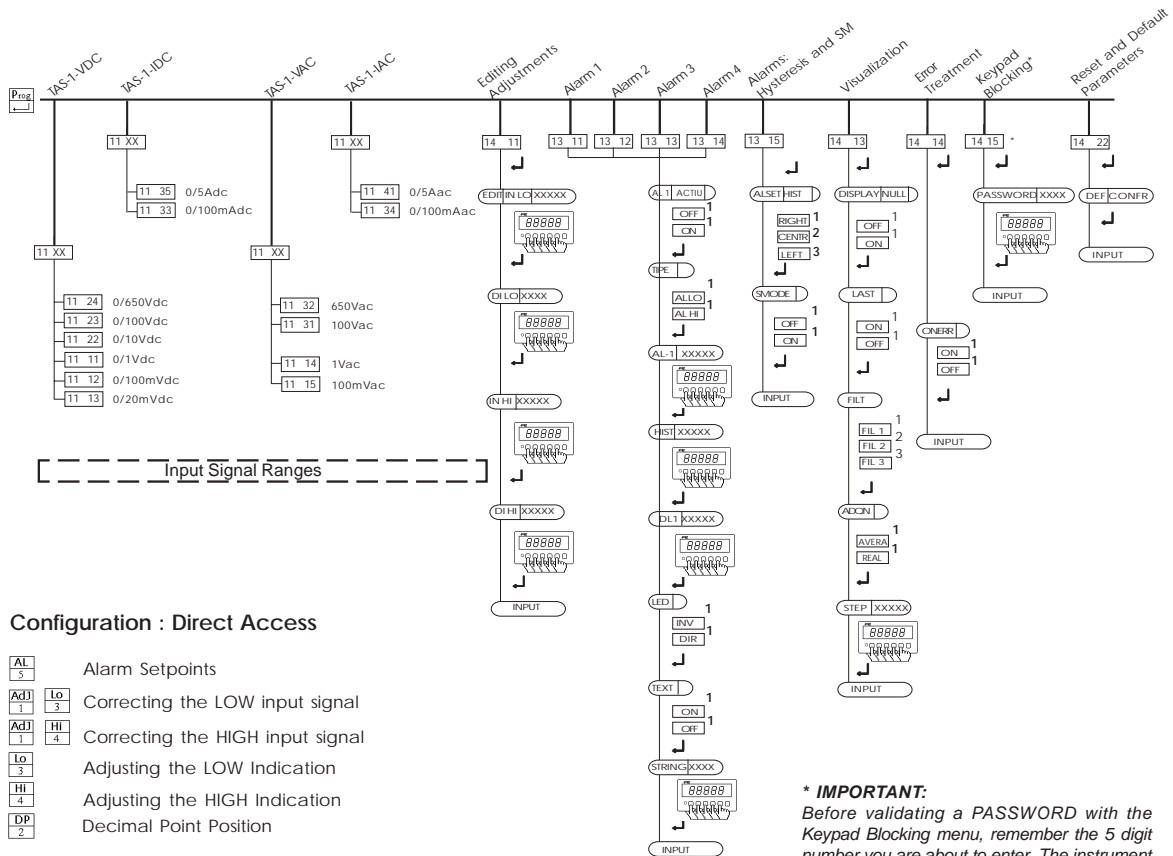TAS-1-VDC | TAS-1-IDC | TAS-1-VAC | TAS-1-IAC | Editing Adjustments | Alarm 1 | Alarm 2 | Alarm 3 | Alarm 4 | Alarms: Hysteresis and SM | Visualization | Error Treatment | Keypad Blocking* | Reset and Default Parameters

11 XX
11 XX
14 11
13 11 13 12 13 13 13 14
13 15
14 13
14 14
14 15 *
14 22

11 35 0/5Adc
11 33 0/100mAdc

11 41 0/5Aac
11 34 0/100mAac

EDIT IN LO XXXXX

AL 1 ACTIU
OFF
ON

ALSET HIST
RIGHT 1
CENTR 2
LEFT 3

DISPLAY NULL
OFF
ON

PASSWORD XXXX
88888

DEF CONFR

INPUT

11 XX
11 XX

11 24 0/650Vdc
11 23 0/100Vdc
11 22 0/10Vdc
11 11 0/1Vdc
11 12 0/100mVdc
11 13 0/20mVdc

11 32 650Vac
11 31 100Vac
11 14 1Vac
11 15 100mVac

DI LO XXXX
88888

TIPE
ALLO
AL HI 1

SMODE
OFF
ON 1

LAST
ON
OFF 1

ONERR
ON
OFF 1

INPUT

INPUT

INPUT

AL-1 XXXXX
88888

Input Signal Ranges

IN HI XXXXX
88888

HIST XXXXX
88888

FILT
FIL 1 1
FIL 2 2
FIL 3 3

INPUT

DI HI XXXXX
88888

DL1 XXXXX
88888

ADQN
AVERA 1
REAL

INPUT

LED
INV 1
DIR

STEP XXXXX
88888

Configuration : Direct Access

AL 5	Alarm Setpoints
AdJ 1 / Lo 3	Correcting the LOW input signal
AdJ 1 / Hi 4	Correcting the HIGH input signal
Lo 3	Adjusting the LOW Indication
Hi 4	Adjusting the HIGH Indication
DP 2	Decimal Point Position

TEXT
ON 1
OFF

STRING XXXX
88888

INPUT

***IMPORTANT:**
Before validating a PASSWORD with the Keypad Blocking menu, remember the 5 digit number you are about to enter. The instrument will not accept any future order until the same 5 digit password is reintroduced.

3- CONFIGURATION

Section 3.1 shows how to enter a code to select an input signal range. All codes are indicated on page 4.

Examples in this page show how to configure a TAS-1-IAC unit with an input signal of 0/5 Aac and indication 0/2500.0. All other units and signal ranges follow the same procedures.

3.1- INPUT SIGNAL

The TAS-1 units have several built-in predefined input signal ranges, selectable with the help of codes (4 digit codes). On page 4 there is a list of all accessible ranges and the codes associated.

3.2- DIRECT ACCESS

The frontal keypad hasseveral direct access buttons for a quick configuration of the instrument :

Pad 1 (ADJ) - Correct the LOW or HIGH input levels
Pad 2 (DP) - Decimal Point Position
Pad 3 (LO) - Set for the LOW indication level
Pad 4 (HI) - Set for the HIGH indication level
Pad 5 (AL) - Alarms Setpoint

CONFIGURING A 0/5 AAC *INPUT SIGNAL RANGE* (Code 11 41 ; as shown on table on page 4, for a TAS-1-AAC unit)

1- Press **Prog**
message «Prog» during 1 second
blank screen

2- Input the code **11 41**

3- Validate the code pressing ↵

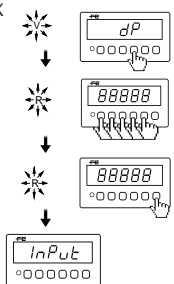4- Message showing the selected range «5 A» during 1 second

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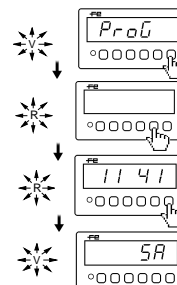
3.2.1- DECIMAL POINT POSITION

Activate the Decimal Point at position XXXX.X

1- Press **DP**

2- message «DP» during 1 second
Press 2 to fix decimal point position **2**
(To fix at other positions, press 1,2,3,4 or 5)

3- Validate changes pressinf ↵
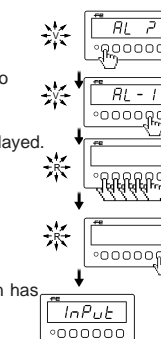
message «INPUT» shows the configuration has been accepted

3.2.4- ALARM SETPOINTS
Fix the setpoint for Alarm1 at 10500

1-Press **AL**

2-Enter the number of the alarm we want to modify **1**

3-Current value for Alarm1 setpoint is displayed. Modify it by pressing on **1,2,3,4,5** until we see 10500

4-Validate the changes pressing ↵

message «INPUT» shows the configuration has been accepted

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3.2.2-ADJUSTING THE LOW INDICATION VALUE

For the low input level (0 Aac) we want to configure a low indication of 0000.0

1-Press **Lo**

2- Current value for the low indication is displayed. Modify it by pressing on **1,2,3,4,5** until we see 00000

3-Validate the changes pressing ↵

message «INPUT» shows the configuration has been accepted

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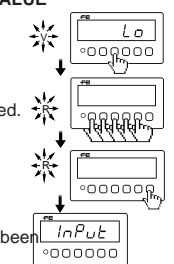
3.2.5-CORRECTING THE LOW INPUT SIGNAL (OFFSET)
Allows offset correction, by linking the current input signal on terminals to the Low Indication Value memorized.

1-Generate the low input level signal

2-Press Adjust **Adj**
The instrument asks «Hi» or «Lo» ?

3-Press **Lo**

4-Message «Cr Lo» shows the unit has corrected the low level value, linking the current input signal value to the low indication value memorized (LO keypad)
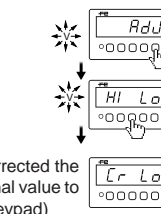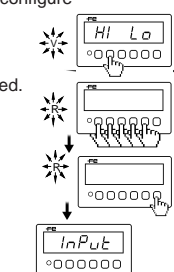

3.2.3- ADJUSTING THE HIGH INDICATION VALUE

For the high input level (5 Aac) we want to configure a high indication of 2500.0

1-Press **Hi**

2- Current value for the high indication is displayed. Modify it by pressing on **1,2,3,4,5** until we see 25000

3-Validate the changes pressing ↵

message «INPUT» shows the configuration has been accepted

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3.2.6-CORRECTING THE HIGH INPUT SIGNAL

Allows to link a current signal at the input terminals to the High Indication Value memorized on the HI keypad.

1-Generate the high input level signal

2-Press Adjust **Adj**
The instrument asks «Hi» or «Lo» ?

3-Press **Hi**

4-Message «Cr Hi» shows the unit has corrected the high level value, linking the current input signal to the high indication value memorized (HI keypad)

Datasheet
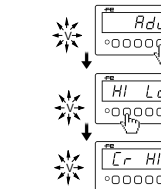
4-ADVANCED CONFIGURATION

4.1- INPUT SIGNAL : DC VOLTAGE

Codes : 11 XX

Input	Code		Message
0/650 Vdc	11	24	650U
0/100 Vdc	11	23	100U
0/10 Vdc	11	22	10U
0/1 Vdc	11	11	1U
0/100 mVdc	11	12	100nU
0/20 mVdc	11	13	20nU

4.2- INPUT SIGNAL : AC VOLTAGE

Codes : 11 XX

Input	Code		Message
0/650 Vac	11	32	650AU
0/100 Vac	11	31	100AU
0/1 Vac	11	14	1AU
0/100 mVac	11	15	100nAU

4.3- INPUT SIGNAL : DC CURRENT

Codes : 11 XX

Input	Code		Message
0/5 Adc	11	35	5Ab
0/100 mAdc	11	33	100nAb

4.4- INPUT SIGNAL : AC CURRENT

Codes : 11 XX

Input	Code		Message
0/5 Aac	11	41	5AA
0/100 mAac	11	34	100nAA

4.5- ALARM CONFIGURATION

Alarm Number	CODE		Menu
Alarm 1	13	11	Alarm Parameters
Alarm 2	13	12	Alarm Parameters
Alarm 3	13	13	Alarm Parameters
Alarm 4	13	14	Alarm Parameters
General	13	15	Hysteresis and SM

The alarm configuration menu list several parameters to which we must assign a value.

Numerical values are assigned with the number pads. Predefined values (such as ON/OFF) are selected by selecting available options with keys '1', '2' or '3'.

Validate with key '⏎' in order to access next parameter.

Menu : Alarm Parameters

Parameters	Values	Description
AL1	On	Alarm1 working
	oFF	Alarm1 not working
tIPE	AL HI	Alarm1 working as «maximum»
	AL Lo	Alarm1 working as «minimum»
AL-1	88888	Setpoint for Alarm1 (expressed in display points)
HISt	88888	Hysteresis value (max. 255) (expressed in display points)
dL1	88888	Delay on relay activation (expressed in seconds)
LEd	dIr	Led is active when alarm is active
	InU	Led is active when alarm is inactive
tErt	On	Alarm text active
	oFF	Alarm text inactive
StrnG	88888	Text associated with alarm led

Menu : Hysteres and SM

Parameters configured on this menu apply to the 4 alarms

Parameters	Values	Function
HISt	LEFt	Hysteresis is applied to the process of alarm deactivation*
	CEntr	Band alarm. Hysteresis is applied to the process of alarm activation and deactivation*
	rIGHt	Hysteresis is applied to the process of alarm activation.*

*The hysteresis points are defined on parameter HYST for each alarm.

SModE	On	Security Mode activated on alarms acting as «minimum»**
	oFF	Securty Mode deactivated

**Output relay are inactive until the set point is reached for the first time.

4.6- MANUAL ADJUSTMENT

Code : 14 11   Function : Edit

Parameters	Values	Function	
In Lo	number	Input Low	- Low Input Signal
dı Lo	number	Display Low	- Indication for Low Signal
In HI	number	Input High	- High Input signal
dı HI	number	Display High	- Indication for High Signal

Code 14 11 can be used both to modify adjustments and to visualize current values.

4.7- DEALING WITH ERRORS

Code : 14 14   Function : onErr

Parameters	Values	Function
onErr	on	Activates all alarms in case of error state *
	oFF	Deactivates all alarms in case of error state*

* More information on «what is an error», on section 4.7 «Messages and errors»

4.8-ADVANCED CONFIGURATION

Code : 14 13   Function : dISPL

Parameters	Values	Function
nuLL	on	No zeros active to the left
	oFF	Zeros active to the left
LASt	on	Fixes the least significant digit to zero
	oFF	Frees the least significant digit
FıLt	FIL1	Fast filter on the input signal : 0.25 Seg 98%
	FIL2	Medium filter on the input signal : 0.5 Seg 98%
	FIL3	Slow filter on the input signal: 1 Seg. 98%
Ad7n	rEAL	Real time indication
	AUErA	Indication of mean values
StEP	88888	Time (between 1 and 255 seconds) to calculate mean values for mean indication

4.9- BLOCKING THE KEYPAD

Code : 14 15   Function : PASSUUord

Parameters	Values	Function
PASSUUord	00000	Blocks the frontal keypad Password is made of a numerical value of 5 digits

4.10-RESETTING THE SYSTEM. DEFAULT VALUES

Code : 14 22   Function : dEFConfr

Resets the unit to the default manufacturing values. It is needed to reconfirm the action by pressing INTRO after the message dEFConfr

General Default Configuration

			Setpoint	Histeresis	Delay	Type	Led	Text	String	
Acquisition Mode	Real									
STEP Value	10	Alarm 1	ON	1000	1	0	HI	DIR	OFF	AL-1
Zero Blanking	ON	Alarm 2	ON	1000	1	0	HI	DIR	OFF	AL-2
Least Significant Digit to zero	OFF	Alarm 3	ON	1000	1	0	HI	DIR	OFF	AL-3
Display Refresh	Filter 2 (0.5 seg.)	Alarm 4	ON	1000	1	0	HI	DIR	OFF	AL-4
Password	deactivated									
		Hysteresis		CENTER						
		Security Mode		ON						
		OnError		OFF						

Default Configuration TAS-1-VDC		**Configuration TAS-1-IDC**	
Input Signal	0/100 VDC	Input Signal	0/5 ADC
Lo - Low Level Indication	0	Lo - Low Level Indication	0
HI - High Level Indication	100.00	HI - High Level Indication	5.000
Decimal Point	0 0 0.0 0	Decimal Point	0 0.0 0 0

Default Configuration TAS-1-VAC		**Configuration TAS-1-IAC**	
Input Signal	0/650 VAC	Input Signal	0/5 AAC
Lo - Low Level Indication	0	Lo - Low Level Indication	0
HI - High Level Indication	650.0	HI - High Level Indication	5.000
Decimal Point	0 0 0.0 0	Decimal Point	0 0.0 0 0

4.11-MESSAGES AND ERRORS

Messages and errors are active when the instrument senses a «not normal» situation . The instrument identifies the type of «anormality» and informs with an error or with a message.

Messages

«Messages» are associated with non-critical situations, those which only affect the measure temporary. The «message» remains active on display until the situation clears. The instrument recovers the normal working state when situation clears.

-oUr	The input signal is lower than selected range
oUr	The input signal is higher than selected range
t InE	Security waiting time exceeded while in configuration mode. The instrument rolls-back to the previous configuration
Error	Error when entering a data. Value not accepted. Reintroduce the value. (Typical case : The value assigned to hysteresis is higher than 255)

Errors

«Errors» are associated with critical situtations which disable the hability to measure the signal.

The «error» remains active on display until the situation disapears. At this time, the instrument recovers normal functionality.

«Errors» execute actions on alarms, activating or deactivating them depending on the status of variable OnErr (*see page.11*). Alarms recover their normal behaviour when the the error state clears.

Err0	Internal Error. Restart the instrument. ** It is possible that no action is performed on alarms if this error is affecting the internal EPROM
NErr0	Mathematical Error 0 Parameters introduced for the input signal are not coherent. (Typical case : the high level value is similar or very close to low level value, on input signal range or indication)
NErr1	Mathematical Error 1: mathematical overflow. The unit is trying to process values higher than 32000 or lower than -32000.
dErr0	Error on Display Indication Trying to display a value higher than 32000 or lower than -19999. Reduce HI and LO levels dividing by 10.

5- CONFIGURING WITH A PC

TAS-1 units allow configuration from a PC. You need software SW-TAS-1 and the cable PCConnector. Cable is connected to the rear side of the instrument (stereo jack) and to the 9-pin SUB-D PC Port. Software installs executable file TAS-1.exe

1.- Select com port. Press «START COMM»
2.- Configuration windows open

These windows contain all information on the unit. Meter and alarms are shown on the main window. Additional options are shown in the small window to the right.
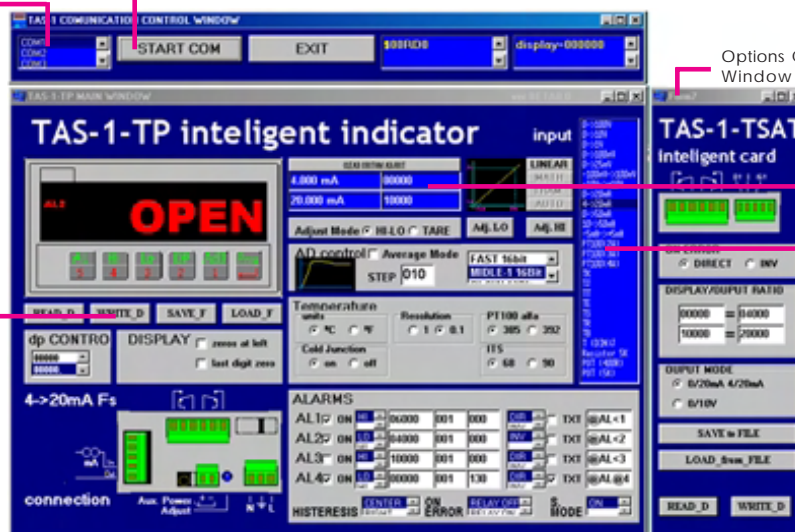
To force a writing onto the device press WRITE_D. Some changes already force a writing (such as changing the input signal), and ask for a confirmation.

To force a configuration reading of the instrument press READ_D

To save/load configurations on your hard disk, use buttons SAVE_F / READ_F. Note that the options (right windows) have their own configuration file independent of the main instrument and so have their own «SAVE TO FILE» / «LOAD FROM FILE» buttons.

6- TECHNICAL SPECIFICATIONS

INDICATION

Display	5 Digits, 7 Segments , Red Led High Brightness
Digit Height	14,2 mm. / 0,56''
Filter	Anti-reflexive.
Indication	From - 19999 to 32000
Refresh	5 /seg. (Filter selectable)

A/D CONVERTER

Speed	14 Readings / Second
Accuracy	16 BIT + sign (± 65.000 points)
CMRR	> 130 dB

POWER

Standard	230 Vac 50/60 Hz. Consumption 3,5W Max
Optional	115 Vac 50/60Hz. Consumption 3.8W Max
Optional	24 Vdc (±10%) isolated. Consumption 4W Max
	Isolation 1000 Vdc (Primary - Secondary)
	Maximum consumption at 24 Vdc .- 265 mA
	Peak current at start-up <600mA

ENVIRONMENTAL DATA

Working Temperature	0 ... + 50 ºC
Storage Temperature	-20 ... + 85 ºC
Humidity	0 ... 85%, non condensaded

MECAHNICAL DATA

Dimensions	Standard 1/8 DIN
	96 x 48 x 124 mm. (3,78" x 1.89" x 4,88")
Front	Protection IP65 (NEMA 4)
Weight	0,5 Kgs

ALARMS AND RELAYS (OPTION AL2)

4 alarms on display. Alarms 1 and 2 can control Relays 1 y 2 (Option AL2)
2 Relays ON/OFF 2 A. (non inductive), 250 Vac
Note .- AL2 option not mounted on standard units

ANALÓG OUTPUT	Technical data see page 10
RS485 MODBUS OUTPUT	Technical data see page 12
PEAK / VALLEY, ETC OPTION	Technical data see page 14

UNIT TAS-1-VDC

Input Signal Ranges	0/650 Vdc, 0/100 Vdc, 0/10 Vdc
	0/1Vdc, 0/100 mVdc, 0/20 mVdc

Note .- Although not mentioned above, the unit accepts any signal range between 0/20mV and 0/650Vdc, including 60mV, 100mV y150mV shunt signals. For these ranges. select the closest range and readjust with code 14 11

Accuracy	0,1% from reading ± 1 point
Thermal Drift	± 100 ppm/ºC
Input impedance	1 MOhm for Vin>1Vdc
	5 MOhm for Vin<1Vdc
Effective Resolution	32.000 points

UNIT TAS-1-VAC

Input Signal Ranges	0/650 Vac, 0/100 Vac
	0/1 Vac, 0/100 mVac

Note .- Although not mentioned above, the unit accepts any signal range between 0/20mVac and 0/650Vac, including 60mV, 100mV y150mV shunt signals. For these ranges. select the closest range and readjust with code 14 11

Accuracy	0,3% of reading ± 1 point
Thermal Drift	± 150 ppm/ºC
Input impedance	1 MOhm for Vin>1Vdc
	5 MOhm for Vin<1Vdc
Effective Resolution	32.000 points

UNIT TAS-1-IDC

Input Signal Ranges	0/5 Adc
	0/100 mAdc

Note .- Although not mentioned above, the unit accepts any signal range between 0/100mA and 0/5 Adc. For these ranges. select the closest range and readjust with code 14 11

Accuracy	0,1% of reading ± 1 point
Thermal Drift	± 150 ppm/ºC
Input impedance	0.02 Ohm for I>100mA
	1 Ohm for I<100mA
Effective Resolution	32.000 points

UNIT TAS-1-IAC

Input Signal Ranges	0/5 Aac
	0/100 mAac

Note .- Although not mentioned above, the unit accepts any signal range between 0/100mAac and 0/5 Aac, including X/5 and X/1 Current Transformer signals. For these ranges. select the closest range and readjust with code 14 11

Accuracy	0,3% of reading ± 1 point
Thermal Drift	± 200 ppm/ºC
Input impedance	0.02 Ohm for I>100mA
	1 Ohm for I<100mA
Effective Resolution	32.000 points

SIZES AND PANEL CUT-OUT

48mm
96mm
124mm
2mm
15mm
92mm
44mm
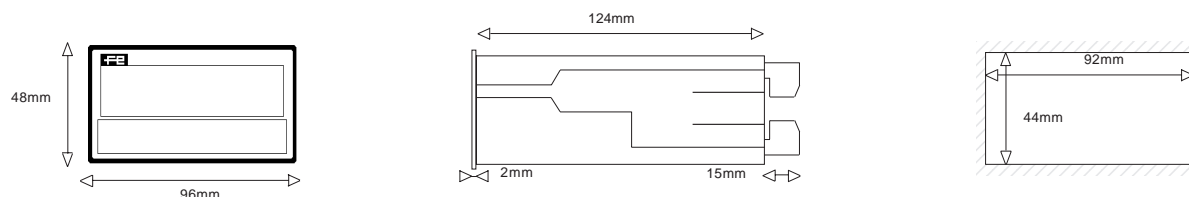
7- AVAILABLE OPTIONS - INSTALLING AND CONFIGURING

7.1- ANALOG OUTPUT - TSAT OPTION BOARD

The TSAT board adds analog output capabilities to the TAS-1 instruments. Jumper selectable for voltage (0/10 Vdc) and for current (4/20mA and 0/20mA in modes SINK and SOURCE) adds a galvanic isolation of 2KVeff.

The analog output adjustment is done via the frontal keypad. The analog output value is adjusted related to the display indication. This allows the intelligent use of the correction functions for offsets and fast readjustment of the TAS-1 series, meaning that when readjusting the input/display readings, the analog output does not need to be readjusted most of the times.

in case of trouble with the input signal, such as loop break or sensor break, the analog output signal will exhibit always the same behaviour predefined by the operator on the menu.

7.1.1- CONNECTIONS

Voltage Output	.-	Terminal 12 (Negative)
		Terminal 13 (Positive)
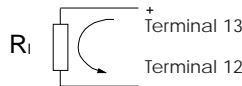
Current Output	.-	Terminal 13 (Negative)
(Source = Active)		Terminal 14 (Positive)

Current Output	.-	Terminal 12 (Negative)
(Sink=Pasive needs		Terminal 13 (Positive)
external power supply)		
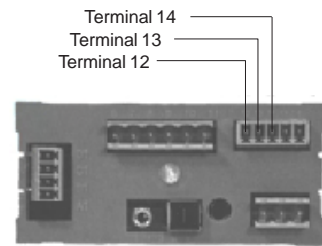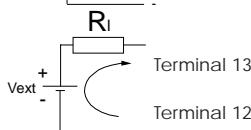
7.1.2- TECHNICAL CHARACTERISTICS

|	
Output Signals	0/10 Vdc, 0/20 mA and 4/20 mA (and others)
Resolution	12 bits
Accuracy	<0.1% FS
Ripple	<0.01% FS
Thermal Drift	100 ppm/ºC
Pass Band	1.5 Hz (-3 dB)
Response Time	250 ms (99% of indication)
Isolation Levels	2KVeff (50 Hz, 1 minute)

mA Output	RLmax	500 Ohms (Source Mode)
	Imax	21.5 mA aprox.
	SINK Output maximum 40Vdc on terminals	

Vdc Output	RL min	1 KOhm
	Vmax	11 Vdc aprox.

Jumpers to the left.- Output in Vdc
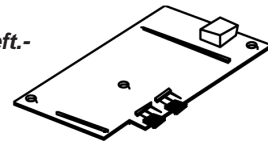
Jumpers to the right.- Output in mA
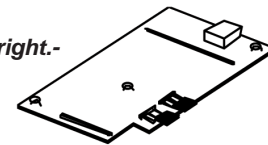
7.1.3- START-UP

1.- Place jumpers on TSAT board for Vdc or mA output

2.- Plug the TSAT board on the bus pins (Expansion Bus) on board AL2 or EXP

3.- To configure the analog output you need to know the analog output signal and the related display indication

Input Signal	Indication	Analog Output
4 mA	*0*	*0 Vdc (00000 miliVots)*
20 mA	*100.00*	*10 Vdc (10000 miliVolts)*

Note .- Analog output units are entered with 3 decimals, this is, in miliVolts and microAmperes.

4.- Make connections, power the unit and configure the board (see next page)

7.1.4- CONFIGURING THE ANALOG OUTPUT

Entering the Menu

Introduce the programming code «55 11»

Message «IC ANG»	Analog Output board recognized
Message «MENU»	Entering the programming menu
Message «4_20» or «0 10»	Shows the operating mode selected by jumpers (Vdc or mA)

Adjusting the Analog Output

Note .- The values for the following 4 parameter are setable using keys 1,2,3,4,5

Parameter «d_LO»	(Display Low) Display value associated with the low level analog output
Parameter «o_LO»	Output Low Analog output value associated with the «d_LO» value *
Parameter «d_HI»	Display High Display value associated with the high level analog output
Parameter «o_HI»	Output High Analog output value associated with the «d_HI» value*

Note .- values for «d_LO» and «d_HI» are in microVolts or microAmperes

Behaviour when Error

Parameter «OnErr» .-	Behaviour of the analog output when an «error» occurs (section 4.11 describes «errors»)
«DIR» -	Analog Output rises up to Full Scale (11Vdc or 21mA aprox)
«INV» .-	Analog Output sinks down to zero (-0.5 Vdc or 0mA aprox)

Exiting the Menu

Mesage «INPUT»	Confirms that the parameters have been accepted
Message «ERROR»	Informs that at least one of the values is not correct, and the whole configuration could not be applied. Repeat the process from the begining.
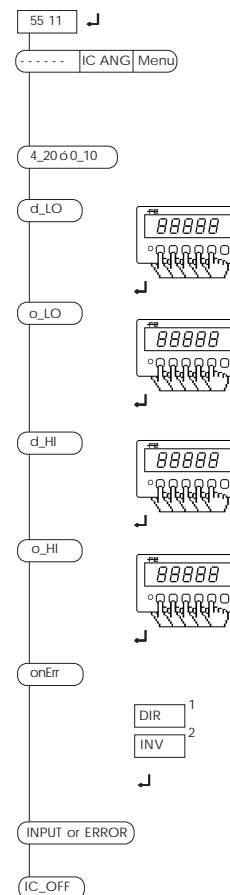
7.2- INSTALLING THE OPTION BOARDS

The Option Boards are inserted onto the vertical pins of the Expansion Modules. These modules are AL2 or EXP.
Note .- Both AL2 and EXP are optional themselves and are not included in the standard units

The board has to be firmly inserted onto the vertical pins of the expansion module. Once inserted, reconnect the expansion module to the frontal of the instrument and insert the whole into the box.

The instrument automatically recognizes the pressence of an inserted board.

Note1 : The expansion module is included with those instruments TAS-1 with the AL2 option built in or the EXP option. The AL2 or the EXP modules can be also added to those instruments who were acquired without any of these two options.

Note2 : The TEK board can share the expansion bus with the TSAT option of with the R485M option, or can be directly connected to the bus alone.

Nota3 : Boards TSAT for Analog Output and R485M for Modbus output can not be integrated simultaneously on the same instrument.

Option Board (Analog Output, Modbus or TEK)

Expansion Module
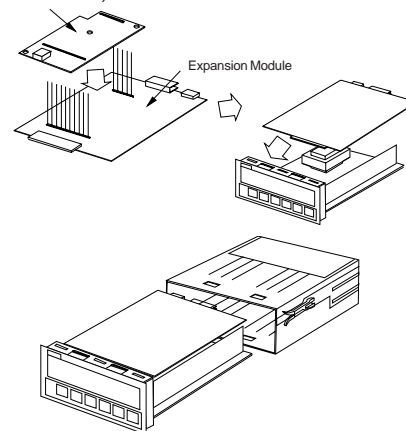
7.3- MODBUS OUTPUT - R485M OPTION BOARD

The R485M board adds Modbus communication capabilities to the TAS-1 units, for retransmission of visualized data to a remote element. The board is isolated and is completely configurable from frontal keypad.

|	
Protocols	ModBus RTU and ModBus ASCII selectable
Bus	RS485 Half Duplex (EIA-RS485) shielded twisted pair cable, in line, closed with terminator
Speed	2400, 4800, 9600, 19200, 38400 bauds
Addresses	from 0 to 99
Distances	1200 meters per BUS segment
	4800 meters with repeaters
Isolation	2 KV with inputsignal
	3.5 KV with power signal

7.3.1- CONFIGURATION

Introduce te programming code «55 11»
Message «IC 485»   RS485 board recognized
Message «MENU»   Entering the programming menu

Parameter «PROT»   Protocol
            Select Modbus ASCII or Modbus RTU

Parameter «DIR»   Address
            Input instrument address

Parameter «BAUDS» Speed in Bauds

Parameter «n BIT»   Number of Bits
            Select 8 or 7 bits per character

Parameter «t PAR»   Parity
            «Even» «Odd»   «nPar»

Message «INPUT» .- confirms that the parameters have been accepted

Message «ERROR» .- informs that at least one of the values is not correct, and the whole configuration could not be applied. Repeat the process from the begining.
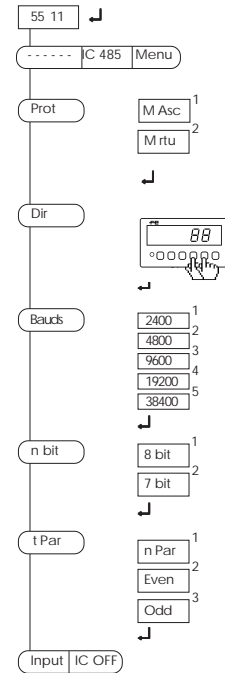
7.3.2- ACCEPTED FUNCTIONS

04 Hex   Registry read   (*«Input Register» on the standard*)
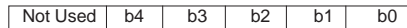
7.3.3- REGISTER MAP

00 00 Hex   Display Value
        Type : Integer
        Value : from -32768 to 32767

Note1 : If there is no numeric value on display (but a text value), register 0000Hex offers value 32767 or -32768. And bit b0 of register 0002Hex show the display status.

00 01 Hex   Decimal Point Position
        Type : Integer
        Value : 0, 1, 2, 3 or 4

0 = no decimal   2 = 2 digits decimal   4=4 digits decimal
*1 = 1 digit decimal   3 = 3 digits decimal   5=5 digits decimal*

00 02 Hex   Status
        Type : Integer
        Word composed of 1+4 bits

Not Used	b4	b3	b2	b1	b0

    b0=0   Value contained on register 00 00H is an indication (number)
    b0=1   Value contained on register 00 00H is not an indication
Word b4,b3,b2,b1

0.- Reserved	3.- +Ovr	6.- Con	9.- MErr1	12.- Reserved	15.- Others
1.- Low	4.- DErr0	7.- Open	10.- Reserved	13.- Reserved	
2.- -Ovr	5.- Brk	8.- MErro0	11.- Reserved	14.- Reserved	

00 03 Hex   Alarms
        Type : Integer

|		
b0=0 AL1 in OFF state	b2=0 AL3 in OFF state
b0=1 AL1 in ON state	b2=1 AL3 in ON state
b1=0 AL2 in OFF state	b3=0 AL4 in OFF state
b1=1 AL2 in ON state	b3=1 AL4 in ON state

Not Used	b3	b2	b1	b0
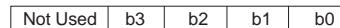
Note2 : The length of all registers is 2 bytes, defined as LSB and MSB. MSB (Most Significant Byte) is the first to be transmitted LSB (Least Significant Byte) us the second to be transmitted
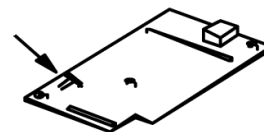
7.3.4- CONNECTIONS AND BUS TERMINATOR

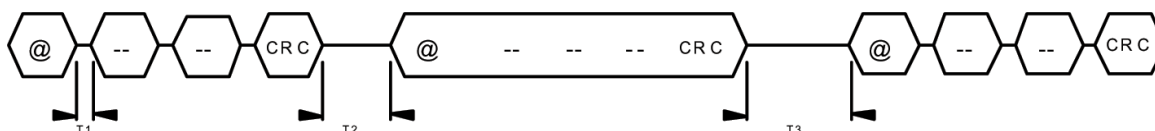Conections .- Cables A and B as Standard Modbus

Terminal 14 B
Terminal 13 A
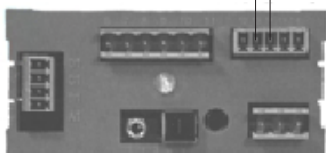
Terminator .- Place jumper if the BUS ends on this instrument

7.3.5- MODBUS FRAME STRUCTURE-I

Example for a Modbus-RTU frame .- Start Character corresponds with instrument address and final character corresponds with the CRC Security Code
In Modbus-ASCII Start and End characters are specific

T1 = Time between two characters
T2 = Time between end of question and start of response
T3 = Time between end of responde and start of next question

T2 MAX (RTU and ASCII)		T1 (min/max)		T3 (min/max)	
38400	4.3 mSeg	RTU	0CT / 3CT	RTU	3.5CT / --
19200	5.7 mSeg	ASCII	0CT / ---	ASCII	--- / ---
9600	9.2 mSeg				
4800	15.5 mSeg				
2400	27 mSeg				

7.3.6- CHARACTER STRUCTURE

Bit structure for the characters on protocolos ModBus RTU and ModBus ASCII

	START	DATA	PARITY	STOP	TOTAL BITS
RTU	1	8	P	1	11
	1	8	I	1	11
	1	8	--	2	11
ASCII	1	7	P	1	10
	1	7	I	1	10
	1	7	--	2	10

7.3.7- MODBUS FRAME STRUCTURE-II

QUESTION : Communicacion MASTER and SLAVE

ADDRESS	1 CHARACTER	Instrument Address
FUNCTION	1 CHARACTER	Function 04H, register read
READING START REGISTER	2 CHARACTERS	Register 00 00H = Display Value
NUMBER OF REGISTERS TO READ	X CHARACTERS	02 = 2 registers (4 bytes)
CRC	2 CHARACTERS	Control Checksum

RESPONSE : Communication SLAVE to MASTER

ADDRESS	1 CARACTER	Instrument Address
FUNCTION	1 CARACTER	Function 04H, register read
LENGTH	1 CARACTER	Number of data characters following
DATA	X CARACTERES	Response data*
CRC	2 CARACTERES	Control Checksum

7.4- PEAK, VALLEY, HOLD, TARE, RESET- OPTIÓN TEK

The TEK option adds functions for PEAK/VALLEY memory, or remote TARE or remote HOLD to the instruments TAS-1. These functions are selectable and programmable from frontal keypad, and are activated connecting two external contacts to the rear side terminals. Each contact has assigned one function (which can be changed) plus a third function associated to both contacts closing at the same time, to release a RESET for PEAK/VALLEY memory. Isolated option.

7.4.1- AVAILABLE FUNCTIONS

Functions	PEAK, VALLEY, HOLD, TARE, RESET
Terminals	2 Terminals for 2 Free Potential Contacts
	1 Function for each contact
Contact1	PEAK or VALLEY or HOLD or TARE or RESET configurable from frontal keypad
Contact2	PEAK or VALLEY or HOLD configurable from frontal keypad
Contact12	RESET. This function is fixed and is activated when closing both contacts at same time.
Isolation	2KV to the input signal
	3K5V to the power 230Vac and 115Vac
	1KV to the power 24Vdc

7.4.2- CONNECTIONS

Terminal 12 .- COMMON
Terminal 15 .- CONTACT1
Terminal 16 .- CONTACT2
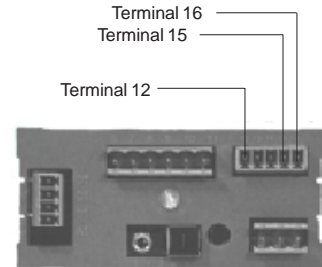
7.4.3- TEK CONFIGURATION

Entering the Menu
Introduce the programming code «14 23»
Message «E INP»   TEK board recognized

Configuring the external contacts

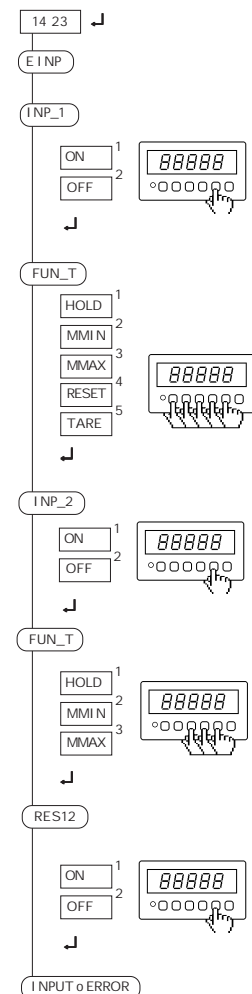|			
Parameter «INP_1»	Contact 1		
	ON	Active	
	OFF	Not Active	
Parameter «FUN_T»	Function assigned to Contact1		
Parameter «INP_2»	Contact 2		
	ON	Active	
	OFF	Nor Active	
Parameter «FUN_T»	Function assigned to Contact2		
Parameter «RES12»	RESET12		
	Function «Reset» when connecting contacts 1 and 2 simultaneously		
	ON	Active	
	OFF	Nor Active	

Exiting the Menu
Mesage «INPUT» .- confirms that the parameters have been accepted

Message «ERROR» .- informs that at least one of the values is not correct, and the whole configuration could not be applied. Repeat the process from the begining.

Default Configuration
When entering code «14 22» to apply a unit reset, the TEK option is configured as follows :

	STATE	FUNCTION
CONTROL 1	OFF	HOLD
CONTROL 2	OFF	HOLD

Datasheet

WARRANTY.

FEMA ELECTRÓNICA, S.A. warrants this product free of manufacture defects for two years 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 has 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 FEMA ELECTRONICA, S.A. will repair or replace at its own discretion the material which results to be faulty.
Attach with the material a copy of the invoice and delivery note, with a description of the malfunction, and ship it free of charge and properly packed to your local distributor or to the following address

FEMA ELECTRONICA, S.A.
Altimira 14 (Talleres-14, Nave-2)
P.I. Santiga
P.O. Box 49
E 08210 BARBERÀ DEL VALLÈS
BARCELONA (SPAIN)

LIMITATION OF LIABILITY

FEMA ELECTRONICA, 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 ELECTRONICA, S.A. liability shall not exceed the purchase price paid of the product upon which liability is based. In no event shall FEMA ELECTRONICA, S.A. be liable for consequential, incidental or special damages.

INSTALLATION

PRECAUTIONS.- Installation and use of this unit must be done by qualified operators. The unit has not AC (mains) switch, neither internal protection fuse, and it will be in operation as soon as power is connected. The installation must contain an external mains switch with protection fuse plus 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.
External Protection Fuse to be added :
for 230 Vac : **80mA fuse TimeLag** as IEC 127/2
for 115 Vac : **125mA fuse TimeLag** as IEC 127/2

SAFETY PRESCRIPTIONS.- These instruments have been designed and tested according to EN-61010-1 rules and are delivered in good operational conditions. This user 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, if reconnection is required, disconnect the AC (mains) power before such wiring is attempted. Install the unit in a place with good ventilation to avoid excessive heating, and far from electrical noise sources 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 connection instructions). Characteristics of the power supply are showed on the characteristics label attached to the instrument. Please make sure 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.

WARNING.- On units with DC power supply, be careful with the polarity indicated for each terminal.

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

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

When shielded wires are used, leave unconnected the shield on the indicator side and connect the other end of the shield to the ground terminal of the machine.

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 on a 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

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.