

**KOSMOS SERIES**



**DIGITAL PANEL THERMOMETER**



**MODEL MICRA-T**

**INSTRUCTION MANUAL**

EDITION: April 2001  
CODE: 30727001

**MICRA-T  
English**

## INTRODUCTION TO THE KOSMOS MICRA-T SERIES

**This manual does not constitute a formal agreement. All information given in this manual is subject to change without notice.**

DITEL brings a new philosophy in digital panel instrumentation by using multipurpose, modular-concept devices providing a rich array of basic functions and advanced capabilities.

With a fully MODULAR DESIGN, it is possible to implement a wide variety of applications simply by adding the desired option(s).

Built-in intelligence allows the meter to recognize the options installed and implement the necessary parameters to properly function within desired parameters. The basic instrument without output options omits these data in the program routines.

CALIBRATION is performed at the factory eliminating the need for adjustment potentiometers. Any circuit or option liable to be adjusted incorporates a memory where calibration parameters are stored, making it possible the optional cards be totally interchangeable without need of any subsequent adjustments.

Custom CONFIGURATION for specific applications can be made quickly and easily through three or five front panel keys, following structured choice menus aided by display prompts at each programming step.

Other features of the LC1x08 family include :

- CONNECTIONS via plug-in terminal blocks without screws and CLEMP-WAGO clips cable retention system.
- DIMENSIONS  
Models ALPHA & BETA 96x48x120 mm DIN 43700  
Models JUNIOR, JUNIOR20, & MICRA 96x48x60 mm DIN 43700
- CASE MATERIAL UL-94 V0-rated poly-carbonate.
- PANEL INSTALLATION by means of single part fingertip without screws.

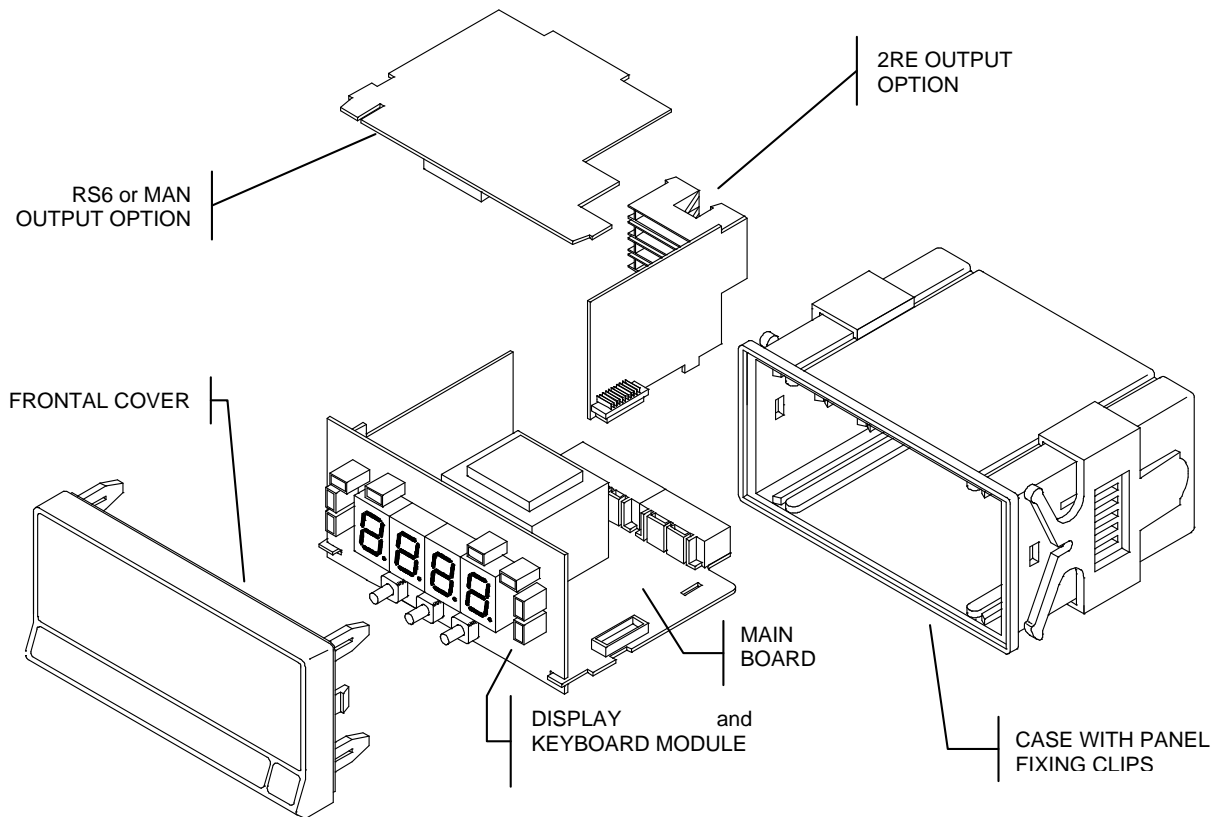
To guarantee the meter's technical specifications, it is advised to check calibration parameters at periodical intervals according to the ISO9001 standards for the particular application operating criteria.

Recalibration of the meter should be made at the factory or in a qualified laboratory.

# MICRA-T

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## 1. MODEL MICRA-T

The MICRA-T model is a four-digit, small format instrument that accepts virtually any voltage or current process signal to measure process variables with direct indication in engineering units.

Designed as simple, low-cost indicators but keeping the high performance qualities of the MICRA series, the MICRA models are well suited for applications of indication only with the possibility of incorporating communication outputs or analog output and setpoint control.

Fully software programmable, the MICRA-T model provides selectable input type sensor Pt100 or Thermocouple J,K,T.

Software configuration allows selection of reading units (Celsius or Fahrenheit), resolution (degrees or tenths of degree) and offset (-99 to 99 points).

Other standard features of the indicator are memory storage and display of the maximum (peak) and minimum (valley) readings as well as tare operation and reset of these memories.

The basic instrument is a soldered assembly composed of the main board, the display and keyboard module and the input card.

Extended capabilities are furnished by an optional output card that incorporates the RS232C and RS485 (RS6) communication protocols or analogue 4-20 mA output card (MAN) and a control card with 2 SPDT 8A relays (2RE).

Each option provides independent connectors protruding out of the rear of the meter, status LED's visible from the front and a specific programming module which is automatically activated once the card is installed.

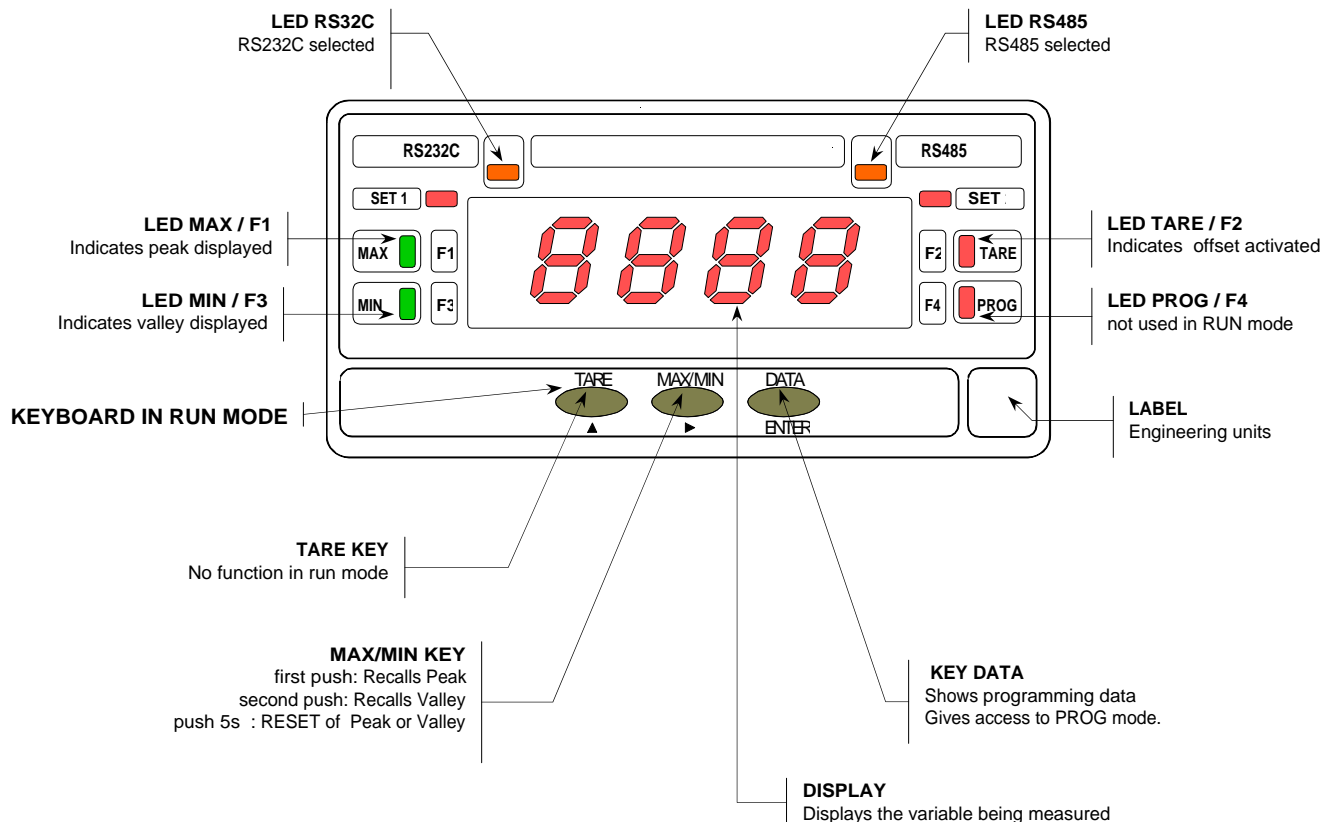
The outputs are opto-isolated with respect to the input signal, to the relay outputs and the power supply.



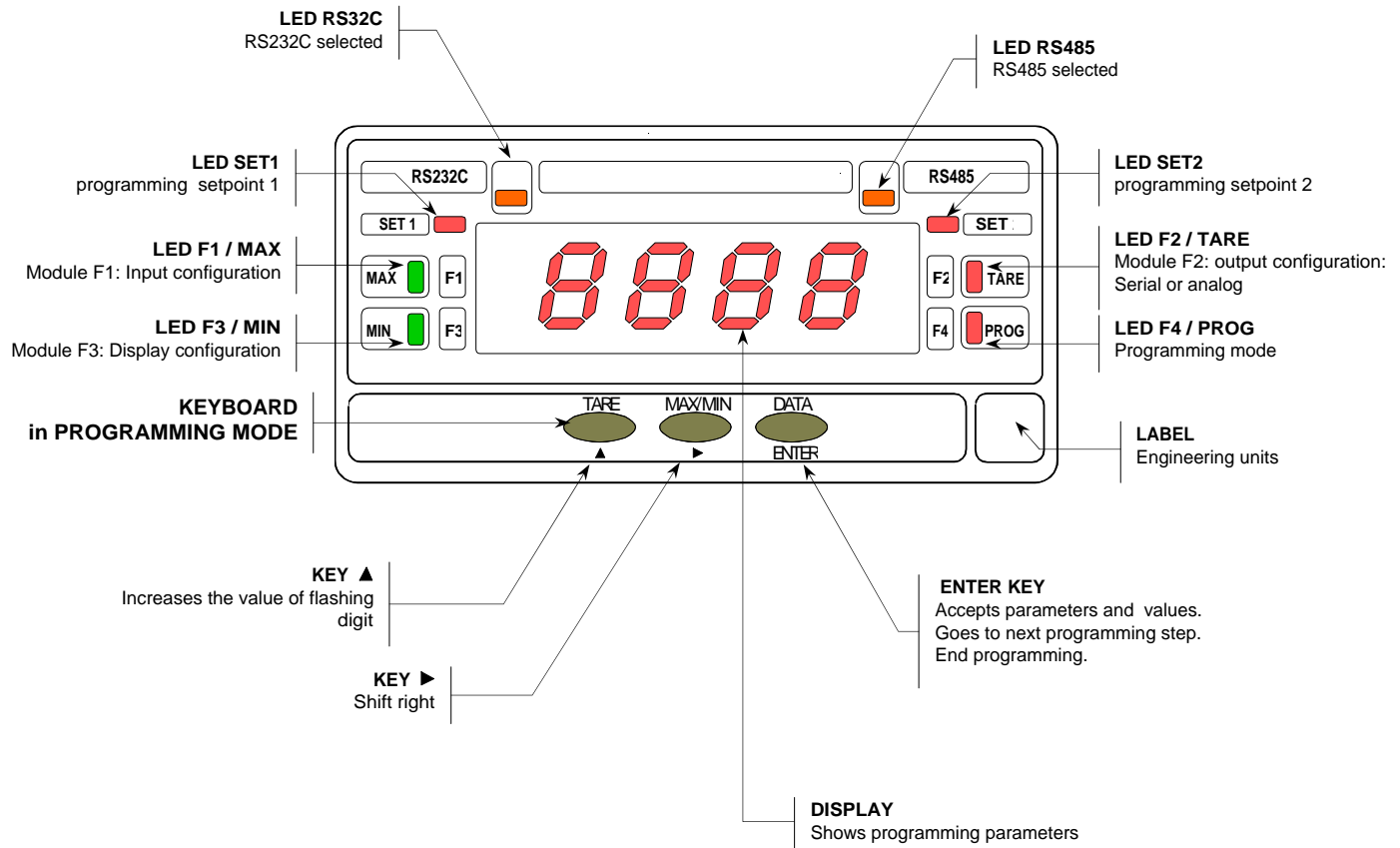
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This instrument conforms the following community standards: 89/336/CEE and 73/23/CEE  
**WARNING:** Refer to the instructions manual to preserve safety protections.

## FRONT-PANEL FUNCTIONS DESCRIPTION (RUN MODE)



# FRONT-PANEL FUNCTIONS DESCRIPTION (PROG MODE)



## 2. OPERATING INSTRUCTIONS

### PACKING CONTENTS

- ☐ Instructions manual in English.
- ☐ The digital panel instrument MICRA-T.
- ☐ Accessories for panel mounting (sealing gasket and fixing clips).
- ☐ Accessories for wiring connection (removable terminal block connectors and fingertip).
- ☐ Wiring label affixed to the instrument's case. Set of labels with different engineering units.
- ✓ **Check packing contents.**

### CONFIGURATION

#### Power supply (pages 9 & 10)

- ☐ The instruments for 115/230V AC power supply, are set up at the factory for 230V AC. **(USA market 115 V AC).**
- ☐ The instruments for 24/48V AC power supply, are set up at the factory for 24V AC.
- ☐ If the instrument is supplied for 12V DC, 24V DC or 48V DC power supply, it is not necessary to make any change.
- ✓ **Check wiring label before connecting the instrument to the mains supply.**

#### Programming instructions (page. 11)

- ☐ The software inside the instrument allows configuring the input parameters. If a 2RE, MAN or a RS6 option is installed, the software detects it on power up enabling a specific routine for its configuration.
- ✓ **Read carefully this paragraph.**

#### Input type (page 13-15)

- ☐ The instrument provides inputs for Pt100 or Thermocouple J,K or T.
- ✓ **Check transducer type.**

#### Programming lockout (page 16)

- ☐ As shipped from the factory, the instrument allows full access to change programming parameters. To disable the possibility of making changes on the configuration, it is necessary to remove a plug-in jumper located on the solder side of the display board.
- ✓ **Check jumper position.**

## 2.1 – Power supply and connectors

To change the meter's physical configuration remove the case as shown in figure 9.1.

**115/ 230 V AC:** The instruments with 115/230 V AC power are set up at fabrication for 230 V AC (**USA market 115 V AC**), see figure 9.2. To change power supply configuration to 115 V AC, make the jumpers indicated in figure 9.3 and table 1. The wiring label should be modified to match the new configuration.

**24/ 48 V AC:** The instruments with 24/48 V AC power are set up at fabrication for 24 V AC, see figure 9.2. To change power supply configuration to 48 V AC, make the jumpers indicated in figure 9.3 and table 1. The wiring label should be modified to match the new configuration.

### 12, 24 or 48V DC:

Instruments for DC power are set up for the supply voltage specified in the wiring label (12V, 24V or 48V according to the order reference).

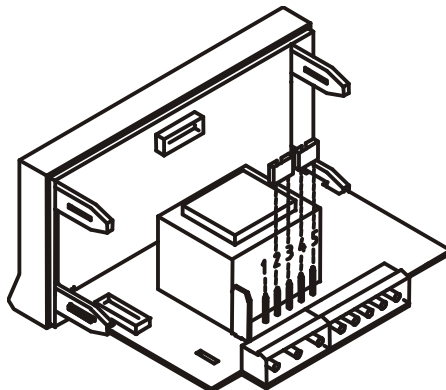


Fig. 9.2. Jumper settings for 230 V or 48 V AC

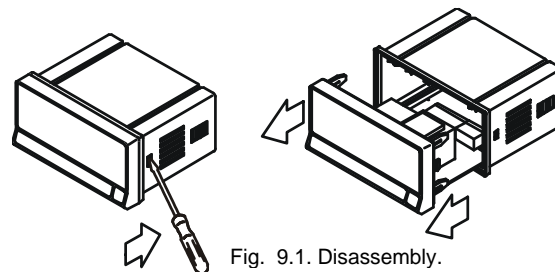


Fig. 9.1. Disassembly.

Table 1. Jumper settings.

Pin	1	2	3	4	5
230V AC	-	[Jumper]		[Jumper]	
115V AC	[Jumper]		[Jumper]		-
48V AC	-	[Jumper]		[Jumper]	
24V AC	[Jumper]		[Jumper]		-

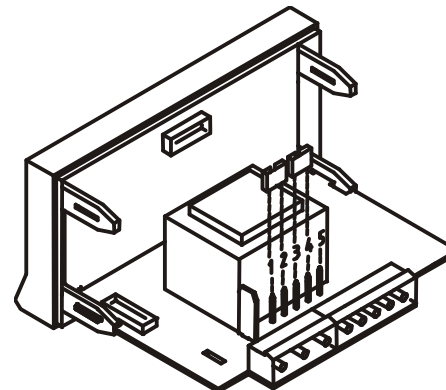
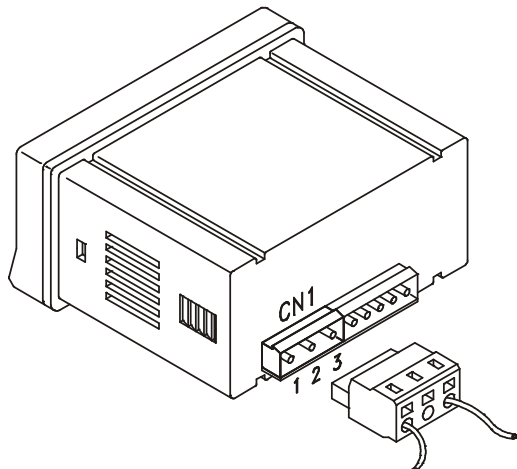


Fig. 9.3. Jumper settings for 115 V or 24 V AC

## POWER CONNECTION



### AC VERSIONS

PIN 1 – AC PHASE

PIN 2 – GND (GROUND)

PIN 3 – AC NEUTRAL

### DC VERSIONS

PIN 1 – DC POSITIVE

PIN 2 – Not connected

PIN 3 – DC NEGATIVE

### INSTALLATION

To meet the requirements of the directive EN61010-1, where the unit is permanently connected to the mains supply it is obligatory to install a circuit breaking device easy reachable to the operator and clearly marked as the disconnect device.

### WARNING

In order to guarantee the electromagnetic compatibility, the following guidelines should be kept in mind :

- Power supply wires may be routed separated from signal wires. Never run power and signal wires in the same conduit.
- Use shielded cable for signal wiring and connect the shield to the ground of the indicator (pin2 CN1).
- The cables section should be  $\geq 0.25 \text{ mm}^2$

**If not installed and used in accordance with these instructions, protection against hazards may be impaired.**

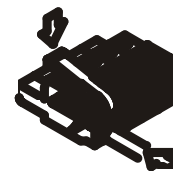
## CONNECTORS

To perform wiring connections, remove the terminal block from the meter's connector, strip the wire leaving from 7 to 10mm exposed and insert it into the proper terminal while pushing the fingertip down to open the clip inside the connector as shown in the figure.

Proceed in the same manner with all pins and plug the terminal block back to the corresponding meter's connector.

Each terminal can admit wires of section between  $0.08 \text{ mm}^2$  and  $2.5 \text{ mm}^2$  (AWG 26 ÷ 14).

Some terminals have removable adaptors to provide proper fastening for wires of sections less than  $0.5 \text{ mm}^2$ .



## 2.2 – Programming instructions

### To enter in the programming mode

Connect the meter to the main supply, for approx. 1s a self-test routine automatically activates all the digits of the display. After, the instrument goes to the normal operating mode (RUN).

To enter in the programming mode press **ENTER**. On the display will appear **Pro** and F4 led activated. This led remains on as long as we are in programming mode.

### To exit from the programming mode

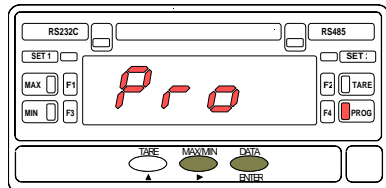
To return to the run mode, it is necessary to pass through the different menus with **▶**, until the led F4/ PROG is the only activated led. Then push **ENTER**. After, it automatically goes to the normal operating mode.

### How to interpret the programming instructions

The programming software routine is composed by a series of hierarchically organized menus, each allowing the setting of a specific parameter. In general, the normal sequence at each step is to push the **▶** key a number of times to make changes and the **ENTER** key to store them into the memory and advance to the next step.

The elements used along the programming instructions are described following.

#### [11.1] Programming mode



The programming instructions for each menu step are accompanied by a figure representing the display indication for the corresponding parameter. Pay special attention to the LED indications and active keys and follow the procedure described on the text to introduce correctly the desired data.

When the display indication is represented with blank segments, it means that this is one of the possible options of this menu (normally the default one) depending on the previous selection.

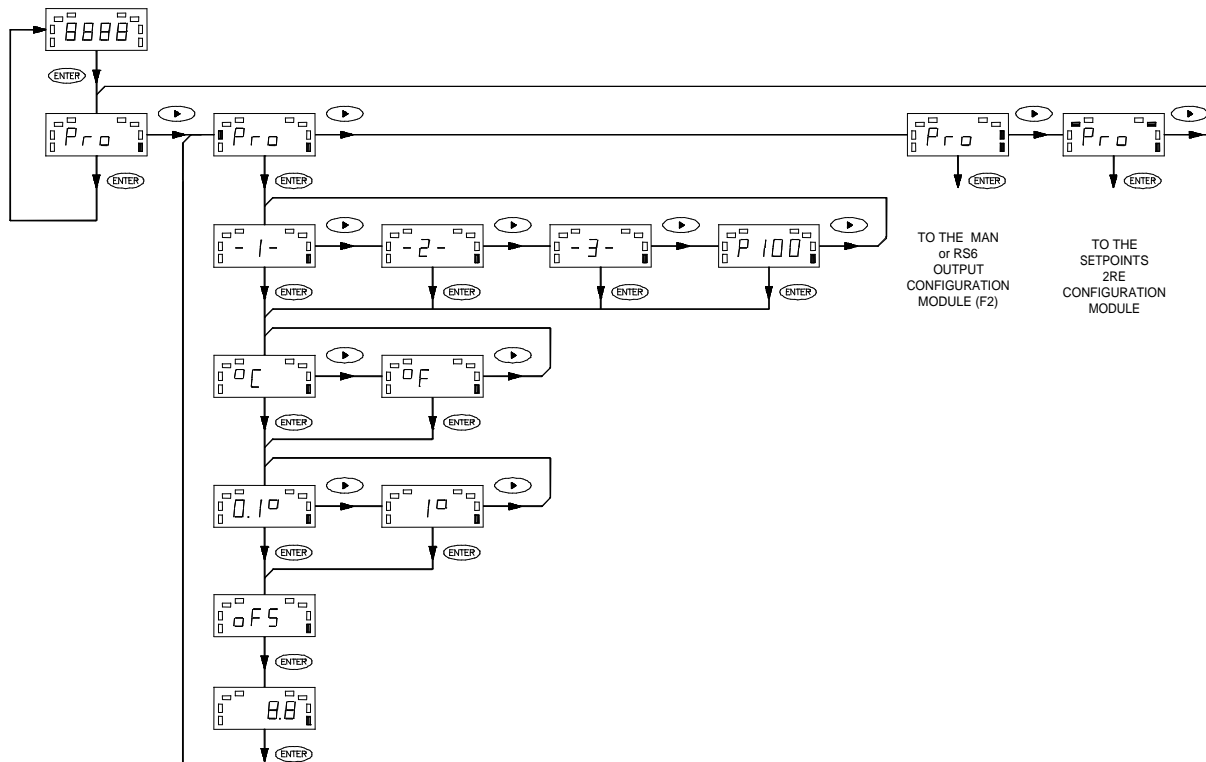
A series of blanked '8' represents any numerical value that can be changed by use of keys **▶** and **▲** (change digit) and (change value).

## 2.3 – Input configuration.

The figure shows the diagram of the MICRA-T programming routine where the MODULE 1 of input configuration has been developed. The parameters to be configured are:

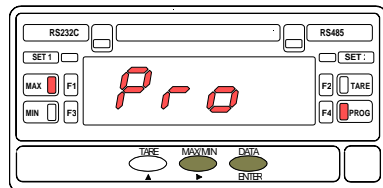
Sensor type , temperature units, resolution and if necessary offset.

To access to the selection of the input parameters, press **ENTER** to move on from the run to the programming mode (**Pro** indication, **PROG** LED activated) and **▶** to get input menu.



## MENU F1 - INPUT CONFIGURATION

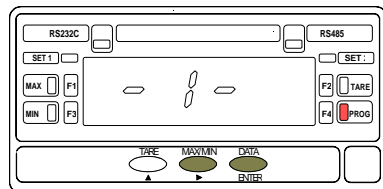
### [13.1] Beginning



The entry level of the input configuration module is represented by the fig. 13.1 (leds F1 y PROG activated). Press **ENTER** to get access to this module.

Once completed the entire program sequence, the instrument returns to this stage. To return to the run mode, press **▶** and, when only the PROG LED is activated, press **ENTER** to save changes in the memory and exit from the programming mode.

### [13.2] Input type

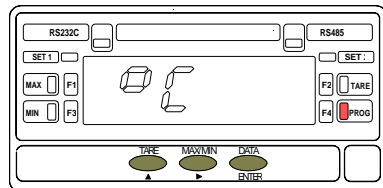


Pressing **ENTER** (from the previous step) allows access to the input type selection menu.

Choose from one of three types of thermocouple inputs : **-1-** (thermocouple J), **-2-** (thermocouple K), **-3-** (thermocouple T) or P100 ( Pt100 input).

Press the **▶** key to change the input type to the desired setting and press **ENTER** to save the selection and advance to the next program step.

### [13.3] Unit



The current reading units appear on the display. Figure 14.2 shows one of the two possible options [**°C** = Celsius, **°F** = Fahrenheit]. To change this parameter, press the **▶** key to switch to the desired units. Press **ENTER** to save the selection and advance to the next program step.

## [14.1] Resolution

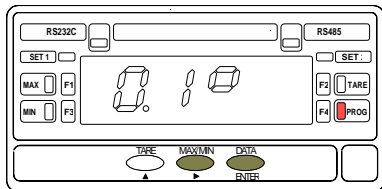


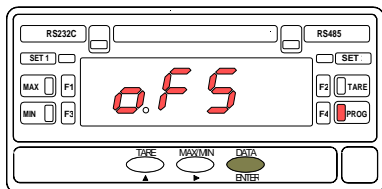


Fig. 14.1 shows the previously selected resolution. To modify, press  key until the display show the desired resolution [**0.1°** = or **1°** = resolution]. Then, press  key to validate the choice and pass to the next step.

## [14.2] OFFSET function

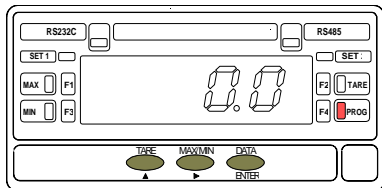




The indication shown in fig. 13.2 is viewed for 2 seconds before the offset is allowed to be programmed on next step.


Generally, it won't be necessary to program any amount of offset except in those cases in which a known difference may exist between the actual temperature and the one the sensor reads. For example, if the sensor is located in a place where there is a 10 degree below the temperature under control, it should be desirable to introduce an offset of +10°.

After 2 s or by pushing , the instrument goes to the offset programming stage.

## [14.3] OFFSET value



The previously programmed offset appears on the display with the first digit in flash. To change the value, press  to increment the active digit value (the first digit can only be '0' or a minus sign). Press  to shift to the next digit to be modified and repeat these operations until desired offset is completed on the display. The offset is programmable from -9.9 to +9.9 with resolution of 0.1° and from -99 to +99 with resolution of 1°.

Press  to validate changes and exit from the input configuration. The "TARE"

## 2.4. – Input signal connection

Refer to the transducer's specifications and to the wiring advisements given in page 10.

### **SIGNAL CONNECTION (CN2)**

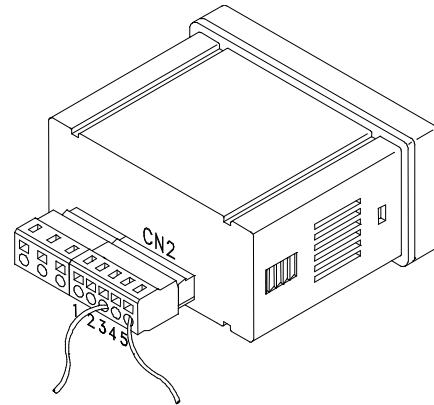
PIN 1 = -TC (signal negative)

PIN 2 = +TC (signal positive)

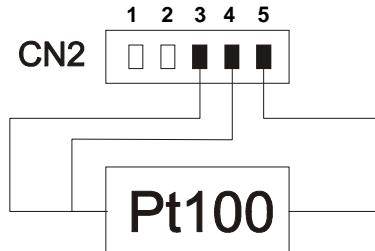
PIN 3 = Pt100

PIN 4 = Pt100

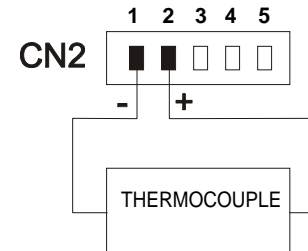
PIN 5 = Pt100 (Common)



Wiring schematic for Pt100  
with three wires



Wiring schematic for thermocouple J, K or T  
with two wires



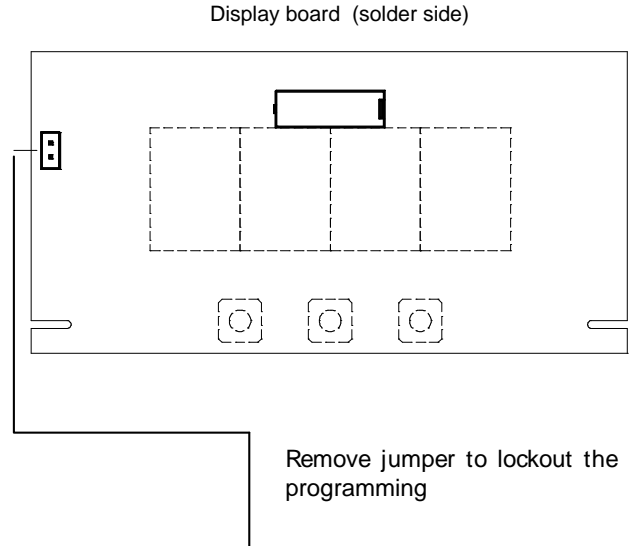
## 2.6 – Programming lockout

After completing the instrument's programming, it is recommended to lockout the access to the programming to prevent from accidental or unauthorized modifications.

This operation is made by taking off a plug-in jumper located on the solder side of display board circuit (see figure at right).

**NOTE : Disconnect power before changing the jumper position.**

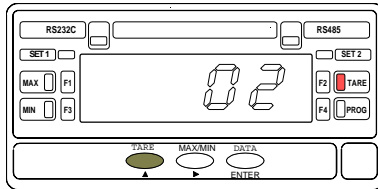
While the instrument is locked out it is however possible to access to the programming routines to check the current configuration, but it won't be possible to entry or modify data. In this case, a push of **ENTER** to access the programming routines will show the indication **dALA** instead of **Pro**.



### 3. MEMORY FUNCTIONS

MICRA-T provides three keys, all of them are operative in the programming mode while only **TARE** and **MAX/MIN** can be used in the run mode. It also provides four LED's for control functions , two for output status indication and two more for serial option.

OFFSET. Normally it's not necessary to program an offset but it should be useful to compensate differences due to the sensor position or other reason.



[22.1] Offset in the memory

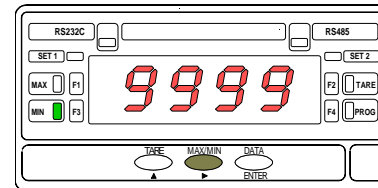
#### MAX/MIN.

The instrument detects and memorizes the maximum and minimum values (peak and valley) reached by the variable after the last reset.

The peak and valley values can be displayed at any moment during normal operation by pressing **MAX/MIN**.

The first stroke recalls the peak value and illuminates the "MAX" led. The second stroke recalls the valley value and activates the "MIN" led. The third stroke deactivates the led and returns the meter to the normal reading.

To erase the peak and valley memories, press **MAX/MIN** to display the value wanted to be eliminated ( "MAX and MIN" leds indicate which one is present on display). Press again **MAX/MIN** and hold it for 5s after which the display shows -999 or 9999 indicating that the peak or valley memory respectively has been reset back to these values.



[22.2] Reset of MIN value.

## 4. OUTPUT OPTIONS

As an option, the LCI-208-1x model can incorporate one or two of the following output cards ( The LCIA-10 and the LCIA-06 options are exclusive and can not be installed together in the same instrument)

- A serial outputs card with RS232C and RS485 communications protocol, 1200 to 9600 baud half-duplex. Both types are included in the option but only one of them can be operative as selected via software. **THIS OUTPUT SHOULD NEVER BE CONNECTED TO THE TELEPHONE LINES.**  
**Ref. RS6**

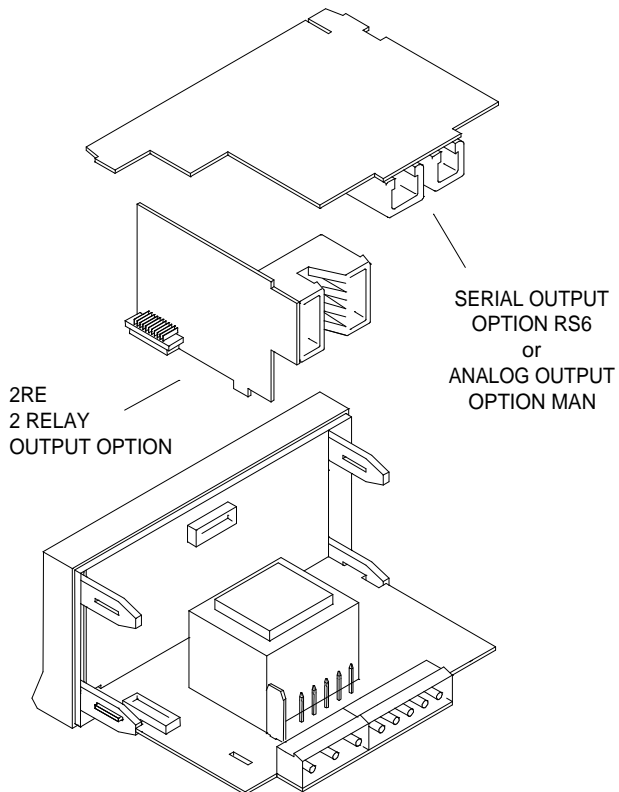
- An analog output card that drives out a 4-20 mA signal proportional to a user-defined display range.  
**Ref. MAN**

- A control card with 2 SPDT 8 A @ 250 V AC / 150 V DC. The outputs provide selectable HI/LO mode and programmable hysteresis or time delay.  
**Ref. 2RE**

The output options consist of additional cards that are supplied with their specific instructions manual describing characteristics, installation, programming and operation.

Once installed in the meter's assembly by means of plug-in connectors, a program module is automatically included in the software routines.

For more detailed information on characteristics, applications, mounting and programming, please refer to the specific manual furnished with the option.



## 5. TECHNICAL SPECIFICATIONS

### INPUT SIGNAL

- Configuration.....differential asymmetrical
- Cold junction compensation..... -10°C to 60°C
- Excitation current for Pt100 ..... < 1 mA
- Max. lead resistance..... 40 Ω/ wire (balanced)

Input	Range (res. 0.1 °)	Range (res. 1°)
TC J	-50.0 a +200.0 °C	-50 a +800 °C
	-58.0 a +392.0 °F	-58 a +1562 °F
TC K	-50.0 a +200.0 °C	-50 a +1250 °C
	-58.0 a +392.0 °F	-58 a +2282 °F
TC T	-100.0 a +100.0 °C	-200 a +400 °C
	-100.0 a +212.0 °F	-328 a +752 °F
Pt100	-100.0 a +200.0 °C	-100 a +800 °C
	-100.0 a +212.0 °F	-148 a +1472 °F

### ACCURACY A 23° ± 5° C

- Error max.:
  - Pt100 (res. 0.1 °C).... ± (0.1% of the reading +0.2 °C)
  - Pt100 (res. 1 °C)..... ± (0.1% of the reading +0.6 °C)
  - TC (res. 0.1 °C) ..... ± (0.2% of the reading +0.5 °C)
  - TC (res. 1 °C) ..... ± (0.2% of the reading +1 °C)
- Cold junction ..... ±(0.05 °C/ °C +0.25 °C)
- Temperature coefficient ..... 100 ppm/ °C
- Warmup time..... 5 minutes

### POWER SUPPLY

- AC ..... 230/115 V, 24/48 V ±10% 50/60 Hz AC
- DC .. 12V (10.5 to 16V), 24V (21 to 32V), 48V (42 to 64V)
- Consumption ..... 3 W

### FUSES (DIN 41661)

- MICRA-T(230/115V AC)..... F 0.1A / 250 V
- MICRA-T2 (24/48V AC)..... F 0.2A / 250 V
- MICRA-T3 (12 V DC) ..... F 1A / 250 V
- MICRA-T4 (24 V DC) ..... F 0.5A / 250 V
- MICRA-T5 (48 V DC) ..... F 0.5A / 250 V

### A/D CONVERSION

- Technique.....dual slope
- Resolution ..... (± 2000 counts)
- Rate ..... 12/ s

### DISPLAY

- Type ..... -999/ 9999, 4 red 14 mm digits
- Decimal point..... programmable
- LED's.....4 for control and 4 for output status
- Update time.....330 ms
- Over-range or sensor-break indication ..... OvE

### ENVIRONMENTAL

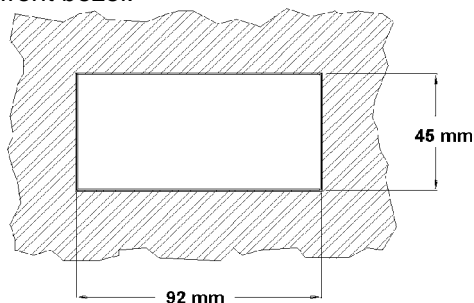
- Indoor Use
- Operating temperature ..... 0 °C to +50 °C
- Storage temperature ..... -25 °C to +85 °C
- Relative humidity (non condensing)..... <95 % at 40 °C
- Max Altitude ..... 2000 meters

### DIMENSIONS

- Dimensions .....96x48x60 mm
- Panel cutout ..... 92x45 mm
- Weight ..... 250 g
- Case material..... polycarbonate s/UL 94 V-0

## 5.1 - Dimensions and mounting

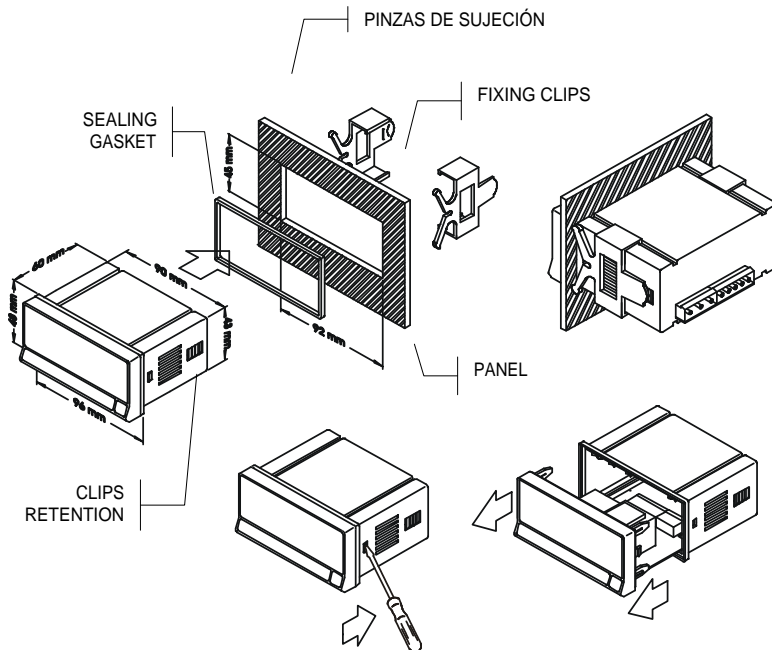
To install the instrument into the panel, make a 92x45mm cutout and insert the instrument from the front placing the sealing gasket between this and the front bezel.



Place the fixing clips on both sides of the case and slide them over the guide tracks until they touch the panel at the rear side.

Press slightly to fasten the bezel to the panel and secure the clips.

To remove the instrument from the panel, pull outwards the fixing clips rear tabs to disengage and slide them back over the case.



**CLEANING:** The front cover should be cleaned only with a soft cloth soaked in neutral soap product.  
**DO NOT USE SOLVENTS**



## 6. WARRANTY

All products are warranted against defective material and workmanship for a period of three years from date of delivery.

If a product appears to have a defect or fails during the normal use within the warranty period, please contact the distributor from whom you purchased the product.

This warranty does not apply to defects resulting from action of the buyer such as mishandling or improper interfacing.

The liability under this warranty shall extend only to the repair of the instrument ; no responsibility is assumed by the manufacturer for any damage which may result from its use.



# DECLARATION OF CONFORMITY

*Manufacturer :* DITEL - Diseños y Tecnología S.A.

*Address :* Travessera de les Corts, 180  
08028 Barcelona  
ESPAÑA

*Declares, that the product:*

Name : Indicador Digital

Model : **MICRA-T**

*Conforms with :* EMC 89/336/CEE  
LVD 73/23/CEE

*Date:* 25 March 1999

*Sign:* José M. Edo

*Position:* Technical Manager



*Applicable Standards:* **EN55081-1** Generic emission  
EN55022/CISPR22 Clase B

*Applicable Standards:* **EN50082-1** Generic immunity  
IEC1000-4-2 Level 3 Criteria B  
Air Discharge 8kV  
Contact Discharge 6kV

IEC1000-4-3 Level 2 Criteria A  
3V/m 80..1000MHz

IEC1000-4-4 Level 2 Criteria B  
1kV Power Lines  
0.5kV Signal lines

*Applicable Standards:* **EN61010-1** Generic Safety  
IEC1010-1 Installation Category II  
Transient Voltages <2.5kV  
Pollution degree 2  
Conductive pollution excluded  
Insulation Type  
Enclosure : Double  
Inputs/Outputs: Basic