

CONTENTS

■ Safety warnings	Page	13
■ Technical specifications	Page	14
■ Description of instrument	Page	15
■ Electrical connections	Page	15
■ Operation	Page	15
■ Setting the parameters	Page	16
■ Parameter menu	Page	17
■ Error messages	Page	19
■ Reference standards	Page	19
■ Dimensions and connection diagrams 33x75 mm	Pages	20-21
■ Dimensions and connection diagrams 72x72 mm	Pages	22-23

SAFETY WARNINGS

- **During the installation and operation of the instrument, the following instructions should be adhered to:**
 - 1) The instrument should be installed by a skilled person.**
 - 2) Always follow the connection diagrams closely to install the instrument.**
 - 3) Do not power or connect the instrument if any part of it is damaged.**
 - 4) Before touching the terminals, make sure the wires to be connected to the instrument are not live.**
 - 5) The connection cables should be able to resist the maximum operating temperature (T_{max}), obtained from the sum of the maximum ambient temperature (T_a) + a temperature of 20 °C (T_{max}= T_a + 20 °C)**
 - 6) The instruments guarantee main insulation between the low voltage parts (250 V) and the very low voltage parts.**
 - 7) Any external switches connected to the control should guarantee a minimum insulation at the operating temperature of 250 V AC or should be protected by an equivalent insulation.**
 - 8) The instruments require no maintenance.**

TECHNICAL SPECIFICATIONS

- TM series of digital thermometers for the measurement and display of the temperature using thermocouple or thermal resistance probes.
- Three dedicated models for probe input:
 - **Thermal resistance PTC (Positive Temperature Coefficient)** - Ni, Pt
model TM NiPt
 - **Thermal resistance NTC (Negative Temperature Coefficient)**
model TM NTC
 - **Thermocouples TC** - J, K, L, R, S, T, E, N
model TM JK
- Setting of programming probes.
- Two probe inputs for model TM *NTC-P3D* - for the measurement of two temperatures that can be displayed either through the closure or opening of an outside consensus to be connected to the instrument.
- Thermometers with led 3 digit, seven segment and decimal point display 3 (excluding the model TM *JK-P7A*, with 4 digits and maximum display of +1600 °C).
- Display range: -99 ÷ +999 °C (excluding model TM *JK-P7A*, with 4 digits and display range -99 ÷ +1600 °C).
- Display resolution: 0.1 °C (-9.9 ÷ +99.9 °C)
e 1 °C (< -9.9 °C e > +99.9 °C).
- Precision: ±0.5 % of the end of scale value ±1 digit (at ambient T 23 °C).
- Sampling time: 0.5s.
- Possibility of displaying the minimum and maximum temperature.
- Possibility of varying the probe calibration offset.
- Possibility of varying the temperature measurement unit between °C and °F.
- Possibility of varying the update speed for the display of the measurement.
- Possibility of entering an access password for the protection of the settings.
- Acoustic and visual alarm warning due to probe malfunction or sensor cable disconnected.
- Infrared receiver with RC-5 protocol (models TM *NiPt* - ..P3.. and TM *JK* - ..P3... only) for remote control (accessory available separately for remote programming).
- Available in 33x75 mm and 72x72 mm rear panel versions.
- Power supply: see table on the following page.
- Rated power: 3 VA for the 33x75 models.
4.5 VA for the 72x72 models.
- Max absorption: 100 mA at 12 V - 50 mA at 24 V.
- Operating temperature: 0 ÷ +50 °C.
- Operating humidity: <80%.
- Storage temperature: -10 ÷ +70 °C (<80% RH).
- Protection level: front panel IP54
terminals IP20

Rear panel 33x75 mm

Code	Model	Power supply (*)	Probe inputs	Digital input	Infrared receiver
VM620200	TM NiPt-P3D	from 12 to 24 V AC/DC 50/60 Hz	1	NO	YES
VM622800	TM NTC-P3D	from 12 to 24 V AC/DC 50/60 Hz	2	YES	NO
VM624400	TM JK-P3D	from 12 to 24 V AC/DC 50/60 Hz	1	NO	YES

Rear panel 72x72 mm

Code	Model	Power supply (*)	Probe inputs	Digital input	Infrared receiver
VM619400	TM NiPt-P7A	24/230 V AC 50/60 Hz	1	NO	NO
VM621000	TM NTC-P7A	24/230 V AC 50/60 Hz	1	NO	NO
VM623600	TM JK-P7A	24/230 V AC 50/60 Hz	1	NO	NO

* Power supply voltage tolerance $\pm 10\%$

DESCRIPTION OF INSTRUMENT**Display**

- 3 digit led display with decimal point, with the exception of model TM JK-P7A, with 4 digit led display.

For all the models, the display range is:

- minimum display: $-99\text{ }^{\circ}\text{C}$ or $-9.9\text{ }^{\circ}\text{C}$
- maximum display: $+999\text{ }^{\circ}\text{C}$ ($+1600\text{ }^{\circ}\text{C}$ for model TM JK-P7A) or $+99.9\text{ }^{\circ}\text{C}$

In model TM NTC-P3D, the display of the second temperature is indicated by the led at the position of the marking T2.

Keys

- There are three parameter setting keys:



Parameter confirm and programming/display key.



Parameter increase key or movement to the next parameter.



Parameter decrease or exit menu key.

ELECTRICAL CONNECTIONS

- Adhere strictly to the safety warnings and the instructions in the connection "**diagram section**".

OPERATION**Normal operation**

- This operation is obtained outside the parameter programming mode. In this status, the instrument takes the measurement on the basis of the parameters set. The information displayed is as follows:

- The temperature measured by the sensor
- The indication on the display of the second temperature (model TM *NTC-P3D* only)

Minimum and maximum temperatures

- From normal operation, press “OK” to enter the display of the minimum and maximum temperatures measured. Use the “up” (▲) key to alternate the display of the “HI” and “LO” readings from one to the other by pressing “OK”, to display the temperature required:
 “HI” → “OK” → maximum temperature measured
 “LO” → “OK” → minimum temperature measured
 It is possible to return to normal operation at any time by pressing “down” (▼).
 To zero the minimum (or maximum) temperatures measured, simply hold down the “OK” key for at least 3 seconds following the display of the value or its label.

SETTING THE PARAMETERS

- Access to parameter programming mode is gained by pressing the “up” (▲) and “down” (▼) together for at least 3 seconds.

Note: to reset the default values set in the factory, switch on the instrument while holding down the “OK” key.

The parameters are as follow, grouped into three menus by type:

- 1) **Display** (indicated with [DSP]): probe offset, resolution, measurement unit, measurement filter
- 2) **Sensor** (indicated with [SNS]): type of sensor, sensor parameters
- 3) **System** (indicated with [SYS]): password, enable modification

All the parameters inside the three menus and their values are listed in the section that follows.

- Use the “up” (▲) key to scroll in sequence through the three menus (DPS, SNS and SYS)
- Press “OK” to enter the menu required
- Inside each menu, it is possible to scroll through **the labels of parameters that can be modified** by pressing “up” (▲).
 To display the value of the parameter press “OK” (when “OK” is pressed a second time, the display of the parameter label is restored).
- To modify the value of the parameter, hold down “OK” for at least 3 seconds
- The value of the parameter will start to flash and it will be possible to increase or decrease it with the “up” (▲) and “down” (▼) keys respectively.
- To confirm the value set, press “OK”.
 The parameter will stop flashing and the new value will be displayed
- It is possible to return to normal operation at any time by pressing “down” (▼) (or if no keys are pressed for at least 40 seconds)

Note: if no key is pressed for at least 40 seconds during the modification, the display of the parameter will be restored without saving the modifications made.

Note: during the display and modification of the parameters, the instrument continues to operate with the previously set parameters.

If “password 2” is enabled (access password for the protection of the settings made-see system menu), when the “up” (▲) and “down” (▼) keys are held down for three seconds from normal status, “- - -” will appear. To set the parameters, enter the previously set password (a number from 0 to 255) using the “up” (▲) and “down” (▼) keys and press “OK” to confirm. If the password has been entered correctly, the label of the first menu will appear, otherwise normal status will be restored.

PARAMETER MENU

To simplify the programming operation, the parameters are grouped into menus in the following order:

- [DSP] display menu
- [SNS] sensor menu
- [SYS] system menu

Description of parameters

Inside the tables, the labels are presented in the same order as they appear in the various instrument menus.

[DSP] display menu

Labels of parameters that can be modified	Description	unit	Parameter values		default	notes
			min	max		
SOF	Probe calibration offset	degrees	-50	+50	0.0	(1)
RIS	Resolution displayed	-	HI	LO	HI	(2)
UNI	Temperature measurement unit	-	°C	°F	°C	(3)
FIL	Measurement filter	-	no	yes	yes	(4)

Notes:

- (1) *this value is added to the measurement to compensate for any imprecision*
- (2) *this is the resolution with which the measurement is displayed: 0.1 if “HI” or 1.0 if “LO”*
- (3) **Important:** *if the measurement unit is modified, the parameters set will not be converted, and will have to be recalibrated*
- (4) *if the parameter is set to “yes”, a moving mean over 8 values for the measurement is taken (that is, over 4s approximately). When set to “no” the mean is not calculated*

[SNS] sensor menu

Labels of parameters that can be modified	Description	unit	Parameter values		default	notes
			min	max		
TY0	Sensor type 0	-	0	16		(5)
TY1	Sensor type 1	-	12	16		(6)
GFA	Cold joint connection enabled	-	no	yes	yes	(7)
S01	sensor 0 or 1 displayed	-	S0	S1	S0	(8)

Notes:

(5) the default value of the parameters and sensor depends on the model of instrument. All the sensors installed in relation to the model are listed below:

NiPt Thermal resistances

Type of sensor	Display message
Pt100 (*)	PtE (*)
Ni100	nl

* The instrument is set to this parameter by default

NTC thermal resistances

Type of sensor	Display message
(**)	nt0 (**)
(**)	nt1 (**)
type 4	nt2 (*)
(**)	CSt (**)

* The instrument is set to this parameter by default. This corresponds to the use of the NTC di code VN870200 temperature sensor (see the "Red Line" catalogue under the Thermal Regulation-Temperature Probes item)

** For the use of sensors other than "type 4" above (see note *), it is possible to select one of the three items "nt0, nt1, CSt" corresponding to probes with different temperature and resistance. In these cases, we recommend contacting the Technical Assistance Service directly to identify the type of sensor to be selected.

JK Thermocouples

Type of sensor	Display message
J	J
K (*)	C (*)
L	L
T	t
E	E
N	n
R	r
S	S

* The instrument is set to this parameter by default

(6) the parameter is visible only in the NTC models - this default parameter is not set, the value indicated is "no" and with model TM NTC-P3D only it is possible to select one of the four values indicated in the NTC thermal resistance table

(7) the parameter is visible only in the C models

(8) Important: this parameter is not enabled in any model
To enable the display of the 2nd probe, use the outside input:
contact open-sensor 0 displayed
contact closed-sensor 1 displayed

[SYS] system menu

Labels of parameters that can be modified	Description	unit	Parameter values			notes
			min	max	default	
PS2	password 2	-	0	255	0	(9)
NEN	Parameter modification enable	-	yes	no	yes	(10)

Notes:

- (9) the password is enabled if the parameter is different from 000
 (10) if set to "no", it is not possible to modify any of the other parameters, only to display them

ERROR MESSAGES

- Due to alarms or malfunctions, the display of the measurement may alternate with the display of messages describing the type of alarm. The alarm/error messages possible during operation are described in the table below.

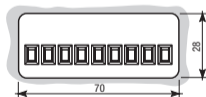
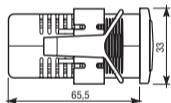
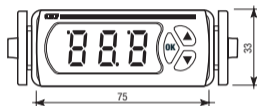
Message	Type of error
ERO	Sensor 1 disconnected or in short circuit.
ER1 (*)	Sensor 2 disconnected or in short circuit.

- * This message is visible only in model TM NTC-P3D

REFERENCE STANDARDS

- For safety: **CEI-EN 60730-2-9**
- For electromagnetic compatibility:
 - CEI-EN 55014-1**
 - CEI-EN 55014-2**
 - CEI-EN 61000-2-2**
 - CEI-EN 61000-2-3**

REAR PANEL DIMENSIONS 33x75 mm

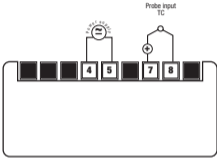


TM *NiPt*-P3D
 TM *NTC*-P3D
 TM *JK*-P3D

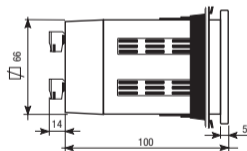
REAR PANEL DIAGRAMS 33x75 mm

Model	Connection diagram
TM <i>NiPt</i> -P3D	
TM <i>NTC</i> -P3D	

REAR PANEL DIAGRAMS 33x75 mm

Model	Connection diagram
TM JK-P3D	 <p>The diagram shows a 4-pin connector with terminals 4, 5, 7, and 8. Terminal 4 is connected to a probe input with a negative sign (-) and a TC symbol. Terminal 5 is connected to terminal 7. Terminal 7 is connected to a probe input with a positive sign (+) and a TC symbol. Terminal 8 is connected to terminal 7.</p>

REAR PANEL DIMENSIONS 72x72 mm

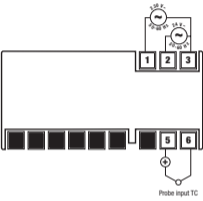


TM NIPt-P7A
 TM NTC-P7A
 TM JK-P7A

REAR PANEL DIAGRAMS 72x72 mm

Model	Connection diagram
TM NIPt-P7A	<p>Probe input PTC 3 wire</p> <p>Probe input PTC 2 wire</p>
TM NTC-P7A	<p>Probe input NTC</p>

REAR PANEL DIAGRAMS 72x72 mm

Model	Connection diagram
TM JK-P7A	 <p>Probe input TC</p>

