

INSTRUCTIONS MANUAL



Temp70 PT100 *vio*



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1. Safety information

- **Definition of warning words and symbols**

This manual contains extremely important safety information, in order to avoid personal injury, damage to the instrument, malfunctions or incorrect results due to failure to comply with them. Read entirely and carefully this manual and be sure to familiarize with the tool before starting to work with it.

This manual must be kept near to the instrument, so that the operator can consult it easily, if necessary. Safety provision are indicated with warning terms or symbols.

- **Reporting terms:**

ATTENTION for a medium-risk hazardous situation, which could lead to serious injury or death, if not avoided.

ATTENTION for a dangerous situation with reduced risk which can cause material damaged, data loss or minor or medium-sized accidents, if not avoided.

WARNING for important information about the product.

NOTE for useful information about the product.

Warning symbols:



Attention

This symbol indicates a potential risk and warns you to proceed with caution.



Attention

This symbol draws attention to a possible danger **from electric current**.



Attention

The instrument must be used following the indications of the reference manual. Read the instructions carefully.



Advice

This symbol draws attention to possible damage to the instrument or instrumental parts.



Note

This symbol highlights information and tips.

- **Additional documents providing safety information**

The following documents can provide the operator with additional information to work with the measuring system safely:

- Specific notes on product safety.

- **Use according to destination**



This instrument is designed exclusively for electrochemical measurements both in the laboratory and directly in the field.

Pay attention to the technical specifications shown in the INSTRUMENT FEATURES / TECHNICAL DATA table; any other use is to be considered unauthorized.

This instrument has left the factory in perfect technical and safety conditions.

The regular functionality of the device and the operator safety are guaranteed only if all the normal laboratory safety standards are respected and if all the specific safety measures described in this manual are observed.

- **Basic requirements for safe use**



The regular functionality of the device and the operator safety are guaranteed only if all the following indications are respected:

- The instrument can be used in accordance with the specifications mentioned above only.
- The instrument must operate exclusively in the environmental conditions indicated in this manual.
- The only part of the instrument that can be opened by the user is the battery compartment.

Any other operation have to be authorised by the manufacturer.

- **Unauthorised use**



The instrument must not run, if:

- It is visibly damaged (for example due to transportation).
- it has been stored for a long period of time in adverse conditions (exposure to direct light, heat sources or places saturated by gas or vapours) or in environments with conditions different from those mentioned in this manual.

- **Device maintenance**



If used correctly and in a suitable environment, the instrument does not require maintenance procedures.

It is recommended to occasionally clean the instrument case with a damp cloth and a mild detergent. This operation must be performed with the instrument off and by authorized personnel only.

The housing is in ABS/PC (acrylonitrile butadiene styrene /polycarbonate). This material is sensitive to some organic solvents, for example toluene, xylene and methyl ethyl ketone (MEK).

If liquids get into the housing, they could damage the instrument.

Do not open the instrument housing: it does not contain parts that can be maintained, repaired or replaced by the user. In case of problems with the instruments, contact your local distributor.

It is recommended to use original spare parts only. Contact your local distributor for information. The use of non-original spare parts can lead to malfunction or permanent damage to the instrument. Moreover, the use of spare parts not guaranteed by the supplier can be dangerous for the user himself.

- **Responsibility of instrument owner**

The person who owns and uses the tool or authorizes its use by other people is the owner of the tool and is responsible for the safety of all users of the tool and third parties.

The owner of the instrument must inform users of the use of the same safely in their workplace and on the management of potential risk, also providing the required protective devices.

When using chemicals or solvents, follow the manufacturer's safety data sheets.

2. Instrumental features

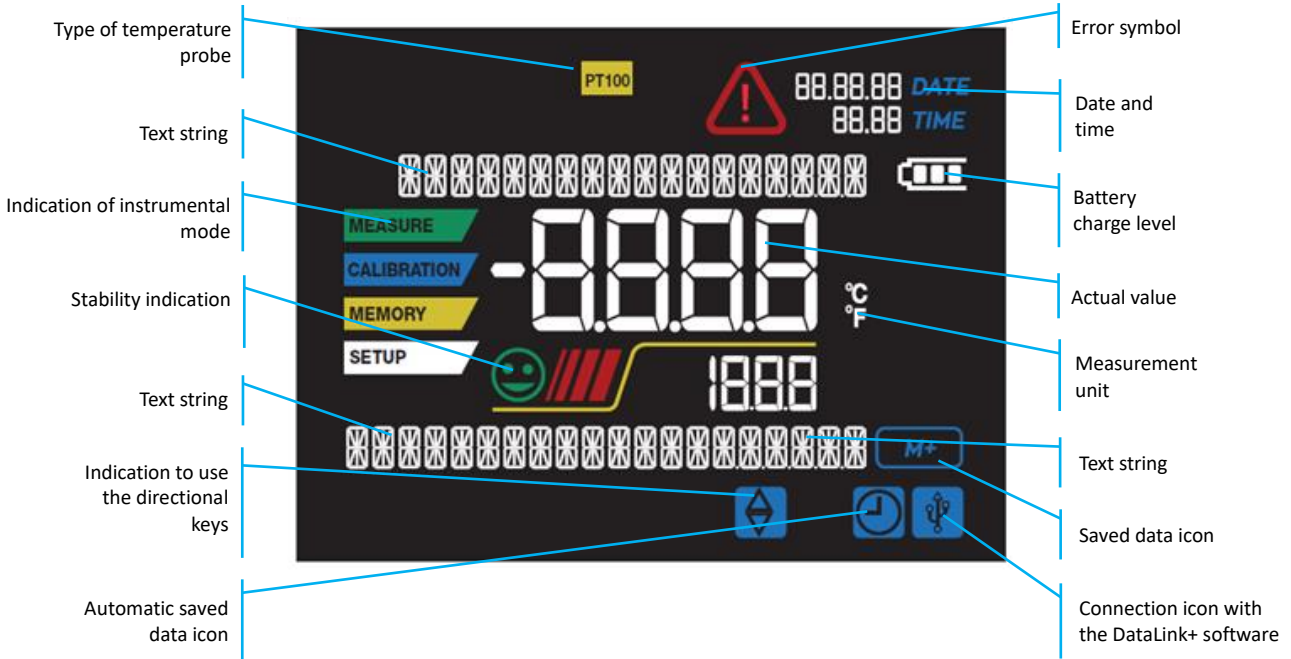
- *Datasheet*



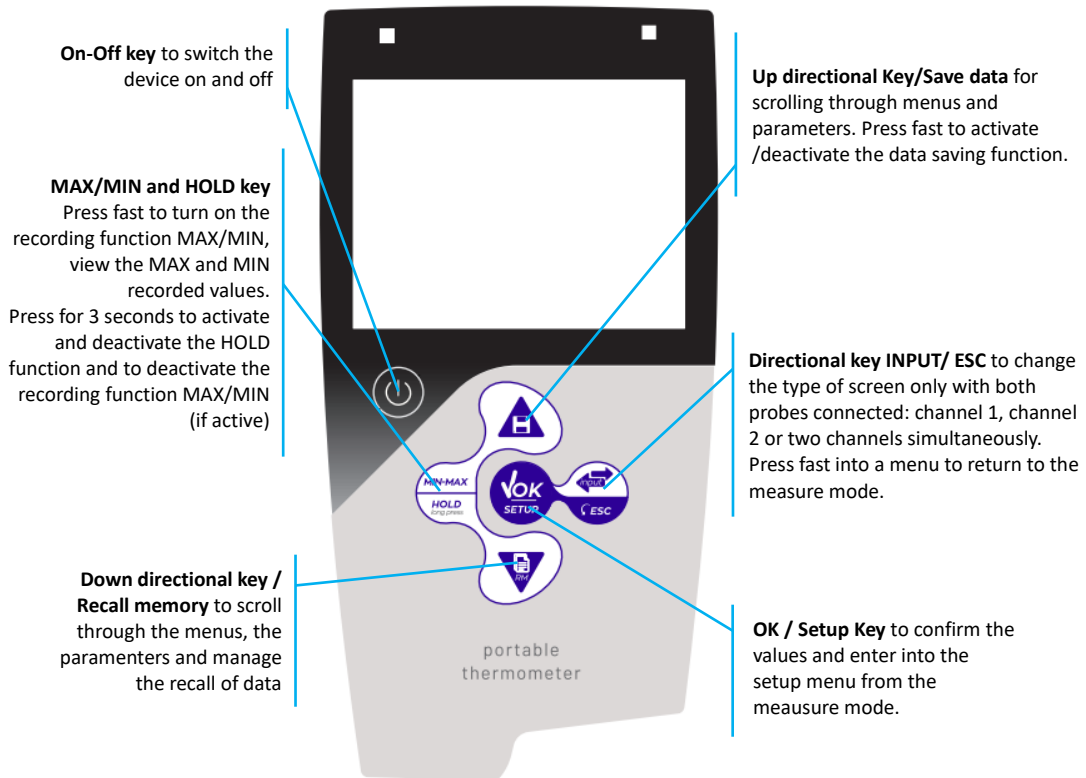
		Instrument
		Temp70 PT100 Vio
Temperature	Probes	PT100 (x2)
	Inputs	Double connector with 3 pins
	Measuring range	-200,0...+999,9 °C
	Resolution	0,01 °C (from -99,99 to +99,99 °C) 0,1 °C elsewhere in the scale
	Accuracy	± 0,03 °C (from -99,99 to +99,99 °C) ± 0,1 elsewhere in the scale
System	Display	Backlit colour LCD
	Brightness and contrast management	Manual and automatic with integrated sensor
	Sleep mode	Yes
	Auto switch-off	Yes, after 20 minutes (deactivable)
	LED indication	Yes
	Reading stability indicator	Yes adjustable (Low-Med-High)
	Stability filter (HOLD)	Yes
	Reading MAX/MIN	Yes
	Offset adjustment	Yes
	Internal memory	1000 data
	Sampling	1 min...99 hours
	Working conditions	Temperature: 0...+60 °C humidity: <95% U.R. (non-condensing)
	Maximum altitude of use	2000 m
	Dimensions	185 x 85 x 45 mm
	Weight	400 g
	IP protection	IP 56
	Sound level during standard operation	< 80 dB
	Power supply	3 x 1,5V "AA" alkaline
Battery life	> 550 hours	
Reference standards	EMC 2014/30/UE RoHS 2011/65/EU EN 61326-1	

3. Instrument description

- **Display**



- **Keypad**



- **LED**

All instruments are equipped with a two-colour LED (red and green) that provides the user with important information on the system status:

Function	LED	Description
Power on	GREEN	Fixed
Power off	RED	Fixed
Standby	GREEN	Flashing every 20 s
Stable measurement	GREEN	Flashing every 3 s
Error during calibration	RED	Flashing every 3 s
Selection confirmation / DataLogger (saving data)	GREEN	Switched on for 1 s
Recall data saved	GREEN/RED	0,5 seconds green and 0,5 seconds red

4. Setup

- **Supplied components**



The instrument is always supplied inside the specific carrying case.

Into the carrying case there are always: instrument with batteries, screwdriver, user manual, connection cable and power supply.

- **Start-up**

- The device leaves the factory ready to be used by the user.
- Batteries are included.

- **Switching On/Off**

Turn on the system by pressing the button . The display initially activates all segments and then appears:

- model and firmware of the instrument;
- information about the calibration of the channel 1 and the channel 2;
- screen of the measured temperature;
- to switch off the instrument, press the key in measure mode.

- **Batteries replacement**



The instrument works with 3 batteries AA 1,5V.

To proceed with the replacement:

1. Turn off the device;
2. Turn the instrument downwards, with the side of the connectors placed on a stable surface: in this way the battery stopper cap will be turned towards the operator;
3. Keep pressed the battery stopper cap with two fingers;
4. Using the screwdriver supplied, completely unscrew the screw closed to the battery symbol;
5. Remove the battery stopper cap with the help of the lanyard;
6. Remove the 3 exhausted batteries and insert the new ones. Pay attention to the correct polarity. Follow the diagram above the battery symbol in the rear compartment of the instrument;
7. Reinsert the battery stopper cap; always keep it pressed with two fingers, insert the screw and tighten.



• **Instrument transportation**

The instrument is always supplied with the appropriate carrying case. Use the original case only, to transport the instrument. If you need to buy it again, contact your local distributor. The interior of the case is shaped to be able to house the instrument and the sensors still connected.

• **Key Functions**

Button	Pression	Function
	Short	Press to turn the device on or off
	Short	In measure mode, press to enter into the Setup menu. In the setup menus, press to select the desired program and / or value
	Short	Turn on the MAX/MIN recording function, view of the MAX and MIN recorded values
	Long	Turn on/tun off of HOLD function. Turn off of the MAX/MIN recordings (if active)
	Short	To scroll the different views while the two probes are connected: channel 1, channel 2 and both channels simultaneously. Into the setup menus, press to return to measure mode
	Short	To scroll and modify the values of the parameters in the Setup menu. Turn on/turn off data recording
	Short	To scroll and modify the values of the parameters in the Setup menu. Recall the saved data

IMPORTANT:

- When the Sleep mode is active (by default after two minutes of inactivity of the instrument) press any key to reactivate the brightness of the display.
- Only at this point do the keys regain their function.

• **Inputs / Outputs connections**

Use original accessories guaranteed by the manufacturer only.
If necessary, contact your local distributor.



Temp70 PT100 Vio upper board

Read the manual before proceeding to connect the probes

• **Display symbols and icons**











Symbol	Description
	Type of probe connected
	Error in measurement
	Battery charge indication
	Measurement stability indicator
	The bars scroll if the measurement is not stable
	Number of data stored in Data Logger mode on instrumental memory
	Press the directional keys to change the parameter or value on the display
	FIXED: Automatic Data Logger set INTERMITTENT: Automatic Data Logger in operation
	Instrument connected to the DataLink+ software

5. Device operation

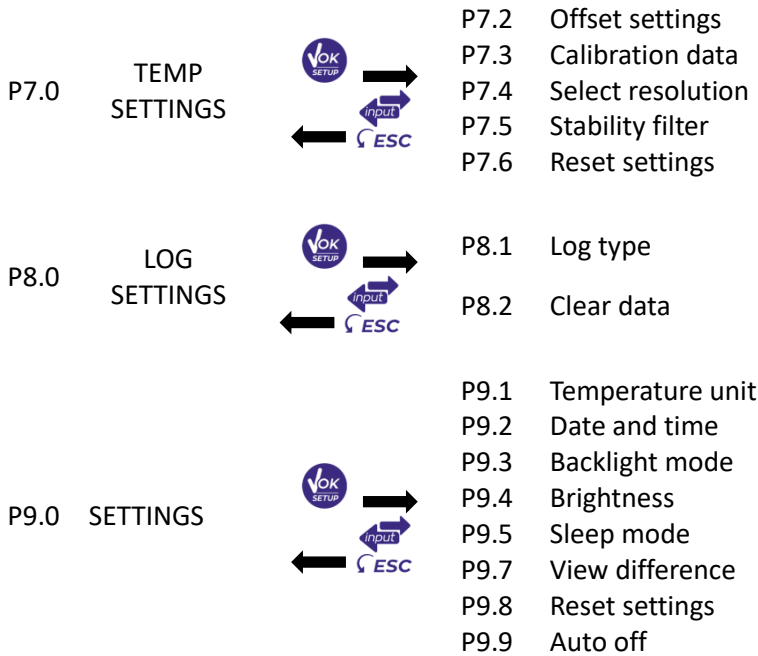
On the left side of the display, through a string of different colours, it is always indicated how the instrument is located.

String	Meaning
	The instrument is in measure mode.
	The instrument is in the Recall phase of the recorded MAX or MIN value. The function HOLD is active. Recall of the saved data.
	The user is in the setup mode. The configuration menus can concern the characteristics of the parameters or the general setting of the instrument





6. Setup menu

- In measure mode, press the key  to enter SETUP mode, select the parameter to edit by using the directional keys ( and ) and confirming with ;
- Within the selected menu, move between the different programs using the directional buttons and press the button  to access the submenu you want to edit;
- The icon  indicates that the value or parameter to choose is editable using the directional keys;
- Using the directional keys, select the desired option or modify the numerical value and confirming with ;
- Press the key  to return to the previous menu.

- Setup Menu Structure**



7. Temp Settings parameter

- In measure mode press  to access the Setup Menu;
- Press the key  to enter into the menu **TEMP SETTINGS P7.0**;
- Move with the keys  and  to select the programs to access.

The table below shows the setup menu structure for the parameter, and for each program the options that the user can choose and the default value:

Configuration of the Temp settings menu

Program	Description	Options	Factory Default Settings
P7.2	OFFSET SETTINGS	± 5 °C	---
P7.3	CALIBRATION DATA	---	---
P7.4	SELECT RESOLUTION	0,1/0,01	0,01
P7.5	STABILITY FILTER	LOW-MED-HIGH	MED
P7.6	RESET SETTINGS	YES – NO	NO

P7.2 Offset settings

Enter into this menu to adjust the offset.

Note: enter in the menu only if the temperature probe is connected.

If menu P 7.2 is accessed without a temperature probe connected, the display will show an error



message: "CONNECT THE PROBE", followed by the flashing of the icon

Note: if the display shows the temperature of the channel 1, the Offset menu settings will be the one of the channel 1. if the display shows the channel 2, enter to modify the offset of the channel 2. If the display shows the screen with both channels simultaneously, the user will select which offset has to be modified: channel 1 or channel 2.



P7.3 Calibration data

Access this menu to get information about the last offset calibration performed.

The following screens will automatically scroll on the display (the view changes according to the one selected):

	View of the Channel 1	View of the Channel 2	View of the double channel
First screen:	Date and time of the offset setting for the channel 1	Date and time of the offset setting for the channel 2	Date and time of the offset setting for the channel 1
Second screen:	Set offset value for the channel 1	Set offset value for the channel 2	Set offset value for the channel 1
Third screen:			Date and time of the offset setting for the channel 2
Fourth screen:			Set offset value for the channel 2

Note: the message "NO CAL DATA" will be shown for each channel if the offset has been never modified or a reset has been effected from the menu P7.6.



P7.4 Select resolution

Access to this menu to select the desired resolution for the temperature reading:

- 0,1
- 0,01 (Factory Default settings)

Note: changing the temperature resolution, the temperature resolution for both channels will change too.



P7.5 Stability filter

To consider the reading of a value truthful, we recommend waiting for the measurement stability, indicated

by the icon . When the measurement is not stable, four red flashing bands appear on the display. Access this menu to change the measurement stability criterion:

- **Low:** changes less than or equal to 3 hundredth of a degree, the stability icon is fixed and means that the value is stable;
- **Med:** : changes less than or equal to 2 hundredth of a degree, the stability icon is fixed and means that the value is stable;
- **High:** : changes less than or equal to 1 hundredth of a degree, the stability icon is fixed and means that the value is stable.

P7.6 Reset settings

Access this Setup to reset the parameters of the Temp Settings menu.

The reset will restore all the parameters to the default settings shown in the table above.

Note: after the Reset is complete, the instrument returns to measure mode and all the parameters return to their default settings.



8. Log Settings Menu

SETUP

- In measure mode press to enter the SETUP menu;
 - Press the key or to move to **LOG SETTINGS P8.0** menu;
 - Press the Key to enter the menu;
 - Move with the keys and to select the desired program.
- The table below shows the setup menu structure for the parameter and for each program the options that the user can choose and the default value are listed:

Log settings Menu Configuration

Program	Description	Options	Factory Default Settings
P8.1	LOG TYPE	MANUAL / HOURS / MINUTES	MANUAL
P8.2	CLEAR DATA	YES / NO	NO

P8.1 Log type

Access this menu to select the data acquisition mode:

- **MANUAL:** The data is acquired only when the user presses the button .
- **HOURS - MINUTES:** Set a frequency range of automatic data acquisition.

With the direction keys move from **MANUAL** to **HOURS** or **MINUTES**. Access by pressing the key and, as indicated by the icon change the value of the acquisition time. Confirm the setting with the key .

Use of automatic Data Logger

In measure mode press the key to start or stop the automatic recording.

When the automatic data saving is running, the icon flashes.

When it is set, but not in operation, the icon on the screen remains fixed. When the 1000 total values are reached, the recording stops automatically.

Note: Entering the Setup menu, the recording stops.

Note: if the recording is on, while on the display is shown the measure of the channel 1, only its data will be saved. if the recording is on, while on the display is shown the measure of the channel 2, only its data will be saved. If the recording is on when both channels are shown, both channels data will be saved.






P8.2 Clear data



Access this menu and select YES to clear the saved data. After that the instrument returns into measure mode.



Example of automatic Data Logger mode

Example: automatic recording of channel 1 on internal memory every 2 minutes.

- Connect the temperature probe only on channel 1;
- Access to the LOG SETTING P8.0 setup menu;
- Enter the LOG TYPE P8.1 menu, press the button  and move with directional keys to MINUTES;
- Use the directional keys to change the number that flashes on the display. Enter "2" and confirm with  key.
- Return to measure mode.

The icon  is on, which indicates that an automatic frequency Data Logger has been set.







Press  to start recording; the icon  starts flashing, indicating that the storage is in progress. The number next to the *M+* icon indicates how much data has been saved.

- Press again  to end the recording and the icon  returns fixed on the display.

Note: if the automatic switch off is activated, the instrument will turn off after 20 minutes. For a longer recording is necessary to deactivate the auto-switch off P9.9.



9. Instrument configuration menu

- In measure mode, press button  to access the SETUP menu;
- Press the key  or  to move to SETTINGS menu P9.0;
- Press the key  to access the menu;
- Move with keys  and  to select the program to access.

The table below shows the setup menu structure for the instrument, for each program, there are the options that the user can choose and the default value:

Configuration Settings menu

Program	Description	Options	Factory Default Settings
P9.1	TEMPERATURE UNIT	°C - °F	°C
P9.2	DATE AND TIME	---	---
P9.3	BACKLIGHT MODE	INDOOR / OUTDOOR / AUTO	AUTO
P9.4	BRIGHTNESS	LOW / MED / HIGH	MED
P9.5	SLEEP MODE	2 MIN / 5 MIN / OFF	2 MIN
P9.7	VIEW DIFFERENCE	YES / NO	NO
P9.8	RESET SETTINGS	YES / NO	NO
P9.9	AUTO OFF	YES / NO	YES


P9.1 Temperature unit

Access this setup menu to select the temperature unit to use: (°C - °F).

Note: by setting a different unit of measurement, the offset will be convert to the new measure unit. The offset correction is shown when the instrument is turned on and in menu P7.3.

P9.2 Date and time setting

Access this setup menu to update the date and time of the device. Use the directional keys to change the

year, confirm with button  and repeat the same operation for month, day, hours and minutes.

P9.3 Backlight mode

Access this setup menu to select the contrast mode to use for the display backlight:

- **INDOOR (In)** – Recommended if you use the device indoors;
- **OUTDOOR (Out)** – Recommended if you use the device outdoors;
- **AUTO** – Default option. Thanks to the brightness sensor, the display automatically adapts to the environment conditions. This mode also ensures longer battery life.

P9.4 Brightness

Access this setup menu to choose between three different levels of display brightness:

- **LOW** – low;
- **MEDIUM** – medium;
- **HIGH** – high.

Note: Keeping the display bright always adversely affects battery life.



P9.5 Sleep mode

Access this setup menu to select whether and after how long activating the device Sleep mode:

- **OFF:** Sleep mode off.
- **2 MIN:** The instrument enters Sleep mode if no key is pressed for 2 minutes;
- **5 MIN:** The instrument enters Sleep mode if no key is pressed for 5 minutes.

When the device is in Sleep mode, the brightness of the display is reduced to a minimum, significantly saving battery consumption.

Note: To exit from the Sleep mode and return the display to normal brightness, press ANY button. Once the display brightness is activated, the buttons reacquire their function (paragraph "Key function").



P9.7 View difference

Access this Setup to set how to view the temperature difference between the two channels as absolute value. This difference will be shown in the middle of the display in the screen with double channel.

Note: the difference is shown also for recall of data saved, HOLD function, MAX/MIN recording and recall of MAX/MIN value.



P9.8 Reset settings

Access this Setup to restore the parameters of Settings menu.

The reset takes all the parameters to the default settings shown in the table above.

Note: after the Reset, the instrument returns in measure mode and all the parameters return to the default settings.



P9.9 Auto off

Access this setup menu to activate or deactivate the auto-shutdown of the instrument:




- **YES:** The instrument automatically turns off after 20 minutes of inactivity;
- **NO:** The instrument remains always on, even if you are not using it.


IMPORTANT: The correct and systematic use of parameters P9.3 / P9.4 / P9.5 / P9.9 allows to significantly lengthen battery life.

10. Temperature measurement

- **Measurement**

Always connect the probe before switching on the device.

- Press the key  to turn on the instrument.
- After a self-diagnosis the instrument starts in measure:
 - probe connected to channel 1: the instrument turns on in the screen of the temperature channel 1;
 - probe connected to channel 2: the instrument turns on in the screen of the temperature channel 2;
 - both probes connected: the instrument turns on in the screen with simultaneously temperature for both channels.
- Place the probe/s in the measuring point and wait for the stability.
- When the reading is stable, the icon  appears on the display. When the measurement is not stable, four red flashing bands  appear on the display. Always wait for measurement stability.

Note: if the probe is not connected, the message "CONNECT THE PROBE" appears, followed by the flashing of the icon .



Note: connecting or disconnecting the probes, the instrument will automatically update the measuring screen, to show the temperatures of the connected probes.



- **MAX/MIN function**

During the measurement, press the key  to start the MAX/MIN values recording. According to the number of probes connected and the screen on the display, a text string will flash:

- "MIN/MAX REC" 1 probe connected;
- "REC" both probes connected.

Press the key  once to check the maximum value reached up to that moment, press it another time to check the **minimum** value reached up to that moment. Pressing again, the instrument starts the recording of the MAX/MIN value with the flashing string. To exit from the MAX/MIN recording, keep pressed the key  for at least 3 seconds, the flashing string disappears from the display.



Note: if the auto-switch off is activated, the instrument automatically switch off after 20 minutes of inactivity. For a longer recording of the MAX/MIN values is necessary to deactivate the auto-switch off P9.9.

Note: if some data are saved in the internal memory, the function MAX/MIN cannot be activated. It is necessary to download the data on DataLink+ software or clear them.



- **HOLD function**

During measurement, keep pressed the key  for 3 seconds to stop the reading. On the display, the string HOLD appears and the reading stops. Keep pressed for 3 seconds to unlock the reading.

Note: during MAX/MIN (record and recall values) and HOLD functions, the icon  indicates that the measurement is stable. When the measurement is not stable, four red flashing bands  appear on the display.

Note: if some data are saved in the internal memory the function HOLD cannot be activated. It is necessary to download the data on DataLink+ software or clear them.



11. Other features

- **Automatic switch-off**

The instrument automatically turns off after 20 minutes of inactivity.

To deactivate the automatic switch off, enter the parameter P9.9 of the Setup menu and select Off.

- **Offset adjustment**

All the instruments are pre-calibrated from the factory and remain stable over time, but in case of a reading error, it is possible to calibrate the device to clear that error.

To recalibrate the instrument at 0,0°C proceed as follows:

- Prepare some ice with double-distilled water;
- Put the ice cubes in a 500 ml beaker up to half of its volume;
- Add some double-distilled water to reach $\frac{3}{4}$ of its volume;
- Place the beaker over a magnetic stirrer under gentle agitation;
- Dip the probe in the beaker assuring it is well deep in the water and does not touch the sides of the beaker;
- Cover the beaker with some polystyrene to isolate the mixture of water/ice from the air as much as possible;
- Keep stirring for 10 minutes at least;
- Wait to reach the temperature of 0°C.

If the instrument reads 0,0°C (\pm Accuracy of the measuring range), then the device is working properly and there is no need to calibrate it; on contrary, access the Setup menu P7.2, calibrate the value with the key



or



and confirm with the key




In the middle of the display, the correct temperature is displayed, while the partial value of the calibration is displayed below it. The adjustment changes the entire measuring scale, for example if the calibration is -1,0°C, then the measurement moves by -1,0°C over the whole scale.

In this way, the calibration is saved even after the instrument is switched off and after the replacement of the batteries.

In case of sensor replacement, it is necessary to restore the factory calibration from the Setup menu P7.6, and, if necessary, proceed with a new calibration.

Note: *The offset cannot be modified, if it is not possible to change the offset.*

The error string "CONNECT THE PROBE" appears followed by the flashing of the icon  .



12. DataLink+ Software

It is possible to connect the instruments of the 70 Vio series to the PC and then use the DataLink software to perform data download, Data Logger directly on PC and exports in Excel and PDF.

The software can be downloaded for free from the web site:

- https://www.giorgiobormac.com/it/download-software_Download.htm.
- Connect the USB cable inside each package to the USB port on the top panel of the instrument and the other end to a COM port on the computer.
- Use the USB cable supplied with the instrument only.
- Start the program and then switch on the instrument.
- Wait for connection to be established (the connection data are shown at the bottom left of the display).

13. Warranty



- ***Warranty period and limitations***

- The manufacturer of this device and its accessories offers the final consumer of the new device the five-year warranty from the date of purchase, in the event of state-of-the-art maintenance and use;
- During the warranty period, the manufacturer will repair or replace defective components;
- This warranty is valid only and exclusively on the electronic parts of the device and does not apply, if the product has been damaged, used incorrectly, exposed to radiation or corrosive substances, if foreign materials have penetrated inside the product or if changes have been made, which have not been authorized by the manufacturer.

14. Disposal of electrical devices



This equipment is subject to the regulations for electronic devices. Dispose of in accordance with local regulations.