VOLTCRAFT®

Operating manual

EN

PTM-120

Thermometer with fixed insertion probe

Permanently connected sensor

Waterproof

Precise and fast

Table of contents

1 Legal address of the manufacturer

Conrad Electronic SE
Klaus-Conrad-Str. 1
D-92240 Hirschau
http://www.conrad.com
WEEE reg. no. DE 28001718
CE

2 About this documentation

2.1 Foreword

Read this document carefully and familiarise yourself with the operation of the product before you use it. Keep this document ready to hand and in the immediate vicinity of the product so that it is available to the personnel/user for reference at all times in case of doubt.

The product was developed according to the state of the art and fulfils the requirements of the applicable European and national Directives. All corresponding documents are available from the manufacturer.

Only technically qualified persons are permitted to carry out commissioning, operation, maintenance and decommissioning. The qualified personnel must have carefully read and understood the operating manual before beginning any work.

2.2 Purpose of the document

- This document describes the operation and maintenance of the product.
- Provides important information for working safely and efficiently with the product.
- In addition to the quick reference guide with all relevant legal and safety content in hard copy, this document is a detailed reference option for the product.

2.3 Correctness of content

The contents of this document were checked for corrected and are subject to a continuous correction and updating process. This does not rule out potential errors. In the event that errors are discovered or in case of suggestions for improvement, please inform us immediately via the indicated contact information in order to help us make this document even more user-friendly.

2.4 Layout of this document

Description

Each chapter is explained at the beginning in the description.

Prerequisite

All mandatory prerequisites are then listed for each step.

Instruction

Tasks to be carried out by the personnel / user are represented as numbered instructions. Adhere to the sequence of the specified instructions.

Representation

Shows an illustrative instruction or a configuration of the product.

Formula

Some instructions include a formula for a general understanding of a configuration, programming or a setting of the product.

Outcome of an action

Result, consequence or effect of an instruction.

Emphases

In order to simplify legibility and provide a clearer overview, various sections / information are emphasised.

- 1234 Display elements
- *Mechanical controls*
- ***Product functions***
- *Product labels*
- Cross-reference [▷ p. 5]
- *Foot notes*

2.5 Further information

Software version of the product:

- V1.2 or later

For the exact product name, refer to the type plate on the rear side of the product.

NOTE

For information about the software version, press and hold the ON button to switch on the product for longer than 5 seconds. The series is shown in the main display and the software version of the product is shown in the secondary display.

3 Safety

3.1 Explanation of safety symbols

DANGER

This symbol warns of imminent danger which can result in death, severe bodily injury, or severe property damage in case of non-observance.

CAUTION

This symbol warns of potential dangers or harmful situations which can cause damage to the device or to the environment in case of non-observance.

NOTE

This symbol indicates processes which can have a direct influence on operation or can trigger an unforeseen reaction in case of non-observance.

3.2 Foreseeable misuse

The fault-free function and operational safety of the product can only be guaranteed if generally applicable safety precautions and the device-specific safety instructions for this document are observed.

If these notices are disregarded, personal injury or death, as well as property damage can occur.

DANGER

Incorrect area of application!

In order to prevent erratic behaviour of the product, personal injury or property damage, the product must be used exclusively as described in the chapter Description [▷ p. 10] in the operating manual.

- Do not use in safety / Emergency Stop devices!
- The product is not suitable for use in explosion-prone areas!
- The product must not be used for diagnostic or other medical purposes on patients!
- The product is not intended to come into direct contact with food. For measurement in foods, samples must be taken and discarded after the measurement!

3.3 Safety instructions

This product has been designed and tested according to the safety requirements for electronic measuring devices.

CAUTION

Erratic behaviour!

On suspicion that the product can no longer be operated without danger, it must be decommissioned and prevented from recommissioning with appropriate labelling. The safety of the user can be impaired by the device if, for example, if it shows visible damage, it no longer works as specified or if it was stored for an extended period of time under unsuitable conditions.

– Visual inspection!
– In case of doubt, send the product to the manufacturer for repair or maintenance!

CAUTION

Stab injury!

Products with insertion probes entail the risk of stab injuries due to the pointed probe design.

– Handle insertion probes with care!
– Fit a protective cap on the measuring probe!

NOTE

If the product is stored at a temperature above 50 °C, or is not used for an extended period of time, the batteries must be removed. Leaks from the batteries are avoided as a result.

NOTE

This product does not belong in children's hands!

NOTE

The sensor handle, connecting cable and product housing are not designed for continuous contact with foods.

Designed for continuous contact with foods in accordance with EC Regulation 1935 / 2004:

– The temperature sensor from the measuring tip to approx. 1 cm before the end of the stainless steel tube.

For this purpose, also refer to

Technical data [▶ 24]

3.4 Intended use

The product is a water-protected thermometer. It is designed for precise and instantaneous temperature measurements in the following media:

– Food
– Liquids
– Gases
– Soft plastic materials
– Bulk material

See Technical data [p. 24].

3.5 Qualified personnel

For commissioning, operation and maintenance, the relevant personnel must have adequate knowledge of the measuring process and use of the measurements, for which purpose this document makes a valuable contribution. The instructions in this document must be understood, observed and followed.

In order to ensure that no risks arise from the interpretation of the measurements in the concrete application, the user must have additional technical knowledge, because the user is liable in case of damage/danger due to misinterpretation as a result of inadequate technical knowledge.

4 Description

4.1 Scope of delivery

Please check to ensure the completeness of the product after opening the package. You should find the following components:

– Quick reference guide

– Handheld measuring device, ready for operation, including batteries

4.2 Job description

The product offers precision, speed and reliability in a compact, ergonomic housing. Additional impressive features include the dust-proof and waterproof design in accordance with IP 65/67 and the 3-line illuminated display, which offers overhead display at the push of a button. The product can be switched on, switched off and configured and the measurements and parameters can be adjusted and held with the operating elements. The permanently connected temperature sensor is designed for a measuring range from -70 °C to 250 °C and provides exact measuring results within a few seconds. Use of the silicone cable and silicone handle at a maximum temperature of 250 °C should be limited to 2 hours. Permanent use is permissible at temperatures up to 230 °C.

5 The product at a glance

5.1 The PTM-120

LCD Display

PTM-120

PTM-120

5.2 Display elements

Display

Battery indicator	Evaluation of the battery status
Unit display	Display of units, if applicable, with unstable symbol or type of mode, min/max/hold
Main display	Measurement of the current temperature or value for min/max/hold
Auxiliary display	Measurement of the current temperature in min/ max/hold mode with unit

5.3 Operating elements

On / Off button

Press briefly	Switch on the product Activate / deactivate lighting
Long press	Switch off the product Reject changes in a menu

Up / Down button

Press briefly	Display of the min/max value Change value of the selected parameter
Long press	Reset the min/max value of the current measure-ment
Both simultaneously	Rotate display, overhead display

Function key

Press briefly	Freeze measurement
	Return to measurement display
	Call up next parameter
Long press, 2s	Open menu, frozen measurement is displayed
	Close menu, changes are saved

6 Operation

6.1 Commissioning

6.1.1 Explanation

Description

The product is switched on with the *On/Off button*. It may be necessary to configure the product after switching on. See Configuration [▷ p. 13].

Prerequisite

– Sufficiently full batteries are inserted in the product.

Instruction

– Press *On/Off button*.

Outcome of an action

Information about the configuration of the product appears in the display.

PoFF	Automatic shut-off	Automatic shut-off activated. The product is switched off if no buttons have been pressed after the adjusted time
t.oF	Zero point correction	If a zero point correction of the temperature sensor was made
t.SL	Gradient correction	If a gradient correction of the temperature sensor was made

The product is now ready for measurement.

6.2 Configuration

6.2.1 Explanation

The following steps describe how to adapt the product for your purposes.

NOTE

There are various configuration parameters available depending on the product version and configuration. They can differ depending on the product version and configuration.

6.2.2 Opening the configuration menu

Description

In order to configure the product, you must first open the ***Configuration*** menu. The menu is opened as shown in the illustration.

Prerequisite

– The product is switched on.

Instruction

1. Press the *Function key* for 2 seconds to open the ***Configuration*** menu.
2. ConF appears in the display. Release the function key.
3. By briefly pressing the *Function key*, you can scroll through the parameters. Select the parameter you would like to configure.
4. When you have selected the desired parameter, change the parameter to the desired value with the *Up button* and the *Down button*.
5. The changes are saved after running through the entire ***Configuration*** menu. Stor appears in the display. The ***Configuration*** menu can be exited from any arbitrary parameter by pressing and holding the *Function key* for 2 seconds. The changes made up that point are saved.

Representation

Call up menu	Next parameter	Change value	Save changes	Discard changes
2s		Press: Single step Hold: Rapid change	2s	2s

Outcome of an action

The ***Configuration*** menu is closed after the last parameter.

NOTE

If the product is switched off without saving the configuration, the last save value is reproduced on the next start-up of the product.

6.2.3 Configuring parameters of the configuration menu

Description

The following representation shows the available parameters and various configuration options.

Prerequisite

– The ***Configuration*** menu is open. See Opening the configuration menu [▶ p. 13].

Instruction

1. Select the desired parameter you would like to configure.
2. Adjust the desired configuration in the selected parameter with the *Up button* and *Down button*.
3. The available configuration options are listed for each parameter in the following representation.

Representation

Parameter	Values	Meaning
Alarms		
AL.		
	oFF	No active alarm
	on	Alarm alerting via text display, acoustic signal and flashing of the backlighting
	bEEP	Alarm alerting via text display and acoustic signal
	LitE	Alarm alerting via text display and flashing of the backlighting
AL.Lo		
	-70.0 .. AL.Hi	Min. alarm limit; a min. alarm is triggered when the value is undercut, e.g. at -94.0 °F
AL.Hi		
	AL.Lo .. 250.0	Max. alarm limit; a min. alarm is triggered when the value is exceeded, e.g. at 482.0 °F
Shut-off time		
PoFF		
	oFF	No automatic shut-off
	15 30 60 120 240	Automatic shut-off after a selected time in minutes, during which no buttons have been pressed

Backlighting		
Li tE		
	oFF	Backlighting deactivated
	15 30 60 120 240	Automatic shut-off of the backlighting after a selected time in seconds, during which no buttons have been pressed
	on	No automatic shut-off of the backlighting
Temperature unit		
Uni t		
	°C	Temperature display in °C
	°F	Temperature display in °F
Factory settings		
Ini t		
	no	Use current configuration
	YES	Reset product to factory settings. Ini t donE appears in the display

Outcome of an action

The changed value is saved and the ***Configuration*** menu is closed. Stor appears in the display. If necessary, the product is restarted automatically in order to adopt the changed values.

NOTE

The configuration is closed if no button is pressed for 2 minutes. Any changes made up to that point are not saved. c.End appears in the display.

6.2.4 Adjustment of the measuring input

Description

The temperature input can be adjusted with the zero point correction and the gradient correction. If an adjustment is made, you change the pre-adjusted factory settings. This is signalled with the t.oF or t.SL when the product is switched on. The standard settings of the zero point value and the gradient value is 0.00. It signals that no correction is made.

In order to adjust the product, you must first open the ***Adjustment*** menu. The menu is opened as shown in the illustration.

Prerequisites

- Sufficiently full batteries are inserted in the product.
- The product is switched off.
- Ice water, regulated precision water baths or a water bath with a reference measurement are available as a reference.

Instruction

1. Press and hold the *Down button*.
2. Press the *On/Off button* to switch on the product and open the ***Configuration*** menu. Release the *Down button*. The display shows the first parameter.
3. By briefly pressing the *Function key*, you can scroll through the parameters. Select the parameter you would like to configure.
4. When you have selected the desired parameter, change the parameter to the desired value with the *Up button* and the *Down button*.

5. In order to save the new parameter value, press and hold the *Function key* for longer than 1 second.

Representation

Call up menu

Hold Release

Outcome of an action

The ***Configuration*** menu is closed after the last parameter.

NOTE

If the product is switched off without saving the configuration, the last save value is reproduced on the next start-up of the product.

6.2.5 Configuring parameters of the adjustment menu

Description

The following representation shows the available parameters and various configuration options.

Prerequisites

The ***Adjustment*** menu is open. See Adjustment of the measuring input [▷ p. 15].

Instruction

1. Select the desired parameter you would like to configure.
2. Adjust the desired configuration in the selected parameter with the *Up button* and *Down button*.
3. The available configuration options are listed for each parameter in the following representation.

Representation

Parameter	Values	Meaning
Zero point correction		
t.oF		
	0.00	No zero point correction
	-5.00 .. 5.00	Zero point correction in °C. and/or at °F -9.00 .. 9.00
Gradient correction of the temperature		
t.SL		
	0.00	No gradient correction
	-5.00 .. 5.00	Gradient correction in %

Formula

Zero point correction:

Displayed value = measured value – t.oF

Gradient correction °C:

Display = (measured value – t.oF) * (1 + t.SL / 100)

Gradient correction °F:

Display = (measured value – 32 °F – t.oF) * (1 + t.SL / 100) + 32 °F

Example calculation

– Zero point correction t.oF to 0.00
– Gradient correction t.SL to 0.00
– Display unit Unit to °C
– Display in ice water -0.2 °C
– Display in ice water setpoint t.oF = 0.0 °C

– Display in water bath 36.6 °C
– Display in water bath setpoint t.SL = 37.0 °C
– t.oF = display zero point correction – setpoint zero point
– t.oF = -0.2 °C – 0.0 °C = -0.2 °C
– t.SL = (setpoint gradient correction / (display gradient correction – t.oF) – 1) *100
– t.SL = (37.0 °C / (36.6 °C – (-0.2)) -1) *100 = 0.54

Outcome of an action

The changed value is saved and the ***Configuration*** menu is closed.

NOTE

If the product is switched off without saving the configuration, the last save value is reproduced on the next start-up of the product.

7 Bases for measurement

7.1 Possible measuring errors

7.1.1 Immersion depth

Liquids

Immerse to a depth of at least 20 mm and then stir. Otherwise, measuring errors can occur due to the heat transmission of the sensor tube if the immersion depth is too shallow.

Gases

Immerse as far as possible into the gas to be measured so that the measuring sensor is subjected to a heavy flow.

7.1.2 Surface effects and poor heat transfer

Surface temperature

Special measuring sensors are required for this purpose. Surface characteristics, design of the measuring sensor, heat transfer and environmental temperature influence the measurement result.

NOTE

Thermally conductive paste between the measuring sensor and surface can also increase measurement accuracy in some cases.

7.1.3 Cooling / evaporation

Air temperature

The measuring sensor should be dry; otherwise the temperature measurement is too low.

7.1.4 Response time

Response time T_{90}

An adequate wait time must be observed for the measuring process before reading the measured value. The response time T_{90} describes the time in which the displayed measured value reached 90% of the end value. See Technical data [▶ p. 24].

7.1.5 Limit values

Temperature range

CAUTION

Destruction of the measuring sensor!

When conducting measurements in media with high or very low temperatures, there is a risk that the measuring sensor is not designed for such extremes.

– The limit values must be observed!

8 Maintenance

8.1 Operating and maintenance notices

NOTE

The product and temperature probe must be handled with care and used in accordance with the technical data. Do not throw or strike.

NOTE

If the product is stored at a temperature above 50 °C, or is not used for an extended period of time, the batteries must be removed. Leaks from the batteries are avoided as a result.

8.2 Battery

8.2.1 Battery indicator

If the empty frame in the battery display blinks, the batteries are depleted and must be replaced. However, the device will still operate for a certain length of time.

If the bAt display text appears in the main display, the battery voltage is no longer adequate for operation of the product. Now the battery is fully depleted.

8.2.2 Changing battery

DANGER

Danger of explosion!

Using damaged or unsuitable batteries can generate heat, which can cause the batteries to crack and possibly explode!

– Only use high-quality and suitable alkaline batteries!

CAUTION

Damage!

If the batteries have different charge levels, leaks and thus damage to the product can occur.

– Use new, high-quality batteries!
– Do not use different types of batteries!
– Remove depleted batteries and dispose of them at a suitable collection point!

NOTE

Unnecessary screwing places the water-tightness of the product, among other things, at risk and should be avoided.

NOTE

Read the following handling instructions before replacing batteries and follow them step by step. If disregarded, the product could be damaged or the protection from moisture could be diminished.

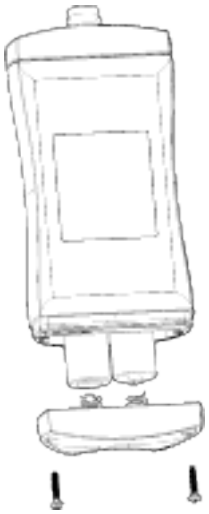
Description

Proceed as follows to replace the batteries.

Prerequisites

– The product is switched off.
– A suitable PH1 is available

Instruction



1. Unscrews the Phillips screws and remove the cover.
2. Carefully replace the two Mignon AA batteries. Ensure that the polarity is correct! It must be possible to insert the batteries in the correct position without using force.
3. The O-ring must be undamaged, clean and positioned at the intended depth. In order to facilitate assembly and avoid damage, a suitable grease can be applied.
4. Fit the cover on evenly. The O-ring must remain at the intended depth!
5. Tighten the Phillips screws.

Outcome of an action

The product is now ready for use again.

8.3 Calibration and adjustment service

8.3.1 Certificates

The certificates are categorised as ISO calibration certificates and DAkkS calibration certificates. The purpose of the calibration is to verify the precision of the measuring device by comparing it with a traceable reference.

NOTE

The ISO standard 9001 is applied for the calibration certificates. These certificates area affordable alternative to the DAkkS calibration certificates and provide information of the traceable reference, a list of individual values and documentation.

NOTE

The DAkkS calibration is based on DIN EN ISO/17025, the accreditation basis recognised worldwide. These certificates offer high-quality calibration and consistently high quality. DAkkS calibration certificates can only be issued by accredited calibration laboratories which have demonstrated their expertise in accordance with DIN EN ISO/IEC 17025. The ISO calibration includes any necessary adjustment with the purpose of minimising a deviation of the measuring device.

DAkkS calibration certificates are accompanied with a list of individual measurements before and after the adjustment, documentation and, if applicable, graphic representation, calculation of the expanded measuring uncertainty and traceability to the national standard.

NOTE

Only the manufacturer can check the basic settings and make corrections if necessary.

9 Error and system messages

Display	Meaning	Possible causes	Remedy
----	No suitable measuring probe connected	Incorrect measuring probe	Connect a suitable measuring probe
	Measurement far outside of the measuring range	Measuring probe or product defect	Measurement leaves the permissible range
			Send in for repair
No display, unclear characters or no response when buttons are pressed	Battery depleted	Battery depleted	Replace battery
	System error	Error in the product	Send in for repair
	Product is defective	Product is defective	
bAt	Battery depleted	Battery depleted	Replace battery
Err.1	Measuring range exceeded	Measurement too high	The measurement is above the permissible range
		Incorrect measuring probe connected	Check measuring probe
		Measuring probe or product defect	Send in for repair
Err.2	Measuring range is undercut	Measurement too low	The measurement is below the permissible range
		Measuring probe or product defect	Check measuring probe
			Send in for repair
SYS Err	System error	Error in the product	Switch product on/off
			Replace batteries
			Send in for repair

10 Disposal

NOTE

The device must not be disposed of with household waste. If the product is disposed of, please take it to a municipal collection point, where it will be transported to a disposal company in accordance with requirements of hazardous goods laws. Otherwise, return it to us, freight prepaid. We will then arrange for the proper and environmentally-friendly disposal. Please dispose of empty batteries at the collection points intended for this purpose.

11 Technical data

Measuring range temperature		-70.0 .. +250.0 °C (-94.0 .. +482.0 °F)
Accuracy temperature		-20 .. +100 °C: ±0.1 K ±1 digit otherwise: ±0.2 % of measured value ± 2 digits
Response time T90 water (0.4 m/s)		approx. 3 s
Measuring cycle		approx. 2 measurements per second
Temperature connections		Permanently connected Pt1000 sensor (EN 60751)
Display		3-line segment LCD, additional symbols, illuminated (adjustable white, permanent illumination)
Additional functions		Min/max/hold, alarm (optical and acoustic)
Compensation		Offset and gradient correction
Housing		Break-proof ABS housing
	Protection rating	IP65 / IP67
	Dimensions L*W*H [mm]	108 * 54 * 28 mm without kink protection
	Weight	150 g, incl. battery and sensor
Operating conditions		-20 to 50 °C; 0 to 95 % r.h. (temporarily 100 % r.h.)
Storage temperature		-20 to 70 °C
Current supply		2*AA battery (included in the scope of delivery)
	Current requirement/ battery life	approx. 0.4 mA, approx. 2 mA with lighting Service life > 5000 hours with alkaline batteries (without backlighting)
	Battery indicator	4-stage battery status indicator, Replacement indicator for depleted batteries: "BAT"
Auto-power-OFF function		The device switches off automatically if this is activated
Directives and standards		The devices conform to the following Directives of the Council for the harmonisation of legal regulations of the Member States: 2014/30/EU EMC Directive 2011/65/EU RoHS Applied harmonised standards: EN 61326-1:2013 Emission limits: Class B Immunity according to Table 2 Additional errors: < 0.5 % FS EN 50581:2012

12 Service

12.1 Manufacturer

If you have any questions, please do not hesitate to contact us:

Contact

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