

PAMEL

OPERATING MANUAL

TERMO4G / TERMO8G

MULTICHANNEL THERMOMETER WITH ALARMS

4 / 8 channels	DS18B20 RJ45	H / L / ERR alarms
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The screen drawings in this manual are explanatory. Actual labels depend on the language installed in the device firmware.

Manual version: 21.08.2026 | screen/function basis: firmware 0.6.8

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1. Essential safety rules

DANGER: the supplied mains adapter is connected to 230 V AC. Do not use a damaged adapter, cable or device in flooding, condensation or visible moisture.

WARNING: the RJ45 sockets on TERMO are only for PAMEL/DS18B20 temperature probes and compatible accessories. Never connect a router, switch, network card or PoE supply.

- Power TERMO with 5 V DC. The standard set includes a 5 V / 0.5 A supply and a USB A-B cable.
- Keep the electronics, RJ45 sockets and USB connector dry. Do not immerse the enclosure or connectors.
- After moving a cold device into a warm room, leave it disconnected until it reaches room temperature and is completely dry.
- Remove a hot probe by gripping its metal sheath, not the cable.
- Switch the unit off before changing probes.
- Do not open or modify the unit without agreement with PAMEL.

2. Purpose and operating principle

TERMO4G and TERMO8G are multichannel thermometers for simultaneous supervision of several temperature points. TERMO4G supports up to 4 probes. TERMO8G supports up to 8 probes.

The unit reads digital DS18B20 probes, applies the individual A/B calibration of each logical channel, displays temperatures and supervises upper, lower and probe-error alarms independently.

1. The controller starts a non-blocking measurement cycle for all installed probes.
2. Each reading is converted using its own calibration.
3. The value is compared with the configured upper and lower limits.
4. A new alarm must persist for about 5 s before it becomes active.
5. H/L alarms return to normal with a fixed 0.20°C hysteresis.
6. Loss of an installed probe for about 5 s produces ERR; normal operation returns automatically after a valid reading.

3. Models, equipment and technical data

The number of probes supplied with the product depends on the ordered set and may be from zero up to the maximum for the model. Two digits after the decimal point are a display format and do not mean that the physical sensor resolution is 0.01°C.

TERMO4G	max. 4 installed DS18B20 probes, 4 RJ45 sockets
TERMO8G	max. 8 installed DS18B20 probes, 8 RJ45 sockets
Power	5 V DC via USB type B
Included supply	5 V / 0.5 A
Cable	USB A-B, printer type
Display	graphic 128 × 64 px
Controls	3 buttons: left, centre, right
Display formats	XXX.XX / XXX.X / XXX
Raw DS18B20 step	0.0625°C
Alarm limit range	0.00...120.00°C
Alarm adjustment step	0.02°C / 0.1°C / 1°C depending on format
Alarm hysteresis	0.20°C
Alarm qualification	about 5 s
Temporary mute	1 minute

Data interface	optional, depending on version
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4. Front panel and three buttons

TERMO4G and TERMO8G use the same three-button operating concept.

- LEFT: previous probe, decrease value, previous option.
- CENTRE: short press confirms or opens the alarm/settings of the selected probe. Hold for about 3 s on the main screen to open SERVICE MENU.
- RIGHT: next probe, increase value, next option.
- I/O switch: physically switches the device on or off.

On the main screen the > symbol indicates the currently selected probe.

5. Device construction and connectors

The front contains the graphic display, three control buttons and the I/O switch. The enclosure contains RJ45 sockets for temperature probes and a USB-B connector for power; versions with a data interface may also use the USB connection for communication.

Do not assume that an RJ45 socket is Ethernet. The connector shape is only used as a robust plug for the probe wiring.

6. Mounting and product versions

Mount the unit in a dry, visible place where the buttons and connectors can be reached without pulling the probe cables. If the enclosure has rear mounting ears, use the actual unit as the drilling template because enclosure dimensions can differ slightly between production series.

Keep the device away from steam outlets, direct water spray and surfaces that can heat the enclosure.

7. RJ45 connector for DS18B20 probes

RJ45 sockets are dedicated to TERMO temperature probes. Insert the plug until the latch clicks. When disconnecting, press the latch and pull the plug body - never pull the cable.

If a probe is not detected, check the plug, cable and probe first. An unknown probe that has not been logically installed will not appear as an extra channel.

8. Quick start - first three minutes

1. Connect the required DS18B20 probes to the RJ45 sockets.
2. Connect the USB A-B cable to TERMO and to the supplied 5 V / 0.5 A adapter or a computer USB port.
3. Set I/O to I.
4. Wait for the start screen and the number of detected installed probes.
5. Use LEFT/RIGHT to select a probe.
6. Short-press CENTRE to configure its alarm.

On first use, if no logical probe configuration exists, the firmware may migrate currently connected probes to the first logical slots. You can later assign them precisely in SERVICE MENU → INSTALL PROBES.

9. Start screen and main screen

After power-up the device shows PAMEL, the model and firmware version, then reports the number of installed probes that returned a valid reading. The main screen shows the active logical channels.

- NO PROBES / ALARMS OFF means that no installed probe currently provides a valid reading.
- > before a label marks the selected channel.
- Short CENTRE opens settings or the active-alarm menu for that channel.
- Hold CENTRE for about 3 s to open SERVICE MENU.

PAMEL
TERMO4G / TERMO8G
FW 0.6.8
DETECTED: 4
>1.COLUMN 78.20°C
2.TANK 64.15°C

10. How the display adapts to the number of probes

The main display is built from the number of currently visible installed channels. With one probe the temperature is shown very large. With two probes the display uses two full-width rows. With three or four probes it uses a 2 × 2 layout.

If only one or two probes are required, there is no need to install unused slots - the display remains clearer.

1 probe: one large value
2 probes: two full-width rows
3-4 probes: 2 × 2 tiles

11. Views for 3...8 probes

TERMO8G ONLY - this function concerns configurations with 5 to 8 probes.

With 3 or 4 probes, all channels fit on one 2 × 2 page. With 5 to 8 active probes TERMO8G uses two pages with four fixed positions each.

- Page 1 shows the first four active logical channels.
- Page 2 shows the next channels. Empty positions are displayed as ---.
- LEFT/RIGHT still selects probes. Crossing the 4th/5th active channel automatically changes the displayed page.

- Page switching is only a display function; all probes continue to be measured and supervised in the background.

PAGE 1 / 2	
1.COLUMN 78.20°C	2.TANK 64.15°C
3.WATER 32.40°C	4.KEG 18.05°C
PAGE 2 / 2 - TERMO8G	
5.RETURN 45.10°C	6.COOL 12.30°C
7.PROBE 22.00°C	---

12. Main-screen indicators - examples and meaning

Short status symbols and the alarm frame make it possible to identify the channel that requires attention without opening a menu.

>1.COLUMN H
78.24°C
2.TANK OFF
64.15°C
3.PROBE ERR

OFF	master alarm for this probe is disabled; temperature measurement may still work
H	active upper alarm
L	active lower alarm
M	an active alarm is muted
ERR	no valid reading from an installed probe / communication error
Frame	channel is in alarm or error state

13. Alarm structure

Each installed probe has its own alarm set: a master ALARM ON/OFF and three independent conditions: upper H, lower L and probe error ERR.

- A new H/L/ERR condition must last about 5 s before activation.
- H/L use a fixed 0.20°C hysteresis when returning to normal.
- An active, unmuted alarm produces one common 200 ms buzzer pulse every 5 s, regardless of how many probes are alarming.
- Multiple alarmed probes remain marked at the same time.

14. Setting an alarm - all screens

1. Select the probe on the main screen with LEFT/RIGHT.
2. Short-press CENTRE.
3. Set master ALARM to ON or OFF.
4. Enable UPPER ALARM if required and set its threshold.
5. Enable LOWER ALARM if required and set its threshold.
6. Set PROBE ERROR to ON or OFF.
7. CENTRE confirms each next screen.

If all three conditions H, L and ERR are disabled, the master alarm for that probe is effectively off.

1.COLUMN
UPPER ALARM
78.20°C
ACT 77.95°C
<<< OK >>>

15. What to do while an alarm is active

Short-press CENTRE while the selected probe is in H/L/ERR to open the alarm action menu.

ALARM: 1.COLUMN H
MUTE 1 MIN
UNTIL NORMAL
ALARM OFF
ALARM SETTINGS
BACK

MUTE 1 MIN	silences the buzzer for 60 s; if the condition still exists, the repeated signal resumes immediately after the mute period
UNTIL NORMAL	mutes this probe until it genuinely returns to the normal state; it then re-arms automatically
ALARM OFF	permanently disables the master alarm for the selected probe and saves this state
ALARM SETTINGS	opens the alarm configuration for this probe
BACK	returns to the main screen

16. Example: 78.20°C upper alarm on COLUMN

Assume you want a clear warning when COLUMN exceeds 78.20°C.

1. Select COLUMN.
2. Short-press CENTRE.
3. ALARM → ON.
4. UPPER ALARM → ON.
5. Set 78.20°C and confirm.
6. Set LOWER ALARM → OFF if it is not needed.
7. Leave PROBE ERROR → ON so a lost reading is also reported.

After the threshold remains exceeded for about 5 s, the tile is framed, H is displayed and the buzzer repeats every 5 s until muted, disabled or the temperature returns to normal.

17. Probe installation - assigning physical probes to channels

TERMO stores the unique 64-bit ROM identifier of each DS18B20. Therefore a logical channel such as 1.COLUMN stays assigned to the same physical probe regardless of later plug order.

A new installation session is transactional: the previous working configuration remains in memory until the complete new assignment is successfully saved. Interrupting the wizard does not intentionally erase the old probe map.

18. Probe installation - step by step

MOST IMPORTANT: when detecting a specific slot, leave exactly one physical probe connected.

1. Hold CENTRE for about 3 s and open SERVICE MENU.
 2. Select INSTALL PROBES and confirm YES.
 3. For logical slot 1 choose INSTALL? → YES if required.
 4. Disconnect other probes and leave only the probe that should become slot 1.
 5. Choose OK = DETECT. A successful assignment is confirmed as SAVED.
 6. Repeat for the required slots.
 7. Complete the wizard so the new configuration is saved.
- PROBE ALREADY USED means the same physical ROM was selected twice in the current installation session.
 - Zero probes is a valid configuration; probes can be installed later.

INSTALL PROBES
1.PROBE
INSTALL? YES
MUST BE 1 PROBE
OK = DETECT
SAVED

19. Probe names

Each logical channel can have its own name of up to 10 characters. Allowed characters are A-Z, 0-9, space, - and _. The logical number always remains part of the label, for example 1.COLUMN.

1. SERVICE MENU → PROBE NAMES → YES.
2. LEFT/RIGHT changes the current character.
3. Short CENTRE moves to the next position.
4. Long CENTRE saves the name.

Good names describe the physical location: COLUMN, TANK, WATER, KEG, RETURN, COOLER.

PROBE NAMES
1.COLUMN
CHAR 4/10: U
LONG OK = SAVE
<<< NEXT >>>

20. SERVICE MENU

Open it by holding CENTRE for about 3 s on the main screen. LEFT/RIGHT changes the option and CENTRE confirms. Current firmware 0.6.8 does not provide a user setting for measurement frequency or communication baud rate.

SERVICE MENU
INFO
LANGUAGE
RESOLUTION
INSTALL PROBES
PROBE NAMES
CALIBRATE
CONTRAST
RESETS

INFO	model, firmware, number of installed probes and number ONLINE
LANGUAGE	select the available device-interface language
RESOLUTION	XXX.XX / XXX.X / XXX display format
INSTALL PROBES	assign DS18B20 ROM identifiers to logical channels
PROBE NAMES	names up to 10 characters
CALIBRATE	individual A and B for each installed probe
CONTRAST	LCD contrast adjustment
RESET SETTINGS	restores user settings while keeping installed probe ROMs
FULL RESET	also deletes the probe installation after confirmation

21. Resolution: XXX.XX, XXX.X and XXX

The resolution option changes how the value is presented and the step used when editing alarm thresholds. It does not change the physical DS18B20 sensor.

RESOLUTION
XXX.XX
<<< OK >>>

XXX.XX	two decimal places; alarm threshold step 0.02°C
XXX.X	one decimal place; alarm threshold step 0.1°C
XXX	no decimal part; alarm threshold step 1°C
Raw sensor step	0.0625°C

22. Measurements and transmission

Firmware 0.6.8 measures continuously in one non-blocking cycle. A new DS18B20 conversion starts immediately after the previous readout cycle completes; there is no user menu for FAST/NORMAL/SLOW measurement rates.

For a calmer display, only the LCD value is lightly smoothed (EMA 1/4). Alarm decisions and the data interface use the current unsmoothed measurement, so display smoothing does not delay protection.

In versions with the data interface, PAMEL_BUS_AT uses a fixed 9600 8N1 link and is read-only. A PC can read channel values and valid/present states, but cannot remotely change TERMO settings.

23. Probe calibration - meaning of A and B

Use calibration only against a trustworthy reference. Different temperatures at different physical locations may be real and are not a calibration fault.

A	slope/gain coefficient; range 0.50...2.00; step 0.01; default 1.25
B	offset correction in °C; range -10.00...+10.00°C; step 0.02°C; default 0.00°C

24. Calibration screens and example

1. SERVICE MENU → CALIBRATE → YES.
2. Set A for the first installed probe and confirm.
3. Set B and confirm.
4. Repeat for the remaining installed probes.
 - If a probe is consistently about +0.40°C too high over the tested range, correct mainly B towards a negative value.
 - If the error changes substantially with temperature, A may need adjustment; use at least two reliable reference points.

Do not treat boiling water from a kettle as an exact 100°C reference. Boiling temperature depends on pressure and probe placement.

25. Contrast and resets

Use resets only when their effect is understood.

RESET SETTINGS
KEEP PROBES? YES
FULL RESET
DELETE PROBES? YES / NO

CONTRAST	range 5...20; default 10
RESET SETTINGS	restores user settings but keeps the installed probe ROM assignments
FULL RESET	restores settings and deletes probe assignments; probes must then be installed again

26. USB, computer communication and accessories

USB type B is the normal TERMO power input. The device can be powered from the supplied 5 V / 0.5 A adapter or from a computer using a USB A-B cable.

- Standard version: USB is used for power.
- Version with data interface: the same connection may also carry communication.
- TERMO PC: PC software for reading TERMO data; its detailed operation belongs to a separate manual.
- RS485: not standard equipment; possible only in special ordered versions.

A USB-B connector by itself does not guarantee that a particular unit has the optional data interface.

27. Probes, operation and condensation

- Route cables so they are not stretched, cut, crushed or exposed to excessive heat.
- Push RJ45 plugs fully home; disconnect by pressing the latch and pulling the plug body.
- Never pull a metal probe out of a hot process by its cable.
- Do not immerse RJ45 connectors or the TERMO enclosure.
- After condensation or moving the unit from cold to warm conditions, leave it unpowered until fully dry.
- Before calibrating two probes, first place them close together in the same stable environment.
- For long storage, disconnect power and protect connectors from moisture and dirt.

28. Before calling service - troubleshooting

Use the table before contacting service. Prepare a photo of the display and the firmware version from INFO.

No temperature / ERR	check the RJ45 plug, cable, probe and whether the probe is logically installed
Wrong probe name or channel	verify logical probe installation and custom names
Alarm does not work	check master ALARM, H/L/ERR enables and the threshold; the condition must persist about 5 s
Alarm beeps and silence is needed	select the alarming probe and use MUTE 1 MIN or UNTIL NORMAL
OFF is shown	the alarm for this probe is disabled; measurement may still be valid
Wrong number of decimal digits	SERVICE MENU → RESOLUTION
Cannot save a probe	during detection leave exactly one probe connected
No probes after reset	FULL RESET with probe deletion requires probe installation again
PC cannot communicate	verify that the ordered unit actually includes the optional data interface

29. Help, current materials and version information

Before contacting PAMEL service, prepare: model TERMO4G/TERMO8G, firmware version shown in INFO, number of installed and ONLINE probes, the displayed message and a photo of the screen.

Current manuals, supplementary documents and service information are published on pamel.pl.

Contact: PAMEL, ul. Urodzajna 5E, 42-300 Myszków, Poland • pamel@pamel.pl • tel. 453-343-360.

30. Example probe configurations

TERMO8G ONLY - this function concerns configurations with 5 to 8 probes.

Use only the channels you actually need. Examples:

- TERMO4G: 1.COLUMN, 2.TANK, 3.WATER, 4.RETURN.
- TERMO4G: only 1.MEAT and 2.CHAMBER - the two-channel view remains large and clear.
- TERMO8G: 1...4 on page 1 and 5...8 on page 2.
- Non-consecutive logical slots are allowed; for example installed 3.PROCESS and 7.RETURN still appear as two active channels when both are ONLINE.

31. Good alarm-setting practice

- Set thresholds from the real process requirement, not from single hundredths that naturally fluctuate.
- Keep PROBE ERROR enabled when loss of a reading is important.
- After moving a probe to another location, reconsider the threshold values.
- Muting the buzzer does not remove the alarm cause - continue watching H/L/M/ERR.
- A useful alarm should be meaningful and not so tight that normal process variation causes constant nuisance alarms.

32. Correctness check after connection

1. Switch TERMO on and verify the start screen.
2. Compare DETECTED/ONLINE probe count with the expected installation.
3. Use LEFT/RIGHT to visit every channel.
4. Warm one probe gently by hand and check that the intended logical channel changes.
5. Set a temporary alarm threshold near the current temperature and verify the alarm.
6. Restore the correct process thresholds after the test.
7. Verify that custom names match the physical probe locations.

A short check after installation is the easiest way to catch swapped probes before starting the real process.

33. Quick operation map

TERMO8G ONLY - this function concerns configurations with 5 to 8 probes.

- Main screen LEFT / RIGHT: select probe.
- Main screen short CENTRE: alarm/settings or active-alarm actions for selected probe.
- Main screen CENTRE held about 3 s: SERVICE MENU.
- Active alarm: MUTE 1 MIN / UNTIL NORMAL / ALARM OFF / ALARM SETTINGS / BACK.
- Probe installation: exactly one physical probe connected while a slot is being detected.
- Probe names: LEFT/RIGHT changes character, short CENTRE moves, long CENTRE saves.
- 5-8 active probes: TERMO8G automatically changes between two 2 × 2 pages as selection crosses the 4th/5th channel.

34. Supplementary instructions and TERMO PC

This manual describes complete stand-alone TERMO4G/TERMO8G operation. Computer communication is optional and is not required for measurement or alarms.

- In a data-interface version, the PC may read temperatures through PAMEL_BUS_AT 1.0 at fixed 9600 8N1.
- Communication is read-only: the PC does not change alarm thresholds, calibration or other settings.
- TERMO PC and physical interface connection details are documented separately so the main manual remains clear.
- RS485 is only available in special ordered versions.

Always use the current supplementary documents from pamel.pl.

TECHNICAL SUPPLEMENT - firmware 0.6.8

Measurement and probe identification

- TERMO4G firmware 0.6.8 runs on an ATmega128A at 16 MHz.
- Up to 8 logical DS18B20 probes are supported. Each logical slot stores the probe unique 64-bit ROM address, so physical connection order does not define the channel number.
- No probe is required to start the thermometer. Installed slots may be non-consecutive, for example only probe 3 and probe 7.
- Temperature measurement is non-blocking: conversion is started and the user interface remains responsive while results are collected after the conversion time.
- The LCD uses an EMA 1/4 filter only for presentation. Alarm logic and PAMEL_BUS_AT use the raw measured temperature, so a short display lag is normal.
- For 5 to 8 active probes the main screen uses two 2 x 2 pages and switches page automatically when the selection crosses the 4/5 boundary.

Source basis: TERMO4G AVR-GCC 0.6.8 and the current production project. These details describe firmware behaviour and do not change the electrical ratings printed on the device.

ALARM AND DATA INTERFACE DETAILS

Alarm behaviour

- Each probe has a master alarm and independent H / L / ERR conditions. A new alarm is qualified for 5 s; H/L return uses 0.20 C hysteresis.
- An active unmuted H/L/ERR condition produces one shared 200 ms buzzer pulse every 5 s, regardless of the number of simultaneous alarms.
- MUTE 1 MIN silences the buzzer for 60 s. If the condition still exists, signalling resumes immediately. UNTIL NORMAL mutes the selected probe until it really returns to normal. ALARM OFF disables that probe master alarm.
- Loss or invalid reading of an installed probe can be reported as ERR after 5 s when ERR monitoring is enabled.

PAMEL_BUS_AT and service information

- USART1 uses fixed 9600 8N1. The device profile is THERMOMETER and the PC can read all 8 logical channels.
- Temperature is transmitted as signed S16 in hundredths of a degree Celsius; TEMP_VALID and TEMP_PRESENT are also available. The interface is read-only; remote setting changes and process control are not provided.
- Hold the centre button for about 3 s on the main screen to enter SERVICE MENU. The resolution setting XXX.XX / XXX.X / XXX changes presentation only.
- The start and INFO screens identify PAMEL / TERMO4G / firmware version; compiler information is intentionally not shown.

WARRANTY TERMS

Dear User, thank you for choosing a PAMEL product. These commercial warranty terms describe the manufacturer's warranty and do not replace mandatory consumer rights arising from applicable law.

1. PAMEL grants a commercial warranty for the controller itself (excluding additional equipment) in the territory of the Republic of Poland. The basic warranty is 24 months; a 6-month manufacturer's extension and paid extensions may apply according to the warranty card. The total commercial warranty period cannot exceed 80 months from the device production date.
2. Additional equipment and consumable or self-installation items, including probes, heaters, antennas, holders, cables and batteries, are not covered by the controller's extended commercial warranty unless a separate document states otherwise.
3. During the warranty period PAMEL removes defects originating in the device free of charge. Where the applicable warranty conditions for replacement or refund are met, these remedies are handled according to the warranty card and law.
4. The warranty period is extended by the time during which the device is held for a warranty repair where required by law or the applicable warranty terms.
5. Claims should be reported by e-mail to pamel@pamel.pl or by telephone. PAMEL may first attempt remote diagnosis and provide shipping or service instructions.
6. At the manufacturer's request the Buyer must complete the claim report and provide information needed for diagnosis.
7. The warranty covers only defects caused by reasons inherent in the device.
8. The warranty does not cover damage caused by incorrect installation, use or maintenance; unsuitable storage; incorrect consumables; unauthorized repair or modification; mechanical damage; flooding or condensation; contamination; atmospheric events; accidents; or exceeding rated parameters.
9. The warranty does not cover claims concerning technical parameters when the device complies with the manufacturer's declared data.
10. To preserve warranty rights, deliver the device complete, securely packed, with the required documentation and accessories, with seals and identification labels intact, and with the original warranty card where one was issued.
11. Normal operating services and materials such as installation, programming, cleaning, maintenance, fuse or lamp replacement are not warranty repairs and may be chargeable.
12. Service may refuse a commercial warranty repair where documentation does not match the device, documents were altered without authorization, or identification labels were removed.
13. Warranty repairs are normally carried out within the period stated on the warranty card. If imported parts are required, the period may be extended and the Buyer will be informed.
14. Installation must comply with standards, this manual and legal requirements. Where law requires qualifications, the installation must be performed by an appropriately qualified person.
15. The detailed rights and obligations under this commercial warranty are determined by the warranty document supplied with the product and applicable law.
16. Equipment not collected from service within the period specified in the warranty/service terms may be handled according to those terms and applicable law.
17. Parts replaced during repair remain the property of the manufacturer unless applicable law provides otherwise.
18. The manufacturer is not responsible for loss of user data stored in the device. A repaired device may be returned with factory settings.
19. By signing the warranty card the Buyer confirms that they have read and accepted its terms. A card requiring a signature or production-date label may be invalid if those required elements are missing.

WARRANTY START DATE: _____ SELLER STAMP: _____ CUSTOMER SIGNATURE: _____

WARRANTY CARD AND SERVICE RECORD

Product / model:

Production or serial number:

Sale / production date:

Seller stamp and signature:

This page is an integral continuation of the warranty terms on the previous page. It does not change or limit statutory consumer rights.

Before sending the device for service, provide an exact fault description, contact details and the device model. Include proof of purchase or the warranty card when required for the claim.

Date	Reported fault / request	Service action / result	Signature

Service entries should be completed by the service centre or seller. Do not alter repair records yourself.