

AMTAST

AMT620 Lab pH Meter

OPERATION MANUAL

Benchtop pH / mV Meter for Laboratory and Industrial Use



AMTAST USA INC.

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Safety Information

IMPORTANT SAFETY INFORMATION

1. Only unplug the power adapter after switching the instrument off.
2. Keep the meter out of direct sunlight to protect the LCD's lifespan.
3. Keep the electrode socket clean and dry at all times.
4. Never touch the center pin of the BNC electrode connector with your hand or a metal object — static discharge can damage the instrument's electronics and reduce input impedance.
5. Do not clean the enclosure with solvents or chemical cleaning agents; the housing is ABS engineering plastic.

1. Introduction

Thank you for purchasing the AMT620 Lab pH Meter. Please read this manual carefully before use — it will help you operate and maintain the instrument correctly and avoid problems caused by improper handling.

The AMT620 employs an integrated microprocessor and is suitable for pH and mV measurement of aqueous solutions in institutional, industrial, and production laboratories. Specifications are subject to change as improvements are made.

2. Technical Data

Parameter	Specification
pH range	0.00 – 14.00 pH
mV range	±1999.9 mV
Temperature range	–5.0 – 105.0 °C
Resolution	0.01 pH, 1 mV, 0.1 °C
pH accuracy	≤ 0.01 pH
mV accuracy	≤ 0.1% F.S.

Parameter	Specification
Temperature accuracy	$\leq 0.5\text{ }^{\circ}\text{C}$
Input bias current	$\leq 10^{-12}\text{ A}$
Input impedance	$\geq 10^{12}\text{ }\Omega$
Stability	$\leq 0.01\text{ pH} / 3\text{ hours}$
pH temperature compensation range	$0.0 - 100.0\text{ }^{\circ}\text{C}$
Data logging memory	1,024 records
Communication port	RS232
Operating environment	$5 - 35\text{ }^{\circ}\text{C}$, relative humidity $\leq 85\%$
Power supply	DC 9V power adapter
Dimensions	$200 \times 160 \times 65\text{ mm}$
Weight	0.65 kg

Compatible pH Buffer Sets

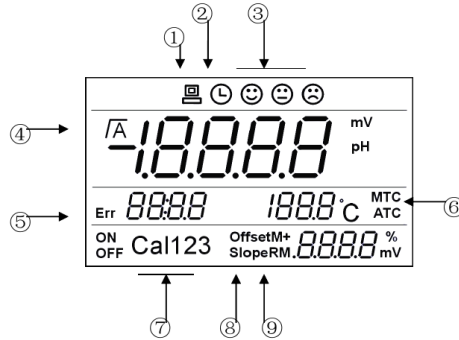
The AMT620 can be configured for any of the following buffer sets (see Section 9.2):

Set	Buffer Values
b1 – Standard	pH 1.68, 4.00, 7.00, 10.01
b2 – Mettler-Toledo	pH 2.00, 4.01, 7.00, 9.21
b3 – NIST	pH 1.68, 4.01, 6.87, 9.18
b4 – MERCK	pH 2.00, 4.00, 7.00, 9.00, 12.00

3. Accessories & Installation

1. Install the electrode holder arm onto the base of the instrument.
2. Plug the pH combination electrode and the DC9V power adapter into their respective sockets on the rear panel.
3. As soon as the power adapter is connected to an AC outlet, the instrument enters standby (hold) mode.

4. LCD Icons



Icon	Meaning
① RS232 icon	Displayed when the instrument is connected to a PC; RS232 communication is enabled automatically.
② Timing storage icon	Displayed when timed data logging is active; the instrument logs readings at the configured interval.
③ Sensor diagnostics	Shown after calibration: smiling face = good electrode performance, neutral face = fair performance, frowning face = poor performance — replace the electrode.
④ Measurement status	“Γ” = stable reading, measurement continues. “/A” = auto ending point reached; the reading is held.
⑤ Error icon (Err)	Displayed with a diagnostic code when the instrument detects a problem (see Self-Diagnostics).
⑥ Temperature / compensation	MTC = temperature entered manually. ATC = temperature measured automatically and used for compensation.
⑦ Calibration icon (Cal1/2/3)	Indicates which calibration point (1st, 2nd, or 3rd) is currently active.
⑧ Sensor performance	Offset = electrode zero-point value. Slope = electrode slope value.
⑨ Data storage / recall	M+ = a reading has been stored. RM = a stored reading is being displayed.

5. Operation Keys

The instrument has 6 operation keys:

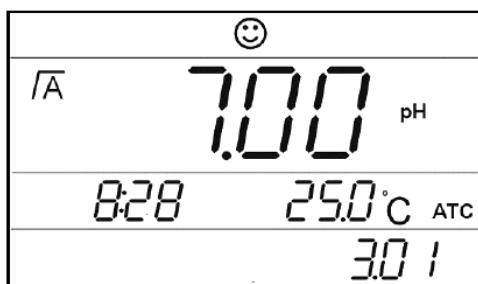
Key	Function
ON/OFF	Power key. When the meter is switched off but the adapter remains plugged in, the instrument stays in standby (hold) mode.
MODE	Switches between pH and mV measurement. Press and hold to enter the function parameter setting menu.
CAL	Starts pH sensor calibration.
M+ / $\wedge$	Stores the current reading once it is stable. Also increases a manually entered temperature or a parameter value.
RM / $\vee$	Recalls the last stored reading (short press) or clears all stored readings (long press). Also decreases a manually entered temperature or a parameter value.
READ	Combination measurement key. Short press (< 1.5 s) takes a reading. Long press (≥ 1.5 s) toggles the auto ending-point function on or off.

6. Measurement

6.1 pH Measurement

Before first use, the pH sensor should be calibrated (see Section 7).

1. Rinse the electrode with distilled water and immerse it in the sample.
2. Gently shake the vessel for a few minutes, then press READ (short press).
3. If auto ending-point is enabled, the “/A” icon appears once the reading stabilizes and the value is held. If auto ending-point is disabled, the “Γ” icon appears when the reading is stable and can be read, while measurement continues.



The example above shows: date/time 8:28 on March 1st, sample temperature 25.0 °C with automatic temperature compensation (ATC), auto ending-point active, a reading

of 7.00 pH, and good electrode performance.

When READ is pressed, the MTC icon flashes to indicate whether temperature compensation is currently manual or automatic and to let you confirm the displayed sample temperature. Use M+/Λ and RM/V to adjust the temperature if needed, then press READ again to confirm and measure.

6.2 mV Measurement

Switch to mV mode with the MODE key, then follow the same procedure as pH measurement: rinse and immerse the electrode, shake gently, and press READ to take a reading.

6.3 Measurement Ending-Point Status

The instrument supports two ending-point judgment modes, selected with a long press of READ while in measurement mode:

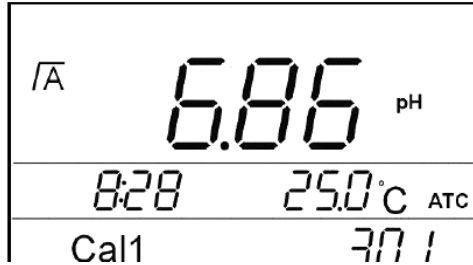
- “/A” (balanced) — the instrument holds the reading once the value has settled; measurement ends.
- “Γ” (stable) — the reading can be recorded, but the instrument continues monitoring for further stability.

Remarks: while auto-storage is set to ON, the instrument always uses the auto ending-point function and the READ long-press cannot change this setting. Set auto-storage to OFF first if you need to change the ending-point mode.

7. pH Sensor Calibration

1-Point Calibration

1. In pH measurement mode, press CAL. The display shows “Cal1” flashing.
2. Rinse the electrode and immerse it in the standard buffer solution. Shake gently, wait a few seconds, then press CAL again.
3. The instrument automatically recognizes the buffer value and waits for the reading to stabilize.
4. Once complete, “Cal2” begins flashing, prompting you to continue to a 2-point calibration. Press READ to stop here and return to measurement mode, or continue to the next step for additional points.



Note: a 1-point calibration adjusts only the electrode's zero point (Offset); the slope value is retained from the previous calibration. Even a well-performing electrode may show up to 0.05 pH of measurement error under this condition.

2-Point Calibration

1. After the 1st point, rinse the electrode and immerse it in a second standard buffer. Shake gently, wait, then press CAL.
2. The instrument recognizes the buffer and waits for the reading to stabilize.
3. Once complete, the instrument automatically returns to pH measurement mode, and “Cal3” begins flashing to offer a 3rd calibration point. Press READ to stop here, or continue for a 3-point calibration.

Note: a 2-point calibration adjusts both the offset and slope of the electrode, giving good measurement precision for most applications.

3-Point Calibration

1. After the 2nd point, immerse the electrode in a third standard buffer (e.g., pH 9.18). Shake gently, wait, then press CAL.
2. The instrument recognizes the buffer, judges the response, and automatically returns to pH measurement mode once complete, along with an updated sensor performance icon.

A 3-point calibration provides the best measurement precision, and corrects for non-linearity across a broad pH range — especially valuable when measuring both acidic and alkaline samples.

During calibration, the MTC icon flashes to remind you compensation is manual; confirm or adjust the sample temperature with M+/Λ and RM/V, then press CAL to proceed.

8. Data Storage, Recall & Communication

Mode	Description
Manual storage	With auto-storage off, press M+ once a reading is stable to store it. The display briefly shows the storage number, then returns to the measurement screen.
Automatic storage	When auto-storage is set to ON, the instrument stores every stable reading automatically as soon as the auto ending-point condition is met.
Timed storage	When timed storage is set to ON, the instrument logs a new reading at the configured interval (1 – 60 minutes) without waiting for a stable/ending-point reading.

Each stored record includes the reading number, measurement value, temperature (and ATC/MTC status), date, and time.

Recalling & Clearing Stored Data

- Short-press RM/V to display the most recently stored reading.
- Long-press RM/V to clear all stored data — the display flashes “Clr.”; confirm with RM/V or cancel with READ. Cleared data cannot be recovered.

RS232 Communication

Download at www.amtast.com, search amt620 then you can find the software link.

After installing the companion communication software and connecting the meter to a PC via RS232 cable, the RS232 icon appears on the LCD. While connected, manually, automatically, and timer-stored readings are transferred directly to the PC instead of the instrument's internal memory.

9. Function Parameter Setting

Press and hold MODE (> 1.5 s) to enter the parameter setting menu. Use MODE to cycle through parameters P1–P5; use M+/Λ and RM/V to change values. Long-press MODE to save changes and exit.

No.	Parameter	Description
P1	Calibration information	Displays the pH sensor's last calibration date/time, calibration method (1/2/3-point), sample temperature, and Offset/Slope values. Read-only.
P2	pH buffer set	Selects which buffer set (b1–b4) the instrument should recognize during calibration. Must match the physical buffers in use.
P3	Auto-storage	Turns automatic data storage on or off. Factory default: OFF.
P4	Timed storage interval	Sets the timed logging interval from 1 to 60 minutes. Factory default: OFF.
P5	Date & time	Sets the instrument's date and time (24-hour format). On type 620, this is parameter P2.

10. Self-Diagnostics

The instrument continuously monitors its own operation and displays a code if a problem is detected:

Code	Cause	Recommended Action
Err1	Electrode potential ≥ 2000 mV	Check that the electrode is connected, not exposed to air, and undamaged.
Err2	Electrode potential ≤ -2000 mV	Check that the electrode is connected, not exposed to air, and undamaged.
Err3	pH reading > 15.00 pH	Check that the electrode is connected, not exposed to air, and undamaged.
Err4	pH reading < -1.00 pH	Check that the electrode is connected, not exposed to air, and undamaged.
Err5	Memory is full	Save any needed readings, then clear the stored data.
Err6	Calibration potential out of range for the selected buffer set	Confirm the electrode connection and condition, verify the correct buffer set is selected, then re-calibrate.
Err7	Zero-point (Offset) out of range (< -60 mV or > 60 mV)	Check for air bubbles at the electrode tip, confirm buffer selection and freshness, then re-calibrate. Replace the electrode if the error persists.

Code	Cause	Recommended Action
Err8	Slope out of range (< 85% or > 105%)	Check for air bubbles at the electrode tip, confirm buffer selection and freshness, then re-calibrate. Replace the electrode if the error persists.
Err9	Calibration points too similar, or electrode fault detected during multi-point calibration	Re-calibrate the pH electrode.

11. Maintenance

Instrument performance depends not only on its design but on proper care — especially important given the pH meter's high input impedance and frequent exposure to chemical samples.

- Only disconnect the power adapter after switching the instrument off.
- Keep the meter out of direct sunlight to protect the LCD.
- For best resolution, calibrate using a buffer at the same temperature as your sample; sample pH should fall within the range of your selected buffer set.
- Keep the electrode socket clean and dry. Handle the electrode tip carefully — it is thin and fragile — and refer to the electrode's own instructions for storage and cleaning.
- Never touch the BNC connector's center pin with your hand or a metal object; static discharge can damage the instrument and contaminate the input terminal.
- Do not use solvents or chemical agents to clean the enclosure (ABS engineering plastic).

12. Packing List

The package includes this operation manual, and the following accessories:

- 1 × pH combination electrode
- 1 × electrode holder set
- 1 × DC9V power supply

13. Warranty

Electronic components are warranted for 1 year from the date of purchase under normal storage (not include pH sensor), operation, and transport conditions. If the instrument malfunctions due to a manufacturing defect, it will be repaired or have parts replaced at no charge upon presentation of the sales invoice and product inspection certificate.

Appendix I: pH Linearity Check

To check the instrument's pH linearity, input 177.48 mV (simulating the pH 4.00 buffer's electrode potential) and -178.07 mV (simulating pH 10.01) into the instrument with temperature compensation set to 25 °C, then perform a 2-point calibration. After calibration, the instrument should display the “good performance” (smiling face) icon. Set the buffer set to b1. Verify linearity against the table below:

mV/pH							
414.11	354.95	295.80	236.64	177.48	118.32	59.16	0
0.00	1.00	2.00	3.00	4.00	5.00	6.00	7.00
-414.11	-354.95	-295.80	-236.64	-177.48	-118.32	-59.16	
8.00	9.00	10.00	11.00	12.00	13.00	14.00	

Appendix II: Buffer pH vs. Temperature

The nominal pH value of each standard buffer solution varies slightly with temperature, as shown in the tables below.

b1 — Standard Buffer Set

°C	pH1.68	pH4.01	pH7.00	pH10.01
5	1.67	4.00	7.09	10.25
10	1.67	4.00	7.06	10.18
15	1.67	4.00	7.04	10.12
20	1.68	4.00	7.02	10.06
25	1.68	4.00	7.00	10.01
30	1.68	4.01	6.99	9.97

°C	pH1.68	pH4.01	pH7.00	pH10.01
35	1.69	4.02	6.98	9.93
40	1.69	4.03	6.97	9.89
45	1.70	4.04	6.97	9.86
50	1.71	4.06	6.97	9.83
55	1.71	4.08	6.98	9.81
60	1.72	4.10	6.98	9.80

b2 — Mettler-Toledo Buffer Set

°C	pH1.68	pH4.00	pH6.86	pH9.18
0	2.00	4.01	7.12	9.52
5	2.02	4.01	7.09	9.45
10	2.01	4.00	7.06	9.38
15	2.00	4.00	7.04	9.32
20	2.00	4.00	7.02	9.26
25	2.00	4.01	7.00	9.21
30	1.99	4.01	6.99	9.16
35	1.99	4.02	6.98	9.11
40	1.98	4.03	6.97	9.06
45	1.98	4.04	6.97	9.03
50	1.98	4.06	6.97	8.99
55	1.98	4.08	6.98	8.96
60	1.98	4.10	6.98	8.93
65	1.99	4.13	6.99	8.90
70	1.99	4.16	7.00	8.88
75	2.00	4.19	7.02	8.85
80	2.00	4.22	7.04	8.83
85	2.00	4.26	7.06	8.81
90	2.00	4.30	7.09	8.79
95	2.00	4.35	7.12	8.77

b3 — NIST Buffer Set

°C	pH1.68	pH4.00	pH6.86	pH9.18
0	1.67	4.01	6.98	9.46
5	1.67	4.00	6.95	9.36
10	1.67	4.00	6.92	9.33
15	1.67	3.99	6.90	9.28
20	1.68	4.00	6.88	9.23
25	1.68	4.01	6.87	9.18
30	1.68	4.01	6.86	9.14
35	1.69	4.02	6.84	9.10
40	1.69	4.03	6.84	9.07
45	1.70	4.04	6.83	9.04
50	1.71	4.06	6.83	9.01
55	1.71	4.07	6.83	8.99
60	1.72	4.09	6.84	8.96
65	1.73	4.11	6.84	8.94
70	1.74	4.13	6.85	8.92
75	1.75	4.15	6.85	8.90
80	1.77	4.16	6.86	8.89
85	1.78	4.20	6.87	8.87
90	1.79	4.23	6.88	8.86
95	1.81	4.23	6.89	8.83

b4 — MERCK Buffer Set

°C	pH2.00	pH4.00	pH7.00	pH9.00	pH12.00
0	2.01	4.05	7.13	9.24	12.58
5	2.01	4.04	7.07	9.16	12.41
10	2.01	4.02	7.05	9.11	12.26
15	2.00	4.01	7.02	9.05	12.10
20	2.00	4.00	7.00	9.00	12.00

°C	pH2.00	pH4.00	pH7.00	pH9.00	pH12.00
25	2.00	4.01	6.98	8.95	11.88
30	2.00	4.01	6.98	8.91	11.72
35	2.00	4.02	6.96	8.88	11.67
40	2.00	4.03	6.95	8.85	11.54
45	2.00	4.04	6.95	8.82	11.44
50	2.00	4.00	6.95	8.79	11.33
55	2.00	4.00	6.95	8.76	11.19
60	2.00	4.00	6.96	8.73	11.04
65	2.00	4.00	6.96	8.72	10.97
70	2.01	4.00	6.96	8.70	10.90
75	2.01	4.00	6.96	8.68	10.80
80	2.01	4.00	6.97	8.66	10.70
85	2.01	4.00	6.98	8.65	10.59
90	2.01	4.00	7.00	8.64	10.48
95	2.01	4.00	7.02	8.64	10.37

Contact & Support

If you require service or have questions about your pH meter, please reach out — we aim to respond as quickly as possible.

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