



ThermoProbe

TP7-D
TP9-A

USER MANUAL



Thermoprobe Models TP7D and TP9A



EU Declaration of Conformity according to directive 2014/34/EU (ATEX)

Thermoprobe, Inc. hereby declares the TP7-D and TP9-A products to be in accordance with the following standards and directives:

Name and address of Manufacturer

ThermoProbe, Inc.
112A Jetport Dr.
Pearl, MS 39208 USA

Description of Devices

TP7-D and TP9-A
Portable Electronic Thermometers

Ex-Designation

 II 1 G Ex ia IIB T4 Ga

EC-Type Examination Certificate

ITS17ATEX201515X

Notified Body

Intertek Italia SPA
Via Guido Miglioli, 2/A
20063 Cernusco sul Naviglio (MI), Italy
Identification Number: 2575

Auditing body (QAN)

Intertek Italia SPA
Via Guido Miglioli, 2/A
20063 Cernusco sul Naviglio (MI), Italy
Identification Number: 2575

Applied Harmonized Standards

EN 60079-0: 2018
EN 60079-11: 2012

Explosive atmospheres – Part 0: Equipment – General requirements
Explosive Atmospheres – Part 11: Equipment Protection by Intrinsic Safety ‘i’

Applied European Directives

2014/34/EU - Equipment and protective systems intended for use in potentially explosive atmospheres

ThermoProbe, Inc.

Luke Bartkiewicz
President

5/11/2021, JK



USER INSTRUCTIONS - TP7-D & TP9-A

INTRODUCTION

This manual describes the basic function, use and safety instructions for a model TP7-D and TP9-A portable digital thermometer instrument.

REPLACING BATTERY

When the battery voltage is low, the low battery icon will show on the display.



When the battery voltage is **very** low, the backlight will no longer operate and the low battery icon will 'blink' on the display.

Replace batteries as soon as possible in a safe location after the low battery is noticed. This will ensure backlight operation, and avoid possible malfunctioning. Do not attempt to calibrate the instrument if the low battery indicator is displayed.

WARNING:

- Batteries must be changed in Non-hazardous area.
- Batteries must be of correct approved type.
- Batteries must be installed with correct polarity making sure the (+) end of the battery is aligned with (+) symbol embossed in the battery case.
- Batteries must not be installed with polarity reversed where one cell could charge another cell.
- New batteries must not be mixed with old batteries. Batteries must not be mixed with batteries of other models or manufacturers.

- Ensure the instrument is in a non-hazardous area & powered off.
- Use a #2 Phillips drive to remove the 3 screws holding the front cover on the TP7-D or the 2 screws holding the front cover on the TP9-A.
- Use a #1 Phillips drive to remove the single screw from the battery cover. Remove the battery cover, push one battery towards the spring contact and lift battery up from the holder, and then remove the remaining battery.
- Install each new battery making sure the (+) end of the battery is aligned with (+) symbol embossed in the battery case.
- Replace the retaining device and reinstall the cover.

CERTIFIED Batteries for the TP9-A and TP7-D are as follows:

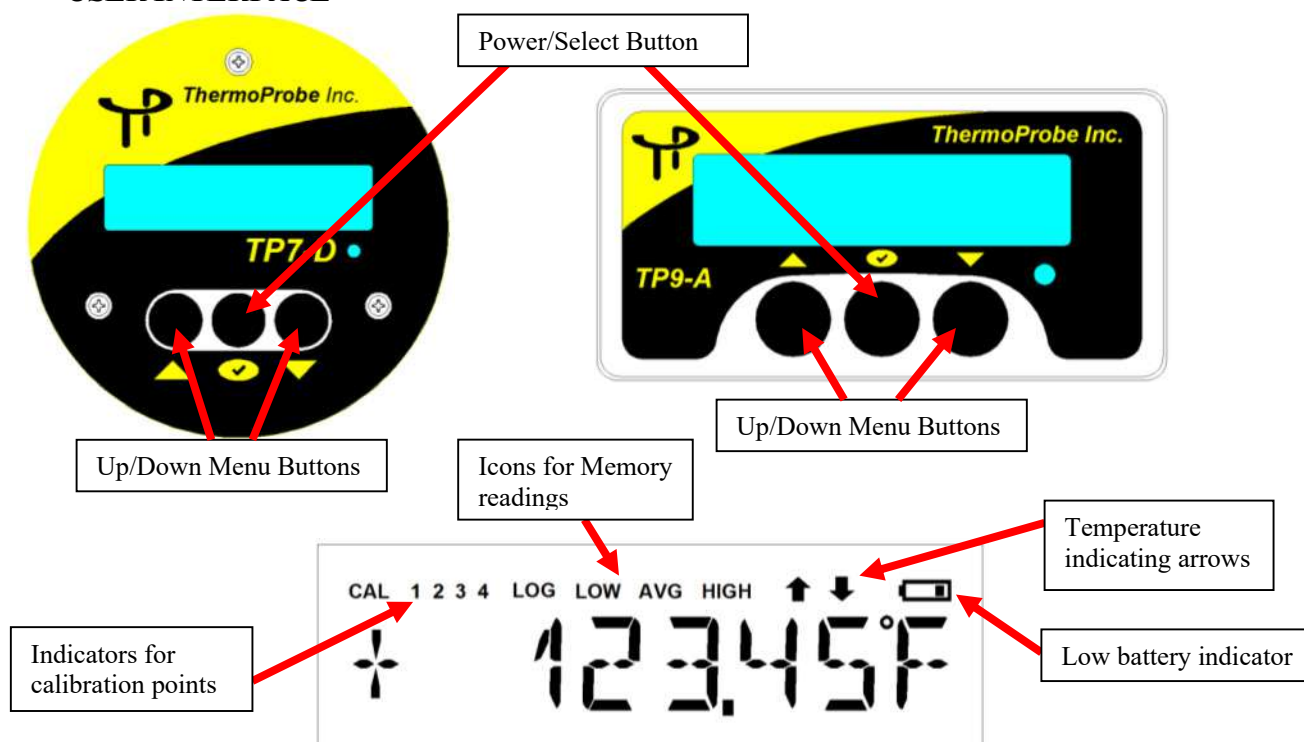
Manufacturer	Type	Part Number
Duracell	AA (LR6) Alkaline	MN1500
Panasonic	AA (LR6) Alkaline	LR6XWA
GP (Gold Peak)	AA (LR6) Alkaline	GP15A

AUTHORIZED REPAIR

It is recommended that service beyond the scope of this manual be performed by ThermoProbe, Inc. or one of its authorized distributors.

05/2021, JK

USER INTERFACE



Power Button:

Pressing the Power button once will turn on the device. (Note: The instrument will automatically power off 20 minutes after the last button push.) Pressing and holding the “Power” button until it displays ‘OFF’ will turn off the instrument.

Selection MENU:

Use the “Up/Down” Menu buttons for the following selections:

LOG: Saves current stable temperature up to 10 readings

C-F: Select Celsius or Fahrenheit temperature display

DECIMAL: Select 0.1 or 0.01 display resolution

MEMORY - Use “up/down” buttons to display:

Lowest reading

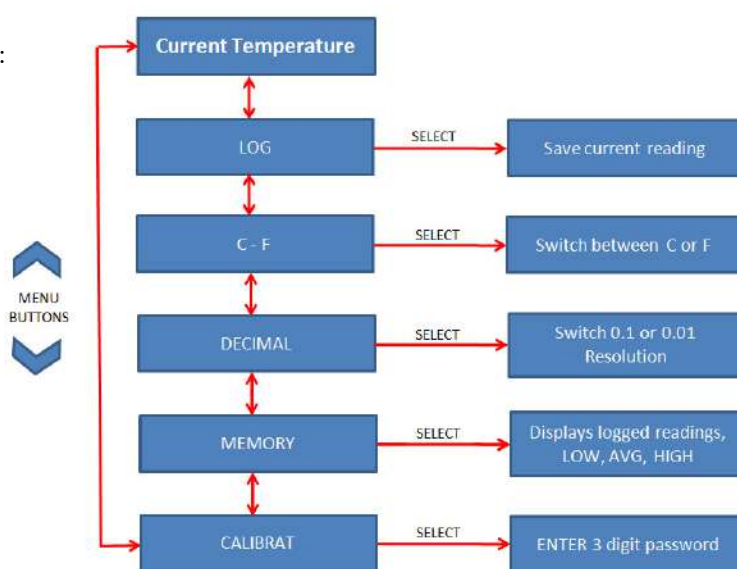
Average reading

Highest reading

Saved (Logged) readings 1-10

(Use **CLR LOG** to erase saved readings)

CALIBRAT: Enter calibration/adjustment mode
(Requires 3 digit password: 112) - See Calibration Procedure



05/2021, JK

Backlight

When the instrument is operating in low-light conditions a photocell will detect this situation and turn the backlight on.

Temperature Logging

It is necessary for the temperature to be stable before logging temperature. The display arrows will flash 3 times when the temperature reading has stabilized.

If you wish to **log the temperature**, Press the “down” button once until **LOG** is displayed. Press the “Select” button once to save a reading. An acknowledgment of a saved reading will occur with a display of “**LOG 1-10**”. This can be repeated for up to 10 saved readings.

The logged temperatures can be accessed from the MEMORY menu. Logged temperatures will display with the LOG icon and a prefix (1,2,3,4,5,6,7,8,9,0) corresponding to the previously logged readings. The up/down buttons can be used to advance through the readings. Select **EXIT** to return to the temperature display.

Logged readings will be retained even after the unit is powered off. Logged readings can be cleared by going to the Memory section of the Menu and selecting **CLR LOG**. New readings cannot be taken until the readings are cleared.

USB Memory

A micro-usb connection is available on the circuit board allowing access to calibration & logged data.

Warning: Do not access the circuit board in a hazardous location.

Lowest, Highest & Average readings

The lowest, highest and average readings can be accessed through the MEMORY menu. The readings are indicated by the LOW, AVG or HIGH icons on the display. These readings are not related to the logged readings, but are determined from the temperature when the unit is powered on. These readings are deleted after the unit is powered off.

Display Codes

OPEN CKT - Indicates the sensor is operating above its temperature limit, the Probe Assembly is open circuited from a cut or broken section, or the cable is not properly inserted at the circuit board terminal. The most common cause is a damaged cable.

SHORT CKT - Indicates the sensor is operating below its temperature limit or the Probe Assembly is short circuited due to a smashed or cut section. The most common cause is a damaged cable.

NONE – There are no logged readings saved in memory.

2 WIRE – A 2 wire probe connection has been detected.

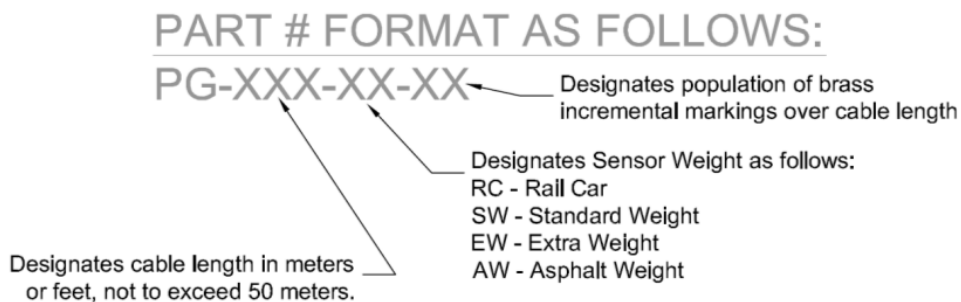
3 WIRE – A 3 wire probe connection has been detected.

NO CAL – The device does not have stored calibration data for the temperature probe. Perform an adjustment/calibration before use.

Probe Types

The TP7-D or TP9-A can use either 2-wire or 3-wire probe assemblies.

ThermoProbe replacement probe assemblies are available in different configurations. The cable length is available in lengths up to 50 meters or 165 feet. Standard brass markings are available applied in 5 feet or 1 meter increments. The sensors are available with 4 weight types. The probe assembly part configurations are as follows:

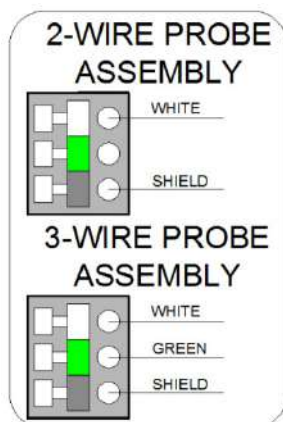


REPLACING THE PROBE ASSEMBLY

NOTES:

- 1) Replacement of the probe assembly requires re-calibration of the device. Replacement should only be done by experienced personnel and if calibration equipment is available.
 - 2) Please refer to IEC/EN 60079-19 (Explosive atmospheres - Part 19: Equipment repair, overhaul and reclamation) when making the repair.
 - 3) Only use replacement probe assemblies obtained from ThermoProbe, Inc. or one of its authorized distributors.
- a) First follow REPLACING BATTERY instructions **a through c** to remove batteries.
 - b) On the circuit board push the terminals clamps down and remove the wires noting the wire lead color code arrangement. See Figure 1.
 - White – positive sensor wire
 - Green – cable compensating wire (not used on 2 wire models)
 - Silver – negative sensor wire & shield wire
 - c) Set the cover and circuit board aside and remove the strain relief knot in cable assembly.
 - d) Unwrap the cable from the assembly and pull the cable free of the rubber grommet.
 - e) Insert the new cable wire through the rubber grommet and then pull several inches of cable past the grommet.
 - f) Tie a simple overhand knot in the cable at the grommet for strain relief and pull the knot up to the grommet.
 - g) On the circuit board, push the terminal clamp levers down and insert the new wire leads according to the terminal color codes. The label indicates how to connect a 2 wire probe vs. a 3 wire probe (includes green wire). See Figure 1.
 - h) Reinstall the batteries and cover and re-spool the cable assembly.
 - i) Perform a calibration (see calibration procedure).

Figure 1: Probe Assembly Lead Attachment



05/2021, JK

CALIBRATION PROCEDURE

- The calibration mode should only be accessed by qualified personnel with proper equipment; otherwise calibration integrity may be compromised. Read the following instructions carefully.
- At least 2 points are required to make an adjustment. (2-Point calibration). Additional points can be taken (3-Point or 4-Point calibration) to calibrate a large range of temperatures (e.g. 0°F to 300°F) or if you want to match specific points in your range. You should include points at the bottom and top of the range. You must have the proper equipment for every point of calibration.
- Do not attempt to calibrate the instrument if the low battery indicator has been displayed since the new calibration values may not be properly stored to memory.
- Refer to API 7.2 or another recognized standard for routine calibration verification recommendations.
- Calibration must not be performed in any environment considered to be hazardous.

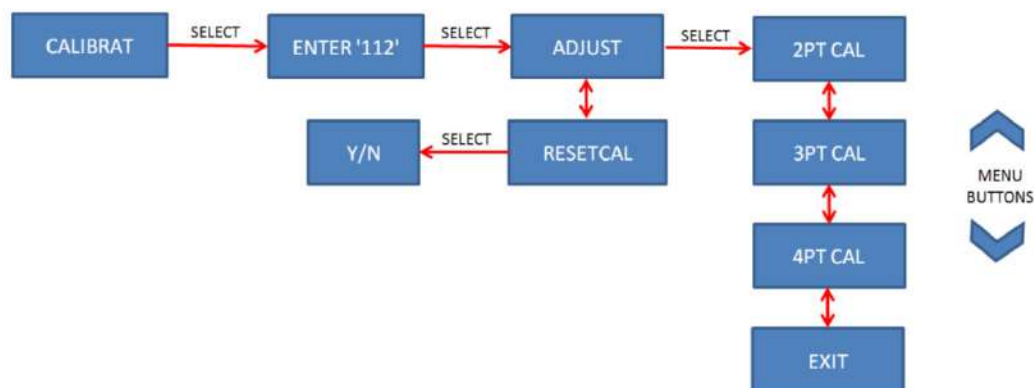
Equipment needed:

- Ice Bath or other low temperature bath with reference thermometer.
- Warm to hot fluid bath between 20°C (approx 68°F), or higher up to 90°C (approx 194°F) with reference thermometer. (see Note)*
- Optional high temperature oil bath at about 150°C/300°F and reference thermometer.

*Note for limited calibration: If entire range capability of instrument is not required, the 2 point high adjustment can be made at a temperature relatively close to the common temperature of the liquid measured and accuracy will be maintained within the limited range. For example: If liquid product to be measured is commonly less than 38°C (approx. 100°F), then a “high point” calibration can be made near that temperature. Temperature accuracy above this calibration point cannot be assured.

To calibrate proceed with the following steps:

1. Enter calibration mode by going to **CALIBRAT** in the selection Menu. When this is selected, the user will be prompted to enter a 3 digit password. Using the “up/down” buttons allows each digit to be adjusted. Once the correct value is set, advance to the next digit by pressing the “select” button. After the 3rd digit is set press the “select” button to enter Calibration mode. If an incorrect password is entered, **FAIL** will display and the unit will return to temperature mode. Once in Calibration mode the ‘CAL’ icon on the display will blink. *The calibration mode password is: 112*



2. Select **ADJUST** from the calibration menu and then select the desired number of calibration points. Pick **2PT CAL**, **3PT CAL** or **4PT CAL** using the select button.

NOTE: If the user is not ready to enter the calibration mode, the **EXIT** option can be chosen.

3. The device is now in adjustment mode. The display will show **ADD PT1**. The “up/down” buttons can be used to select a different point to adjust or **CANCEL**. If the **CANCEL** option is chosen then the calibration procedure is exited and the prior calibration values are re-activated.

ADD PT1 = Lowest temperature point

ADD PT2 = the next higher temperature point

ADD PT3 = the next higher temperature point (only used in 3-point calibration or 4-point calibration mode)

ADD PT4 = the highest temperature point (only used in 4-point calibration mode)

ADJ DONE = Save and exit calibration mode (all points adjusted & valid)

CANCEL = Exit calibration mode without saving

Pick which point to adjust and press the select button to begin. The current temperature will display and the CAL icon and the number of the point to adjust will now be blinking.

NOTES:

- Calibration can be performed to hundredths of a degree.
 - The up/down buttons can be used to increase or decrease the display reading.
 - **Holding** the up/down buttons adjusts **0.1 degrees** increments.
 - **Momentary Presses** of the up/down buttons for less than 0.5 seconds adjusts **0.01 degrees** for every press.
 - The display arrows will flash 3 times when the temperature reading has stabilized.
 - All points must be saved before selecting **ADJ DONE**. A **DATA ERR** message will display if all points have not been saved or are not in increasing temperatures. (Ex: PT1 = 32F, PT2 = 120F, PT3 = 250F)
 - While in calibration mode the temperature will display based on the prior calibration curve.
 - The **RESETCAL** feature can be used to return the unit to a factory calibration curve. (calibration/adjustment will still be required).
 - The **RESETCAL** (reset to factory calibration) feature should be used if the probe is replaced using a 2-wire assembly **instead** of a 3-wire assembly or if prior calibration has caused the unit to read excessively out of tolerance.
4. Once the temperature has stabilized, using a reference device check the actual temperature in the bath and use the “up/down” buttons to adjust the device to the actual temperature. Once the device temperature matches the actual temperature, **press the select button to save the setting**. The display will show **SAVE** or **EXIT**. If **EXIT** is selected it will return to the **ADD PT1** menu. Once **SAVE** is selected the display will advance to the next temperature point for adjustment showing **ADD PT....** The up/down buttons can be used to select a different point to adjust or **CANCEL**. If the **CANCEL** option is chosen then the calibration procedure is exited and the prior calibration values are re-activated.
- NOTE: Once **SAVE** is selected the temperature display will return to the previous reading until the calibration is completed.
 - NOTE: If **SAVE** is selected before the temperature has stabilized, the display will show **NOT STABLE**. Wait for the temperature to stabilize before saving.
5. Move the probe to the next bath and repeat step 4. After you save the highest temperature point the display will flash **READY** and the new calibration settings will be in effect. The buttons will now resume their normal operating functions. The calibration settings are saved to flash memory when the device is turned off. The unit will not turn off automatically. Manually turning the unit off saves the calibration data.

These ThermoProbe instruments are intended for use in both hazardous (potentially flammable or explosive) and non-hazardous areas under dry conditions at ambient temperatures between -20 to 40°C.

The instruments are not intended for use in permanent outdoor installations and are not intended or tested for icing conditions. Additional means of protection should be used where the equipment may be exposed to excessive external stresses (e.g. vibration, heat, impact, etc.). The user must have a working knowledge of appropriate safety requirements.

- a) The user must have a thorough knowledge of the products to be measured and must know of the safety precautions to be taken when working with the material to be measured.
- b) The instrument shall be checked concerning severe defects; check that instrument is complete (including grounding/bonding cable), has good batteries, etc. If necessary, check measurement accuracy. If any defects are found, the instrument should not be used until repairs have been made.
- c) The instrument, especially cable and probe, should be clean for safety and ease of use.
- d) The physical measurement location should be evaluated for primary and secondary risks.
- e) Power source must be removed before performing any maintenance.
- f) Exchange of components other than the batteries may compromise ATEX/IECEx or other certifications and shall only be undertaken by ThermoProbe or one of its qualified service providers. See also “Authorized Repair” section.
- g) To reduce the risk of fire or explosion, this device must be bonded to the vessel according to clause 6.3.2 e), IEC/EN 60079-14 before and during introduction into the vessel and shall remain bonded until the sensor probe is completely withdrawn from the vessel.
- h) The device must remain bonded to ground/earth using the provided connection whenever a hazardous atmosphere could be present as well as during situations where electrostatic charging can occur such as the unwinding/winding of the thermometer cable or filling or emptying of the tank.

CAUTION: In the event that any part of the instrument should become electrostatically charged in a potentially hazardous location, follow company policies for testing and clearing the area of any hazardous gases before attempting to bond the instrument to earth ground. If this is not possible allow sufficient time for the instrument to naturally dissipate any charges before attempting to bond to earth ground. Given the atmosphere, this could take several hours.

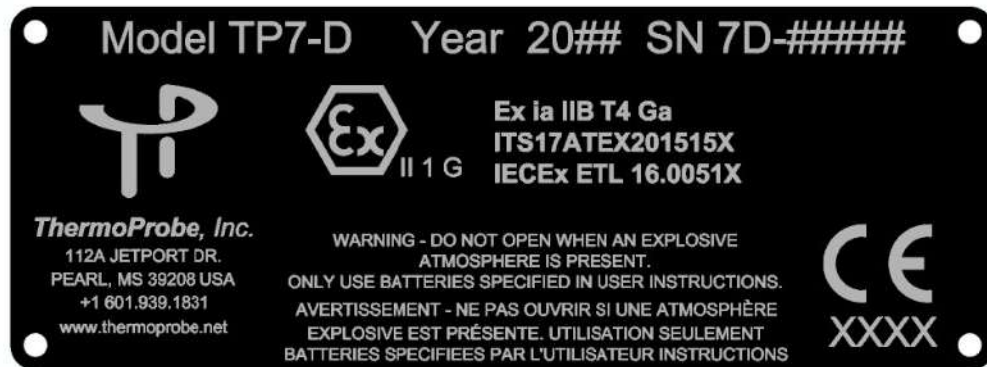
GUIDANCE NOTE

Problems with aggressive substances and environments: Be aware of aggressive substances and that extra protection may be needed.

Caustic soda, highly basic and acidic substances will erode aluminum and copper ground clip and wire. The Sensor-Cable assembly has external surfaces of stainless steel and fluoropolymer material. Exposure to Excessive heat can melt the plastic components of the instrument.

SAFETY APPROVALS FOR TP7-D AND TP9-A:

Ex ia IIB T4 Ga



Applicable Standards are:

IEC 60079-0:2017 Ed 7, IEC 60079-11:2011 Ed 6
EN 60079-0:2018, EN 60079-11:2012

Agency or Safety Designation

IECEX
Europe: ATEX

INTRINSIC SAFETY

Intrinsically safe equipment is defined as "equipment and wiring which is incapable of releasing sufficient electrical or thermal energy under normal or abnormal conditions to cause ignition of a specific hazardous atmospheric mixture in its most easily ignited concentration." (ISA-RP12.6) This is achieved by limiting the amount of power available to the electrical equipment in the hazardous area to a level below that which will ignite the gases.

In order to have a fire or explosion, fuel, oxygen and a source of ignition must be present. An intrinsically safe system assumes the fuel and oxygen is present in the atmosphere, but the system is designed so the electrical energy or thermal energy of a particular instrument loop can never be great enough to cause ignition.

BATTERIES

WARNING:

- Batteries must be changed in Non-hazardous area.
- Batteries must be of correct approved type.
- Batteries must be installed with correct polarity making sure the (+) end of the battery is aligned with (+) symbol embossed in the battery case.
- New batteries must not be mixed with old batteries.
- Batteries must not be mixed with batteries of other models or manufacturers.
- Batteries must not be installed with polarity reversed where one cell could charge another cell.

CERTIFIED Batteries for the TP9-A and TP7-D are as follows:

Manufacturer	Type	Part Number
Duracell	AA (LR6) Alkaline	MN1500
Panasonic	AA (LR6) Alkaline	LR6XWA
GP (Gold Peak)	AA (LR6) Alkaline	GP15A

05/2021, JK