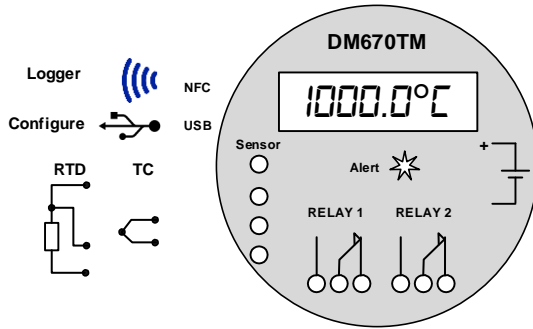# DM670TM PRECISION BATTERY POWERED DIGITAL THERMOMETER WITH DUAL TRIP AND NFC INTERFACE LOGGING FUNCTION. USER GUIDE

⚠ Important - Please read this document before commencing installation.

Every effort has been taken to ensure the accuracy of this document, however we do not accept responsibility for damage, injury, loss or expense resulting from errors and omissions, and we reserve the right of amendment without notice.

⚠ IMPORTANT - CE, UKCA & SAFETY REQUIREMENTS

- Product must be installed correctly providing environmental protection to IP65 or greater(Cable Entries).
- To maintain CE EMC requirements , Sensor wires must be less than 3 metres.
- Apart from the battery the product contains no serviceable parts. No attempt must be made to repair this product. Faulty units must be returned to supplier for repair.
- This product must be installed by a qualified person. All electrical wiring must be carried out in accordance with the appropriate regulations for the place of installation.
- Battery - Fire Explosion and Severe Burn Hazard . Do not attempt to re-charge, Crush, Incinerate, Disassemble, Heat above 100 °C (212 °F) or expose to water.
- Disposal of the battery must conform with the regulations applicable for the area use.

ABSOLUTE MAXIMUM CONDITIONS (To exceed may cause damage to the unit):-
Battery Voltage	+ 3.7 V dc (Protected for reverse connection)
Input Voltage	± 1 V between any terminals
Ambient	Temperature (-30 to 70) °C Humidity (10 to 95) % RH (Non condensing)
Relays	50 V dc 40 V ac rms

PRODUCT SPECIFICATION

Please refer to the product data sheet for full specification, available to download at www.status.co.uk.

RECEIVE AND UNPACKING

Please inspect the packaging and instrument thoroughly for any signs of transit damage. If the instrument has been damaged, please notify your supplier immediately.

CONFIGURATION

The instrument is provided with a USB interface for direct connection to a PC. Free software USBSpeedLink is available, is simple to use and provides the user with either basic or advanced modes of operation. Please refer to the USBSpeedLink software for further information on configuration. The software can be downloaded from www.status.co.uk.

INSTALLATION AND BATTERY REPLACEMENT ⚠

IMPORTANT Always remove battery before any wiring takes place. Gain access for connection and battery holder by twisting cap to release front panel assembly from case. For connection information please refer to the internal markings found on the protection panel.

SENSOR CONNECTION
General – The instrument is designed to be directly attached to the sensor probe assembly. Remote Probes may be used but the user must ensure all sensor entries maintain environmental protection to at least IP65 rating. To comply with CE EMC requirements the sensor wires should be no longer than 3 metres.

RTD – For best result we recommend using three wire connection, this method compensates for any lead resistance between the sensing element and instrument. Two wire connection is possible, refer to connection diagram on the instrument protection panel.

Thermocouple - Thermocouple wire type must be maintained from the sensor element to the instrument terminals. The terminals are effectively the cold junction point and can be displayed as "Case" temperature.

RELAY CONNECTION
Two independent change over contacts are provided. Screw terminals are provided for connection for wire size 16 to 20 AWG. All cable entries must be sealed to at least IP65 rating. The relay contacts are rated at 48 V dc 28 V ac rms @ 1 A (5 mA minimum current) see DM670TM data sheet.

BATTERY
Please observe the above battery warnings. To remove battery use screw driver to ease the positive end of the battery out of holder. Insert new battery negative end first then press into place. (Observe polarity). Battery type 3.6 V Lithium (2.4 A/Hr) CR14505 (IEC) AA case style. Please dispose of the battery in a responsible way.

DISPLAY

The display provides six 14 segment characters for display of temperature and alpha numeric messages, together with a 8 segment bar graph and six icons. The display is capable of operating in an ambient temperature range of (-30 to 70) °C, but at temperatures lower than -5 °C (due to the slower LCD speed) scrolled messaging is not practical, so the display will automatically revert to basic mode showing temperature. The display's high contrast coupled with a digit height of 15.8 mm offers clear readouts at low as well as high ambient light and direct sunlight. The display layout is as follows :-
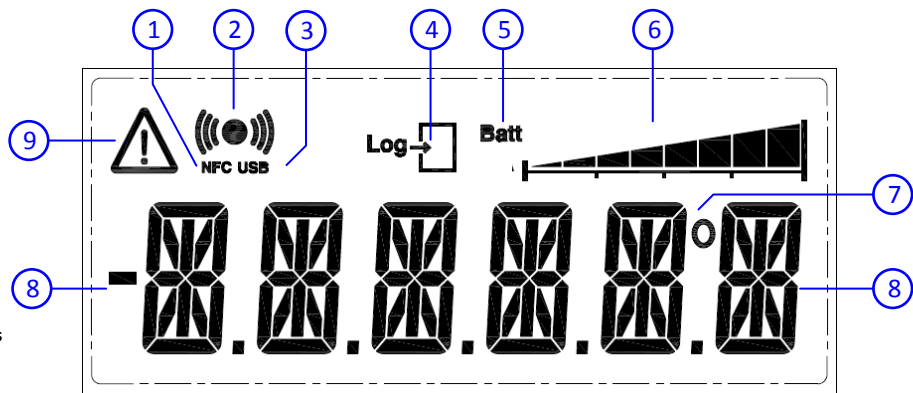
1. **NFC** - The Symbol is on when a NFC field is detected. When a detected field is lost the symbol will turn off after a few seconds.
2. **TRANSMIT/RECEIVE** - Symbol on when either NFC or USB communication is active.
3. **USB** - Symbol on when USB port is connected to a PC. Please note battery is not required during configuration.
4. **LOG and 6. BAR GRAPH** – These two symbols indicate the state of the logger. The condition is dependent on the selected logger mode either single or Rolling mode.

|	Start of Log	Mid Log	End of Log (alternating)
Single Mode (Log to the maximum number of logs then stop) LOG - symbol off when not logging. On when logging. Flashing when full BAR GRAPH - Indicates the log volume			

	Start of Log	Mid Log	Log Rolled over (max bar toggles)
Rolling Mode (Log to the maximum number of logs then as each new log is taken the oldest log is discarded) LOG - symbol off when not logging. On when logging. Flashing when full BAR GRAPH - Indicates the log volume Toggling on/off when log has rolled over.			
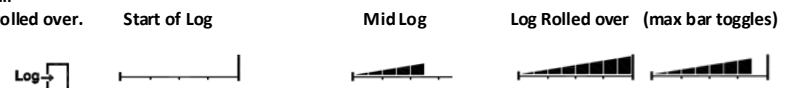
5. **BATT** - Symbol on when low battery is detected.
6. **BAR GRAPH**
7. **DEG** - Deg Symbol used to indicate either °C or °F on the last digit.
8. **DIGITS** - Six digit 14 segment display with – sign, range 9999.9 to -9999.9. Advanced mode offers two temperature dependent 32 character message options.
9. **WARNING ICON** - This symbol will toggle on and off to indicate a warning. The warning symbol will be active either when the sensor signal is out of range, not connected or when the battery is low.

MULTIFUNCTION ALERT LED

The alert LED normal state is off, on alert the LED will emit a intense white light pulse every 5 seconds. The LED can be programmed to pulse on any of the following combined events :-

Mode	Description
No events	The LED never operates, extending battery life. (Factory default setting)
Battery	Alert on low battery detect.
Trip	Alert when relay 1 or relay 2 trip is on.
Temperature	In Advanced mode only the alert can be made to alert in any one of eight user set temperature bands. Example to alert operator when temperature is outside a safe operating range.

The function of the alert LED can be further enhanced with the option of displaying an alert message in advanced display mode.
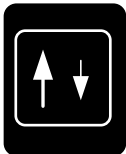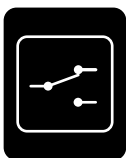
MAX/MIN BUTTON

This button allows the user to display recorded temperatures with or without time stamp dependent on the option selected by the configuration software:-

Timestamp off - the maximum, minimum temperatures. (Factory default setting)
Timestamp on - the maximum, minimum, average and current (now) temperatures with time stamps , format "day"+ "date" +"month" +"Year" + "time" (see note *1).

To clear maximum/minimum/average data press and hold the max/min button, the Alert LED will pulse, after 3 short pulses the LED will give a longer pulse. Keep the button held on until the last pulse goes out. The data and time stamps will now be cleared.

RELAY BUTTON

This button allows the user to display the relay state with or without a time stamp dependent on the option selected by the configuration software:-

Timestamp off - Relay 1(2) Title, State, Action, Set point. (Factory default setting)
Timestamp on - Relay 1(2) Title, State, Action, Set point, last trip on time date, last trip off time date , format "day" + "date" + "month" + "year" + "time" (see note *1).

To clear latched relay(s) press and hold the relay button, the Alert LED will give 4 short pulses. Keep the button held on until the last pulse goes out. The latched relays will now be cleared (as long as the alarm condition has also cleared).
In the case of latched relays the time stamp will apply to the latch set and clear.

NFC LOGGER INTERFACE

The NFC interface allows the instrument to communicate with an Android device using NFC connectivity.
The prime function of the interface is to read logged data from the device using a free app, which is available for downloading to Android devices.
The app allows the user to read existing logs, change the log manifest, start a new log, synchronise the instrument clock and reset the maximum/minimum/average readings. Logs can run to a fixed number and stop or continually roll over, up to 5000 log points can be recorded. The start of the log can be delayed up to one month.

Note:- For larger logs the data may take over a minute to fully download via the NFC interface.
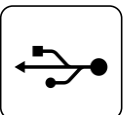
USB LOGGER INTERFACE (connector inside housing)

The USB interface allows the instrument to communicate with a PC running the USBLogLink software
The prime function of the interface is to read logged data from the device using free software available to download.
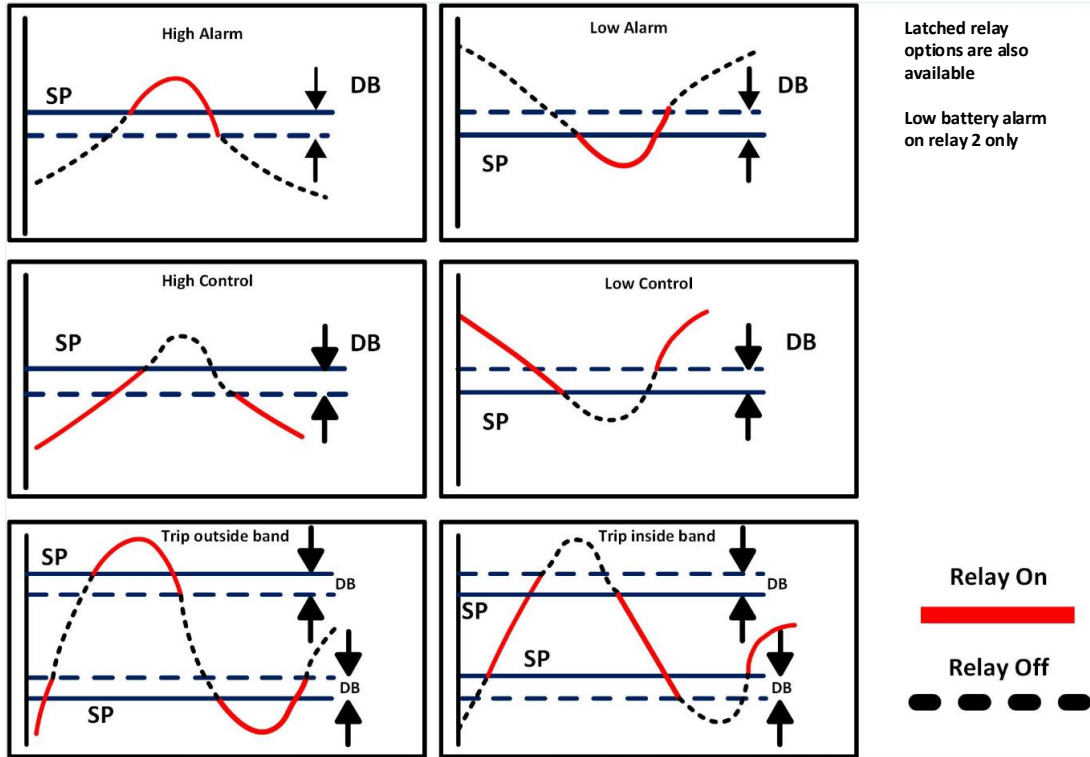The software allows the user to read existing logs, change the log manifest, start a new log, synchronise the instrument clock and reset the maximum/minimum/average readings.
USBLogLink is available from www.status.co.uk.
Compatibility to read NFC Tag type 4 to full capacity 65536 bytes is required by the Android device.

Note *1 The time stamp requires the instrument real time clock time date to be maintained when the battery is replaced (no summertime daylight saving function is enabled) , this can be done via the NFC interface app or the USB configuration software.

RELAY FUNCTIONS

High Alarm — SP, DB

Low Alarm — SP, DB

High Control — SP, DB

Low Control — SP, DB

Trip outside band — SP, DB, DB, SP

Trip inside band — DB, SP, SP, DB

Latched relay options are also available

Low battery alarm on relay 2 only

Relay On
Relay Off

GENERAL RECOMMENDATIONS ⚠️

The instrument is a high accuracy digital thermometer. In order to ensure correct operation the following must be observed:-

- The product must be stored in a dry clean environment and remain in original packaging prior to installation.
- The instrument must not be installed adjacent to electro mechanical starters, controllers, thyristor power units or electrical switch gear.
- Any cleaning of the instrument must be done using a mild detergent and soft cloth. No solvents or abrasive cleaners should be used.
- Any external cable entries must be sealed to at least IP65 rating.
- Stated ambient operating conditions must not be exceeded. Battery life will reduce with higher ambient temperature operating conditions.

ELECTRICAL CONNECTIONS

For a wiring diagram please refer to the rear panel of the DM650TM inside the case housing.

2 part connectors are used for input and both relay connections, allowing the unit to be easily removed from the housing for reprograming or data download if this is not possible in situ.

WARNING: GROUNDED T/C PROBES ⚠️

For configuring, reading live data or reading logged data

If using a grounded thermocouple probe on the input it is important not to connect the programming USB lead to a mains powered computer. It is possible to damage the instrument if connected in this way.

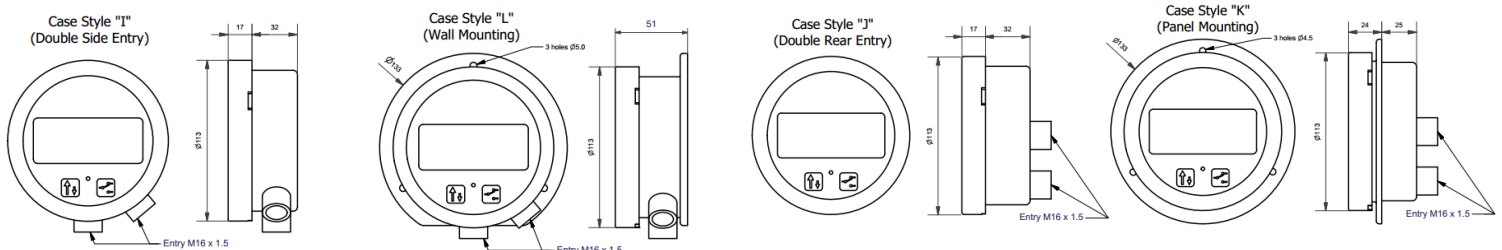To avoid damage use one of the following methods :-

- Disconnect the probe before configuration, reconnect the probe after configuration.
- Ensure the probe and DM670 housing are not in contact with any conductive parts during configuration.
- Use a laptop type computer running from its battery power supply, not connected to a mains supply, this is recommended for reading lived data or offsetting a unit if already installed in the field.
- Use a USB isolator between the computer and the DM670.

MECHANICAL INSTALLATION

Case notes: one M16 blanking plug is provided with each housing.

Case style L wall mounted versions are secured using three equally spaced 5.0 mm Dia holes, on a 114.5 mm dia circle.

Case style K panel mount versions are secured using three equally spaced 4.5 mm Dia holes, on a 116.0 mm dia circle. 100 mm dia centre cut out required.

Case Style "I" (Double Side Entry) — Entry M16 x 1.5

Case Style "L" (Wall Mounting) — Entry M16 x 1.5

Case Style "J" (Double Rear Entry) — Entry M16 x 1.5

Case Style "K" (Panel Mounting) — Entry M16 x 1.5

The enclosure must be sealed to at least IP65 rating to ensure correct operation of the electronics. Care must be taken when installing assembly to ensure the stated ambient operating conditions are not exceeded. Material Enclosure Stainless steel. Front panel membrane polycarbonate.