

# Operating Instructions for Digital Thermometer

**Model: DTE**



We don't accept warranty and liability claims neither upon this publication nor in case of improper treatment of the described products.

The document may contain technical inaccuracies and typographical errors. The content will be revised on a regular basis. These changes will be implemented in later versions. The described products can be improved and changed at any time without prior notice.

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## **2. Note**

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Please read these operating instructions before unpacking and putting the unit into operation. Follow the instructions precisely as described herein.

The instruction manuals on our website [www.kobold.com](http://www.kobold.com) are always for currently manufactured version of our products. Due to technical changes, the instruction manuals available online may not always correspond to the product version you have purchased. If you need an instruction manual that corresponds to the purchased product version, you can request it from us free of charge by email ([info.de@kobold.com](mailto:info.de@kobold.com)) in PDF format, specifying the relevant invoice number and serial number. If you wish, the operating instructions can also be sent to you by post in paper form against an applicable postage fee.

The devices are only to be used, maintained and serviced by persons familiar with these operating instructions and in accordance with local regulations applying to Health & Safety and prevention of accidents.

When used in machines, the measuring unit should be used only when the machines fulfil the EC-machine guidelines.

## **3. Instrument Inspection**

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Instruments are inspected before shipping and sent out in perfect condition.

Should damage to a device be visible, we recommend a thorough inspection of the delivery packaging. In case of damage, please inform your parcel service / forwarding agent immediately, since they are responsible for damages during transit.

### **Scope of delivery:**

The standard delivery includes:

- Digital Thermometer      model: DTE

## **4. Regulation Use**

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Any use of the Digital Thermometer, model: DTE, which exceeds the manufacturer's specification, may invalidate its warranty. Therefore, any resulting damage is not the responsibility of the manufacturer. The user assumes all risk for such usage.

## 5. Important – CE & Safety Requirements

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- 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 to 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

## 6. Operating Principle

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The DTE is a battery powered LCD digital thermometer designed for use in a wide range of industrial and process applications. Similar to our standard DTB instrument, this latest development provides extra operational features such as MAX / MIN with recorded time and date, messaging feature, two alarm relays, and data logging. The rugged IP 65 rated housings and all stainless steel design offers protection from moisture and dust. The DTE also offers a range of mounting options such as direct mount, surface mount, and panel mount. With our range of sensing probes and process connections this makes the DTE an ideal replacement for traditional mechanical instruments such as liquid bulb and bi-metal gauges where external power is not available or practical.

The larger LCD display, now 15.8 mm high, can also be set to units of °C or °F, and with 0.1° resolution, the DTE not only eliminates the guesswork out of reading dials and mercury columns, it also provides a much higher degree of accuracy. Low battery indication is via the display however, one of the two alarm relays can also be utilised for latching to a scrolling message.

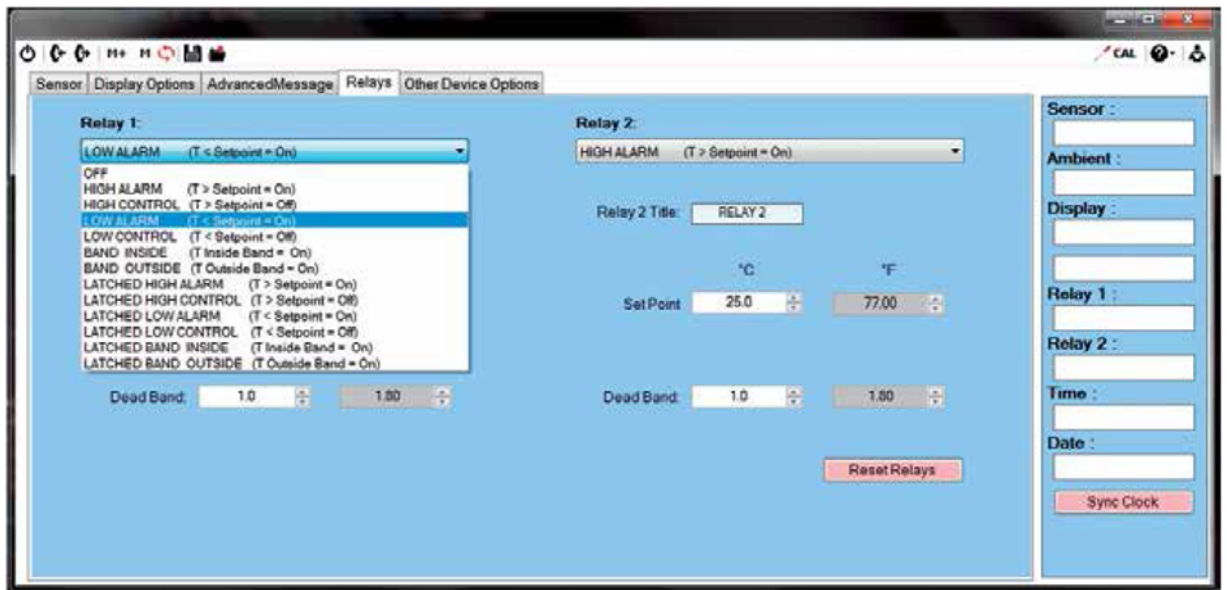
## 7. Configuration

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. In addition, data logging is possible via NFC App. The software and the app can be downloaded from [www.kobold.com](http://www.kobold.com)

Display message library contains 7 user set messages plus the following options. The message selected is entered into the box provided for each band.



Dual relays are provided offering a low voltage contact change over. The relays offer six different actions plus latching capability. Latched relays may be reset via the USB interface or by the front panel button. The button also allows the user to display the relays state. Two modes of operation are provided for the button; the first displays temperature only, the second provides additional time date stamp. If the relay button is pressed and held for more than five seconds the alert LED will light continuously. If the button is not released within a further second period any latched relay will be reset. Programmable set point, dead band, and high/low band values are provided, set-up using the USB interface.



## 8. 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 meters.

**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 DTE data sheet.

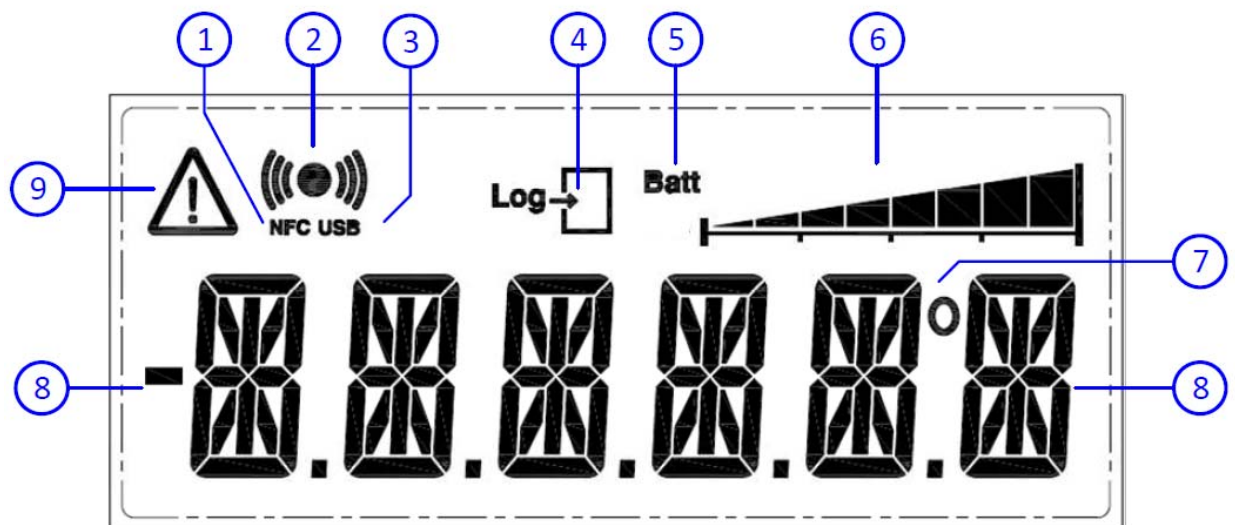
**BATTERY**

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.

## 9. Operation and User Controls

**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:



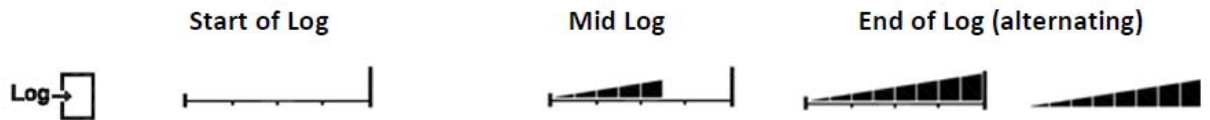
1. NFC - The Symbol is on when a NFC field is detected. When a detected field is lost the symbol will turn off after a few seconds.
2. TRANSMIT/RECEIVE - Symbol on when either NFC or USB communication is active.
3. USB - Symbol on when USB port is connected to a PC. Please note battery is not required 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.

# DTE

Single Mode (Log to the maximum number of logs then stop)

LOG - symbol off when not logging. On when logging. Flashing when full

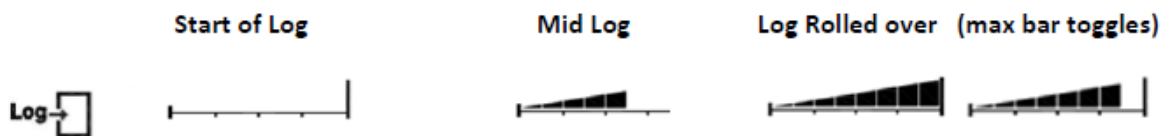
BAR GRAPH - Indicates the log volume



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.



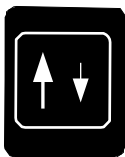
## MULTIFUNCTION ALERT LED

The alert LED normal state is off; on alert the LED will emit an 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.



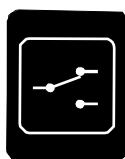


### MAX/MIN BUTTON

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.



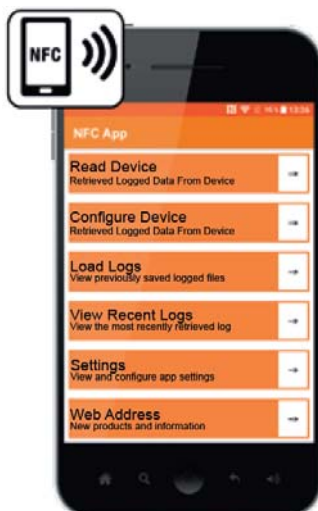
### NFC LOGGER INTERFACE

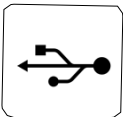
The NFC interface allows the instrument to communicate with an Android device using NFC connectivity.

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

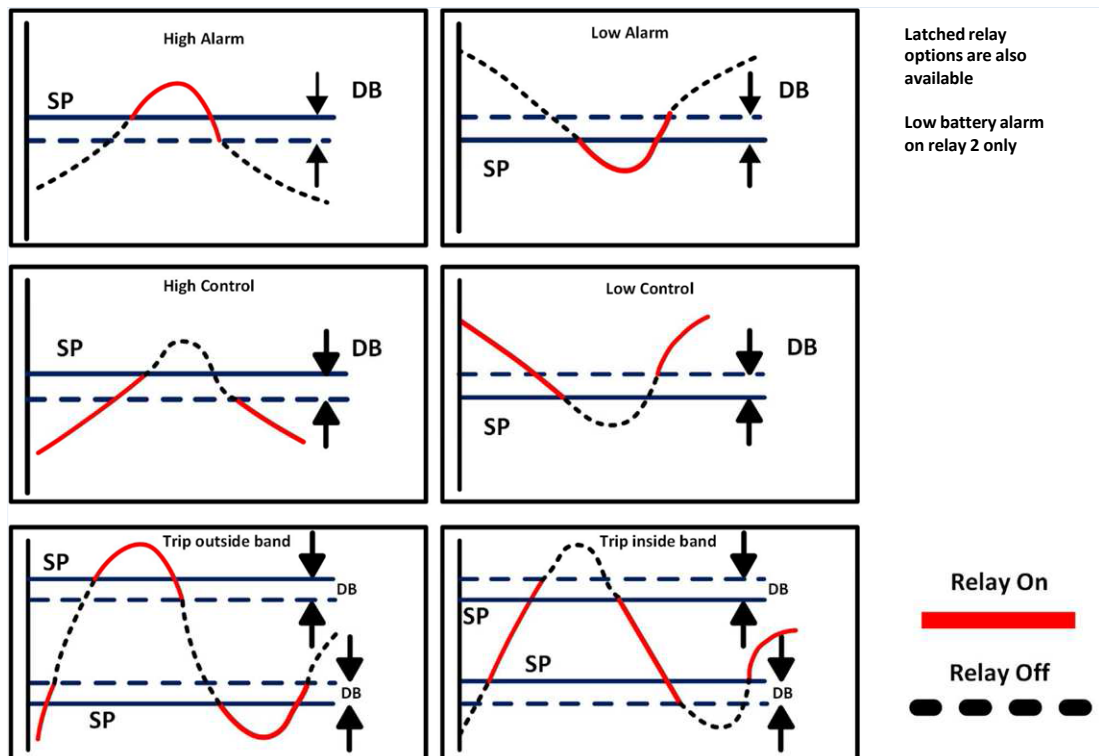
The prime function of the interface is to read logged data from the device using free software available to download.

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 the manufacturer or supplier.

**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.

## 10. Relay Functions



## 11. General Recommendations

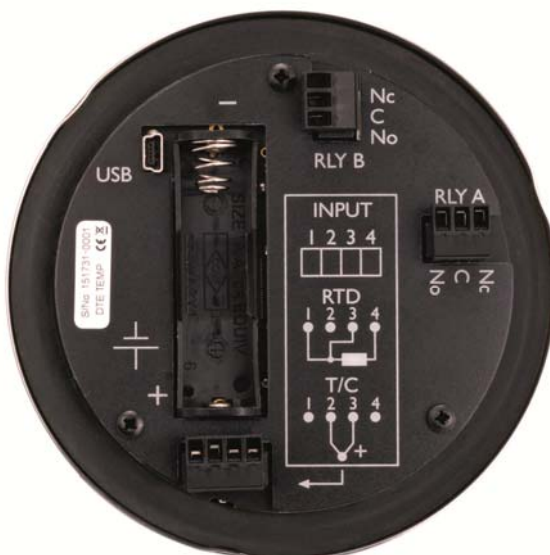
The instrument is a high accuracy digital thermometer. In order to ensure correct operation, the following must be observed:

- 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.

## 12. Electrical Connections

For a wiring diagram please refer to the rear panel of the DTE 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 reprogramming or data download if this is not possible in situ.



### 13. Warning: Grounded T/C Probes

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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 main powered computer. It is possible to damage the instrument if connected in this way.

To avoid damage, use one of the following methods:

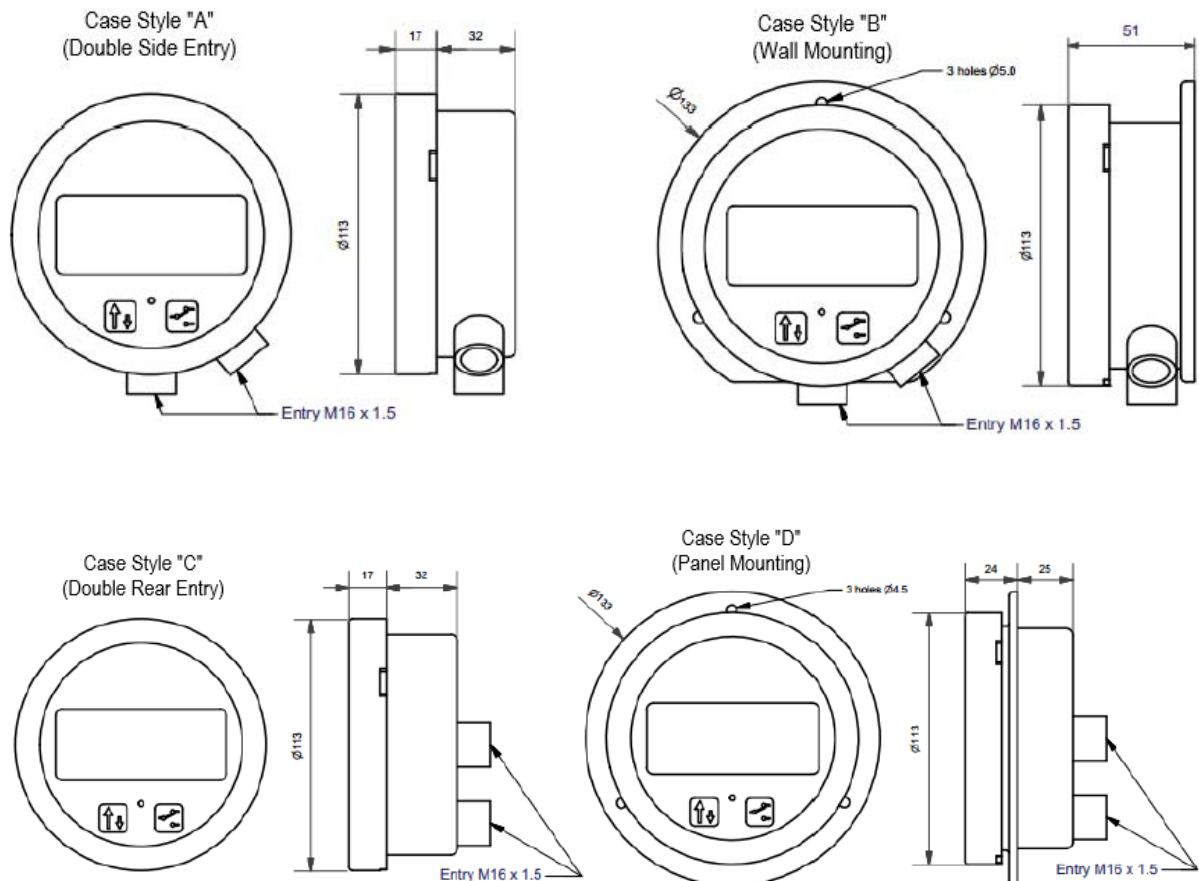
- Disconnect the probe before configuration, reconnect the probe after configuration.
- Ensure the probe and DTE housing are not in contact with any conductive parts during configuration.
- Use a laptop type computer running from its battery power supply, not connected to a mains supply, this is recommended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

## 14. Mechanical Installation

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

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

Case style D 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.



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.

## 15. Technical Information

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Case diameter:	100 mm
Housing material:	304 stainless steel
Sensing element:	RTD (Pt100) and thermocouple (T/C)
Measuring units:	can be configured and displayed in °C or °F
Sensor Measuring range:	-200 ... 850 °C (Pt100, depending on probe)
T/C Measuring range:	relative to thermocouple type
Accuracy @ 20 °C:	± 0.1% of reading ± 0.2 °C (for Pt100)
Temperature stability:	± 0.015% full range / °C (for Pt100)
Refresh rate:	5 s
Display:	clear 6-digit LCD alphanumeric display, 15.8 mm high
Communication:	USB, NFC interface Android app allows log data to be transmitted via e-mail etc.
MAX. / MIN.:	The MAX / MIN and average values are shown in the display
Display messaging:	time and date of Max. / Min. readings + 7 x user set messages (32 character)
Data logging:	On board data log function with real time date stamp, offers 5000 log points with user set log intervals between 10 seconds and 2 hours. Bar graph indicates log volume.
Ambient and storage temperature range:	-30 ... 70 °C
Compression fitting material:	316 stainless steel
Protection:	IP 65 (cable/probe entries must be sealed to IP 65 to maintain)
Power:	lithium 3.6 V battery
Battery life:	>1 year (depends on function operations)
Probe:	mounting by customer

Input RTD (3 wire)		
Sensor type	Range	Accuracy/ stability at 20 °C
Pt100 (IEC)	-200 ... 850 °C	±0.2 °C ±0.05m % of reading (plus, sensor error)
Ni100	-60 ... 180 °C	
Ni120	-70 ... 180 °C	
Cu53	-40 ... 180 °C	
Cu100	-80 ... 260 °C	

Input Thermocouple		
Model	Range	Accuracy/ stability at 20 °C
K	-150 ... 1370 °C	±0.1 % of full scale ±0.5 °C ± CJ error (plus, sensor error)
J	-200 ... 1200 °C	
N	-270 ... 1300 °C	
E	-260 ... 1000 °C	
T	-270 ... 400 °C	±0.2 % of full scale ±0.5 °C ± CJ error (plus, sensor error)
R	0 ... 1760 °C	±0.1 % of full scale ±0.5 °C ± CJ error (plus, sensor error) over range 800 ... 1760 °C
S	0 ... 1760 °C	
L	-200 ... 900 °C	±0.1 % of full scale ±0.5 °C ± CJ error (plus, sensor error)
U	0 ... 600 °C	
B	0 ... 1820 °C	
C	0 ... 2300 °C	
D	0 ... 2300 °C	
G	0 ... 2300 °C	

Display	
Type/options/function	Description
Display height	15.8 mm non-backlit
Display information options. Some information is displayed scrolling.	6 digits 14 segment input value plus "Warning", "Transmit", "NFC", "USB", "Log", "Battery" icons, 8 segment log volume indicators. Maximum, minimum, average *1. Date and time, case temperature. Custom messages for visual alarms/information. Relay condition.
High intensity LED	Alarm and warning options

\*1 Rolling average log is independent of data logging

Relays Relay 1 and Relay 2	
Type/options/function	Description
2 x independent relays	Single pole change over (common, N/o, N/c)
Rating	48 V <sub>DC</sub> maximum @ 1 A (5 mA minimum) 28 V <sub>AC</sub> RMS maximum @ 1 A

## 16. Order Codes

### Order Details (example: DTE-A0000 0)

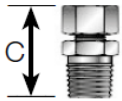
Model	Case style	Options
DTE-	<b>Compact Version</b> <b>A0000</b> = side entry, direct mounting (standard) <b>C0000</b> = back entry, direct mounting	<b>0</b> = without <b>Y</b> = special option (specify in clear text)
	<b>Remote version</b> <b>B0000</b> = side entry, remote wall mounting <b>D0000</b> = back entry, remote panel mounting	

### Order Details Fabricated Stainless Steel (316) Thermo Pockets (example: TWL-0000 G BG4A 00 150)

Model	Sensor connection	Process connection	Immersion length <sup>1)</sup>
TWL-0000	<b>G</b> = ½" BSP <b>N</b> = ½" NPT	<b>BG4A00</b> = ½" BSP <b>BN4A00</b> = ½" NPT	Length under connection in mm

1) Length to be specified while ordering but do not form part of the model code.

### Order Details Stainless Steel (316) Sliding Compression Fittings

<b>DTB-K2R08</b>	1.4404 (316L SS) bore through compression fitting x G ¼ male (C = 38.5)	
<b>DTB-K2R15</b>	1.4404 (316L SS) bore through compression fitting x G ½ male (C = 46)	
<b>DTB-K2N08</b>	1.4404 (316L SS) bore through compression fitting x ¼" NPT male (C =	
<b>DTB-K2N15</b>	1.4404 (316L SS) bore through compression fitting x ½" NPT male (C =	

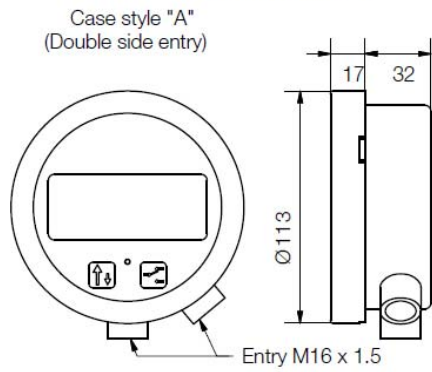
**Note:** For non-standard specifications please contact our sales office.



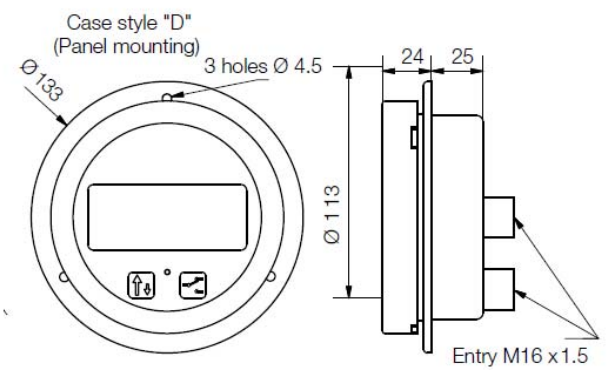
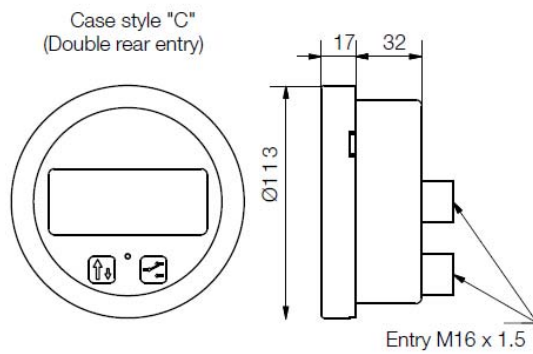
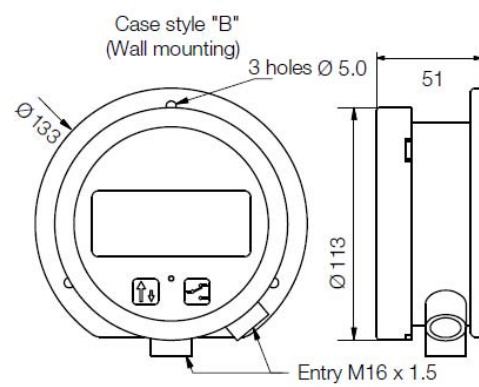
# 17. Dimensions

[mm]

## Compact Version



## Remote Version



## 18. EU Declaration of Conformance

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We, KOBOLD Messring GmbH, Hofheim-Ts, Germany, declare under our sole responsibility that the product:

**Digital Thermometer**

**Model: DTE**

to which this declaration relates is in conformity with the standards noted below:

**EN 61326-1:2013** Electrical equipment for measurement, control and laboratory use. EMC requirements. General requirements

**EN 60529:2014** Degrees of protection provided by enclosures (IP Code)

Also, the following EC guidelines are fulfilled:

**2014/30/EU**

**EMC Directive**


**2011/65/EU**

**RoHS** (category 9)

**2015/863/EU**

Delegated Directive (RoHS III)

Hofheim, 27 July 2021



H. Volz  
General Manager



M. Wenzel  
Proxy Holder

## 19. UK Declaration of Conformity

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We, KOBOLD Messring GmbH, Hofheim-Ts, Germany, declare under our sole responsibility that the product:

**Digital Thermometer**

**Model: DTE**

to which this declaration relates is in conformity with the standards noted below:

**BS EN 61326-1:2013**

Electrical equipment for measurement, control and laboratory use. EMC requirements. General requirements

**BS EN 60529:2014**

Degrees of protection provided by enclosure (IP code)

Also, the following UK guidelines are fulfilled:

**S.I. 2016/1091**

**Electromagnetic Compatibility Regulations 2016**

**S.I. 2012/3032**

The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012



H. Volz  
General Manager



M. Wenzel  
Proxy Holder

Hofheim, 27 July 2021