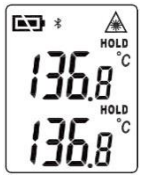
D-177 Thermometer Operating Instructions

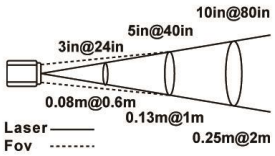
The thermometer is a non-contact infrared thermometer, also with Probe thermometer. You can select only one Mode at the same time but can change the Mode at will. Please remember to keep away from baby and children and don't use it for safety related applications.

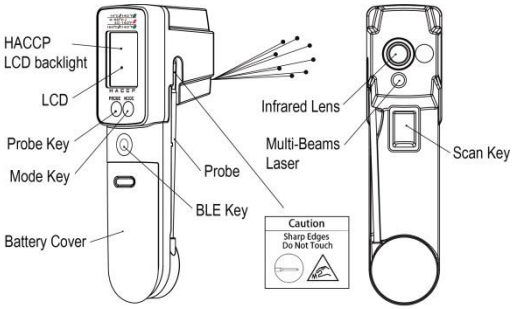
*** Special Features:**

1. **HACCP LCD Backlight**
2. **Splash Proof (IP54)**



(Default Screen)





*** Multi-Beams Laser**

specify the approximate measurement area for better targeting.

In Non-contact Infrared Thermometer function (IRT Mode)

 # The laser will automatically turns on while the Scan button is pressed.

Simply aim the thermometer at the measure target with "Infrared Lens" and press Scan (infrared) key to display the surface temperature. The distance to target ratio is 8:1 therefore the thermometer should be positioned as close to the target as possible.

The thermometer will automatically shut off if left idle for more than 30 seconds.

**** Multi-Beams Laser: always enable while measuring.**

Distance:Spot (FOV)= 8:1	Emissivity = 0.1~1 Step.01	Wave Length = 8-14um

While scanning, the newest temperature will be updated on the LCD and the measurement will continue as long as the Scan (infrared) key is depressed. When the Scan (infrared) key is released, icon "Hold" will appear on the display and the last measurement will remain visible for 15 seconds before the display goes blank.

Mode Selection **MIN → MAX → LOCK →°C/ °F → EMIS**

MINIMUM OR MAXIMUM MODE

The thermometer will display the minimum or maximum reading during the measurement period only until the Mode key is pressed.
To utilize the minimum mode, please press Scan (infrared) key → Mode key → Scan (infrared) key. And keep pressing Scan (infrared) key for measurement.
To utilize the maximum mode, please press Scan (infrared) key → Mode key *twice→ Scan (infrared) key. And keep pressing Scan (infrared) key for measurement.

LOCK MODE

The lock mode is particularly useful for continuous monitoring of temperatures. The thermometer will continuously display the temperature for up to 60 minutes or until the Scan (infrared) key button is pressed.
To utilize the lock mode, please press Scan (infrared) key → Mode key *three times→ Scan (infrared) key.

°C OR °F MODE

To change the '°C' or '°F' mode, please press Scan (infrared) key → Mode key *four times→ Scan (infrared) key.
Same steps can be taken when switching from °F to °C.

EMISSIVITY

The infrared thermometer is supplied with a default emissivity of 0.95. The emissivity can be changed from 0.10 (10E) to 1 (100E). Changes should only be carried out by experienced personnel. For information relating to the emissivity of specific materials, please contact the nearest retailer. Note: non-contact infrared thermometers are not recommended for use in measuring the temperature of shiny or polished metals.
To change the emissivity, please Scan (infrared) key → Mode key *five times→ Scan (infrared) key for each 0.01 (1E) adjustment→ Mode key.

In Contact Thermocouple Probe function (COT Mode)

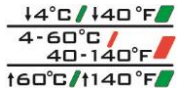
Attach the thermometer at the measure target with "Probe" and press Probe key to continuously display the temperature for up to 4 minutes. After that the device will automatically shut off to extend the battery life. Press Probe key will interrupt the scanning to display the last temperature with a 'Hold' wording. To reenter scanning just press Probe key again.

⚠ 1. Do not twist the probe and rotate the probe in wrong direction.
2. Over stress on probe may cause break.
3. After measure high temp, the probe may remain HOT for a while.
4. Probe is dangerous for human when the probe is in an open position. Remember to hold the probe back when not in use.

⚠ **The probe of contact thermometer may be damaged if exceeding the specification of measurement temperature range.**

⚠ **To avoid electric shock and thermometer damage, do not measure live circuit where voltage exceeding 24V AC RMS or 60V DC with the thermocouple probe.**

HACCP CHECK



The "HACCP CHECK" feature is incorporated in our thermometer temperature to indicate critical temperature zone. The LCD backlight indicates a food product stays in a safe or unsafe HACCP "Danger Zone" temperature. The green and red LCD backlight will always be lit before power off.

A Green LCD backlight indicates a safe cool or frozen condition below 4°C (40°F) or indicates a safe holding temperature above 60°C (140°F).
When temperature is between 4°C and 60°C, the red LCD backlight indicates that the temperature is fallen within the HACCP "Danger Zone" from 4°C to 60°C (40~140°F).

STORAGE & CLEANING

Clean the device with a damp cloth. Do not use any solvents such as Acetone as they corrode the plastic. Isopropyl alcohol may be used to disinfect. Do not submerge any part of the thermometer. The thermometer should be stored at room temperature between –20 to +65°C (-4 to 149°F).

LCD ERROR MESSAGES

The thermometer incorporates visual diagnostic messages as follows:

'Hi' or 'Lo' is displayed when the temperature being measured is outside of the measurement range.

'Er2' is displayed when the thermometer is exposed to rapid changes in the ambient temperature.
'Er3' is displayed when the ambient temperature exceeds the range of 0°C (32°F) ~ 50°C (122°F). The thermometer should be allowed plenty of time (minimum 30 minutes) to stabilize to the working/room temperature.

For all other error messages it is necessary to reset the thermometer. To reset it, waiting for auto power off, remove the battery and wait for a minimum of one minute, reinsert the battery and turn on. If the error message remains please contact the Service Department for further assistance.

BATTERIES

The thermometer incorporates visual low battery indication as follows:


'Battery OK': measurements are possible


'Battery Low': battery needs to be replaced, measurements are possible


'Battery Exhausted': measurements are not possible

⚠ When the 'Low Battery' icon indicates the battery is low, the battery should be replaced immediately with AAA, 1.5V batteries.
Please note: It is important to turn the instrument off before replacing the battery otherwise the thermometer may malfunction.

⚠ Dispose of used batteries promptly and keep away from children.

⚠ If the device is not to be used for a long time, turn the power off, remove and store the batteries in a cool, dry place.

⚠ Disposal of batteries into fire or a hot oven, or mechanically crushing or cutting of batteries, that can result in an explosion.

⚠ Leaving batteries in an extremely high temperature surrounding environment that can result in an explosion or the leakage of flammable liquid or gas.

⚠ The batteries subjected to extremely low air pressure that may result in an explosion or the leakage of flammable liquid or gas.

SPECIFICATION

	Infrared Scan function (IRT Mode)	Thermocouple Probe (K type, Grounded)(COT Mode)
Measurement Range	-60~350°C (-76~662°F)	-60~350°C (-76~662°F)
Operating Range	0~50°C (32~122°F)	
Accuracy (Tobj=15-35°C, Tamb=25°C)	±0.6°C (1.1 °F)	below -5: ±1°C -5~ 65: ±0.5°C above 65: ±1% of reading
Accuracy (Tamb=23±3°C)	-60~0: ±(1°C+0.1/degree) 0~ 65: ±1°C 65~350: ±1.5% of reading	
Emissivity Range	0.95 default – adjustable 0.1 to 1 step .01	
Resolution	0.2°C/0.5°F	
Distance:Spot	8:1	
Dimension	39.5*53.9*158.0mm (1.56*2.12*6.22 inch)	
Weight(with battery)	160g(5.64oz)	
Battery Life	Typ.18, min 14 hours continuous use (Alkaline, with Laser)	

⚠EMC/RFI

Readings may be affected if the unit is operated within a radio frequency electromagnetic field strength of approximately 3 volts per meter, but the performance of the instrument will not be permanently affected.

BLUETOOTH APP OPERATING INSTRUCTIONS

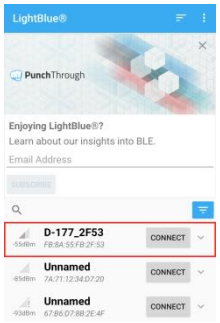
Turn on the thermometer, press the BLE Key to start the Bluetooth broadcast. In broadcast mode, "BLE key" will flash blue light first, the light will be changed to blue-green during connecting. After the APP is successfully connected with the device, the light will be changed "from blue-green to green" for 8 seconds.

**** Each broadcast time of the thermometer is 30 seconds. During the broadcast, if "pairing failed", the Bluetooth of thermometer will be in "sleep mode" until the broadcast time is over. When "pairing successful", the Bluetooth of thermometer will be in sleep mode until the thermometer is turned off. Once disconnecting, the thermometer will reactivate the broadcast for 30 seconds.**

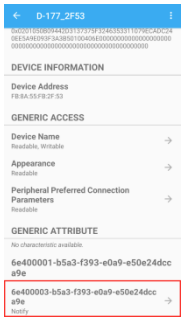
< For Android >

1. Download "LightBlue" APP from the Google Play. (Figure 1)
2. Turn on "Bluetooth" of the android device and the thermometer.
3. Launch the " LightBlue " APP on the android device.
4. Choose "D-177" device. (Figure 2)
5. Pair the thermometer with the android device & click "Notify". (Figure 3)
6. Click "Hex" conversion of units. (Figure 4)
7. Click "UNSUBSCRIBE". Simply aim the thermometer at the measure target with Lens and press Meas. key to display the surface temperature. Start to sync the temperature data to the android device via bluetooth at the same time. (Figure 5)

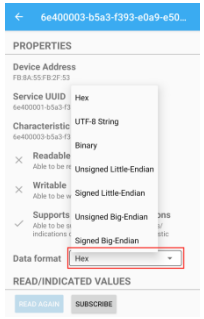
(Figure 1)



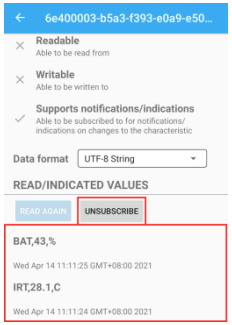
(Figure 2)



(Figure 3)



(Figure 4)

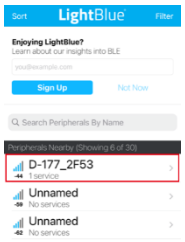


(Figure 5)

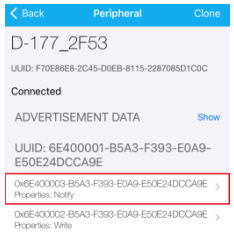
< For iOS >

1. Download "LightBlue" APP from the App Store. (Figure 6)
2. Turn on "Bluetooth" of the iOS device and the thermometer.
3. Launch the "LightBlue" APP on the iOS device.
4. Choose "D-177" device. (Figure 7)
5. Pair the thermometer with the iOS device & click "Notify". (Figure 8)
6. Click "Hex" conversion of units. (Figure 9 & 10)
7. Click "Listen for notifications". Simply aim the thermometer at the measure target with Lens and press Meas. key to display the surface temperature. Start to sync the temperature data to the IOS device via Bluetooth at the same time. (Figure 11 & 12)

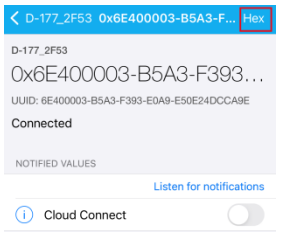
(Figure 6)



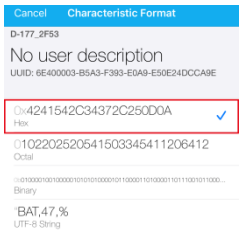
(Figure 7)



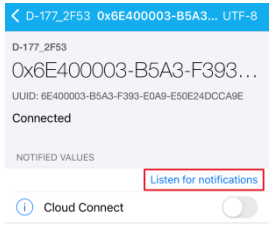
(Figure 8)



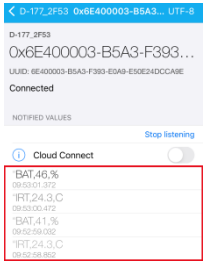
(Figure 9)



(Figure 10)



(Figure 11)



(Figure 12)

DATA FORMAT

1. Nordic BLE Module UUID:

6e400001: -b5a3-f393-e0a9-e50e24dcca9e: UART Service

6e400002: -b5a3-f393-e0a9-e50e24dcca9e: RX

6e400003: -b5a3-f393-e0a9-e50e24dcca9e: TX Characteristic BLE Module → APP

2. Infrared Thermometer Measurement Temperature

Ex: IRT=350.0°C

Byte No	1	2	3	4	5	6	7	8	9	10	11	12	13
ASCII	**I**	**R**	**T**	**,**	**3**	**5**	**0**	**.**	**0**	**,**	**C**	**CR**	**LF**
HEX	0x49	0x52	0x54	0x2C	0x33	0x35	0x30	0x2E	0x30	0x2C	0x43	0x0D	0x0A

Ex: IRT=662.0°F

Byte No	1	2	3	4	5	6	7	8	9	10	11	12	13
ASCII	**I**	**R**	**T**	**,**	**6**	**6**	**2**	**.**	**0**	**,**	**F**	**CR**	**LF**
HEX	0x49	0x52	0x54	0x2C	0x36	0x36	0x32	0x2E	0x30	0x2C	0x46	0x0D	0x0A

3. Ambient Temperature

Ex: AMB=25.9°C

Byte No	1	2	3	4	5	6	7	8	9	10	11	12
ASCII	**A**	**M**	**B**	**,**	**2**	**5**	**.**	**9**	**,**	**C**	**CR**	**LF**
HEX	0x41	0x4D	0x42	0x2C	0x32	0x35	0x2E	0x39	0x2C	0x43	0x0D	0x0A

Ex: AMB=78.6°F

Byte No	1	2	3	4	5	6	7	8	9	10	11	12
ASCII	**A**	**M**	**B**	**,**	**7**	**8**	**.**	**6**	**,**	**F**	**CR**	**LF**
HEX	0x41	0x4D	0x42	0x2C	0x37	0x38	0x2E	0x36	0x2C	0x46	0x0D	0x0A

4. Probe Measurement Temperature

Ex: COT=25.0°C

Byte No	1	2	3	4	5	6	7	8	9	10	11	12
ASCII	**C**	**O**	**T**	**,**	**2**	**5**	**.**	**0**	**,**	**C**	**CR**	**LF**
HEX	0x43	0x4F	0x54	0x2C	0x32	0x35	0x2E	0x30	0x2C	0x43	0x0D	0x0A

Ex: COT=77.0°F

Byte No	1	2	3	4	5	6	7	8	9	10	11	12
ASCII	**C**	**O**	**T**	**,**	**7**	**7**	**.**	**0**	**,**	**F**	**CR**	**LF**
HEX	0x43	0x4F	0x54	0x2C	0x37	0x37	0x2E	0x30	0x2C	0x46	0x0D	0x0A

5. Battery Level:

Ex: BAT=25%

Byte No	1	2	3	4	5	6	7	8	9
ASCII	**B**	**A**	**T**	**,**	**2**	**5**	**%**	**CR**	**LF**
HEX	0x42	0x41	0x54	0x2C	0x32	0x35	0x25	0x0D	0x0A

6. going OFF: Display “going OFF” before the thermometer power off.

Byte No	1	2	3	4	5	6	7	8	9	10	11
ASCII	**g**	**o**	**i**	**n**	**g**		**O**	**F**	**F**	**CR**	**LF**
HEX	0x67	0x6F	0x69	0x6E	0x67	0x20	0x4F	0x46	0x46	0x0D	0x0A

BLUETOOTH GENETAL SPECIFICATION

Item	**Specification**
Chipset	Nordic nRF51822
Power Rating	DC 1.8V to 3.6V
Operation Temp.	-30 ~ 85°C
Storage Temp.	-40 ~ 85°C
Humidity non-operating	95 % Maximum
Frequency and Power	2402-2480 MHz;; 40 ch; 3.0mW
Certification	CE-RED Contain FCC ID: SH6MDBT40 NCC: CCAM15LP0230T1
Contain FCC ID: SH6MDBT40	This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. CAUTION: To assure continued FCC compliance:
	1. Any changes or modifications not expressly approved by the grantee of this device could void the user's authority to operate the equipment. 2. This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body. This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

Ref.No. : 042021