N9002 THERMOMETER
OPERATING INSTRUCTIONS

COMARK
A Fluke Company

CONTENTS

GENERAL INFORMATION

It is recommended that you read the safety and operation instructions before using this instrument.

WARNING

TO AVOID ELECTRIC SHOCK DO NOT ALLOW ANY PROBE OR SENSOR TO COME INTO CONTACT WITH LIVE ELECTRICAL POWER CONDUCTORS WITH VOLTAGES IN EXCESS OF 30V AC RMS OR 60V DC.

CAUTION

Temperature Measurement Probes

This precision instrument has been designed for use with the extensive range of Comark temperature probes. The use of other probes may impair the performance and accuracy of the instrument. Full details of Comark probes and sensors can be obtained from Comark Customer Support department or your local distributor.

Repeated sharp flexing can break thermocouple probe leads. To prolong lead life, avoid sharp bends or kinks in the leads, especially near the connector.

This instrument is manufactured in accordance with the Company's ISO 9001 Quality Approved System.

This instrument complies with the Electromagnetic Compatibility Directive EN 61326-1.

Declarations of Conformity available. Contact Comark Customer Support or your local Distributor.

In line with its policy of continuous development, Comark Instruments reserves the right to alter the instrument specification without prior notice. Further information is available from Comark Instruments or your distributor.

CALIBRATION, CERTIFICATION AND SERVICE

No. 0451

Certification
Comark can provide certificates of calibration for its whole product range, to suit ISO 9000 and other quality assurance procedures, food hygiene regulations, HACCPs and environmental regulations. Comark certificates are produced by independent quality controlled processes which compare product performance against agreed National Standards. For peace of mind and best practice Comark recommend annual certification/recalibration.

Two levels of certification are available for infra-red temperature and non temperature instruments, excluding humidity:- UKAS certificates via an external accredited laboratory and NPL traceable certificates from the Comark calibration laboratory.

Three levels of certification are available for contact temperature and humidity products and these are detailed here:

a) UKAS Temperature Certification
The Comark UKAS (United Kingdom Accreditation Service) accredited temperature calibration laboratory is one of the finest in the UK. Comark UKAS certificates can offer the lowest uncertainty of 0.01°C and provide independent proof of correct calibration using equipment and procedures audited by UKAS inspectors. The equipment used is fully traceable to the National Physical Laboratory.

b) UKAS Humidity Certification
In addition to the Comark temperature laboratory, the humidity laboratory continues the tradition of high accuracy certification and a wide range (25% to 90%RH) with uncertainties of 2.8% of reading. This range also includes Dew point measurements.

c) NPL Traceable Certification
Comark NPL certificates are traceable to the National Physical Laboratory and can offer uncertainty as low as 0.3°C.

Conformance
Certificates of conformance can be supplied for new, serviced and recalibrated instruments. These confirm that instruments are within their original manufactured specification.

Service/Repairs
Regular servicing and any required repairs, under warranty or after, are available from the Comark Service Department.

For more information on all Comark certification, calibration and service facilities please call Comark Customer Support or contact your local distributor.

1. N9002 DESCRIPTION

The N9002 is a high performance handheld industrial thermometer housed in the proven 'N' series case for ultimate strength and durability. It has IP67 certification against water and dust penetration. The case is easy to clean and the sealed soft-touch keypad provides smooth operation. The N9002 features a clock, selectable thermocouple type, single and dual differential mode, auto-off and data

The N9002 has a two year warranty, a free certificate of conformity and full compatibility with the existing Comark probe range. A slip on boot is available for added protection.

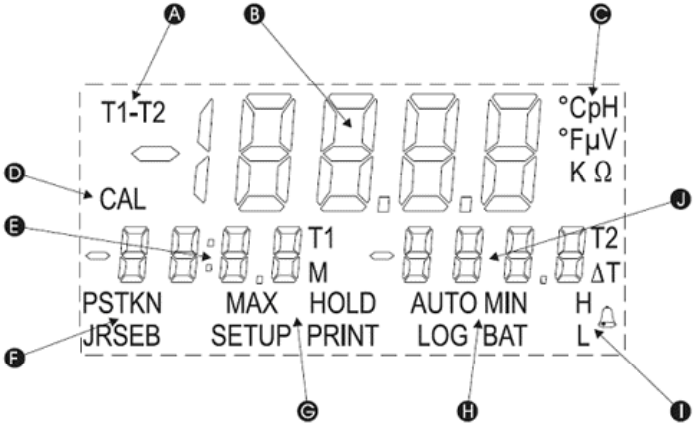
2. N9002 THERMOMETER WITH BIOCOTE® PROTECTION

BioCote® is a silver based antimicrobial agent that is impregnated into the instrument case during moulding. BioCote® effectively inhibits the function, growth and reproduction of a wide range of micro-organisms and its protection is increasingly accepted as part of HACCP, due diligence and health and safety procedures to reduce cross contamination. BioCote® protection lasts for the life of the instrument because the agent is present throughout the case plastic and cannot rub off or be washed or leached out.

BioCote® active ingredients are registered with the US Environmental Protection Agency (EPA).

Although BioCote® inhibits the growth of micro-organisms on the instrument case, it does not protect individuals against such harmful organisms or remove the need to maintain the highest standards of personal and product hygiene and cleanliness.

3. OVERVIEW OF DISPLAY SYMBOLS



A – Activated during DIFFerential mode with both T1 and T2 enabled.

B – Main Temperature display. T1 is displayed here when enabled. Will display DIFFerential temperature in two-channel DIFF mode.

C – Displays current scale in use.

D – CAL is displayed to indicate that the annual instrument re-calibration is due.

E – Nominally used for displaying time, but will display temperature in DIFFerential mode, and MAX/MIN mode. M indicates display of the stored reading in single channel DIFFerential mode.

F – Displays the current sensor type.

G – Indicates MAXimum/HOLD/ and SETUP mode. PRINTing not applicable to N9002.

H – Indicates AUTO power off enabled/MINimum/ and Low BATtery. LOGging not applicable to N9002.

I – Alarms not applicable to N9002.

J – This is the third numeric display, and will nominally display channel T2. Delta T is indication of channel DIFF mode.

4. THERMOMETER SETUP

Pressing SETUP will enter the setup menu for the thermometer. The following stages are included in the SETUP menu and are accessed sequentially, i.e. each stage must be access in turn to reach the one required. Pressing ENTER will accept the setting and step on to the next function. The setup menu can be exited using the CLEAR key. Settings changed in previous steps will however be retained.

4.1 Auto-Power-OFF Enable / Disable

Press SETUP

Toggle AUTO Power ON/OFF with the UP/DOWN arrow keys.

Press ENTER/HOLD to continue.

4.2 Channel Enable / Disable

N.B. At least one channel must be selected.

Toggle T1 ON/OFF with the UP/DOWN arrow keys

Press ENTER/HOLD

Toggle T2 ON/OFF with the UP/DOWN arrow keys

Press ENTER/HOLD to continue.

4.3 Thermocouple Type Setup

Select the thermocouple type with the UP/DOWN arrow keys.

Press ENTER/HOLD to continue.

4.4 Scale Setup

Select the scale required with the UP/DOWN arrow keys.

°C, °F and Kelvin scales are available.

Press ENTER/HOLD to continue.

4.5 Date and Time Setup

Use the UP/DOWN arrow keys to select the minutes.

Press ENTER/HOLD

Use the UP/DOWN arrow keys to select the required hours in 24 Hr Format.

Press ENTER/HOLD.

Use the UP/DOWN arrow keys to select the century.

Press ENTER/HOLD.

Select the year using the UP/DOWN arrow keys.

Press ENTER/HOLD.

Use the UP/DOWN arrow keys to select the month.

Press ENTER/HOLD.

Use the UP/DOWN arrow keys to select the day.

Press ENTER/HOLD to continue.

4.6 Display contrast adjustment

Use the arrow keys to select high or low display contrast. Use high for extended operation in ambient temperatures below –10°C.

Use low for higher ambient temperatures.

4.7 Mains supply rejection frequency

To change this setting, when entering the setup menu, hold the setup key down for longer than 5 seconds.

Toggle the Mains Supply rejection frequency using the UP/DOWN arrow keys.

In the UK use the 50 setting for 50Hz, in the USA use the 60 setting for 60Hz.

If the correct setting is not known, contact Comark or your Distributor for details.

Press ENTER/HOLD to finish and exit from SETUP.

5.0 SWITCHING ON AND OFF

5.1 Display Test

The 'ON/OFF' button on the keypad switches on the instrument. When the instrument is first switched on the unit performs a self-test and the whole display will be energised. After a short pause the display will revert to normal temperature display. The current time is also displayed.

5.2 Auto Power off (APO)/Power Saving

The N9002 can be set to auto-power-off three minutes after the last button operation or to remain permanently on until manually switched off. This mode is indicated on the LCD in the lower portion of the display by the word AUTO. Enabling or disabling auto-power-off (APO) is available from the keypad in SETUP.

6.0 N9002 OPERATION

6.1 Display Hold

Pressing ENTER/HOLD will prevent display updates for actual temperature displays and suppresses update of max and min values. HOLD will appear on the display to indicate this mode. Pressing ENTER/HOLD again will cancel display hold.

6.2 Maximum & Minimum Mode

The N9002 instrument automatically updates the maximum and minimum readings as soon as the instrument is switched on. These can be displayed by pressing the MAX or MIN buttons. If both channels, T1 and T2, are enabled, MAX or MIN is displayed for both channels. If T1 or T2 only is enabled both MAX and MIN are displayed together for the enabled channel. MAX and MIN readings can be reset individually at any time for all channels by pressing CLEAR followed by either MAX or MIN.

6.3 Differential Mode (DIFF)

There are two DIFF modes available for the N9002, single channel and twin channel. If only one channel (T1 or T2) is enabled the instrument will memorise the temperature at the moment the DIFF button is pressed and displays this temperature on the lower left area of the LCD. It also displays the difference between the current temperature and the memorized temperature on the lower right area of the LCD. The main display area shows the current temperature. If both channels (T1 and T2) are enabled the instrument will display the difference between T1 and T2 on the main display and T1 and T2 actual temperatures on the lower left and lower right areas respectively.

6.4 Clear MAX, Clear MIN

To clear MAX or MIN from the memory press CLEAR followed by MAX or CLEAR followed by MIN.

N.B. The N9002 thermometer clears MAX and MIN individually.

7.0 CONNECTING PROBES

The N9002 thermometer is a two-channel instrument using sub-miniature connectors. When connecting probes to the N9002 always remember to check the polarity of the plug before fitting. In order to get correct results make sure that you have selected the correct thermocouple type for the probe that you have connected.

Note: It is recommended that insulated thermocouples be used.

8.0 CARE OF THE THERMOMETER

The N9002 thermometer is dust and waterproof as stated in the specifications and will withstand harsh environments. Use a damp cloth or warm soapy water to remove deposits and prevent them from hardening or becoming sticky. Do not use solvent-based cleaners or methylated spirit, etc.

Caution: Do not place the N9002 thermometer in a dishwasher.

If the instrument is to be stored for an extended period (for example as a spare unit) remove the battery to eliminate the risk of leakage.

9.0 CHANGING THE BATTERIES

The symbol BAT flashes on the display as soon as the battery voltage drops to an initial warning level. During this first level of low battery the instrument can be operated normally, but it is recommended that the battery be replaced as soon as possible. If the battery is allowed to discharge further there is a second level of low battery, which is indicated by the symbol remaining on and not flashing. Replace the battery straight away after seeing this symbol.

To replace the battery: Make sure the instrument is off, unscrew the screw retaining the battery cover on the rear of the instrument using the correct size flat-blade screwdriver. Remove the two cells and replace with new alkaline cells to ensure long life. Be careful to observe the correct polarity. Take care not to over-tighten the screw when re-fitting the cover, and not to lose the rubber-sealing washer.

Note: The N9002 thermometer will continue to keep correct date & time for at least 30 seconds after removal of cells. If this time is exceeded setup may be necessary.

Note: NiCd or NiMh cells can be used but will result in reduced operating time. Do not attempt to recharge the cells in the instrument.

10. N9002 THERMOMETER SPECIFICATIONS

Measurement Thermocouple types	K, N, T, J, R, S, E, B	
Connector	2-pin sub-min connector	
Measurement Range (°C)	From (°C)	To (°C)
Type K	-200	+1372
Type N	-200	+1300
Type T	-200	+400
Type J	-200	+1200
Type R	-50	+1767
Type S	-50	+1767
Type E	-200	+1000
Type B	+100	+1820
Scales	°C, °F and Kelvin	
Resolution	0.1°	
Instrument Accuracy at +23°C	Better than ± 0.1 % of reading ± 0.2°C	
Temperature Coefficient	Less than ± 0.01 % of reading ±0.02 °C per °C change from +23°C	
Ambient Operating Temperature Range	-25°C to +50°C	
Response Time	1 second to full accuracy	
Battery	Two Type I.E.C. LR6 Size AA	
Battery Life (continuous)	Greater than 300 hours (Alkaline)	
Environmental Protection	I.P.67 BS60529 IEC 529	
EMC	Tested to EN 61326-1 Criteria B Performance	

Due to our policy of continual product improvement specifications are subject to change without prior notice.

Comark Instruments
52 Hurricane Way,
Norwich, Norfolk, NR6 6JB United Kingdom
Tel: +44 207 942 0712
Email: sales@comarkinstruments.com

Website: www.comarkinstruments.com

Comark Instruments
PO Box 500, Beaverton
OR 97077 USA
Tel: 503 643 5204
Email: sales@comarkusa.com

Website: www.comarkusa.com

Stock No. 18489 Issue 6 (02/19)