OPERATING INSTRUCTIONS FOR COMARK C9500 SERIES INTRINSICALLY SAFE PRESSURE METERS

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GENERAL INFORMATION

These instruments have been certified by the British Approvals Service for Electrical Equipment in Flammable Atmospheres (BASEEFA) and are suitable for use in accordance with the marks which have been applied.

The marks are described in Annex 1 of the 'Rules of the EECs Licence Scheme for Certified Explosion Protected Electrical Equipment'.



WARNING

The Certification for this instrument is:

EEx ia IIC T4

INTRINSIC SAFETY STANDARD EN 50 020 (1977) APPLIES AT NORMAL ATMOSPHERIC PRESSURE.

NOTE: AT ELEVATED PRESSURE THE ENERGY REQUIRED TO IGNITE CERTAIN EXPLOSIVE ATMOSPHERES CAN REDUCE SIGNIFICANTLY, THEREFORE ADEQUATE PRECAUTIONS SHOULD BE TAKEN PRIOR TO THE MEASURING OF EXPLOSIVE GASES OR MIXTURES.

The battery cover is attached by socket headed screws for which an Allen key is provided with the instrument. This key should be kept outside the hazardous area.

ON NO ACCOUNT SHOULD THE BATTERY COVER BE OPENED WITHIN THE HAZARDOUS AREA.

(A low battery voltage is indicated by the 'BAT' symbol appearing on the display).

WARNING

INPUT HOSES SHOULD NOT BE DISCONNECTED FROM THE INSTRUMENT WHILST CONTAINING GASES WHICH ARE DANGEROUS AND/OR UNDER PRESSURE.

DO NOT APPLY PRESSURES BEYOND THE OVER RANGE MAXIMUM FOR THE INSTRUMENT OR DAMAGE MAY OCCUR.

DO NOT USE ANY OTHER MEANS OF POWER SUPPLY TO THE INSTRUMENT OTHER THAN THE BATTERY TYPES AS LISTED ON THE INSTRUMENT LABEL.

REFER TO SECTION 3 — CONNECTION TO PRESSURE SOURCES BEFORE OPERATING THE INSTRUMENT.

CERTIFICATE No. FM12129
ISO 9001

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

This instrument complies with the Electromagnetic Compatibility Directive 89/336/EEC.

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

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

CALIBRATION, CERTIFICATION AND SERVICE



Certification
Comark can provide Certificates of Calibration which may be required to meet Quality Assurance procedures, Food Hygiene or Environment regulations. This is an independent quality controlled process which compares the measurement of the performance of a product against an agreed National Standard. Annual certification/recalibration is recommended, and is required by the regulations in many cases. Two types of certification are offered:-

(a) **NAMAS Certification**
Comark has one of the finest NAMAS accredited temperature calibration laboratories in the UK for contact temperature measurement. NAMAS (National Accreditation for Measurement and Sampling) is a service of UKAS (United Kingdom Accreditation Service). The Comark laboratory carries out certification to strict NAMAS standards over a temperature range of –70°C to +1100°C, with uncertainties as low as ±0.01K.

NAMAS Certificates of Calibration for other measurement parameters can be provided via an external accredited laboratory.

(b) **National Standards Certification**
Certification can also be provided by the Comark certification laboratory using equipment traceable to National Standards.

Conformance
Certificates of conformance can be supplied for new, serviced and recalibrated instruments, at the time of manufacture or service. These confirm that the instrument has been manufactured, inspected and tested in accordance with the conditions of supply and conforms to the product specification. Please note that certificates of conformance do not equate to or replace certificates of calibration.

Service/Repairs
Regular servicing and any necessary repairs, under warranty or thereafter, can be carried out by the Comark Service Department.

Full details of all the above facilities can be obtained from Comark Customer Support in the UK, or your local Distributor.

2. KEY FUNCTIONS

2.1 ON/OFF Key

Press once to switch on the instrument. Repeat to switch off.

Holding down the key when switching on will display the maximum pressure range of the instrument in PSI.

Holding down the key when switching off will display all segments as a test.

2.2 ZERO Key

Press to zero the current readings on the display to nullify any offsets caused by large temperature variations. The instrument will retain the zero value in memory even after switch off, so that the zero reading will be displayed when the instrument is switched on again. The zero key can be used whenever offsets occur. Please note that pressing the zero key has no effect whilst the instrument is in hold or record modes.

2.3 SCALE Key

Press to display the pressure measurement in each of the different scales available. The selected scale unit is retained in memory even after switch off, so that the selected unit can be displayed when the instrument is switched on again.

2.4 HOLD Key

Press to hold the displayed reading and press again to resume measurement. The scale key will operate while the instrument is in hold mode so that the held reading can be displayed in different scales.

2.5 FILTER Key

Press to filter out transient readings. In filter mode the instrument will average the readings taken over the last 4 seconds (16 readings) to provide a more stable reading on the display. Press the key again to resume normal measurement.

2.6 RECORD Key

Press once to put the instrument into record mode. This will be indicated by the word **RECORD** on the display. Maximum and minimum pressure readings can be stored and displayed while the instrument is in record mode. When the instrument is in record mode, press key once to display the current maximum reading and press again to display the current minimum reading. Pressing the key a third time will return the display to normal measurement.

Record mode can be cancelled and the max/min readings cleared by pressing and holding down the key until the word **RECORD** disappears from the display.

The scale key will operate while the instrument is in record mode so that the max/min readings can be displayed in different scales.

2.7 AUTO Switch Off

The instrument can be programmed to auto switch off by pressing and holding down the **HOLD** key while using the **ON/OFF** key to switch on the instrument. The word **AUTO** appears on the display to indicate auto switch off mode and the instrument will switch itself off approximately 3 minutes after the last use of the keypad. Auto switch off mode can be cancelled by pressing and holding down the **HOLD** key while switching on manually with the **ON/OFF** key.

3. CONNECTION TO PRESSURE SOURCES



The C9500 Series IS instruments are fitted with 1/8" BSP female connectors. The following checks must be made before connecting the instrument to a pressure source:-



Check the security of all fittings.



Check that the pressure source does not exceed the ratings for the instrument as set out in Table 1.



Check that the gases to be measured will not damage or corrode stainless steel, brass, glass, ceramic, silicon, nickel, aluminium, gold or epoxy resin.



Note: Comark C9500 Series IS Pressure Measurement Instruments are not suitable for absolute pressure measurement.



Note: Pressures in excess of maximum over range figure with respect to atmospheric pressure, should not be applied to either port as this could damage the instrument or represent a safety hazard.

TABLE 1

Instrument	Pressure Range	Maximum Over/ Under Pressure
C9501/IS	0 to ±2 PSI/140mbar	6 PSI/400mbar
C9503/IS	0 to ±5 PSI/350mbar	15 PSI/1000mbar
C9505/IS	0 to ±30 PSI/2000mbar	90 PSI/6200mbar
C9507/IS	0 to ±100 PSI/6900mbar	200 PSI/13700mbar

1. INTRODUCTION

The C9500 Series IS pressure meters includes:-

C9501/IS Range 0 to ±2 PSI / 0 to ±140mbar Differential

C9503/IS Range 0 to ±5 PSI / 0 to ±350mbar Differential

C9505/IS Range 0 to ±30 PSI / 0 to ±2000mbar Differential

C9507/IS Range 0 to ±100 PSI / 0 to ±6900mbar Differential

4. OTHER FUNCTIONS

4.1 Battery Low

Low battery is indicated by the symbol **BAT** on the display. Replace the battery as soon as possible after this symbol appears.

4.2 Over Range Pressure

If the pressure measured (either positive or negative pressure) exceeds the full scale of the instrument, the display will show – – – –

If this occurs the pressure must be reduced to avoid damage to the sensor in the instrument.

4.3 Over 9999 Reading Indication

If the numeric value for display exceeds ±9999, with or without a decimal point, the display will blink and suppress the top (5th) digit, whilst continuing with correct values of the lower 4 digits.

4.4 Differential or Gauge Measurement

C9500 Series instruments can be used in either a gauge or differential pressure measurement system. For gauge measurements the negative (–ve) port should be left open to atmospheric pressure and the positive (+ve) port used as the input for the pressure or vacuum to be measured.

4.5 Battery Replacement

Unscrew the two Allen screws at the base of the instrument and slide off the battery cover. Replace the battery with a 9V PP3 type as specified on the label in the battery compartment. Replace the battery cover taking care not to over tighten the two screws. A 2.5mm A/F hex key is provided.

Note: Do not use any other means of power supply to the instrument other than the battery types as listed on the instrument label.

4.6 Use with Pressure Test Kit

The C9500 series instruments can be used together with the optional TK2 pressure test kit as a low cost calibration system for checking or calibrating other pressure instruments.

To use TK2 as a calibrator, connect a calibrated C9500 series instrument, suitable for the maximum pressure to be used, to one of the ports on the hand-pump. Connect the instrument to be checked or calibrated to the other port. Read the instructions supplied with the TK2 kit for details of the pump operation. Ensure the C9500 meter is zeroed with the pressure relief valve open before measurements or adjustments are made.

Note: With the C9501/IS meter it is possible to over-range the instrument with just one squeeze of the pump handle. If this should occur unscrew the pressure release valve slowly until the display again shows a pressure reading then tighten. The volume adjustment on the pump may now be used for fine control of the applied pressure.

5. SPECIFICATION

		C9501/IS	C9503/IS	C9505/IS	C9507/IS
PSI	Range	0 to ±2	0 to ±5	0 to ±30	0 to ±100
	Resolution	0.001	0.001	0.01	0.1
mBar	Range	0 to ±140	0 to ±350	0 to ±2000	0 to ±6900
	Resolution	0.1	0.1	1	1
inH_2O	Range	0 to ±55	0 to ±140	0 to ±830	0 to ±2750
	Resolution	0.01	0.1	0.1	1
inHg	Range	0 to ±4	0 to ±9.999	0 to ±61	0 to ±200
	Resolution	0.001	0.001	0.01	0.1
mmHg	Range	0 to ±99.99	0 to ±260	0 to ±1500	0 to ±5200
	Resolution	0.01	0.1	1	1
Torr	Range	0 to ±99.99	0 to ±260	0 to ±1500	0 to ±5200
	Resolution	0.01	0.1	1	1
Pa	Range	0 to ±9999			
	Resolution	1			
KPa	Range		0 to ±35	0 to ±200	0 to ±690
	Resolution		0.01	0.1	0.1
mmH_2O	Range	0 to ±1400	0 to ±3500		
	Resolution	1	1		
cmH_2O	Range			0 to ±2100	0 to ±7000
	Resolution			1	1
Kgcm^{-2}	Range			0 to ±2.1	0 to ±7.0
	Resolution			0.001	0.001

CALIBRATED ACCURACY ±0.2% of full scale (FS) at +23°C

REPEATABILITY ±0.1% of full scale (FS) at +23°C

MEAN TEMPERATURE COEFFICIENT OF READING <0.1% per °C

OPERATING RANGE 0 to 50°C, 10 to 90% RH non condensing

ENVIRONMENTAL RATING IP67

PROTECTION LEVELS EEx ia IIC T4
BASEEFA Certificate Ex 95C2454*

POWER SOURCE	9V PP3 6F22 — MN1604 UCAR9V
BATTERY LIFE	125 hours (using MN1604)
LOW BAT CHECK	Displays BAT just before end point of battery
OVER PRESSURE INDICATION	– – – –
OVER 9999 READING INDICATION	Lowest 4 digits blink
CONNECTIONS	1/8" BSP female
WEIGHT	330gm including battery
EMC	Emission — EN 50081-1 No emissions above EN 55 022 Class B limits Immunity — EN 50082-1 Performance to Criterion B

* Certification applicable at atmospheric pressure.

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