INSTRUCTION MANUAL

DIGITAL INSULATION-CONTINUITY TESTER

MODEL KMP
3010DL, 3050DL, 3075DL

ROBIN

Index

Page

1. A Word About Safety

Electricity can cause severe injuries even with low voltages or currents.
Therefore it is extremely important that you read the following infomation before using this Insulation Tester.

1.1 This instrument must only be used by a competent trained person and in strict accordance with the instructions. Robin Electronics will not accept liability for any damage or injury caused by misuse or non -compliance with instructions or safety procedures.

1.2 This instrument must not be used on live circuits. Ensure all circuits are de-energised before testing.

1.3 Never open the instrument case except for battery or fuse replacement.

1.4 Always inspect your Insulation Tester and test leads before use for any sign of abnormality or damage. If any abnormal conditions exist (broken test leads, cracked case, display faulty, inconsistent reading-etc) do not attempt to take any measurements. Return to Robin Electronics for rectification.

1.5 Never replace the protective fuse inside the instrument with any other than the specified or approved equal (0.5A/250V) fast acting ceramic to IEC 127.

1.6 This meter has been designed with your safety in mind. However, no design can completely protect against incorrect use. Electrical circuits can be dangerous and/or lethal when a lack of caution or poor safety practice is used. Use caution in the presence of voltages above 50V as these pose a shock hazard.

1.7 Pay attention to cautions and warnings which will inform you of potentially dangerous procedures.

1.8 Model KMP3010DL has a live circuit warning bleeper. If it is connected to a live circuit a rapid pulsating bleep will be emitted. Do not press the test button and immediately disconnect the instrument from the circuit. Models KMP 3050DL and KMP 3075DL also have the same warning circuits but in addition, will display the value of external AC voltage along with a flashing symbol (⚠). The tone of the bleep will be lower if there are no batteries in the instrument.

1.9 Never assume an installation circuit is not live. Confirm it is de-energised before commencing testing.

1.10 Replace worn and/or damaged leads with new ones approved by Robin Electronics immediately.

1.11 It is essential to understand and follow the safety rules contained in this manual. They must always be observed when using the instrument.

1.12 If at anytime during testing there is a momentary degradation of reading, this may be due to excessive transients or discharges on the system or local area.
Should this be observed, the test should be repeated to obtain a correct reading. If in doubt always contact Robin Electronice.

2. Specifications

Insulation Resistance Ranges

			3050DL/3075DL		
				3010DL	
Test Voltage			250V	500V	1000V
Measuring Ranges			0-20MΩ 0-200MΩ 0-2000MΩ	0-20MΩ 0-200MΩ 0-2000MΩ	0-20MΩ 0-200MΩ 0-2000MΩ
Output Voltage on Open Circuit			250V DC ±10% max.	500V DC ±10% max.	1000V DC ±10% max.
Output Voltage			250V DC min. at 0.25MΩ	500V DC min. at 0.5MΩ	1000VDC min. at 1MΩ
Output Current			1mA DC min. at 0.25MΩ	1mA DC min. at 0.5MΩ	1mA DC min. at 1MΩ
Output Short Circuit Current			1.3mA approx		
Accuracy	20MΩ 200MΩ		±1.5%rdg±5dgt		
	2000 MΩ	0~1GΩ	±10%rdg±3dgt		±3%rdg±3dgt
		1G~2GΩ			

Continuity Resistance Ranges

Measuring Ranges	0-20Ω	0-200Ω	0-2000Ω
Open Circuit Voltage on 20Ω Range	4-9V		
Short Circuit Current on 20Ω Range	200mA min.		
Accuracy	±1.5%rdg±5dgt	±1.5%rdg±3dgt	

Operating Temperature & Humidity: 0°C~+40°C at 85% max. relative humidity
Storage Temperature & Humidity: −10°C~+50°C at 75% max. relative humidity
Power Supply: 6×1.5V battery type R-6, AA or equivalent. Alkaline type recommended.
Fuse: 0.5A/250V fast acting ceramic to IEC 127
Safety: Designed in general to comply with IEC 1010-1 installation category III.
*** Model KMP 3010DL has only a 500V range.**

3. Features

- 3 ½ Digit Microprocessor Controlled Insulation Tester
- Three Insulation test voltages 250V, 500V, 1000V (models KMP 3075DL, KMP 3050DL)
- Three continuity ranges, 20Ω, 200Ω and 2000Ω
- Trac-Lok and Backlight (Model KMP 3075DL)
- Three insulation resistance ranges 20MΩ, 200MΩ, 2000MΩ
- 200mA continuity short circuit test current
- 1mA test current at the minimum load on insulation ranges
- Bar graph indicates test voltage-rise and decay can be observed during insulation tests (Models KMP 3075DL and KMP 3050DL only)
- Warning of external voltage presence
- "Press to test" button with lock down feature Releasing the test button automatically discharges the capacitance of a circuit under test
- Auto null feature (Models KMP 3075DL and KMP 3050DL only)

4. Instrument Layout

Fig. 1

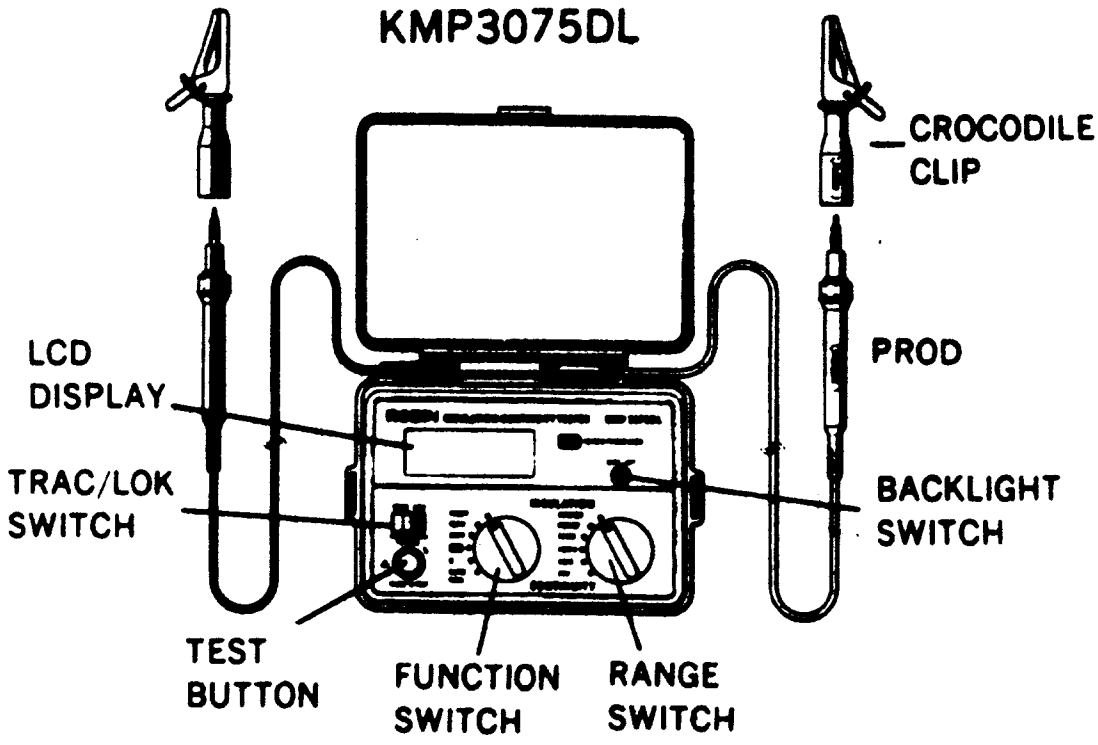


Fig. 2

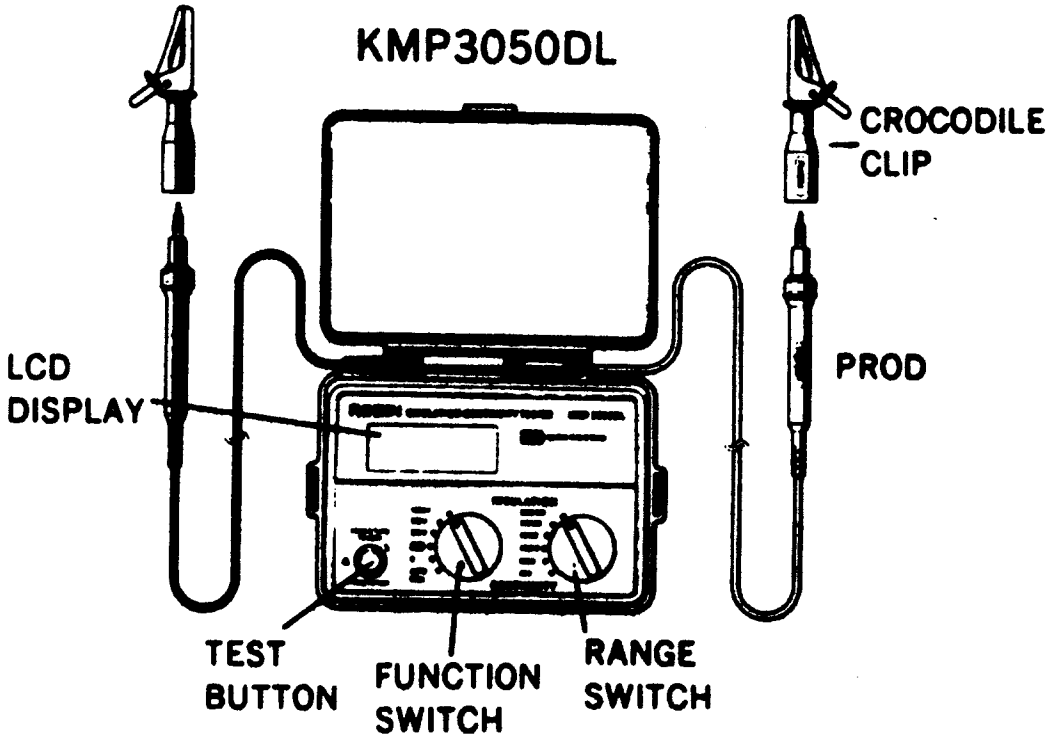


Fig.3

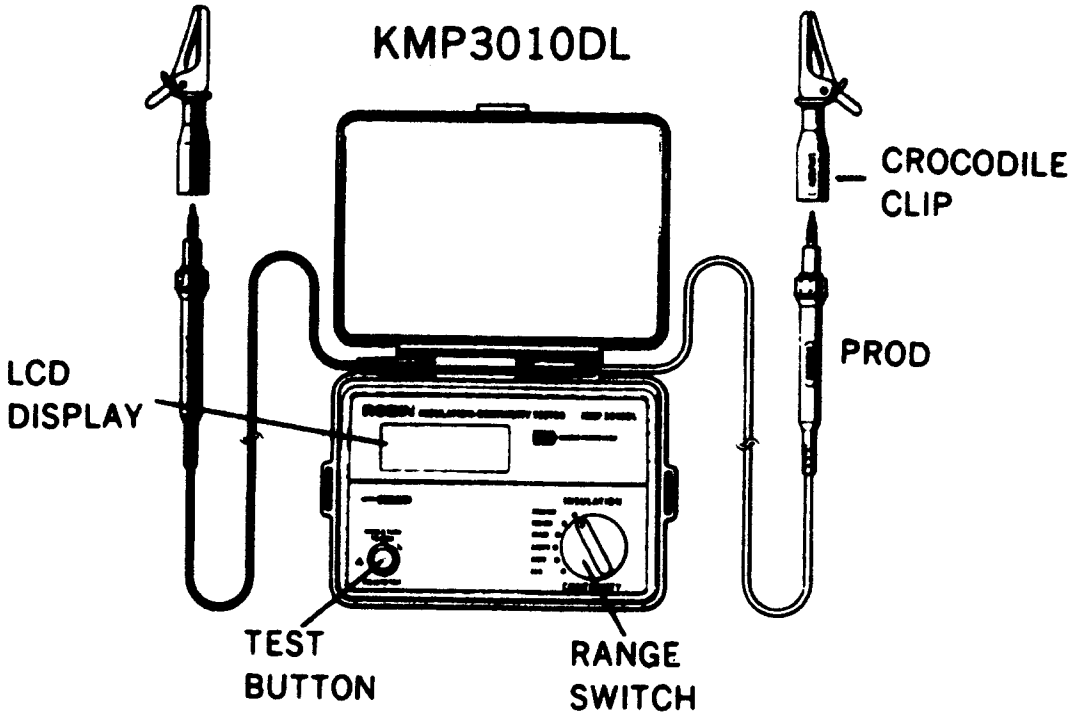
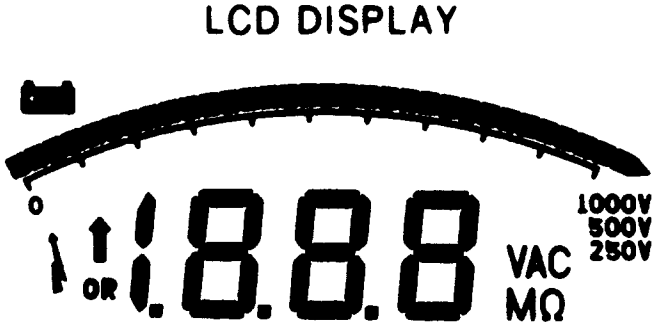
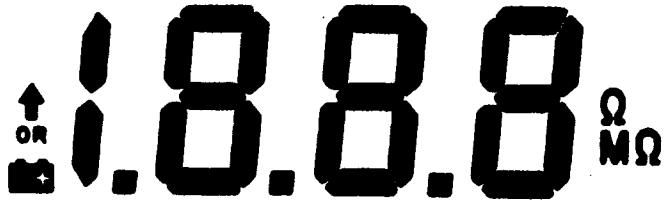


Fig.4



KMP3075DL/3050DL

Fig.5



KMP3010DL

5. Functions

5.1 Trac-Lok Mode (Model KMP 3075DL)

Battery powered Insulation Testers have to transform a typically low DC voltage (9V) to a high voltage (500V/1000V). This puts an enormous drain on the batteries leading to a reduced operating life. With the advent of the 16th Edition Regulations and IEC Standards (IEC 364-6-61) a minimum 1mA current is now required on insulation tests and this means that more power is taken from the batteries.

Also, IEC Standards (IEC 364-6-61, HD 384) requires a test current of 200mA on the continuity ranges. The 16th edition guidance notes also specify minimum test currents and voltages. This again requires a very high output from the batteries.

Conventional Insulation Testers provide these test currents and voltages constantly for as long as the test button is depressed. Under constant use the batteries will soon fade especially if non-alkaline types are used.

Robin have devised Trac-Lok circuits to conserve battery life on both Insulation and Continuity Testers. In Trac mode, the Insulation Tester behaves like ordinary testers. In Lok mode the test voltage is only generated for long enough to obtain a stable reading. It is then removed. This can be seen on the bar graph -at first the voltage rises, then a reading is obtained, then the bar graph decays to zero.

On the continuity/resistance ranges (20Ω, 200Ω, 2000Ω) the test current is removed once a stable reading is reached. There is no bar graph function on these ranges.

It is recommended that the Trac mode is used on circuits where capacitance is expected.

5.2 Bar Graph (Models KMP 3075DL and KMP 3050DL)

While conducting insulation resistance tests, the LCD will display the value of insulation resistance. The bar graph will display the DC test voltage present across the ends of the test leads. This means that the user can verify that the circuit is being stressed by the full DC test voltage (250V, 500V or 1000V).
For circuits that have a large capacitance the bar graph will rise more slowly than for those with low capacitance. When used in the Trac mode the bar graph will display the real time fluctuations in insulation test voltage and show breakdown. This can be used to indicate good and bad circuits as a rapidly fluctuating bar graph indicates unstable conditions.

5.3 Back Light (Model KMP 3075DL)

An Electroluminescent back light is provided to view the results in dimly lit areas.

5.4 Auto Null (models KMP 3075DL, KMP 3050DL)

When conducting continuity tests it is important to remember that the measured resistance includes the resistance of the test leads. An electronic leads null function is provided which automatically subtracts the test lead resistance before displaying the real continuity resistance value. A full description of how this feature can be used will be found in paragraph 10.2.

6. The Nature of Insulation Resistance

Live conductors are separated from each other and from earthed metal by insulation, which ensures that the current flowing between conductors and to earth is kept to an acceptably low level. In simple theory, insulation is perfect, so that its resistance is infinite and there is no current flow through it at all. In practice, there will always be a current between conductors and to earth. And this is known as leakage current. This current is made up of three components.

6.1 Capacitive Current

The insulation between conductors at different voltages behaves as the dielectric of a capacitor, the conductors behaving as the capacitor plates. When a direct voltage is applied to the conductors, charging current will flow to the system but will quickly die away (usually in much less than one second) as the effective capacitor becomes charged. If an alternating voltage is applied, there will be alternating charge and discharge currents so that there will be a continuous flow of alternating current to the conductors.

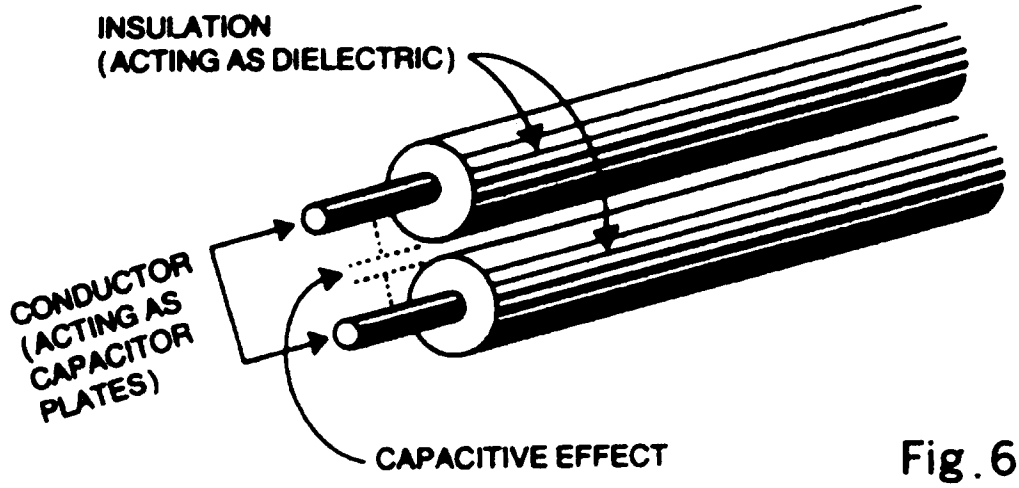


Fig. 6

6.2 Conduction Current

The resistance of the insulation is not infinite, so a small current flows through it. Ohms's Law applies, so the leakage current can be found from:

$$\text{Leakage Current } (\mu A) = \frac{\text{applied voltage (V)}}{\text{insulation resistance (M}\Omega\text{)}}$$

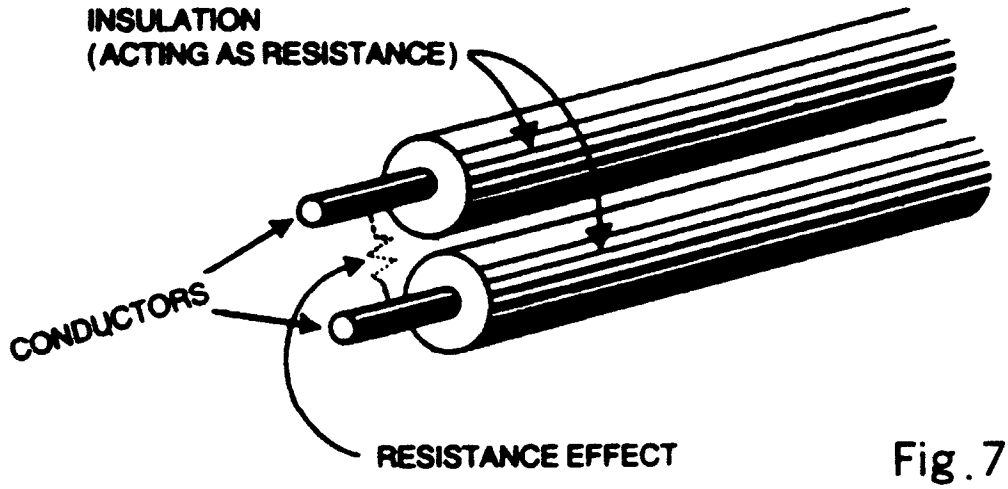


Fig.7

6.3 Surface Leakage Current

Where the insulation is removed, for connection of conductors and so on, current will flow across the surfaces between the bare conductors. If the surfaces are clean and dry, the amount of leakage current is very small indeed, but it may become significant in wet and dirty conditions.

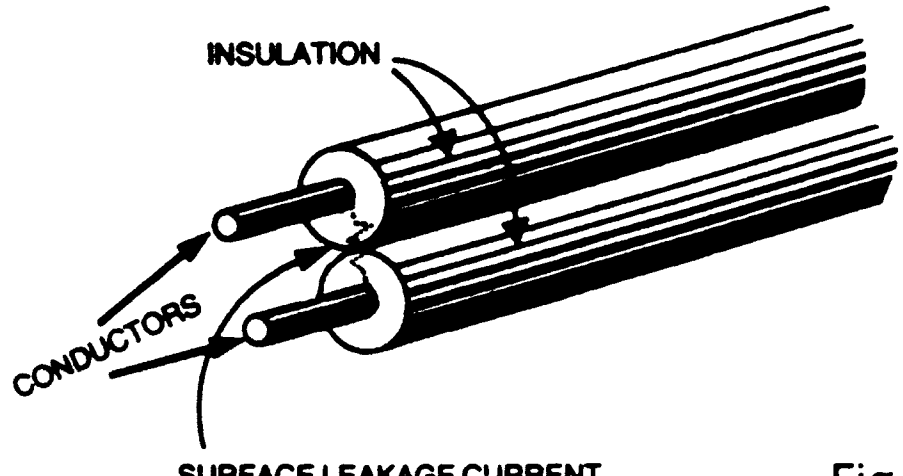


Fig.8

6.4 Total Leakage Current

The total leakage current is effectively the sum of the capacitive, conduction and surface leakage currents described above. Each current, and hence the total leakage current is affected by factors such as ambient temperature, conductor temperature, humidity and the applied level of voltage.

If a circuit is fed with an alternating voltage, the capacitive current (6.1) will always be present, and can never be eliminated. This is why direct voltage is applied to test insulation, the capacitive current quickly falling to zero so that it has no effect on the measurement. A high voltage is used because this will often break down poor insulation or surface leakage paths and thus show up insulation faults which would not be present at lower voltage levels.

The insulation tester measures the applied voltage and the resulting leakage current flow, displaying the resistance which is obtained by an internal calculation based on Ohm's Law:

$$\text{Insulation Resistance (M}\Omega) = \frac{\text{Test Voltage (V)}}{\text{Leakage Current } (\mu\text{A})}$$

As the effective capacitance of the system charges up, so the leakage current reduces. A steady insulation resistance reading indicates that the system capacitance is fully charged and that the capacitive component of current has fallen to zero. It should be noted that the system charges up to the test voltage used (250V, 500V, or 1000V). Thus, it can be dangerous for people or animals to make contact with an electrical installation which is under test. Even when the test voltage is removed, the wiring system may remain charged for a significant time unless steps are taken to provide a path for discharge current. All the testers in this range (KMP 3010DL, KMP 3050DL and KMP 3075DL) automatically connect a discharge resistor across the circuit when the test button is released to provide a path for discharge current.

If a wiring system is wet and/or dirty, the surface leakage component of test current will be high, giving a low insulation resistance reading. If an elecrical installation is large, its individual circuit insulation resistances are all effectively connected in parallel. so that the total insulation resistance will be lower than that of each individual circuit. The greater the number of circuits connected, the lower will be the overall insulation resistance.

7. Models

7.1 KMP 3010DL

This is a single voltage (500V) Digital Insulation/ Continuity Tester. A single rotary dial selects between 3 insulation resistance ranges and 3 continuity/ resistance ranges.

7.2 KMP 3050DL

This is a triple voltage (250V, 500V, 1000V) Digital Insulation/Continuity Tester with auto null and bar graph.

7.3 KMP 3075DL

This has all the functions of the KMP 3050 and in addition has Trac-lok circuits and backlight display.

8. Preparation for Measurement

8.1 Before testing always check the following

The "battery low" indicator is not showing
There is no visual damage to the tester or test leads
Test Lead Continuity.
Select the continuity function and 20Ω range. Short the test leads together.
An overrange (OR) indication will mean that the leads are faulty or instrument fuse is blown. (see fuse replacement section 12).

9. Insulation Resistance Testing

Warning: Insulation tests should be conducted on circuits that are de-energised. Ensure circuits are not live before commencing testing.

9.1 Select the required test voltage (250V, 500V or 1000V) by rotating the function dial. This is not required for model KMP 3010DL as it is a single 500V range tester.

9.2 Select the required range (20MΩ, 200MΩ, 2000MΩ) by rotating the range selector.

9.3 Attach the test leads to the instrument and to the circuit to be tested. If the voltage warning bleeper sounds do not press the test button and disconnect the instrument from the circuit. The circuit is live and should be de-energised before further testing.
Models KMP 3050DL and KMP 3075DL also indicate the presence of external AC voltage on the LCD by showing a flashing symbol and the actual value of AC system voltage.

9.4 Select either Trac mode or Lok mode as required and press the test button.
The value of insulation resistance in megohms will be displayed. The bar graph will display the insulation test voltage. If in Lok mode the bar graph will rise and then decay to zero with the insulation resistance reading remaining on the LCD for as long as the test button is depressed. The insulation test voltage is only applied for as long as indicated by the bar graph.

Caution: Never turn the function dial whilst the button is depressed. This may damage the instrument. Never touch the circuit under test during insulation testing.

When testing is complete ensure that the test button is released before the test leads are disconnected. This is because the system may be charged up and it must be allowed to discharge through the tester's internal discharge resistor.
For Models KMP 3050DL and KMP 3075DL (with bar graph) this discharge will be seen as a decaying bar graph.

10. Continuity Testing (Resistance Tests)

Warning: Ensure circuits are not live before commencing testing.

10.1 Select the continuity test by rotating the function dial. This is not required on model KMP 3010DL since it is a single range (500V) instrument.

10.2 The KMP 3010DL is calibrated using leads of a similar resistance to those supplied.
If an alternative lead set is used, there may be a considerable lead resistance which must be noted prior to taking measurements.
Select the 20Ω range by rotating the range selector and connect the test leads to the instrument.
Short the tips of the leads. Press and hold down the test button by twisting it a quarter turn clockwise. The display will show the resistance of the test leads. This value should be noted and subtracted from continuity measurements if using model KMP 3010DL.
Models KMP 3050DL and KMP 3075DL have an auto null function which enables the tester to automatically subtract this resistance before displaying the system continuity resistance. To enable this function, turn the function dial to the Auto null position whilst still pressing the test button and shorting the leads. Wait for the tone of the bleep to change from a low tone to a higher pitch tone. When this happens turn the function dial back to the continuity position. The display should now show zero. Release the test button by rotating it a quarter turn anti-clockwise.

10.3 Connect the test leads to the circuit under test. Ensure the circuit is not live by checking that the live circuit bleeper does not sound. Models KMP 3050DL and KMP 3075DL will also indicate the value of external AC voltage (see section 9.3).

10.4 If the circuit is not live select either the Trac or Lok function and press the test button.
Read the value of resistance from the LCD.
Note: On the 20Ω range the end of test bleep has a lower tone for resistances less than approx. 5Ω.

11. General

If at any time the display shows OR this means that the value being measured is greater than the range selected. Switch to a higher range in this case.
The test button can be locked down for ease of use. Do not forget to release the test button first before disconnecting the test leads from the system otherwise the circuit may be left in a charged state.
Model KMP 3075DL is provided with a back light. To switch on simply press the back light button. The back light will remain on for 40 seconds.
Each Time the tester makes a measurement and updates the display end of test bleep will sound.

12. Battery and Fuse Replacement

Caution: Always disconnect the test leads from the instrument before attempting battery or fuse replacement.

12.1 Battery Replacement

When the LCD shows the low battery flag, the batteries need replacing. Six batteries (AA or equivalent) are required. Alkaline types are recommended.
Open the battery compartment lid on the back of the instrument by unscrewing the metal screw. Detach the battery holster and replace all six batteries with new ones observing the correct polarity as marked on the holster. Close the battery compartment lid and replace the metal screw before using the tester.

12.2 Fuse Replacement

If the fuse has blown or is suspected of being faulty (see section 8.1) replace it using the recommended type or its approved equal-a quick blow ceramic fuse to IEC 127 is required.
Open the battery compartment lid as per 12.1. Remove tho old fuse and replace with the new one.
Screw the battery compartment lid back on before using the tester.

13. Servicing & Calibration

If this tester should fail to operate correctly, return to Robin Electronics marked for the attention of the Service Department, stating exact nature of fault. Make sure that:—

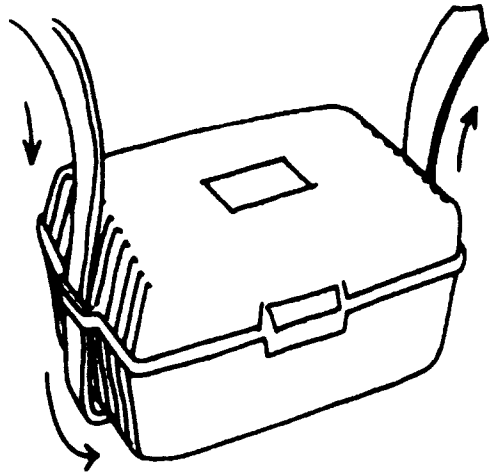
a. Operating instructions have been followed
b. Leads have been inspected
c. Fuse has been checked
d. Batteries have been checked
e. The unit is returned with all accessory leads

Regular re-calibration is recommended for this instrument.
We recommend that with normal use this unit is calibrated at least once in every 12 month period.
When the unit is due for re-calibration, return to Robin Electronics marked for the attention of the Calibration Department and be sure to include all accessory leads as they are part of the calibration procedure.

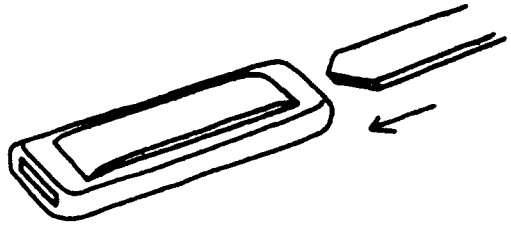
Robin reserve the right to change specifications and design without notice and without obligation.

CASE, STRAP, SHOULDER-PAD AND TEST-LEAD POUCH ASSEMBLY

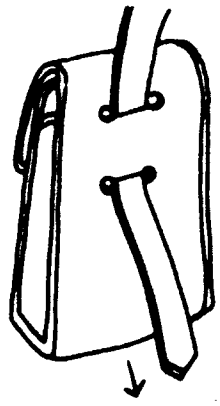
Assemble the shoulder strap through the case lugs and the test-lead pouch in the following sequence:



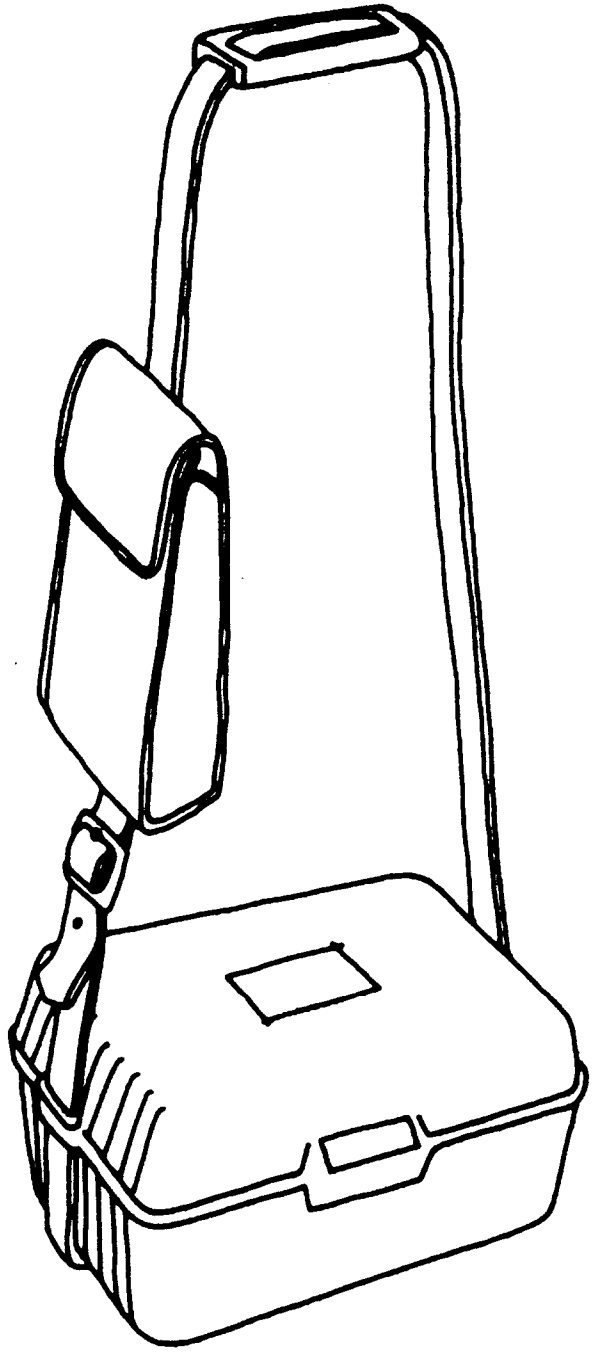
1 Pass the strap DOWN through the first case lug, under the case and UP through the other lug.



2 Slide the shoulder-pad onto the strap.



3 Feed the strap DOWN through the slots in the back of the test-lead pouch.



4 Pass the strap through the buckle, adjust the strap for length and secure.

Quality and reliability is our tradition

DISTRIBUTOR

92-1264B 95-10

ROBIN ELECTRONICS LIMITED

Precision Centre
Dwight Road, Watford, Herts
WD1 8HG, England
☎ Sales Order Line 01923 218744
☎ Administration Line 01923 232000
Fax 01923 218898