MT 1000

OPERATION MANUAL

CONTENTS

ONE: INTRODUCTION

Congratulations! You have just purchased one of the finest handheld Transmission Test Set available. With proper care and use, this instrument will provide years of reliable operation. Therefore, it is very important to completely familiarize yourself with the instrument before attempted use. So, please read this manual carefully, paying particular attention to the safety section.
Thank you for your selection of this fine product, and welcome to the family of MOTECH product owners!

1.1 Inspection

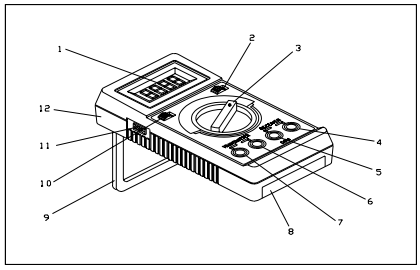
When you unpack your new Transmission Teat Set from its original package, carefully check each item for damage that may have occurred in shipment. If anything is damaged or missing, take the entire instrument, including box and packing materials, back to the distributor from whom it was purchased, where they will either replace the item or the entire instrument. In the unlikely event that the distributor is unable to provide the assistance you request, please contact the Motech Industries Inc.

1.2 Included Items

The MT1000 Transmission Test Set includes following items:
Telecom Test Set
Test Leads (1 pair)
Earphone
RJ11 Phone Line
Carrying Case
Popper Clip Leads (2 pairs)

1.3 Unit Description

Please use the drawing below of the instrument in conjunction with the following descriptions of the controls and connections to help familiarize yourself with the unit:



[1] Liquid Crystal Display: Indicates the value of the measurement.
[2] Measurement Mode Switch: Selects either bridge (1Meg ohm±10%) or terminated measurements. (600Ω and 900Ω Selectable termination.)
[3] Function / Range Switch: Selects the function and range for the desired measurement.
[4] Receiver High: The positive (high) test connector for all measurements.
[5] Receiver Common: The negative (common) test connector for all measurements.
[6] Transmit Red: One of the banana jacks for the tone generator output.
[7] Transmit Black: One of the banana jacks for the tone generator output.
[8] Battery Compartment: Access for the battery, and the fuse. The spare fuse is also stored here.
[9] Tilt Stand: Used to hold the instrument at an angle on a level surface, or when reversed to hang it from a projection.
[10] Generate Level Switch: Sets either 0dBm or –13, dBm as the tone, generator output level.
[11] Power Switch: Turns power to the instrument on and off, (Push on, push-and-hold off).
[12] Earphone Jack: Used with the earphone for telephone line monitoring.

1.4 Specifications

[1]	Transmitter	TIMS(Transmission Impairment Measuring Set) Specifications Impedance: 600Ω Accuracy: ≦5 %
[2]	Tx Frequency	Range: 404Hz, 1004Hz, and 2804Hz Accuracy: 1% @ 23℃±5℃ Temp. coefficient: 200ppm/℃ Distortion: 50dB down from fundamental
[3]	Tx Level	Range: -13dBm or 0dBm Accuracy:±0.3dB@ 23℃±5℃ Temp. coefficient: 200ppm/℃
[4]	Frequency Counter	Range: 0 to 20KHz Resolution: 10Hz Level: -40dBm to +20dBm Accuracy:±0.5% reading±1 digit -32dBm ≦level≦ 0dBm
[5]	Receiver	Impedance:600Ω, 900Ω, or 1MΩ. Accuracy: ≦1% Max DC Block: 60V
[6]	Rx Level	Range: (2)-50 to-12dBm or -12 to +8dBm Resolution: 0.1dBm Detector Type: True RMS Accuracy:0.3dB if: 1. 30Hz ≦Frequency≦3.4KHz 2. -20dBm ≦Level≦ +8dBm
[7]	Noise	Rx Range: -82 to -10dBm Accuracy: ±2 dBm, -72 dBm to 10dBm Detector Type: True RMS Weighting Filter: C-MSG
[8]	DC voltage	Range:200V Full scale Resolution:0.1V Accuracy:±0.5% reading ±1 digit Impecance:1MΩ
[9]	AC voltage	Under AC 300V @50Hz~600Hz AC301V ~ AC750V @ 50Hz Resolution:1V Accuracy:±0.5% reading ±2 digit Impedance:1MΩ Detector Type: True RMS
[10]	Resistance	Range:2000Ω Resolution:1Ω Accuracy:±0.5% reading ±1 digit Protection: 250VDC / 250VAC max. Audible Continuity:≦30Ω
[11]	DC(loop) Current	Range:200mA Full scale Resolurtion:0.1mA Accuracy:±0.1% reading ±1 digit Protection:0.25A fuse

The specifications given assume an operating temperature of 73°F±10°F, Humidity up to 80% , and 1 year calibration cycle.

General Specifications

[1]	Display Type	0.5", 3 ½ digit Liquid Crystal.
[2]	Sampling Rate	2.5 readings per second, approximate.
[3]	Battery Type	NEDA 1604, 9-volt.
[4]	Battery Life	8 hours, approximate (Alkaline type)
[5]	Low Battery Warning Display	indicates “LOBAT" when battery is 95% discharged.
[6]	Overrange Warning	"1" <A single "1" followed by three blanked digits.
[7]	Operating Temperature	0 to 40° Celsius (32°to 104°F)
[8]	Storage Temperature	-20 to +70° Celsius (-4°to +158°F)
[9]	Humidity	Less than 80% , relative.
[10]	Dimensions (HxWxD)	17.2x8.7x3.5cm (6.9x3.4x1.4 in)
[11]	Weight	350 Grams (12.4 Ounces)

TWO: OPERATION AND USE

2.1 Warning

Electricity can cause severe injuries or even death, sometimes even with relatively low voltages or currents.

Therefore, it is vitally important that any electronic instruments such as this Transmission Test Set be totally understood before use.

Please do not use this instrument, or any other piece of electrical or electronic test equipment, without first thoroughly familiarizing yourself with its correct operation and use.

2.2 Cautions

Inputs that exceed the maximum input specifications can cause damage to the instrument.

If a dead or partially discharged battery is left in the instrument for an extended period, damage to the unit could result from leaking battery. Therefore it is important to replace discharged battery promptly, and if the instrument will not be used for an extended period, always remove the battery from the unit. Please dispose of used batteries in a proper manner.

Do not use solvents or aromatic hydrocarbons to clean the instrument, as the plastic case will be damaged.
If cleaning is necessary, use only a mild solution of warm water and detergent.

2.3 Level/Noise Measurements

[1] Connect the red test lead to the red receiver (V-Ω)terminal of the meter.
[2] Connect the black test lead to the black receiver (COM) terminal of the meter.
[3] Press the power button to turn the unit on.
[4] Set the Function/Range switch the 0dBm position.
[5] Set the Measurement Mode switch to the Bridge or the Terminate position, as desired for the measurement being taken (Input impedance in Bridge mode is approximately 1 Meg ohm, and 600Ω or 900Ω selectable in the termination mode.
When using the 900Ω termination, the instrument
still uses the 1mW into 600Ω reference as zero dBm. Therefore it is necessary to correct such 900Ω readings by subtracting 1.7dB from the reading shown in the display.
[6] Connect the test leads to the circuit to be measured.
Read the indicated level in the digital display. If more resolution is required (for example, when reading a small value), select the next lower position with the Function/Range switch until the desired resolution is obtained.
[7] To measure system noise, set the Function/Range switch to the-40dBm position, which will use the C-Message noise weighting filter, producing weighted noise measurements.

2.4 Receiver Frequency Measurement

[1] Turn the MT 1000 on and dial the Rotary Switch to "20KHz" position.
[2] Connect the receiver input jack to the line under test.
[3] Read the measured frequency value displayed on LCD.
If the frequency is greater than 20KHz and cause a single "1" displayed on LCD that indicates overrange of measurement.

2.5 AC Voltage Measurements

[1] Connect the red and black test leads to the V-Ω(red) and COM (black) input connectors, respectively.
[2] Set the Function/Range switch to the AC 750V position.
[3] Press the power button to turn the unit on.
[4] Connect the test leads to the circuit to be measured.
Read the AC voltage value in the digital display.

2.6 DC Voltage Measurements

[1] Connect the red and black test leads to the V-Ω(red) and COM (black) input connectors, respectively.
[2] Set the Function/Range switch to the DC 200V position.
[3] Press the power button to turn the unit on.
[4] Connect the test leads to the circuit to be measured.
Read the DC voltage value in the digital display.

Note:

A negative indication in the display indicates that the positive (red) test lead is negative with respect to the common (black) test lead.

2.7 DC Current (Loop Current)Measurements

[1] Connect the red and black test leads to the V-Ω(red) and COM (black) input connectors, respectively.
[2] Set the Function/Range switch to the DC 200mA position.
[3] Press the power button to turn the unit on.
[4] Connect the test leads in series with the circuit to be measured. Read the DC current value in the digital display.

Note:

[1] A negative indication in the display indicates that the positive (red) test lead is negative with respect to the common (black) test lead.
[2] Currents greater than 200mA will cause the protective fuse to open. To restore proper operation, replace the blown fuse only with one of the proper type and rating.

2.8 Resistance/Continuity Measurements

[1] Connect the red and black test leads to the V-Ω(red) and COM (black) input connectors, respectively.
[2] Set the Function/Range switch to the))) /Ω position.
[3] Press the power button to turn the unit on.
[4] Connect the test leads to the circuit to be measured. Read the resistance value in the digital display.

Note:

For the continuity beeper operation, the Bridge / Terminate switch must be set to the Terminate position. When the Bridge position is selected, the beeper is disabled.

2.9 Tone Generator Usage/Circuit Loss Measurement

[1] Connect the MT 1000 transmitter output terminals to the input of the circuit under test.
[2] Connect the output of the circuit under test to the V-Ω and COM terminals on the MT 1000.
[3] Set the Function/Range switch to the desired tone output frequency in the Hz range.
[4] Press the power button to turn the unit on.
[5] Select the desired tone output level with the 0dBm/ -13dBm switch.
[6] Select either Bridge or Terminate as desired.
[7] Read the circuit loss at the selected frequency in the display.

Example:

Tone output frequency 1004Hz, level 0dBm Display indicates-13.5 Circuit loss at 1004Hz equals 13.5dB.
When using the 900Ω termination, the instrument still uses the 1mW into 600Ω reference as zero dBm.
Therefore it is necessary to correct such 900Ω readings
by subtracting 1.7dB from the reading shown in the display.

THREE: OPERATION AND USE

3.1 Battery Replacement

When the instrument displays the "LO BAT" indication, the battery must be replaced to maintain proper operation.
Please perform the following steps to change the battery:

[1] Remove the battery hatch by sliding it towards the bottom of the instrument.
[2] Unsnap the battery clip from the old battery. Snap the clip in place on a new battery. Please dispose of used batteries in a proper manner.
[3] Place the new battery in the battery compartment.
[4] Replace the battery hatch by reversing the procedure used to remove it.

3.2 Fuse Replacement

If the fuse is suspected of being defective, it should be inspected and, if necessary, replaced. To inspect or replace the fuse, please perform the following steps:

[1] Remove the battery hatch by sliding it towards the bottom of the instrument.
[2] Remove the fuse from the fuse holder. Test for electrical continuity with an ohmmeter.
[3] If the is found to be open, replace it with a 0.250 amp, 250 volt replacement fuse, like the spare included in the lower-left corner of the battery compartment.
[4] Replace the battery hatch by reversing the procedure used to remove it.

Note:

Use of any fuse other than the 0.250 amp, 250 volt unit specified may disable the overload protection and cause damage to the instrument.

3.3 In Case of Difficulties

The MT 1000 has been designed to be accurate, reliable, and easy-to-use. However, it is possible that you may experience difficulties during operation. If there appears to be any kind of problem during use of the instrument, please perform the following steps to help determine the source:

[1] Re-read the operating instructions. It is very easy to inadvertently make mistakes in operating procedure.
[2] Remove and test the fuse. The instrument will not function properly with an open fuse.
[3] Inspect and check the continuity of the test leads. The instrument will not function properly with broken test leads.
[4] Remove and test the battery. The instrument will not function properly with a discharged battery.

If the preceding three steps fail to resolve the problem, please contact the Motech Industries Inc. or the distributor where you purchase this instrument.

Note:

Attempted repair, modifications, or tampering by unauthorized personnel will void the warranty.

FOUR: WARRANTY INFORMATION

Motech Industries Inc. warrants to the original user or purchaser that your unit is free from any defects in material or workmanship for a period of one year from the date of purchase. If any defect is discovered within the warranty period, Motech Industries Inc. will repair or replace the unit, subject to verification of the defect or malfunction, upon delivery or prepaid shipping shipment to Motech Industries Inc.

This warranty does not apply to defects or to physical damage resulting from abuse, neglect, accident, improper repair, alteration or unreasonable use of the unit, resulting in (but not limited to) cracked or broken cased or parts, or to units damaged leaking batteries. Except upon initial purchase, this warranty does not cover finish or appearance items nor does it cover items damaged in shipment to Motech Industries Inc. for repair or calibration.

To receive service under this warranty, you must include proof of purchase, including date and place of purchase, (a copy of your purchase receipt) or we will not be responsible for repairs or replacement of the unit under warranty.

Motech Industries Inc. assumes no responsibility for sipping and handling. However, repaired units will be shipped back to the customer with return shipping charges paid by Motech Industries Inc.

Any applicable implied warranties, including warranties of merchant ability and fitness for a particular use, are hereby limited to one year from the date of purchase. Consequential or incidental damages resulting from loss of use, or from a breach or any applicable express or implied warranties are hereby excluded.

This warranty is in lieu of all other agreements and warranties, general or special, express or implied, no representative or person is authorized to assume for us any other liability in connection with the sale or use of this product of Motech Industries Inc.