INSTRUCTION MANUAL

MT355

LOOP IMPEDANCE PSC/PFC TESTER

Contents

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1. SAFETY

1.1. Safety Information

- Read the following safety information carefully before attempting to operate or service the meter.
- To avoid damages to the instrument do not apply the signals that exceed the maximum limits shown in the technical specifications tables.
- Do not use the meter or test leads if they look damaged, use extreme caution when working around bare conductors or bus bars.
- Accidental contact with the conductor could result in electric shock.
- Use the meter only as specified in this manual or the protection provided by the meter may not be sufficient.
- Read the operating instructions before use and follow all safety Information.

1.2. Safety Symbols

Definition of Symbols Used

	Fuse
	Double Insulated (Class II) Equipment
	CAUTION! Risk of Danger.
CAT III	CAT III meters are designed to protect against transients in fixed-equipment installations at the distribution level.
	CAUTION! Risk of Electric Shock.
	Earth Ground
CE	Conforms to relevant European standard.

2. Description

2.1. Meter Overview

The MT355 is a simple to use Earth Loop Impedance tester to make the accurate measurement of Earth Loop Impedance and Neutral Loop Impedance (Phase Neutral Impedance) quick and easy. Two types of tests are performed, one being No-Trip technology to avoid tripping of RCD's (ELCB's) whist performing the Loop Impedance Tests.

The other test, “TRIP” is where high current <15A is used for the Loop Impedance test where the RCD (ELCB) must be bypassed, this is by and large the fastest and most accurate test available. The MT355 will automatically display the wiring status as well as test results for both Loop Impedance and Prospective Short Circuit current (PSC) for the L-PE test, for both NO-TRIP and TRIP tests. When performing L-N Loop Tests the results will be displayed for Loop Impedance and Prospective Fault Current (PFC) for both NON-TRIP and TRIP tests.

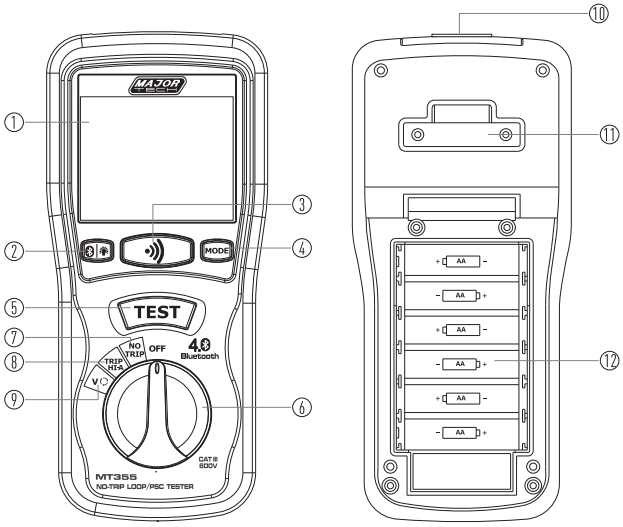
Loop Impedance test results display a resolution of 2 decimal places. Earth Resistance RE is only activated in the L-PE “NO-TRIP” mode, and uses the Loop method to measure the RE.

The instrument can automatically distinguish AC and DC voltages, if AC voltage is detected, the primary display indicates the AC voltage and the secondary display shows the mains frequency. AC Voltage can be measured between L-PE, L-N and N-PE. If the voltage is DC the reading is displayed in the primary display only. The meter measures AC and DC voltage up to 500V. The MT355 has a Phase Rotation Test, where the display indicates “123” for correct phase sequence and “321” for reversed phase sequence.

The Bluetooth function allows the user to transmit data to the Meter-X mobile App for viewing, organising and sharing recordings. The meter has a double moulded rubber case, rugged design for heavy duty use.

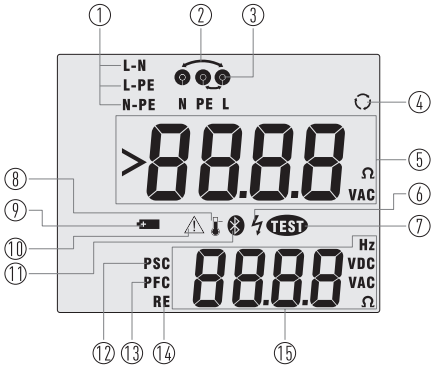
2.2. Meter Description

1 - LCD Display
2 - Bluetooth/Backlight Button
3 - Buzzer Button
4 - MODE Button
5 - Test Button
6 - Rotary Function switch
7 - Loop Impedance Position
  • L-N (High current)
  • L-PE (<15mA)
  • No Trip
8 - Loop Impedance Position (High current)
9 - Volts/Phase Rotation Position
10 - Power Jack
11 - Pothook
12 - Battery Cover



2.3. Display Icons Description

1 - Configuration options, settings you can make within the measurement functions.
2 - Arrows above or below the terminal indicator symbol indicate reversed polarity, check the connection or check the wiring to correct.
3 - Terminal indicator symbol.
4 - Phase Rotation
5 - Primary display and measurement units.
6 - Potential danger, appears when measuring or sourcing high voltages.
7 - Appears when you press the Test Button, disappears when the test is completed.
8 - Appears when the instrument is overheated, the Loop Tests are inhibited when the instrument is overheated.
9 - Low battery icon.
10 - WARNING!
11 - Bluetooth icon
12 - Prospective Short Circuit, calculated from measured voltage and impedance when reading line to neutral.
13 - Prospective Earth Fault Current, calculated from voltage and loop impedance which is measured line to protective earth.
14 - Earth resistance.
15 - Secondary display and measurement units.



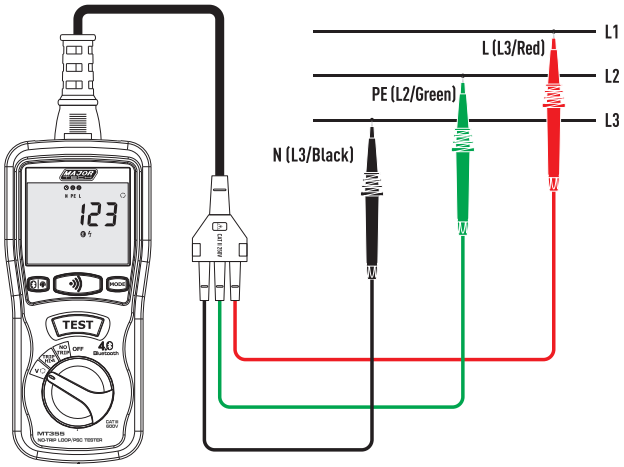
3.OPERATION

3.1. Voltage and Frequency Measurement

1. Turn the rotary switch to **Volts/Phase Rotation** Position.
2. Link the test line.
3. Press the **MODE** Button select terminals (L-PE, L-N, N-PE).
   - The instrument can automatically distinguish AC and DC voltages, if voltage is AC, The primary (Upper) display shows the AC voltage.
   - The secondary (Lower) display shows mains frequency.
   - If voltage is DC, the secondary (Lower) display disables.
   - The tester reads voltage to a maximum of 500V.

3.2. Perform a Phase Sequence Test

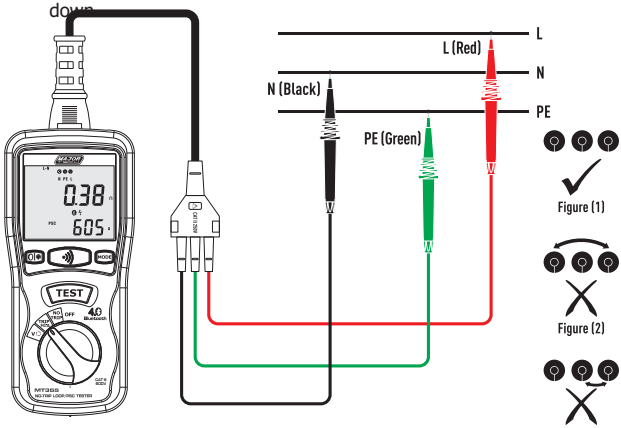
1. Turn the rotary switch to the **Volts/Phase Rotation** Position.
2. Press the **MODE** Button to select "↻" icon.
3. The primary (Upper) display shows:
   - "**123**" for correct phase sequence.
   - "**321**" for reversed phase sequence.
   - Dashes "**---**" instead of numbers if insufficient voltage is sensed.



Measuring in a 3-Phase System

3.3. Loop Impedance Measurement

1. Turn the rotary switch to **PSC/HI** or **NO TRIP** Position.
2. Link the test line.
3. Press the **MODE** Button to select test mode L-N or L-PE.
4. Check the wires state:
   - Before pushing the TEST Button, certify that the port wiring is correct and that there are port wiring instructions on the screen Figure (1) is ok.
   - If shown in Figure (2) or Figure (3), the tester will sound two beeps and disable the test.
   - The tester is designed for use on AC 230V+15%~-15% (50/60Hz) circuits, if the voltage is greater than 265V or less than 195V ,the loop test is forbidden.
   - If the LCD flashes " ", disconnect the meter and switch it off to cool down.



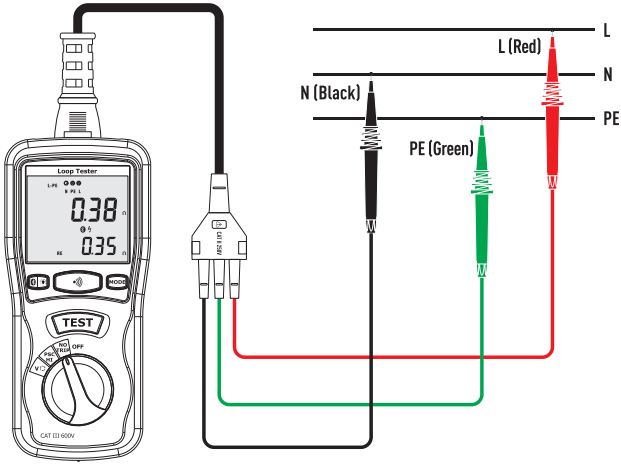
3-Wire Connection for Earth Resistance/Loop Test

5. Press and release the **TEST** Button, wait for the test to complete.
6. The primary (Upper) display shows the loop impedance.
7. The secondary (Lower) display shows the PSC or PFC, press the **MODE** Button to select.

3.4. Earth Resistance Testing by Loop Method

- You can also use the tester to measure the earth resistance component of the total loop resistance.
- You can use three leads or the mains cord to perform this test, use the connection shown in Figure below when making a 3-wire connection for earth resistance loop test.

1. Turn the rotary switch to the **NO TRIP** Position.
2. Press **MODE** Button to select **L-PE/RE**.
3. Press the **TEST** Button, wait for the test to complete.
4. The primary (Upper) display shows the loop impedance, the secondary (Lower) display shows the earth resistance.



3-Wire Connection for Earth Resistance

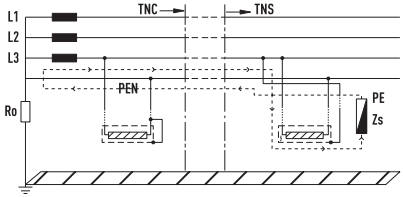
Figure (1)

Figure (2)

Figure (3)

3.5. TRIP HI-A Loop Impedance and Prospective Short Current Measurement

- If there is a RCD or fuse in the circuit, they must be bridged out prior to testing the loop impedance when using the **TRIP HI-A** range.



- According to IEC 60364, every loop should meet the formula:
  Ra≤50/Ia
  Ra: Loop impedance
  50: Max of touch voltage
  Ia: The current can make the protection device break down the circuit in 5 seconds.
- When protection device is RCD, Ia is rated residual current I∆n.

∆n	10	30	100	300	500	1000	mA
Ia (5V)	5000	1667	500	167	100	50	Ω
Ia (25V)	2500	833	250	83	50	25	Ω

- According to IEC 60364, every loop should meet the formula:
  Zs<Uo/Ia.
- When protection device is FUSE, Uo=230V, Ia and Zs max:

Rated Current	Break Time (5s)		Break Time (0.4s)	
	Ia (A)	Zs ( )	Ia (A)	Ω Zs ( )
6	28	8.2	47	4.9
10	46	5	82	2.8
16	65	3.6	110	2.1
20	85	2.7	147	1.56
25	110	2.1	183	1.25
32	150	1.53	275	0.83
40	190	1.21	320	0.72
50	250	0.92	470	0.49
63	320	0.71	550	0.42
80	425	0.54	840	0.27
100	580	0.39	1020	0.22

- Prospective short current must be larger than Ia.

3.6. Backlight

- When starting up, the backlight will automatically turn on and then will turn off in about 30 seconds.
- You can press the **Bluetooth/Backlight** Button to turn the backlight on or off during use, but it will not turn it off automatically.

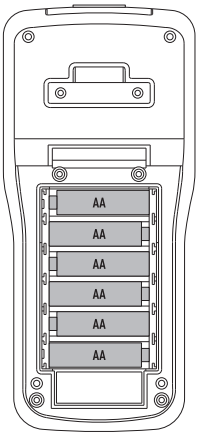
3.7. Bluetooth Operation

- Download the Major Tech METER-X app on iOS & Android devices.
- Hold down the Bluetooth/Backlight button to turn the Blueooth feature ON/OFF. The icon will be visible on the display when Bluetooth is ON and not visible when Bluetooth is OFF.
- On your mobile device, open the METER-X app and connect the meter to the app. You will be able to record live measurements and save them onto your app.
- On the Meter-X app, click on the guide for assistance on using the app.

3.8. Buzzer Operation

Press the **Buzzer** Button to turn the Buzzer on or off.

4. Battery Replacement



1. When the low battery symbol " " appears on the LCD, the six 1.5V "AA" batteries must be replaced.
2. Turn the meter off and remove the test leads.
3. Unclip the tilt stand from the rear of the meter.
4. Remove the four head screws holding the battery cover.
5. Remove the battery compartment cover.
6. Replace the batteries observing polarity.
7. Affix the rear cover and secure the screws.
8. Reattach the tilt stand.

Note: If the meter will not be in use for a long period of time, remove the batteries immediately. Batteries have the potential to leak acid, this acid is harmful and can cause corrosion inside the meter.

5. SPECIFICATIONS

5.1. Technical Specifications

5.1.1. L-PE (Hi-Amp)

Range	Resolution	Accuracy
0.20 to 19.99Ω	0.01Ω	±(3% of reading+6 digits)
20.0 to 199.9Ω	0.1Ω	
200 to 1000Ω	1Ω	
1000 to 9999Ω	10Ω	±(3% of reading+60 digits)

Measuring Current <15.0A. Voltage Used 195V AC to 265V AC (50/60Hz)

5.1.2. L-PE (No Trip)

Range	Resolution	Accuracy
0.20 to 19.99Ω	0.01Ω	±(3% of reading+0.3Ω)
20.0 to 199.9Ω	0.1Ω	±(3% of reading+6 digits)
200 to 1000Ω	1Ω	
1000 to 9999Ω	10Ω	±(3% of reading+60 digits)

5.1.3. RE (By Loop Method)

Range	Resolution	Accuracy
0.20 to 19.99Ω	0.01Ω	±(3% of reading+0.5Ω)
20.0 to 199.9Ω	0.1Ω	±(3% of reading+6 digits)
200 to 1000Ω	1Ω	
1000 to 9999Ω	10Ω	±(3% of reading+60 digits)

Measuring Current <15mA. Voltage Used 195V AC to 265V AC (50/60Hz)

5.1.4. L-N Line Resistance

Range	Resolution	Accuracy
0.20 to 19.99Ω	0.01Ω	±(3% of reading+6 digits)
20.0 to 199.9Ω	0.1Ω	
200 to 1000Ω	1Ω	
1000 to 9999Ω	10Ω	±(3% of reading+60 digits)

Measuring Current <15.0A. Voltage Used 195V AC to 265V AC (50/60Hz)

5.1.5. PSC/PFC

Range	Resolution	Accuracy
0 to 2kA	1A	±(3% of reading+6 digits)

5.1.6. AC Voltage

Range	Resolution	Accuracy
50 to 500V	1V	±(2% of reading+3 digits)

5.1.6. DC Voltage

Range	Resolution	Accuracy
0 to 500V	1V	±(2% of reading+3 digits)

5.1.8. Frequency

Range	Resolution	Accuracy
45 to 65Hz	1Hz	±2Hz

5.2. General Specifications

Function	Range
Power Source	6x1.5V Size "AA" battery or Equivalent (DC 9V)
Low Battery Indication	The " " is displayed when the battery voltage drops below the operating voltage.
Operating Temperature	0 to 40°C (32 to 104°F)
Operating Humidity	Below 80%RH
Storage Temperature	-10 to 60°C (14 to 140°F)
Storage Humidity	Below 70%RH
Dimensions (LxWxH)	200 x 92 x 50mm
Weight	Approx 700g include battery

MAJOR TECH (PTY) LTD

South Africa

www.major-tech.com

sales@major-tech.com

Australia

www.majortech.com.au

info@majortech.com.au