

MRCT

Relay and Current Transformer Test Set



- **Industry leading test duration using patented simultaneous multi-tap measurements reduces testing time by 20% on multi-tap CT's**
- **Accuracy to support testing of metering and protection class CT**
- **Integrated single phase relay test system**
- **Grouped testing: demagnetization, knee points, ratios, saturation curves, winding resistance insulation and more**
- **Measure all ratio's and saturation curves on multi-tap CT's with one lead connection**
- **Optional DC excitation technique for testing CTs with kneepoints up to 40 kV**
- **Optional Integrated VT and CT test system**

DESCRIPTION

The Megger MRCT is a light weight, robust, portable unit used to perform demagnetization, ratio, saturation, winding resistance, polarity, phase deviation, and insulation tests on current transformers. The MRCT automatically calculates ratio errors, saturation curves, and knee points. The MRCT provides a microprocessor-controlled variable voltage and current output and precision instrumentation for automatically testing single and multi ratio CTs, reducing testing time and increasing productivity. The MRCT will directly connect to multi ratio CT's and perform all tests – saturation, ratio and polarity, winding resistance and insulation – on all taps with the push of a button and without changing leads.

The MRCT can be controlled via an integrated display mounted in the lid of the unit. The display is a full color, high resolution, LCD touch screen which allows the user to perform manual and automatic testing quickly and easily using the manual test screen, as well as using pre-constructed test routines. The large color display permits the user to easily read all pertinent data while the test is being performed and provides the ability to view the current transformer's saturation curve. The unit can also be configured to come without a display and can be controlled via a laptop with Megger's PowerDB™ software.



Current transformers can be tested in their equipment configuration, such as being mounted in transformers, oil circuit breakers or switchgear. It is necessary for the equipment to be completely isolated from the electrical system prior to testing.

APPLICATIONS

Saturation Test

With the single push of a button, the MRCT performs a CT saturation test and calculates the rated knee point. The saturation test can be performed at frequency of 50 or 60 Hz up to 2,000 volts as required by IEC regulations. In addition the MRCT can be configured to test kneepoints up to 40 kV using an alternative DC technique. This allows testing the majority of CTs using line frequency while still being able to test larger generation class CT with a portable instrument.

The MRCT will calculate the rated knee point in compliance with either IEEE C57.13.1, IEC 60044-1, IEC 60044-6 or IEC 61869 on both standards as well as of specialized CTs such as PX, TPS, TPX, and TPY. While the saturation test is being performed, the MRCT will plot the CT saturation curve on the display and automatically provide the user with the rated knee point per the desired IEEE or IEC standard. Many substations CTs include a multi-ratio secondary; therefore the MRCT has the ability to plot and simultaneously display up to 10 CT saturation curves.

Ratio, Polarity Test – Ratio testing can be performed by using the MRCT. The method used by the MRCT compares a voltage applied to the secondary winding to the resulting voltage produced on the primary winding. For example, if 1 volt per turn is applied to the secondary winding, the voltage present on the primary winding would be 1 volt. More specifically, if 120 volts were applied to the secondary of a 600:5 current transformer (120:1 ratio), 1 volt would be present on the primary winding.

Winding Resistance Test – Measures CT winding resistance with the injection of a test voltage, measuring the DC current and calculating temperature compensated resistance.

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Demagnetization – Normal operating conditions and typical winding resistance measurements can cause a CT to become magnetized. The MRCT has the ability to automatically demagnetize the CT under test. This automatic demagnetization routine is useful to ensure that the CT saturation test yield correct results. Prior to testing demagnetization is recommended per both ANSI and IEC standards.

CT Burden – The MRCT measures the connected CT burden load with direct injection of secondary current to a load that is disconnected from the CT. The MRCT measures the secondary voltage in magnitude and angle of the connected burden in VA and power factor.

Insulation Resistance Test – In order to ensure that the CT secondary wiring is properly insulated, the MRCT system includes a 500 V, 1,000 V insulation resistance test system. This test ensures that the CT secondary winding and secondary wiring is properly insulated per both ANSI and IEC standards. The MRCT will also automatically switch the test leads to perform all required insulation test. These test include H-L, H-G, L-G.

Note: Disconnect all electronic loads before performing this test.

Data Storage and Printing – The MRCT test system not only permits accurate and automated CT testing, but also catalogs and stores test results within the unit for simple retrieval by software at a later date. All cataloged test results can be uploaded to Megger's PowerDB™ Lite for report generation and saturation curve plotting on a computer. PowerDB™ Lite also has the ability to operate the MRCT with no operator intervention, thus providing a completely computer controlled automated test system.

Upgradeability – The MRCT includes the ability to upgrade testing capability. With various configurations and accessories the MRCT system can be upgraded as new testing needs are developed.

FEATURES AND BENEFITS

■ **Industry leading test duration using patented simultaneous multi tap measurements** - The MRCT system can provide concurrent measurement of voltages on all taps during CT saturation, and ratio and polarity testing. This allows the MRCT system to calculate the knee points and ratios of all windings at the same time thus eliminating the need for multiple tests on a CT. This will drastically reduce testing time.

■ **Automated Test Plans with CT Saturation, Ratio and Polarity, Winding Resistance and Insulation Testing** - The microprocessor controlled output fully automates testing of CTs. The MRCT will directly connect to multi ratio CTs and perform all tests – saturation, ratio and polarity, winding resistance, and insulation – on all taps with the push of a button and without changing leads.

■ **Direct Connection to Multi Ratio CTs** - The MRCT will directly connect to all taps on multi ratio CTs to eliminate lead changes required to test all inner-winding CT ratios, saturation curves and knee points. The MRCT will test all programmed taps with the push of one button.

■ **Full Color, High Resolution, LCD Touch Screen** - Menu screens and touch screen function buttons are provided to quickly and easily select the desired test function. Tests results can be saved to the unit for download to a memory stick to transfer or print test reports.

■ **CT Saturation, Ratio and Polarity, Winding Resistance, and Insulation Automated Testing** - The microprocessor-controlled output fully automates testing of CTs. This automated testing simplifies CT testing and reduces testing time. Automated testing is accomplished directly on the display of the MRCT or via PowerDB™ Lite.

■ **CT Demagnetization** - During operation and routine DC winding resistance testing, it is possible for a CT to become magnetized. The MRCT includes an automated CT demagnetization function, which allows determination of accurate knee point and ratios thus providing stable, repeatable test results, and reduces test time.

■ **Insulation Test** - The MRCT includes a 500/1,000 V insulation test system to verify the CT secondary winding and secondary wiring. This insures that the secondary insulation has not degraded and will continue to perform its function during high current faults.

■ **Test Result Report** - The MRCT offers storage of complete test files in an easy-to-use, versatile format that permits upload to PowerDB™ Lite, or printing test results using the optional external printer. These options provide a simple, complete, easy way to store over 200 test results and saturation curves. All test results can be cataloged and stored in the MRCT.



The MRCT is available in 2 onboard display/enclosure options.

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SPECIFICATIONS

Input

100 to 132 V or 200 to 264 V, 1Ø, 50 or 60 Hz, 15 A max

Output

Voltage – Continuously variable in three ranges:

0 to 30 V at 5.0 A max (15 minute on, 5 minute off)

0 to 300 V at 1.0 A max (15 minute on, 5 minute off)

300 to 2000 V at 1.0 A max (5 minute on, 5 minute off)

Current

Output Current: Power Max V/Duty Cycle

30 Amperes: 200 VA (282 peak) 6.67 V rms
(15 minutes on, 5 minutes off)

60 Amperes: 600 VA 90 cycles

Instrumentation

Voltmeters

Output

Resolution: 0.0000 to 1.9999/19.999/199.99/1999.9

Ranges: 0 to 2/20/200/2000 V

Accuracy: $\pm 0.5\%$ of reading typical
 $\pm 1.0\%$ of reading typical max

Input

Primary Voltage Measurement

Ranges: 0 to 0.35/2.0/20.0/200.0/600.0 V

Resolution: 0.0001 to 1.9999/19.999/199.9/600 V

Accuracy: $\pm 0.02\%$ of reading and $\pm 0.02\%$ range typical
 $\pm 0.05\%$ of reading and $\pm 0.05\%$ range max

Secondary Voltage Measurement

Ranges: 0 to 2/20.0/200.0/2000.0 V

Resolution: 0.0000 to 19.999/199.9/1999.9 V

Accuracy: **0 to 999.9 V**
 $\pm 0.02\%$ of reading and $\pm 0.02\%$ range typical
 $\pm 0.05\%$ of reading and $\pm 0.05\%$ range max
1000 to 2000 V
 $\pm 0.08\%$ of reading and $\pm 0.08\%$ range typical
 $\pm 0.2\%$ of reading and $\pm 0.2\%$ range max

Ammeter

Output:

Ranges: 0.0 to 1.0/10.0/60.0 A

Resolution: .001/.01

Input:

Excitation curve testing

Range: 0.0000 to 1.0 A

Accuracy: $\pm 0.08\%$ of reading $\pm 0.08\%$ range typical
 $\pm 0.2\%$ of reading $\pm 0.2\%$ range max

Phase Angle Measurement

3 digits

Range: 0 to 360 degrees

Resolution: 1 minute

Accuracy: ± 3 minutes typical
 ± 6 minutes max

Ratio Test

Secondary Voltage Injection Method

Range	Accuracy
0.8 to 2000	$\pm 0.02\%$ typical $\pm 0.05\%$ max
2000 to 5000	$\pm 0.03\%$ typical $\pm 0.1\%$ max
5000 to 20000	$\pm 0.05\%$ typical $\pm 0.2\%$ max

Winding Resistance Test

Measuring Range: 0–300 Ω

Accuracy: (at 20° C) $0.5\% \pm 3$ m Ω (typical)/
 $1\% \pm 10$ m Ω (guaranteed) (0 – 300 Ω)

Insulation Test

Test Voltage: 1000 VDC, 500 VDC

Measuring Range: 20 G Ω , 10 G Ω

Short Circuit Current: 1.5 mA nominal

Test Current on Load: 1 mA at min. pass values of insulation
(as specified in BS7671, HD 384 and IEC 364)

Accuracy: 1000 volts $\pm 3\% \pm 2$ digits $\pm 0.2\%$ per G Ω
500 volts $\pm 3\% \pm 2$ digits $\pm 0.4\%$ per G Ω

Communication Interface

Ethernet

Environment

Humidity: Relative humidity 5%...95% not condensing

Operating: -10° C to 50° C

Storage: -30° C to 70° C

Enclosure: The unit is housed in a rugged enclosure suitable for use in outdoor substations.

Standards

IEC 61010, CSA 22.2, CE

Input Power

100 to 240 V ($\pm 10\%$) AC, 50/60 Hz

Dimensions

16.9 L x 12.9 W x 9.3 H in (429 mm x 328 mm x 236 mm)

Weight

Non Display: 41 lb (18.6 kg)

w/ Display: 45.4 lb (20.6 kg)

CE Marking

Low voltage directive: 2006/95/EC

Electromagnetic Compatibility Directive: 2004/108/EC

Conformance Standards

Safety

EN 61010-1 2010

EN 61010-2-030 2010

EN 61010-031 2002

EN 61010 +A1

EMC

EN 61326-1 2006

EN 61326-2-1 2006

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DESCRIPTIONS OF HARDWARE OPTIONS AND ACCESSORIES

CURRENT TRANSFORMER TESTING (CT) USING DC VOLTAGE OPTION

DESCRIPTION

The MRCT can be configured to include the functionality to perform the excitation test on current transformers using DC voltage. With this configuration the MRCT can measure knee points on current transformers up to 40 kV. When the MRCT is configured to test in AC mode, the unit will perform the saturation test using AC voltage up to 2 kV. If the CT requires additional voltage above 2 kV to saturate, the MRCT will switch to DC voltage and complete the saturation of the CT. The MRCT will then convert the DC data to its AC equivalent and combine both sets of data into one excitation curve representing of the CT. On the other hand, if the MRCT is set to perform the excitation/saturation test using primarily DC voltage, then the MRCT will apply AC voltage up to 300V and then switch to DC voltage to finish saturating the CT. Again this data set will be combined and converted to line frequency either 50/60 Hz and a representative excitation curve created.

APPLICATIONS

As part of a regular maintenance program to verify factory readings and locate the presence of defects in current transformers, the MRCT can accurately perform the excitation test on CTs and measure the knee point up to 2 kV using AC voltage. For CTs that have a knee point higher than 2 kV the MRCT can be configured to utilize DC voltage to saturate the CT and accurately measure the knee point up to 40 kV.

DC VOLTAGE TESTING OPTION SPECIFICATIONS

CT Testing Using	Outputs
DC Voltage	Output Voltage 0 to 300 V DC
	Output Current 0 to 1 A eff
	Output Power 300 VA

RELAY OPTION SPECIFICATIONS

Outputs

All outputs are independent from sudden changes in line voltage and frequency. This provides stable outputs not affected by sudden changes in the power source. All outputs are regulated so changes in load impedance do not affect the output.

Output Current

Output power ratings are specified in AC rms values and peak power ratings.

Output Current Power	1 ampere 15 VA 15.0 V rms continuous
Max V / Duty Cycle	4 amperes 200 VA (282 peak)
	50.0 V rms continuous
	15 amperes 200 VA (282 peak)
	13.4 V rms continuous
	30 amperes 200 VA (282 peak)
	6.67 V rms continuous
	75 amperes 300 VA (424 peak)
	5.00 V rms 90 cycles
	DC 200 Watts

AC Voltage Output

Outputs are rated with the following Ranges:

Output volts power max I
 30 volts 150 VA 5 amps
 150 volts 150 VA (see Power V)
 300 volts 150 VA 0.5 amps
 DC 150 watts

Duty Cycle: Continuous

Metering

Measured output quantities such as AC amperes, AC Volts, DC volts or DC amperes, and time may be simultaneously displayed on the large, color TFT LCD, optional touch screen. The AC and DC outputs display the approximate voltage/current output prior to initiation of the outputs.

AC Voltage Amplitude

Accuracy: $\pm 0.05\%$ reading + 0.02% range typical
 $\pm 0.15\%$ reading + 0.05% range max

Resolution: .01

Measurements: AC RMS

Ranges: 30, 150, 300V

AC Current Amplitude

Accuracy: $\pm 0.05\%$ reading + 0.02% range typical
 $\pm 0.15\%$ reading + 0.05% range max

Resolution: .001/.01

Measurements: AC RMS

Ranges: 30, 60A

DC Voltage Amplitude

Accuracy: 0.1% range typical, 0.25% range max

Resolution: 01

Measurements: RMS

Ranges: 30, 150, 300V

DC Current Amplitude

Accuracy: $\pm 0.05\%$ reading + 0.02% range typical,
 $\pm 0.15\%$ reading + 0.05% range max

Resolution: .001/.01

Measurements: RMS

Ranges: 30A

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DESCRIPTIONS OF HARDWARE OPTIONS AND ACCESSORIES

VOLTAGE TRANSFORMER (VT) TESTING OPTION

DESCRIPTION

The MRCT can be configured to include the functionality to test voltage transformers. With the basic configuration the MRCT can measure ratio errors and phase angles as well as the secondary winding resistance. If more information is needed the MRCT can be configured with the advanced testing option that will additionally determine the excitation characteristics, and the impedance of inductive voltage transformers. Additionally, with an output of up to 2 kV the MRCT can be configured for basic or advanced testing of low to medium voltage capacitive coupled voltage transformers up to 800 kV.

APPLICATIONS

As part of a regular maintenance program to verify factory readings and locate the presence of defects in voltage transformers, the MRCT can accurately measure the ratio, phase displacement, secondary winding resistance, excitation characteristics, and impedance. The MRCT utilizes up to 300V to accurately measure the ratio and phase angle of inductive voltage transformers. Also with the additional CVT configuration the MRCT has the capability to supply over 2000V to measure the ratio of low to medium voltage capacitive voltage transformers up to 800 kV.

VT and CT OPTION SPECIFICATIONS

Inductive VT Testing

Outputs

Output Voltage	0 to 300 V AC
Output Current	0 to 1 A eff
Output Power	300VA

Ratio Measurement

Voltage ratio	Voltage Level	Accuracy
1 to 350	0.6 kV to 35 kV	±0.03% typical ±0.1%max
350 to 1100	35 kV to 110 kV	±0.05% typical ±0.2%max
1100 to 2450	110 kV to 245 kV	±0.05% typical ±0.5%max

Phase Angle Measurement

Voltage ratio	Voltage Level	Accuracy
1 to 350	0.6 kV to 35 kV	±3 min typical ±6 min max
350 to 1100	35 kV to 110 kV	±3 min typical ±10 min max
1100 to 2450	110 kV to 245 kV	±3 min typical ±15 min max

Winding resistance measurement

Resolution:	1m Ω
Range:	1m Ω to 30 Ω
Guaranteed Accuracy:	(at 20° C) ±0.5% + 10m Ω

Capacitive VT Testing

Outputs

Output Voltage	0 to 2050 V AC
Output Current	0 to 1 A
Output Power	2000 VA

Ratio Measurement

Voltage ratio	Voltage Level	Accuracy
300 to 8000	>30 kV to 800 kV	±0.07% typical ±0.15%max

Phase Angle Measurement

Voltage ratio	Voltage Level	Accuracy
300 to 8000	>30 kV to 800 kV	±6 min typical ±15 min max

Winding resistance measurement

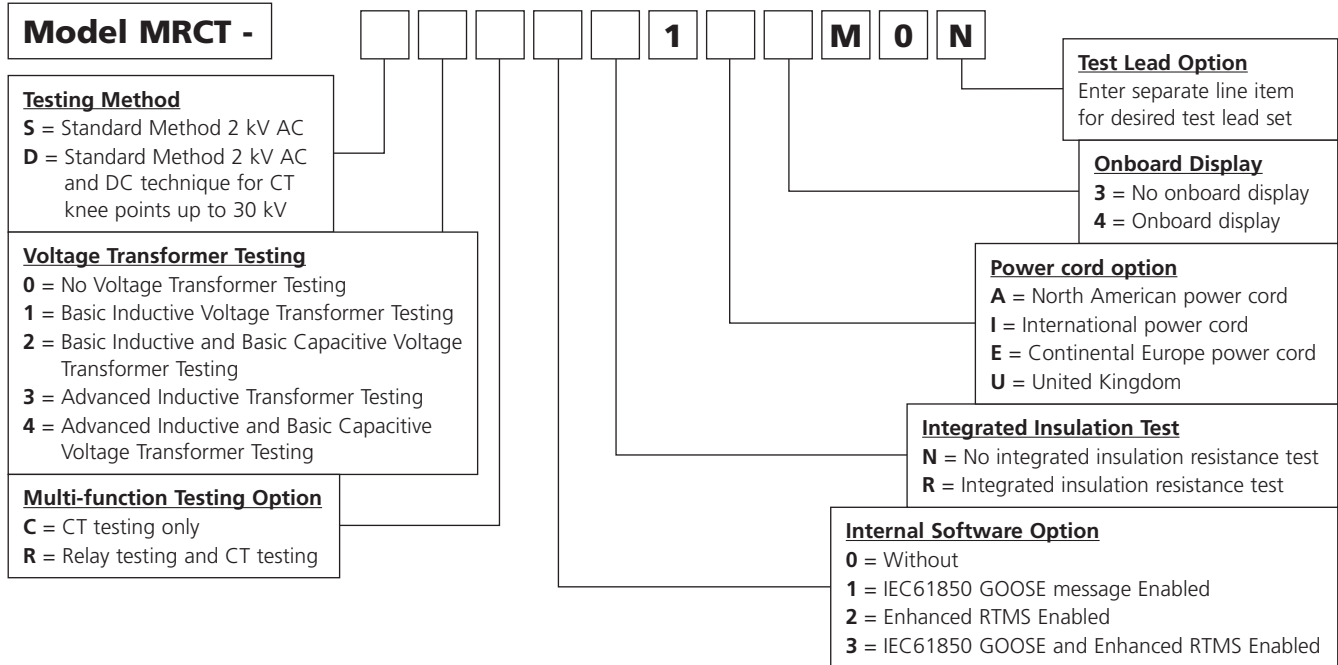
Resolution:	1m Ω
Range:	1m Ω to 300 Ω
Guaranteed Accuracy:	(at 20° C) ±0.5% + 10m,Ω

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ORDERING INFORMATION

STYLE NUMBER IDENTIFICATION



DESCRIPTIONS OF HARDWARE OPTIONS

Testing Method

Customers can choose which method the MRCT will use to perform the excitation test. By selecting **S** the customer will be selecting the standard method of performing the excitation/saturation test. The MRCT will be configured to use AC test voltage up to 2 kV to perform the test. By selecting **D** the customer will receive both the standard method of testing described above as well as Megger's new DC excitation technique. With its new DC method the MRCT will be able to test kneepoints up to 40 kV.

Voltage Transformer Testing

Customers can choose which type of Voltage Transformer testing functionality they want the MRCT unit to have enabled. Customers should select letter **0** if they wish for the MRCT to not be configured for testing any type of voltage transformer. **1** should be selected if the customer wishes for the MRCT to be configured for performing basic tests on inductive voltage transformers. These basic tests include ratio and phase angle error accompanied with secondary winding resistance. The customer should select **2** if they desire the MRCT to be configured to perform the basic tests on both Inductive VTs and Capacitive VTs. The MRCT can also be configured to perform additional advanced tests on voltage transformers. In addition to the ratio, phase angle error, and winding resistance, the advanced option enables performing the excitation test, short circuit impedance, and insulation test. The customer should select the number **3** if the desired MRCT should be configured for Advanced testing of Inductive VTs. By selecting the number **4**, the MRCT will be configured for advanced testing of Inductive VT and basic testing of Capacitive VTs.

Multi-function Testing Option

Customers can select whether or not the MRCT has the capability to test single phase relays. If they want the unit to only test CT, customers should select the letter **C**, but if they wish for the MRCT to be configured to test both CT and single phase relays then the letter **R** should be selected.

Internal Software Option

If the MRCT is configured to test relays, Megger GOOSE Configurator software may be used in the testing or commissioning of IEC 61850 compliant devices. In order for the MRCT to be able to subscribe as well as publish GOOSE messages, the MRCT must be configured to test relays and the IEC 61850 feature needs to be enabled. Enter the number **1** for the unit to come with the IEC 61850 option enabled. Enter **0** for the unit without IEC 61850 enabled.

Integrated Insulation Test

Enter **N** for the unit without an integrated insulation test. Enter **R** for the unit to come with an integrated insulation resistance test capability.

Power cord option

Customers can choose which type of power cord they want the unit to come with.

A option – NEMA 5-15 to IEC60310 C13 connectors, UL & CSA approved for countries with NEMA outlets.

I option – International color coded wires (light blue, brown and green with yellow stripe) insulation jacket stripped ready for male connector with IEC 60320 C13 connector. CE marked.

E option – CEE 7/7 Schuko plug to IEC 60320 C13 connector. CE marked.

U option – United Kingdom power cord with IEC 60320 C13 connector, and 13 amp fuse. CE marked.

Test Lead Option

Customers can choose which type of test lead set they want the unit to come with. Enter separate line item for desired test lead set:

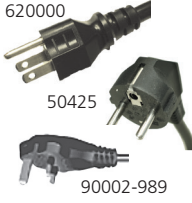
Standard Length Set	1003-358
Long Lead Set	1008-682

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INCLUDED ACCESSORIES

All units come with a power cord, an Ethernet communication cable, and instruction manual. The desired power cord must be entered as a line item. All other accessories must be ordered by line item from the tables further down.

Descriptions of included accessories		Part number
	Power Cord - Depending on the style number, the unit will come with one of the following:	
	Line cord, North American	620000
	Line cord, Continental Europe with CEE 7/7 Schuko Plug	50425
	Line cord, International colour-coded wire	15065
	Line cord, United Kingdom	90002-989
	Ethernet cable shielded 7 ft. black	90038-983
	MRCT User manual (English)	82950

OPTIONAL ACCESSORIES

Optional Testing Bundles

Standard Test Lead Bundle				Bundle number
	Qty.	Includes:	Part No.	1003-358
	1	Primary test clip: Red, 40 mm opening	1011-781	
	1	Primary test clip: Black, 40 mm opening	1011-782	
	5	Cable/spade lug adapter (large): Lug fit most new relay small terminal blocks. Black, 6.2 mm, rated up to 1000 V/20 A CAT II	684003	
	5	Cable/spade lug adapter (small): Lug fit most new relay small terminal blocks. Red, 4.1 mm, rated up to 1000 V/20 A CAT II	684004	
	1	Ground lead: Green with yellow, with large ground clip - 20 ft.	1008-389	
	5	Alligator clip: Black, 4.1 mm	90004-427	
	1	Set of primary test leads: Test Leads - 40 ft. (12.1 m)	1005-466	
	1	Set of secondary test leads: 5 Tap test leads - 20 ft. (6.096 m)	1005-774	
	1	Accessory bag: 12.25 x 7 with zipper	2006-528	
	1	Accessory carry case: Used to carry power cord, ethernet cable, optional STVI, test leads and accessories.	90001-165	
	5	Connection adapter: Male 8-32 to banana jack	90045-084	
	1	USB memory stick: 32GB dark nickel with Megger logo	83726	

Long Test Lead Bundle				Bundle number
	Qty.	Includes:	Part No.	1008-682
	1	Primary test clip: Red, 40 mm opening	1011-781	
	1	Primary test clip: Black, 40 mm opening	1011-782	
	5	Cable/spade lug adapter (large): Lug fit most new relay small terminal blocks. Black, 6.2 mm, rated up to 1000 V/20 A CAT II	684003	
	5	Cable/spade lug adapter (small): Lug fit most new relay small terminal blocks. Red, 4.1 mm, rated up to 1000 V/20 A CAT II	684004	
	1	Ground lead: Green with yellow, with large ground clip - 20 ft.	1008-389	
	5	Alligator clip: Black, 4.1 mm	90004-427	
	1	Set of primary test leads: Test Leads - 65.5 ft. (12.1 m)	1008-680	
	1	Set of secondary test leads: 5 Tap test leads - 49.25 ft. (6.096 m)	1008-780	
	1	Accessory bag: 12.25 x 7 with zipper	2006-528	
	1	Accessory carry case: Used to carry power cord, ethernet cable, optional STVI, test leads and accessories.	90001-165	
	5	Connection adapter: Male 8-32 to banana jack	90045-084	
	1	USB memory stick: 32GB dark nickel with Megger logo	83726	

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Optional Relay Leads

	Descriptions of optional relay leads	Quantity	Part number
	Sleeved pair of test leads: Keeps the test leads in pairs and from getting entangled. Sleeved Test Leads, one red, one black, 200 cm (78.7") long, 600 V, 32 Amperes CAT II	1	2008-539-2
	Jumper lead: Used to common returns together on units with floating ground returns, or parallel of current channels. Jumper lead, black, 12.5 cm (5") long, use with voltage / current outputs, 600 V, 32 Amps CAT II	4	2001-573

Optional VT Leads

	Descriptions of optional VT leads	Quantity	Part number
	VT Test Lead: 20 ft. 2000 V red/blue, Primary Side H2/P2	1	1007-927
	VT Test Lead: 20 ft. 2000 V red/black, Primary Side H1/P1	1	1007-928

Optional CVT Leads

	Descriptions of optional CVT leads	Quantity	Part number
	CVT Test Lead: 51 ft. 2000 V	1	1011-389

Optional Accessories

	Descriptions of optional accessories	Quantity	Part number
	Primary test clip: Red 40 mm opening	1	1011-781
	Primary test clip: Black 40 mm opening	1	1011-782
	Cable/spade lug adapter (large): Large lug fit most new relay small terminal blocks. Lug adapter, black, 6.2 mm, rated up to 1000 V/20 A CAT II	5	684003
	Cable/spade lug adapter (small): Small lug fit most new relay small terminal blocks. Lug adapter, red, 4.1 mm, rated up to 1000 V/20 A CAT II	5	684004
	Ground lead: Green with yellow, with large ground clip 20 ft.	1	1008-389
	Alligator clip: Black, 4.1 mm	5	90004-427
	Set of primary test leads: Test Leads 40 ft. (12.1 m)	1	1005-466

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Descriptions of optional accessories		Quantity	Part number
	Set of secondary test leads: 5 Tap (X1, X2, X3, X4, X5) Test Leads 20 ft. (6.096 m)	1	1005-774
	Accessory bag: 12.25 x 7 with zipper	1	2006-528
	Accessory carry case: Used to carry power cord, ethernet cable, optional STVI, test leads and accessories.	1	90001-165
	Connection adapter: Male 8-32 to banana jack	5	90045-084
	USB memory stick: 32GB dark nickel with Megger logo	1	83726
	Hard-sided transit case: Includes custom designed foam inserts for the MRCT unit and accessory case. Transit case includes retractable handle, polyurethane wheels with stainless steel bearings, double-throw latches, fold down handles, and stainless steel hardware and padlock protection, with O-ring seal making the case water-tight, with an IP 67 rating. Tested and certified to US Department of Defense Standards for impact, vibration, and low/high storage temperatures. The case is small, and weighs only 25 pounds (11.25 kg).	1	1016-063

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