# LEAKAGE CURRENT METERS AND PROBES



- Check for leakage and locate insulation breakdowns on live circuits
- TRMS leakage current clamp-on meter
- AC leakage current probe
- Artificial neutral

Technical Hotline: (800) 343-1391 www.aemc.com



# TRMS Leakage Current Meter Model 565



The TRMS Clamp-On Leakage Current Meter Model 565 is designed to measure low AC currents, which are typically leakage currents in ground conductors. Low currents are measured using either the 60mA or the 600mA range. The high sensitivity of the probe ( $10\mu$ A and  $100\mu$ A) is possible through special jaw construction and, in particular, critical shielding of the jaws. At low measurement levels, this shielding out of the noise is critical for low sensitivity, accuracy and stability.

Leakage current may be measured on a ground conductor and through the vector sum on multi-conductors. On a grounded system, clamp around the two or three conducting legs (not the ground conductor). The vector sum of the load currents will cancel out, leaving the leakage current measured.

The Model 565 may be used as a standard clamp-on meter measuring to 100Arms, as well as VAc and VDC, resistance and continuity (with a buzzer). In mAAc and AAc, a low-pass filter, which will ignore all harmonic currents, can be activated. In this mode, only the fundamental signal is measured. The difference between the full frequency signal (WIDE displayed on LCD) and Filtered mode (50/60Hz displayed on LCD) essentially corresponds to the current attributable to harmonics.

The Model 565 is ergonomic in design and fits well in the hand, facilitating one hand operation. The jaw size is compact yet designed to accommodate the most common conductors up to 1" (26mm) in diameter.

### **FEATURES**

- Check for leakage and locate insulation breakdowns on live circuits
- Measures leakage current up to 600mA with up to 10µA resolution
- Measures current up to 100Arms
- Measures up to 600VAC/DC
- Measures Hz on either V or A inputs
- Measures Resistance and Continuity
- Hold feature freezes Value
- Max feature keeps track of highest measured In-rush value
- Zero button ideal for measuring relative values
- Filter to isolate 50/60Hz fundamental from harmonics
- ► Compatible with VDE 0404

# **APPLICATIONS**

- Ground fault current measurement
- Electrical safety compliance testing
- Medical device safety testing
- Process loop monitoring
- General AC load monitoring
- Industrial troubleshooting



Measuring leakage current on a ground wire with the TRMS Leakage Current Meter Model 565



#### SPECIFICATIONS MODEL

ELECTRICAL				
mA AC Current	(TRMS, Auto-Ra	inging)		
Measurement	Range	0 to 6	600mA	
Resolution	60mA	0.01mA (10µA) 0.1mA (10µA)		
	50 to 60Hz	0. ΠΠΑ (ΤΟΟμΑ) 1 2% of Reading ± Sots		
noouraoy	50 to 500Hz	2.5% of Reading + Sets		
	500Hz to 3kHz	3.5% of Rea	ding ± 10cts	
AC Current (TR	MS. Auto-Rangin	ia)		
Measurement	Bange	10 to	100A	6
Resolution	10A	0.001A (1mA)		an
nooonation	100A	0.01A (10mA)		an
Accuracy	50 to 60Hz	1.2% of Reading + 5cts		
· · · · · · · · · · · · · · · · · · ·	50 to 500Hz	2.5% of Reading ± 50ts		
	500Hz to 3kHz	$3.5\%$ of Reading $\pm$ 10cts		
AC Voltage (TRI	MS)			
Measurement	Range	0 to	600V	
Resolution		0.	1V	
Accuracy	50 to 60Hz	1.0% of Reading + 5cts		ope
-	50 to 500Hz	1.2% of Rea	ading $\pm$ 5cts	
	500Hz to 3kHz	2.5% of Rea	ding ± 10cts	
DC Voltage				
Measurement	Range	0 to	600V	_
Resolution		0.	1V	Ba
Accuracy		1.0% of Rea	ading ± 3cts	
Frequency (Aut	o-Ranging)			
Function		A-Hz	V-Hz	
Resolution	0 to 100Hz	0.1Hz	0.1Hz	
	100Hz to 1kHz	1Hz	1Hz	
Sensitivity		10mArms min	5Vrms min	
Accuracy		0.5% of Rea	ading ± 2cts	
Resistance				
Measurement	Range	0 to	o1kΩ	
Resolution		0.1Ω		
Accuracy		1.0% of Reading ± 3cts		
Continuity				
Measurement	Range	0 to	o1kΩ	
Resolution		0.	1Ω	
Buzzer		<35Ω	± 25Ω	
<b>Overload Protect</b>	tion	660Vrms/150Arms – OL is di	splayed and buzzer will sound	
Nominal Sample	e Rate	Two measurements	per second (approx.)	
MAX Sample Rate		100ms		
Filter		On (50/60Hz only); Off	(Full frequency range)	
In-Rush		Max 100ms	sample time	
Power Source		Two 1.5V A	AA batteries	
Battery Life		45 hrs (	(approx.)	
Power-Off		10 min approx w	vith user override	
Low Battery Ind	dication	is displayed whe	n battery voltage is low	
MECHANICAL			, ,	
Dimensions		8.5 x 2.5 x 1.18" (	(218 x 64 x 30mm)	
Jaw Opening		1.10" (28mm)		
Maximum Cond	ductor Size	1" (26mm)		
Weight		10 oz (280g)	with batteries	
DISPLAY		, (•9)		
Display Type		Eour di	igit LCD	
Backlight		LED with 180	) sec Auto-Off	
ENVIRONMENT	AI			
Operating Tom	nerature	32° to 104°F (0° to 10°C).	< 80% BH (non-condensing)	
Storage Tempo	rature	14° to 140°F (-10° to 60°C).	< 70% BH (non-condensing)	
SAFETY		י ט טט טו-ן ו טדי ט ט),		
Safety Poting		EN 61010 1 Ed 2001 E	N 61010-2-032 Ed 2002	
Salety natility		EN 01010-1 EU. 2001, El 600V	Cat. III	
Double Insulati	ion 🗖	000V,	οια. m ρς	
CF Mark		V	es	
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# **CONSTRUCTION**





# **AC Leakage Current Probe FEATURES Model 2620**



The Model 2620 measures leakage current shunted to ground caused by insulation faults. It enables the operator to locate failures when they occur, or anticipate them before they occur, without shutting down equipment or spending hours troubleshooting.

It is designed specifically for locating low current faults on high current loads. The detector is a sensitive AC current transformer capable of measuring differential or leakage current as low as 500µA, and may

be used to measure current up to 400A continuous.

The Model 2620 provides two output ranges: 1mV/mAac or 1mV/Aac. The output leads are terminated with standard 4mm banana plugs capable of interfacing with any standard multimeter. The use of a digital multimeter with analog bargraph is recommended; Digital to provide accurate readings, and an analog bargraph to track trends.

The Model 2620 measures leakage currents on single or multi-phase systems. Currents measured may be in or out of phase, balanced or unbalanced.

Principle (see page 8): when clamping around all conductors, the net magnetic field at any instant in time will be zero if all the conductors surrounded by the leakage current detector are supplying all the current delivered to and received from the load. If any current is diverted through any alternate path, such as an insulation breakdown to ground, the net loss will be detected producing an output proportional to the amplitude of the fault current.

The Model 2620 may also be used as a highly accurate clamp-on current probe. With its 4" jaw opening and range of 500µA to 200A, the Model 2620 provides a versatile way to analyze unbalanced current measurements, leakage values on grounding conductors and ground loop currents.

#### Very high sensitivity

- Differential or leakage current from 500µA
- Current up to 400A
- Two switch-selectable measurement ranges: 4AAC/400AAC
- Large inside jaw diameter (>4") allows use on large or multiple conductors
- Work with single-, dual- and three-phase networks
- Connect directly to DMMs on mV or Vac range

#### PPLICATIONS

- Preventive maintenance
- Equipment troubleshooting on electrical distribution systems
- High accuracy low-current measurements
- Measure fault currents on three-phase, three-wire systems



Model 2620 checking for ground fault currents



# **SPECIFICATIONS**

MODEL		2620					
ELECTRICAL							
		4A Range	400A Range				
Current Rang	e	500µA to 4A	500mA to 400A				
Output Signal		1mV/mA (4V max)	1mV/A (400mV max)				
Accuracy	500µA to 10mA	3% of Reading $\pm 1 \text{mV}$	_				
	10mA to 100mA	0.5% of Reading $\pm$ 0.5mV	-				
	100mA to 4A	0.5% of Reading $\pm$ 0.5mV	-				
	500mA to 10A	-	0.5% of Reading $\pm$ 0.5mV				
	10A to 100A	_	0.35% of Reading $\pm$ 0.5mV				
	100A to 400A	-	0.35% of Reading ± 1mV				
Phase Shift	10mA to 100mA	<15°	-				
	100mA to 4A	<10°	-				
	10A to 100A	_	<1°				
	100A to 400A	-	<0.6°				
Load Impedance (DMM)		1kΩ min					
Frequency Range		48 to 1000Hz					
Output Termination		5 ft (1.5m) Lead with 4mm safety banana plugs					
MECHANICAL							
Dimensions		11.22 x 6.89 x 1.77" (285 x 175 x 45mm)					
Jaw Opening		4.4" (112mm)					
Maximum Conductor Size		4.4" (112mm)					
Weight		2.87 lbs (1300g)					
ENVIRONMEN	nac	14º to 121ºE ( 10º to 55ºC)	0 to 95% DH (non condensing)				
Operating Temperature		-14 10 151 F (-10 10 55 5), 0 10 65% RH (1011-001001181119) -40° to 158°F (-40° to 70°C): 0 to 85% RH (non-condensing)					
Safety Rating		EN 61010-2-032, 600V Cat. III					
Double Insulation		Yes					
CE Mark		Yes					







# Artificial Neutral Model AN-1



The Artificial Neutral Model AN-1 generates a momentary grounded artificial neutral to allow the measurement of fault currents on ungrounded three-phase systems.

The Artificial Neutral is grounded intermittently through a relay driven by an internal electronic timer. This periodic grounding technique performs three functions – limits the possibility of insulation faults within the instrument, allows for better discrimination of actual fault current and limits instrument overheating.

Relay closure time is switch selectable, Fast (0.5 seconds) or Slow (2.3 seconds), so that the ground fault clamp can be used on a meter with either an analog or digital display. An internal buzzer, also driven by the relay, is activated each time the neutral connection is grounded. Three LEDs, one for each phase, show the presence of each of the three phases prior to measurement. A fourth green LED indicates that the instrument is operating.

### **SPECIFICATIONS**

MODEL	AN-1		
ELECTRICAL			
Working Voltage	30 to 600V		
Frequency	45 to 65Hz		
Resistance Per Phase	3.9kΩ ± 5%		
Relay Duty Cycle	Slow: 500ms – Fast: 2.3 seconds		
Power Source	Eight 1.5V AA batteries		
MECHANICAL			
Dimensions	8.7 x 5.4 x 5.9" (220 x 136 x 150mm)		
Weight	2.9 lbs (1.3kg)		
Case	Fire resistant polycarbonate UL94 VO		
Protection Index	IP20		
ENVIRONMENTAL			
Operating Temperature	32° to 122°F (0° to 50°C); 10 to 90% RH (non-condensing)		
Storage Temperature	-40° to 158°F (-40° to 70°C); 10 to 90% RH (non-condensing)		
SAFETY			
Safety Rating	600V Cat. III		
Double Insulation	Yes		
CE Mark	Yes		

#### **FEATURES**

- Designed for ungrounded networks provides intermittent path to ground for leakage current measurements
- Works from 30 to 600VAC
- Red LED phase fault indicator
- Switch selectable ground fault cycling of 500mS or 2.3 seconds
- Buzzer alerts each momentary fault
- Battery operated
- Double insulated, fire retardant case
- Four color-coded 5 ft 1000V rated leads supplied with alligator clips
- Works with Model 2620 and other leakage current probes

### **APPLICATIONS**

- Troubleshoot faulty three-phase ungrounded devices
- Assist in leakage current measurements on ungrounded systems
- Create momentary ground conditions to detect fault currents



Model AN-1 creates a momentary ground to assist in fault current detection.



# **AC Current Probe Model SR759**



#### FEATURES

- Measurement range of 1mA to 1200AAC
- Large jaw opening accommodates up to two 500MCM conductors
- Ergonomic design and easy operation
- Conforms to EN 61010, 600V Cat. III safety standard
- Low phase shift ideal for power measurements
- Available with mA or mV output signals
- Designed for DMMs, recorders, loggers, oscilloscopes, power and harmonic meters
- Output terminated with 4mm safety shrouded banana plugs on 5 ft (1.5m) leads
- CE Mark

## AC Current Probe Models MN103 & MN114



#### FEATURES

- Small, compact and very tough AC probes
- "Clothes pin" shape makes them ideal for use in tight areas, such as breaker panels, controller panel, or outlets
- Measurements from 1mA to 100Aac (Model MN103)
- Measurements from 1mA to 10AAc (Model MN114)
- Excellent companion to all DMMs. Permits very low AC current measurements.
- Output terminated with 4mm safety shrouded banana plugs on 5 ft (1.5m) leads

MODELS	SR759	MN103	MN114
ELECTRICAL			
Measurement Range	1mA to 1Aac 10mA to 10Aac 0.1 to 100Aac 1 to 1000Aac	1mA to 10Aac 1A to 100Aac	1mA to 10Aac
Output Signal	1000mVac/Aac (1V @ 1A) 100mVac/Aac (1V @ 10A) 10mVac/Aac (1V @ 100A) 1mVac/Aac (1V @ 1000A)	1mVac/mAac (100mV @ 100A)	100mVac/Aac (1V @ 10A)
MECHANICAL			
Maximum Conductor Size	2.05"Ø (52mm)	0.47"Ø (12mm)	0.47"Ø (12mm)
Maximum Bus Bar Size	One 1.95 x 0.19" (50 x 5mm)	-	-
Output Termination	5 ft (1.5m) Lead	5 ft (1.5m) Lead	5 ft (1.5m) Lead



#### **Typical Points for Measuring Leakage Current**





On single phase systems, the Model 565 will measure leakage current at the source, the load or the ground.

On multi-phase systems, the Model 2620 can be used with a standard multimeter to measure leakage current at the source, the load or at the ground.



On ungrounded networks, the Model AN-1 generates a momentary grounded artificial neutral. Leakage current measurements can then be made, using a leakage current clamp and a multimeter, between the Model AN-1 and the load.

ORDERING INFORMATION	CATALOG NO.
TRMS Leakage Current Meter Model 565 (TRMS,100A, 600Vac/bc, Hz, Ohms, Continuity) Includes test leads, soft carrying case, two 1.5V AAA (LR03) batteries and user manual	Cat. #2117.56
AC Leakage Current Probe Model 2620 (4A, 1V/A & 400A, 1mV/A output) Includes user manual	Cat. #2125.52
Artificial Neutral Model AN-1 Includes user manual	Cat. #1971.01
Other Low Current Probes	
AC Current Probe Model SR759 (Lead - 1/10/100/1000A)	Cat. #2116.33
AC Current Probe Model MN103 (Lead – 1mV/mA – 10A max & 1mV/A – 100A max) AC Current Probe Model MN114 (Lead – 100mV/A – 10A max)	Cat. #1031.02 Cat. #2110.71

#### To learn more, visit www.aemc.com

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