

MOM2

Micro-ohmmeter



- Up to 240 A
- Bluetooth® headset for audible pass/fail testing against adjustable limits
- Battery powered
- Handheld, lightweight – 2.2 lb (1 kg)
- Safe test – DualGround™
- Auto range: 1 $\mu\Omega$ to 1000 m Ω
- Ultra capacitor technology (patent pending)

DESCRIPTION

The MOM2 Micro-ohmmeter is a lightweight, handheld unit designed to deliver up to 240 Amps and measure the resistance of circuit breaker contacts, bus-bar joints, and other high-current links. This product is designed with safety, ease of use and versatility in mind.

The MOM2 can be used anywhere to measure a low resistance value with high accuracy. With the MOM2, it is possible to make measurements according to the DualGround™ method. This means that the test object will be grounded on both sides throughout the test giving a safer, faster and easier workflow.

Its ruggedness and light weight make the MOM2 very suitable for field work, such as in substations. The unit comes with a strong rubber holster accessory which makes it extra durable. The MOM2 is capable of testing for a full day without recharge. It can store 190 test values and transfer test data to a PC via Bluetooth.

The Bluetooth feature can also be used in conjunction with the wireless headset (supplied) to provide an audible pass/fail signal against user-adjustable limits as tests are performed.

High Current Generation Using Ultra Capacitor

The MOM2 uses an ultra capacitor to generate the high-output current. Ultra capacitors are able to store huge amounts of energy compared to conventional capacitors. In addition, they can deliver very high currents during discharge as a result of their very low internal resistance.

While testing, the capacitor is discharged through the test object. The voltage drop across and the current flow through the test object are continuously and synchronously sampled. The resistances calculated from the individual samples are then averaged to obtain the final value.

APPLICATIONS

The MOM2 test system is designed to serve a number of applications. The most common are contact resistance measurements of low-, medium- and high-voltage breakers and also at bus-bar joints, and other high current links.

If the contact resistance is too high, this will lead to power loss and temperature rise, which often leads to serious trouble. To avoid such problems, it is necessary to check the resistance at regular intervals.

The following table demonstrates how important low resistance is at high currents:

| Current | Contact resistance | Power loss |
|---------|--------------------|------------|
| 10 kA | 1 mΩ | 100 kW |
| 10 kA | 0.1 mΩ | 10 kW |
| 1 kA | 1 mΩ | 1 kW |
| 1 kA | 0.1 mΩ | 100 W |

At 10 kA a contact with the resistance 0.1 mΩ gives a power loss of 10 kW. This power loss in one single point will definitely confer a temperature rise, which may result in overheating and possibly premature failure.

INSTRUMENT FRONT VIEW

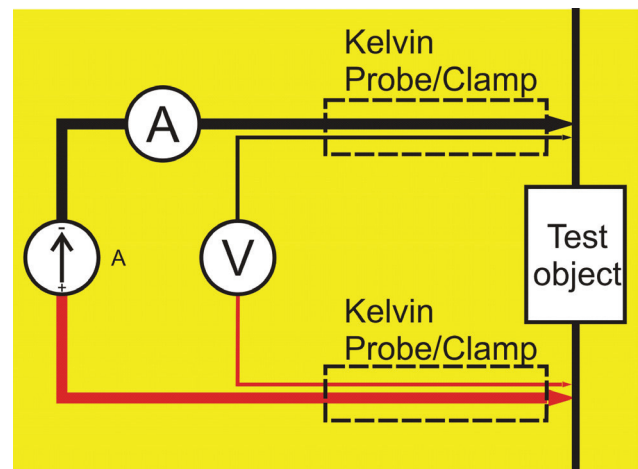
1. Current output terminal (-)
2. Current output terminal (+)
3. Display
 - The display offers a combination of analog arc and a dual digital readout:
 - Analog arc:
Indicates level of the capacitor charge.
 - Dual digital display:
Large main digital readout for good visibility of all main measurement results
Second digital display for additional data.
4. Ground (earth) terminal
5. Keys for navigation and to make settings in the display
6. TEST-button
7. Stand-by/Wake up (Press shortly to toggle)
Clear log (Press and hold for 5 seconds)
8. Function selector

| | | |
|---------------------|-------|---|
| OFF | | |
| I > I min | 0.1 s | Measurement time with minimum current guarantee |
| | 0.6 s | |
| | 3 s | |
| I = I max | 0.1 s | Measurement time with max. charge |
| | 0.6 s | |
| | 3 s | |
| SET | | Bluetooth "pair units" |
| | CLK | Set date and time |
| | | Set volume for the internal loudspeaker |
| | | Discharge the MOM2 internal capacitor |
| | I min | Minimum current guarantee setting |
| | LOG | Data log settings |
| PC COM | | PC communication (dump data to PC) |
| USER | 1 | Stored settings. Set from PC, MOM2 Win |
| | 2 | |
| | 3 | |

9. Connector for the voltage (-) sense lead
10. Connector for the voltage sense (+) lead and the trig function
11. Connector for the battery charger
12. Battery charger indicator



4 wire Kelvin test



The Kelvin probes (included in BD-59090) are used for a 4-wire Kelvin test. This is a way of measuring continuity resistances ensuring all contact and lead resistances are compensated for, allowing a much greater accuracy in measurements. Each Kelvin probe assembly has two probe tips: one tip is for the current generated; the other will measure the very small voltage present. The Kelvin clamps (included in BD-59092) use the same principle.



The "double" probe tip showing the springy center tip

APPLICATION EXAMPLES

Circuit Breaker testing

- Test of circuit breaker contacts
- Test of the connections to the breaker

Testing of Bus-bar

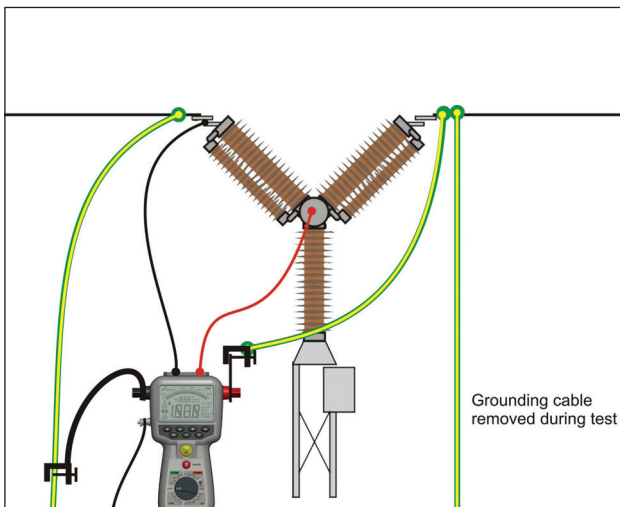
- Test of Bus-bar joints
- Test of connections

Everywhere you need to test a low resistance/ high current connection

- Switches
- Disconnecting devices
- Safety ground connections
- Welding points
- Fuses
- Cables



Hold probes / attach Kelvin clamps to CB and press trig / TEST button. A signal indicates whether test was pass or fail and result is logged in unit for later dump to PC.



Traditional measurement from ground. Injection is done through existing grounding cable (earthing). Optional cable kit is needed. Available kits have 5, 10 or 15 m cables.

BOTH SIDES GROUNDED

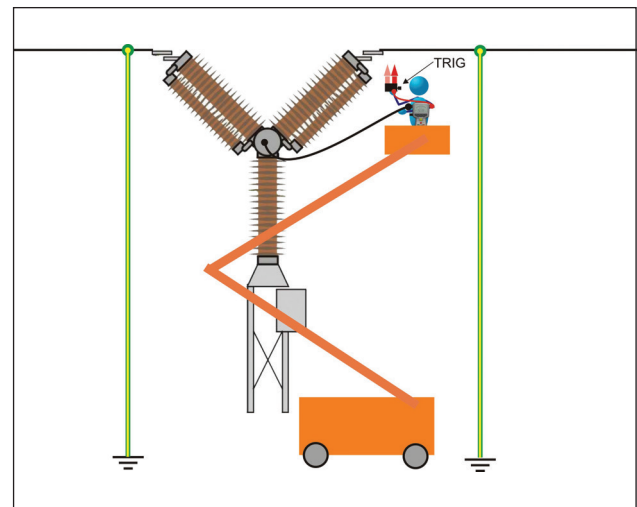
Within electrical power utilities, switchgear owners and service companies, there is an increased emphasis on efficiency of operations, maintenance and service levels. There is an increased emphasis on health, safety, and environmental compliance. Experience has also shown demands for shorter time periods for testing, while the switchgear is less and less available to be taken out of service.

Many utilities require safety grounds to remain in place during station outages, and the MOM2 was designed with this field safety constraint in mind. DualGround means that the test object will be grounded on both sides throughout the test giving a safer, faster and easier workflow. Minimum time is spent in the substation and focus is on the test rather than the equipment.

| Conventional vs. DualGround | |
|---|---|
| Site preparation (isolate work area, apply safety ground, issue permit to work) | Site preparation (isolate work area, apply safety ground, issue permit to work) |
| Hook up test equipment. Issue sanction for test | Hook up test equipment. Issue sanction for test |
| Authorized person removes the ground | Risky step left out |
| Perform testing | Safe testing with both sides grounded |
| Authorized person applies ground | Risky step left out |
| Cancel sanction for test. Disconnect test equipment | Cancel sanction for test. Disconnect test equipment |
| Site closing (cancel permit to work, disconnect ground) | Site closing (cancel permit to work, disconnect ground) |



Equipment and methods that supports DualGround™ testing are associated with the DualGround symbol. This symbol certifies the use of groundbreaking technology and methods that enables a safe, fast and easy workflow with both sides grounded throughout the test.



Measurement on CB with both sides grounded, DualGround.

SPECIFICATIONS

Specifications are valid at fully charged batteries and an ambient temperature of +25°C, (77°F). Specifications are subject to change without notice.

Environment

| | |
|-----------------------|--|
| Application field | For use in high-voltage substations and industrial environments. |
| Temperature | |
| Operation* | -20°C to +50°C (-4°F to +122°F) |
| Storage | -40°C to +70°C (-40°F to +158°F) |
| Relative humidity %RH | 5%-95%, non condensing |
| Pollution degree | 2 |
| Shock | IEC 60068-2-27 |
| Vibration | IEC 60068-2-6 |
| Transport | ISTA 2A |

*Battery operation temperature 0°C to +50° (32°F to +122°F)

*Battery charging temperature +10°C to +40° (50°F to +104°F)

General

| | |
|-------------------------------|--|
| Battery power | Five AA (HR6) 2700 mAh NiMH cells |
| Recharge time | < 12 h |
| Typical recharge time at 25°C | 3 h |
| Battery charger | |
| Mains voltage | 100-250 V AC, 50 / 60 Hz |
| Power consumption | 60 W |
| Protection | Against wrong battery type, low/high temperature |
| Real time clock battery life | ≥10 years |
| Audible feedback | Different buzzer sounds |
| User presets | 3 |
| Field calibration | Yes |
| Encapsulation | IP54 |
| Dimensions | 217 x 104 x 72 mm |
| (excl. binding posts) | 8.5 x 4.1 x 2.8 in. |
| Weight | 2.2 lbs (1.0 kg) instrument only 11 lbs (5.0 kg) with accessories and carrying case |

CE-marking

| | |
|-----|-------------|
| EMC | 2004/108/EC |
| LVD | 2006/95/EC |

Measurement section

| | |
|---|--|
| Minimum current guarantee | Selectable 50 A / 100 A Valid at resistance ≤2mΩ |
| Pass / Fail | Settable from 1 μΩ to 1999 mΩ |
| Number of measurements on fully charged batteries | typ. 2200 at I min = 50 A and 0.1 s typ. 800 at I min = 100 A and 0.1 s |
| Interference suppression | Yes |
| Range | 0 - 1000 mΩ |
| Range selection | Auto |
| Resolution | |
| 0 - 999 μΩ | 1 μΩ |
| 1.0 - 9.99 mΩ | 0.01 mΩ |
| 10.0 - 99.9 mΩ | 0.1 mΩ |
| 100 - 1000 mΩ | 1 mΩ |
| Accuracy | |
| 0 - 1999 μΩ | ±1 % of reading ±1 digit |
| 2 - 1000 mΩ | ±2 % of reading ±1 digit |

Outputs + / -

| | |
|----------------------|-------------------------------|
| Range | > 100 A DC (R < 2 mΩ) |
| Output voltage (max) | 2.5 V DC |
| Generation duration | Selectable: 0.1 s, 0.6 s, 3 s |

| | Recovery time at I min set to 100 A and load 100 μΩ | |
|-----------------|---|-------|
| Generation time | Max | Typ |
| 0.1 s | 10 s | 8 s |
| 0.6 s | 20 s | 16 s |
| 3 s | 130 s | 100 s |

Inputs

| | |
|---------------|-----------------------|
| SENSE + / - | |
| Connector | 4 mm banana jack |
| Voltage | ±3 V DC |
| Trigger input | Threshold 8 V DC |
| DC IN | 12 - 24 V DC, 2 A max |

Logger

| | |
|------------------|---|
| Logger, Data | Label, Timestamp, I max, I min, I Limit, Resistance, Meas.time, P/F limit |
| Labeling schemes | Circuit breaker oriented or diary number |
| Capacity | 190 measurements |

Wireless communication

| | |
|------------------|-----------|
| Headset | Bluetooth |
| PC communication | Bluetooth |

INCLUDED ACCESSORIES



MOM2 shown with transport case, charger, rubber holster, carrying strap, belt clip, MOM2 Win software.



Bluetooth headset



Bluetooth dongle

OPTIONAL ACCESSORIES



Calibration kit



Connection plate, used with the cable kits



Soft carrying case



Kelvin probes (incl. in BD-59090)

ORDERING INFORMATION

| Item | Cat. No. |
|--|----------|
| MOM2 Micro-ohmmeter including: 2 x 1.3 m (4 ft) test cables Kelvin probes (one with trig button) transport case, charger, rubber holster, carrying strap, belt clip, Bluetooth headset with dongle, MOM2 Win | BD-59090 |
| MOM2 Micro-ohmmeter including: 1.3 m (4 ft) test cable red with Kelvin clamp 3 m (10 ft) test cable black with Kelvin clamp C/N GA-90001, transport case, charger, rubber holster, carrying strap, belt clip, Bluetooth headset with dongle, MOM2 Win | BD-59092 |
| MOM2 Micro-ohmmeter including: 1.3 m (4 ft) test cable red with Kelvin clamp 5 m (16 ft) test cable black with Kelvin clamp, transport case, charger, rubber holster, carrying strap, belt clip, Bluetooth headset with dongle, MOM2 Win | BD-59093 |
| Optional Accessories | |
| Test cables with Kelvin probes 2 x 1.3 m (4 ft) (one with trig button) | GA-90000 |
| Test cables with Kelvin clamps 1.3 m (4 ft) red, 3 m (10 ft) black | GA-90001 |
| Test cables with Kelvin probes 3 m (10 ft) black | GA-00372 |
| Test cables with Kelvin probes 5 m (16 ft) black | GA-00374 |
| Cable kit 5 m Current cable 0.5 m (1.6 ft), connection plate and sense cables 5 m (16 ft), ground cable | GA-00380 |
| Cable kit 10 m Current cable 0.5 m (1.6 ft), connection plate and sense cables 10 m (33 ft), ground cable | GA-00382 |
| Cable kit 15 m Current cable 0.5 m (1.6 ft), connection plate and sense cables 15 m (49 ft), ground cable | GA-00384 |
| Calibration kit | BD-90002 |
| Soft carrying case for MOM2, charger & cables | GD-00620 |

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