



FREQUENCY SELECTIVE MULTIMETER + GPS

4031 DATASHEET



REDPHASE INSTRUMENTS

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1. DESCRIPTION

The Model 4031 is a hand held frequency tuneable Voltmeter and Ammeter used to measure the magnitude and phase angles of signals produced by the Model 4024B, 4041 and 4046 Earth Current Injection systems**.

The voltmeter part of the 4031 allows step, touch and terrestrial potentials to be measured easily and accurately. These measurements give utility engineers a picture of which areas within an electrical installation require maintenance or hazard mitigation to warrant the proper working conditions of the installed equipment and to ensure the safety of the general public and utility personnel.

The current input is deigned for use with a Lemo input (Rogowski) Type 545 worm coil or a LEM~Proflex AC current probe. The Lemo rogowski and LEM rogowski current probes are optional accessories which are convenient current measuring devices that are simply wrapped around current carrying structures or cables.

This is particularly useful when performing current branch investigations which track and measure the various AC current paths travelling into and out of electrical installations. These measurements assist utility engineers in designing adequate protection systems.

The high quality of the Multimeter's filters allow the operator to select a frequency within the 40 to 69Hz range in 0.1Hz or 1Hz increments.

An on board GPS function which allows for accurate time stamping and position recording. Additionally the 4031 can also use a universal timing feature on the GPS to synchronize itself with the injection system, (4041 and 4046 only) to determine current phase measurements without the need for a separate phase reference voltage cable.

**** May be used with other current injection systems with cable-less phase synch inactive.**

Model 4031-L



Model 4031-R



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2.0. CONTROLS & INSTRUMENTATION

2.1 Multifunction LCD and keypad:

The LCD displays instrument settings and measurements in large easy to read digits . The keypad allows for easy screen navigation and parameter entry.

Measurement selection

Simultaneous measurement of voltage and current (Rogowski coil or Flex Lem) are made. Phase and impedance readings also displayed.

Frequency selection

Frequency is selectable within range of: 40 to 69 Hz in 0.1 Hz or 1 Hz steps.

Range selection

Possible ranges are:

Voltage: **200mV, 2V, 20V, 200V**

Current: **0.2A, 2A, 20A, 200A**

LEM: **3000mV** (full-scale output from LEM).

(Current range on LEM RR3020:

30A / 300A / 3000A select via slide switch).

Measurement Hold

The measured values can be put on hold via the HOLD feature.

Please note that the 4031 comes with either a Flex Lem or Rogowski current probe input but not both as with the 4025E

2.2 Input Connections

Voltage Input

The input connection is made via two 4mm safety sockets on the front panel.

Rogowski Coil / Type 545 worm Current Input

The coil connection is made with a 3 pin socket on the front panel.

LEM~flex Current Input

The LEM~flex module 4mm safety plugs connect directly to the LEM input terminals without any additional cables required.

2.3 Overload Indication

Overload is indicated on the display as — OL— when the input circuit is overloaded with excessively high signal levels and/or noise.

2.4 Voltage Input impedance:

In the “Hi-Z” position the voltmeter measures voltages, with 1M Ω input. In the 1k Ω (or 1k5 Ω) position the voltmeter simulates a human body for “step and touch” potential measurements. The voltage input is fuse protected.

2.5 Test records and Software updates via USB interface:

The instrument can store up to 5000 test time stamped records, date and GPS position information (if required). The test results may be downloaded to a USB Flash memory device via the type A connector located at the top of the 4031.

The Type A USB connector is also used for easy software upgrades when required without the need to return the instrument back to the factory.

There is an additional mini USB connector located at the bottom of the 4031 which is used for charging only.



3.0. BATTERY Operation

The instrument is powered by an internal Li-On battery which can be recharged via the AC mains adaptor or from a USB host port. Each full recharge will provide continuous use for approximately 5 to 6 hours (no backlight) . A battery level indicator is provided in the top right hand corner of the display.

To conserve battery life, the unit turns off automatically after 1 hour if no keys are pressed.

4.0. ENCLOSURE

The unit is housed in a fully moulded case. The case offers high resistance to impact, temperature, moisture, weather, and corrosion. The front panel is covered with a Lexan polycarbonate label for durability and appearance.

The 4031 is supplied with 2 metre test leads and a universal AC to 5V DC charger.

5.0 Performance Specifications

Supply	
Operating voltage	3.6V - 2350mAh Internal Battery
Charger / Power Supply	100 to 265VAC Universal plug pack 5V dc (USB 500mA port)
Charge current	250mA
Charge Time	12 hours typical
Maximum power consumption	1.53 Watts (with GPS & Backlight enabled)
Bandwidth and resolution	
Frequency range:	40 - 69 Hz
Frequency increment and Step resolution	0.1 Hz or 1 Hz
Linearity Error	< 1%
Magnitude Error	< 1%
Phase Error	< 1 degree max, +/- 3 counts typically
Typical 50Hz or 60Hz noise attenuation	
+/- 1 Hz of power frequency	-42 dB min
> +/- 3 Hz of power frequency	-48 to -60dB
> +/- 5 Hz power frequency	-54 to -64dB
> +/- 10Hz power frequency	-60 to -74dB
Noise overload level	+17.5dB typically above full scale
Input Ranges	
Input Impedance	1 M Ω / 1k Ω -or- 1 M Ω / 1k5 Ω (country dependent)
Voltage Input Range	200mV, 2V, 20V, 200V
Lem Voltage Range	0 to 3000mV
Current Ranges	
Rogowski	0.2A, 2A, 20A, 200A
LEM	30A, 300A, 3000A
4031 chassis and user interface isolation	
From Voltage Input	500Vdc or 350Vac min
From LEM Input	500Vdc or 350Vac min
GPS Specification	
Time To First Fix (TTFF)	34 seconds typically
Power consumption	110mW
Update Rate	1 fix / second
USB Flash Drive Interface	
Flash drive USB interface speed	USB 1.1 (Full Speed)
Environmental	
Operating Temperature	0 to 45°C Degrees
Relative Humidity (RH)	90%
Size	21 cm x 10 cm x 3.4 cm at widest point

Every care has been taken to ensure that the above data is correct at the time of printing. Always refer to the latest data sheet when purchasing. RED PHASE INSTRUMENTS reserves the right to alter specifications without notice.