



Wheel-e

An innovating current in installation testing



REEL AND TESTER OF CONTINUITY

TO MEASURE THE RESISTANCE OF PROTECTIVE CONDUCTORS AND EQUIPOTENTIAL BONDING



QUICK START :

Belt, attach it at the waist and adjust.

"Ω" socket, connect it to an Electro-PJP lead and connect it to an Electro-PJP pole or probe.

4 mm banana plug, connect it to an Electro-PJP crocodile clip or mains socket adapter.

"φ" button, push until hearing the double-beep.

Crocodile clip or mains socket adapter, connect it to the equipotential reference chosen (the earth contact of a mains socket for instance).

Pole or probe, with it touch the protective conductors.

LCD, watch it to know the Ohm value of the measured resistance between the crocodile clip (or the mains socket adapter) and the probe (or the pole).

A I WANT TO SWITCH ON :

- (Wheel-e off) I push the "φ" button during 2 s at least.

The LCD switches on. Wheel-e is ready to measure. The last compensation made is used. The beep is enabled.

B I WANT TO SWITCH OFF :

- (Wheel-e on) I push the "φ" button during 2 s at least.

C I WANT TO DISABLE THE BEEP :

- (Beep enabled) I push briefly the "φ" button.

The icon appears on the LCD. The beep is disabled (the beeps for the compensation and the voltage warning keep enabled).

D I WANT TO ENABLE THE BEEP :

- (Beep disabled) I push briefly the "φ" button.

E I WANT TO COMPENSATE THE RESISTANCE OF MY ACCESSORIES :

- (Wheel-e on) I connect an Electro-PJP pole or probe to an Electro-PJP lead and I connect it to the "Ω" socket.
- I unwind the reel wire and I connect its end to an Electro-PJP crocodile clip or mains socket adapter.
- I push quickly two times on the "φ" button.
- I touch the crocodile clip or mains socket adapter with the tip of the pole or probe and I hold them during a few seconds.
- **Blue backlight, 0.00, two short beeps then a continuous beep** which inform the compensating has succeeded (the displayed value can vary, between 0.00 and 0.07 for instance, because of the measurement tolerance).

Wheel-e is ready to measure. This compensation is kept until the next compensation even if the batteries are replaced and / or if Wheel-e is switched off.

red backlight, E01, and 0 Ω icon : the compensation failed (because the resistance to compensate was too high, the crocodile clip didn't touch the tip of the pole, ...). The previous compensation is kept. I switch off Wheel-e.

F I WANT TO MEASURE THE RESISTANCE OF THE PROTECTIVE CONDUCTORS OF THE INSTALLATION :

- (Wheel-e on) I connect an Electro-PJP pole or probe to an Electro-PJP lead and I connect it to the "Ω" socket.
- I unwind the reel wire and I connect its end to an Electro-PJP crocodile clip or mains socket adapter.
- I connect the crocodile clip or mains socket adapter to the equipotential reference chosen (the earth contact of a mains socket for instance).
- I touch the close protective conductors with the pole or probe. **Important**, if the resistance of the accessories isn't compensated (see E) then the displayed resistance includes the accessories resistance.

The LCD shows one of the following cases :

: any contact or any continuity (or resistance > 20 Ω).

red backlight, flash icon, and fast beeps : DANGER, unusual voltage (a few Volts and more).

blue backlight and continuous beep : resistance ≤ 2.00 Ω* (ou ≤ 1.00 Ω*), for instance 0.64 Ω.

red backlight : resistance between 2 Ω* (or 1 Ω*) and 20 Ω, for instance 3.28 Ω.

G I WANT TO COMPENSATE THE RESISTANCE OF MY ACCESSORIES ON THE 2 SOCKETS :

- (Wheel-e on) I connect an Electro-PJP pole or probe to an Electro-PJP lead and I connect it to the "Ω" socket.
- I connect an Electro-PJP probe to an Electro-PJP lead and I connect it to the "AUX" socket.
- I push quickly two times on the "φ" button.
- I touch the tip of the pole or probe with the tip of the other probe and I hold them during a few seconds. (The crocodile clip or mains socket adapter can stay connected to the equipotential reference chosen.)
- **Blue backlight, 0.00, two short beeps then a continuous beep** which inform the compensating has succeeded (the displayed value can vary, between 0.00 and 0.07 for instance, because of the measurement tolerance).

Wheel-e is ready to measure. This compensation is kept until the next compensation even if the batteries are replaced and / or if Wheel-e is switched off.

red backlight, E01, and 0 Ω icon : the compensation failed (because the resistance to compensate was too high, the tips didn't touch, ...). The previous compensation is kept. I switch off Wheel-e.

H I WANT TO MEASURE THE RESISTANCE OF THE PROTECTIVE CONDUCTORS OF A UNPLUGGED APPLIANCE :

- (Wheel-e on) I connect an Electro-PJP pole or probe to an Electro-PJP lead and I connect it to the "Ω" socket.
- (I can let the reel wire connected to the equipotential reference chosen.)
- I connect an Electro-PJP probe to an Electro-PJP lead and I connect it to the "AUX" socket.
- I touch the accessible conductor of the unplugged appliance and the protective conductor of its plug. **Important**, if the resistance of the accessories isn't compensated (see G) then the displayed resistance includes the accessories resistance.

The LCD shows one of the following cases :

: any contact or any continuity (or resistance > 20 Ω).

red backlight, flash icon, and fast beeps : DANGER, unusual voltage (a few Volts and more).

blue backlight and continuous beep : resistance ≤ 2.00 Ω* (ou ≤ 1.00 Ω*), for instance 0.34 Ω.

red backlight : resistance between 2 Ω* (or 1 Ω*) and 20 Ω, for instance 6.90 Ω.

I I WANT TO USE WHEEL-E AS A SIMPLE REEL JOINED TO AN ALTERNATIVE MEASURING DEVICE :

During the daily operating, sometimes a simple extension is needed to connect to another measuring device. This is possible by using the "AUX" socket.

- (Wheel-e on) I fully disconnect (sockets and reel wire).
- I push the "φ" button during 2 s at least to switch off.
- I connect the alternative measuring device to a lead and I connect this lead to the "AUX" socket.

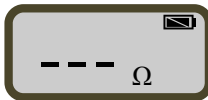
The reel wire becomes an extension. The created circuit is protected by the inner fuse of Wheel-e. Wheel-e must kept off. It mustn't be switched on when connected to a measuring device.



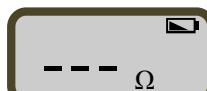
J I WANT TO REPLACE THE BATTERIES :

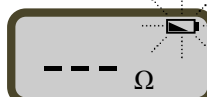
- (Wheel-e on) I fully disconnect (sockets and reel wire).
- I push the "φ" button during 2 s at least to switch off.
- I pick 4 AA batteries and a 4 mm screwdriver.
- I unscrew the J1 screw and remove the J2 batteries cover.
- I replace the 4 J3 batteries.
- I reassemble the J2 batteries cover and screw the J1 screw.
- I push the "φ" button during 2 s at least to switch on.


The LCD switches on. Wheel-e is ready to measure. The last compensation made is used. The beep is enabled.

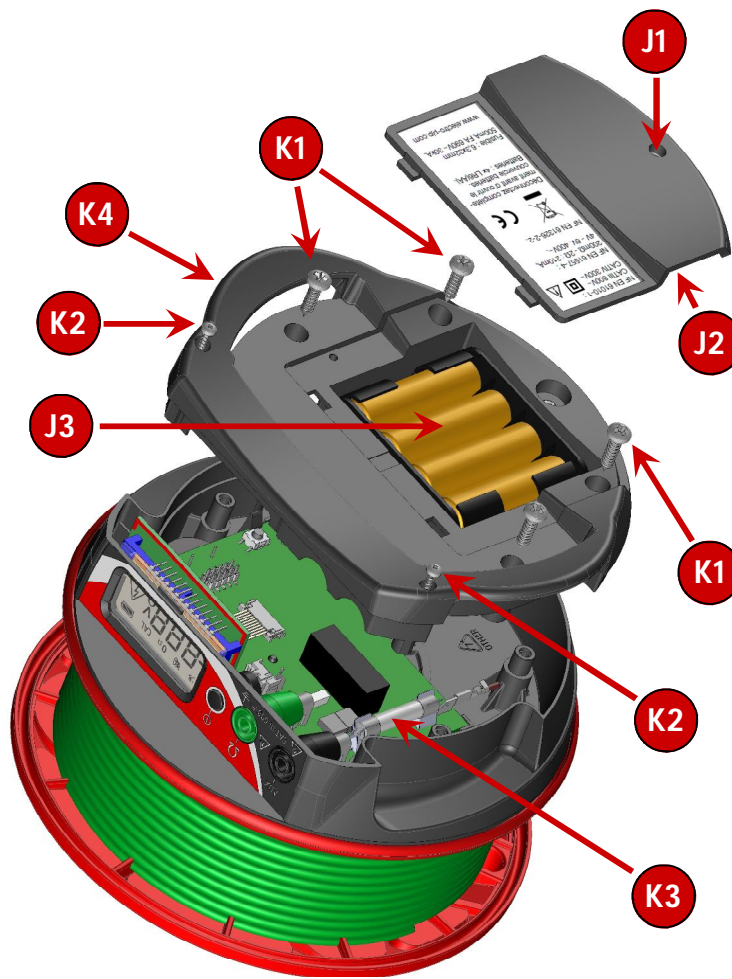


 **full battery icon** : maximum batteries life. (See "Specifications and your safety".)

 **half battery icon** : half batteries life.

 **flashing half battery icon** : 15 % of batteries life, the measurement accuracy is affected.

 **flashing empty battery icon, E03** : measuring is impossible.

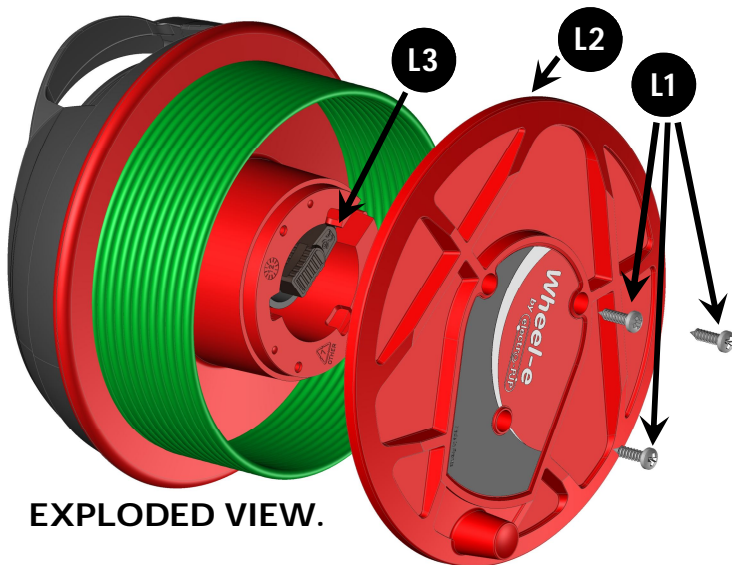


EXPLODED VIEW.

K I WANT TO REPLACE THE FUSE :

- (Wheel-e on) I fully disconnect (sockets and reel wire).
- I push the "φ" button during 2 s at least to switch off.
- I pick two Pz-2 and Pz-4 Phillips screwdrivers and one 4 mm flathead screwdriver.
- With the 4 mm flathead screwdriver I unscrew the J1 screw and remove the J2 batteries cover.
- With the Pz-4 screwdriver I unscrew the 4 rear K1 screws.
- With the Pz-2 screwdriver I unscrew the 2 rear K2 screws remaining.
- I remove the rear face.
- I remove the fuse (K3).
- I replace it with a 6.3 mm x 32 mm, 500 mA AC, 30 kA, 690 V AC fuse (P / N Electro-PJP 4381).
- I reassemble the K4 rear face and the J2 batteries cover.
- I push the "φ" button during 2 s at least to switch on.

The LCD switches on. Wheel-e is ready to measure. The last compensation made is used. The beep is enabled.



EXPLODED VIEW.

L I WANT TO REPLACE THE WIRE :

- (Wheel-e on) I fully disconnect (sockets and reel wire).
- I push the "φ" button during 2 s at least to switch off.
- I pick a Pz-4 Phillips screwdriver.
- I unscrew the 3 front L1 screws.
- I remove the L2 front face.
- I disconnect the L3 plug and remove the whole lead.
- I fully unwind the replacing lead.
- I connect its right-angled plug instead of the L3.
- I reassemble the L2 front face.
- I wind the wire.

Wheel-e is ready to use.


SPECIFICATIONS AND YOUR SAFETY :


The protection is compromised if instructions are not respected.


Device protection : 400 V AC between the two sockets or between one of the sockets and the plug of the wire. Fuse 6.3 mm x 32 mm High breaking capacity 30 kA, 500 mA AC, 690 V AC. See K to replace the fuse.


User protection (reference to earth) : 600 V AC CAT III / 300 V AC CAT IV, reinforced insulation, class 2, pollution degree 2, according to EN / IEC 61010-1:2010, and 300 V AC CAT III / 300 V AC CAT IV, reinforced insulation, class 2, pollution degree 3, according to EN / IEC 61010-1:2010. IP2X according to EN / IEC 60529:2001. The protection of a combination of Wheel-e and accessories is the lower of the protection of Wheel-e and of the accessories.


~ means, alternative current.

 means, on / off.

 means, caution, refer to accompanying documents.

 means, caution, risk of electric shock.

 means, part protected throughout by reinforced insulation.

 means, earth bonding conductor.

CAT III (measurement category III). This is the environment of building wiring installations including socket outlets, fuse panels, ...

CAT IV (measurement category IV). This is the environment origin of the electrical supply to a building, between the building entrance and the main distribution board including electricity tariff meters, ...

Pollution degree 2. Only non-conductive pollution occurs except that occasionally a temporary conductivity caused by condensation is expected. The usual environment is in pollution degree 2.

Pollution degree 3. Conductive pollution occurs, or dry, non-conductive pollution occurs which becomes conductive due to condensation which is expected.

Environmental conditions : pollution degree 2 (usual environment) or 3 (see above) ; storage and operating temperature range, from -20 °C to +55 °C ; maximum relative humidity 80 % for temperatures up to 31 °C decreasing linearly to 50 % relative humidity at 40 °C ; don't submerge the device ; protect it from liquids, rain, and any precipitation ; don't use it in wet or explosive atmospheres.

Maximum current in the wire (when used as a simple reel, see I) : 500 mA (fused).

Unusual voltage warning. When there's a unusual voltage on the protective conductors, Wheel-e doesn't measure resistance and beeps fast and alternately and the LCD backlight flashes in red.

Maximum compensating value : 4 Ω.

Power supply : 4 AA alkaline batteries (AA rechargeable batteries are compatible but reduce the time before replacing the batteries).

Batteries life : about 1.7 day in normal use at 20 °C and with new batteries. About 5 h 50 min when measuring continuously a continuity resistance less than 1 Ω with enabled beep and new batteries. Auto power off after 5 min without activity.

Compliance with the standards EN / IEC61010-1:2010, EN / IEC61557-4:2007. Compatibility with the French standard NF C 15-100 and the French technical guide UTE C 15-105 (regarding the 2 Ω-version*).

Compliance with European directives 2011/65/EU "RoHS", 2006/95/EC "LVD", 2006/96/EC "WEEE", 2004/108/EC "EMC".

Method to measure continuity resistances : current between 200 mA and 210 mA, voltage between 4 V and 24 V, self-reversing of the polarities, compliant with the EN / IEC61557-4:2007 standard.

Measurement accuracy of continuity resistances : ±0.07 Ω from 0.00 Ω to 0.50 Ω ; ±10 % ±0.02 Ω from 0.50 Ω to 2.00 Ω ; and ±8 % beyond 2.00 Ω. To keep the measures right while you are changing accessories or you are moving to another environment (high variation of temperature or relative humidity) or you are changing of input (connecting to the plug of the wire instead of the "AUX" socket and vice versa), operate a compensation of the used accessories (see E and G) before measuring and replace the batteries when the batteries life icon flashes.

Measurement range of continuity resistance : from 0.00 Ω to 20.0 Ω.

Display resolution of continuity resistances : from 0.00 Ω to 9.99 Ω and from 10.0 Ω to 20.0 Ω.

Don't use Wheel-e to check there is no voltage.

Check the device before using and don't use it if damaged.

If the device warns a unusual voltage check the electrical installation.

Compatible electrical installations :

Three-phase four-wire systems with earthed neutral, three-phase three-wire systems unearthed, three-phase three-wire systems with earthed phase, single-phase two-wire systems, and single-phase (split-phase) three-wire systems.

Wheel-e measures the resistance of continuity conductors while the electrical installation is energized or not. The tested conductors shall not be energized but the electrical installation can be energized. The measurements could be wrong because of impedances of additional circuits connected in parallel or transient currents.

USE :

Wheel-e is a continuity tester of protective conductors and equipotential bonding.

See previous pages to know how to use it.

The operator wears Wheel-e at the waist with the included belt. The operator uses it to check the continuity of protective conductors and equipotential bonding of electrical installations.

The electrical installations are generally energized while the operator check them with Wheel-e. But Wheel-e checks only conductors which are at about 0 Volt potential in normal conditions.

By the beeps and backlights of Wheel-e the operator checks if the continuity of the protective conductors and equipotential bonding has really a resistance less or equal to 2 Ω or 1 Ω * depending on the version.

Moreover with the LCD the operator can know the value of the electrical resistance up to 20 Ω.

Connect to Wheel-e Electro-PJP accessories (lead, probes, poles, crocodile clips, ...) whose the user protection is 600 V AC CAT III / 300 V AC CATIV at least.

Wheel-e must be used by qualified person only who will be able to recognize hazardous situations and who are trained in the safety precautions that are necessary to avoid possible injuries while using.

The safety of any system which may include Wheel-e is the responsibility of the assembler of the system.

Clean regularly all the parts with a soft cotton cloth lightly moistened with a mild solution of detergent and water after having fully disconnected the fuse-holder. Dry thoroughly the parts before any energizing.

Don't open the J2 batteries cover while Wheel-e is connected or switched on. Install nothing except the K3 fuse prescribed

Each time before use, always check that the insulation of Wheel-e is in good condition. Any element whose insulation is even partially damaged must be removed from use and scrapped (worn or torn wire insulation is indicated by a change of color).

* 2 Ω AND 1 Ω-VERSIONS.

Wheel-e exists in two versions, a 2 Ω-version whose the OK (beep + blue backlight) / not OK (no beep and red backlight) threshold is set at 2 Ω and a 1 Ω-version whose the threshold is set at 1 Ω.

To check what the version you use, operate a compensation (see E and G) and measure a resistance of 1.5 Ω. If the backlight is blue then you have a 2 Ω-version else you have a 1 Ω-version.

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