# SOCKET & SEE™


## A step-by-step guide to easy Loop Testing using the PDL 200 series

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## What results to expect

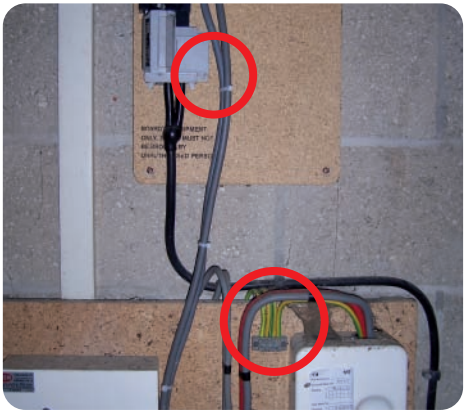
Mains supply systems fall broadly into 2 categories. The most common system particularly in urban areas is called TN (this was formerly known as PME) - where the supply company provides the means of protective earth (*Fig 1*). Less common but still prevelant in rural areas is a TT system (*Fig 2a and Fig 2b*) where the supply is locally earthed by a rod driven into the ground. For TN supply expect to see loop test results of less than 2Ω. For a TT supply expect to see results greater than 2Ω but less than 200Ω.

### 1 A typical TN system

*Note the green/yellow protective conductor coming out of the main (grey) supply fuse.*

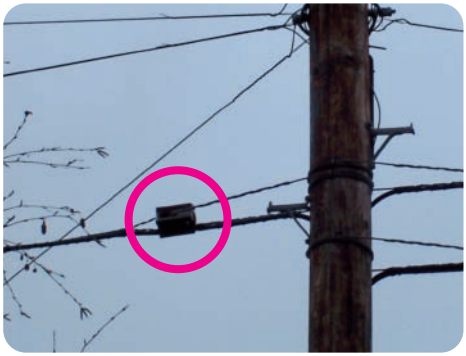
### 2a TT system

2a. *With TT systems – note the green / yellow conductor does not exit from the supply fuse. Typically it will go off to an earth rod which may or may not be visible.*



### 2b TT system

2b. *Typically a TT system will be fed from an overhead supply, look for thick conductors and insulators. (The thin wires are telephone lines).*



## Setting up the PDL 200 series

You must first understand that the loop to be tested includes the supply system, so the mains must be switched on to test.

Plug the tester into a socket on the circuit to be tested, or connect to a spur outlet by using a fused test lead set to make the connections.

Switch the socket on, when the instrument will go through its pre-test routine. The three LEDs in the orange triangle on the tester will flash red and green.

If the socket is correctly wired the LEDs in the orange triangle will all be green with a continuous tone. (*Fig 3*).

Below these indicators, the green LED at the centre of the three in the orange bar should light (green) to show that the supply voltage is correct at 207V to 253V.

This pre-test operation will confirm that the mains supply is available and that loop testing may proceed.

Should any of the LEDs in the triangle be lit as red or orange accompanied by a warbling tone, this indicates a wiring fault, the nature of which is shown by the list on the front of the instrument or on the user guide provided.

## 3 PDL 200 Self check routine & first test


Such faults require the assistance of a competent electrician.

If either the orange LED (indicating a voltage below 207V) or the red LED (indicating a voltage above 253V) in the bar are lit, the tester will be automatically prevented from carrying out further tests. In this (unlikely) event, advise the customer to contact their electricity supplier.

# Loop testing with the PDL 200 series

Leave the PDL 200 plugged into its socket. Check that the three LEDs in the triangle are all green and that the LED at the centre of the bar below it is also showing green to indicate correct supply voltage. Now press the button below marked LOOP TEST.

There will be a second or so of delay, during which time the three LEDs in the triangle will flash orange. Then one of the five LEDs in the bar at the top of the instrument will come on, indicating the result of the loop test.

There are five LEDs, each indicating a spread of results. They are:-

The left-hand LED showing green. (*Fig 4*). This shows a measured loop value of less than 1Ω. **Note that the symbol < means "less than".**

This is an excellent result, a value we would expect from most installations fed from an underground supply.

The second LED showing green. (*Fig 5*). This shows a measured loop value of less than 2Ω but more than 1Ω. This result could be due to the contacts of the socket or the plug being tarnished or poor connection via the test leads – remove and replace the plug several times and try the test again. Another possible reason for the high reading is if the socket under test is distant from the incoming mains. The longer the cables feeding the outlet, the greater will be their resistance and the higher the loop reading will be. However, it is very unlikely that an outlet will be fed by cables so long that they would have a major effect on the loop impedance.

## 4 Correct reading of less than 1Ω


## 5 Reading between 1 and 2Ω

The third LED shows green - this shows a measured loop value of less than 100Ω but more than 2Ω. *(Fig 6)*.

The only installation where this result is acceptable is an installation with an earth electrode (called a TT system) possibly fed by an overhead wiring supply. In any other installation this result is dangerous and will require urgent attention by a competent electrician. Socket outlet circuits in such installations must be fed through a residual current device (RCD) to protect users from electric shock. Where the socket outlets are not RCD protected, advise the customer (not to current standard).

The fourth LED showing green. This shows a measured loop value of less than 200Ω but more than 100Ω. *(Fig 7)*. This is still acceptable for a TT installation.

The fifth LED showing red. This shows a measured loop value of more than 200Ω. Note that the symbol > means "more than".

There are serious problems with this installation, and urgent remedial attention by a competent electrician is required, no electrical work should be carried out. *(Fig 8)*.

**6** Reading between 2 and 100Ω


**7** Reading between 100 and 200Ω


**8** Reading above 200Ω


## Polarity test with the PDL 200 series

Finally, check the polarity of the supply is correct. Apply firm thumb pressure to the POLARITY TEST pad at the bottom of the instrument and hold it for a few seconds. (Please note the button is fixed, it does not depress).

If the polarity is correct, the three LED's in the orange triangle will flash green and all is well. *(Fig 9)*.

If the polarity is incorrect, the three LEDs in the orange triangle will flash red with a warning warbling tone. *(Fig 10)*.

In the unlikely event of this condition showing, advise the customer to contact their electricity supplier as a matter of urgency.

**9** Correct Polarity indication

**10** Incorrect Polarity indication

**Socket & See Limited.**
**Rankine Road, Basingstoke RG24 8PP, United Kingdom.**
**Tel +44 (0)1256 864100 Fax +44 (0)1256 864164 e-mail: sales@kewt.co.uk www.socketandsee.co.uk**