



Polarity

Polarity testing

Introduction

The polarity test is the 8th test in the sequence. Some people will think of it as the 4th test, (which to a certain extent they are correct). It all depends whether or not you count test 4 through to 7 which as, already have been discussed are rare, and chances are they will not be required.

Q

“Why then do we need a polarity test and what is it?”

A

“We require a polarity test to ensure that all single pole devices (fuses, switches and circuit breakers) are connected in the PHASE conductor only. We cannot simply trust that the electrician(s) have connected things up the right way; everyone makes mistakes, even if it's your own work. “

If you have conducted the inspection and test of an installation thus far correctly, then you should have already carried out a form of polarity test. You would have done this using your senses during the inspection, prior to picking up an instrument. However, all though your vision may well be 20:20, this is by no means a substitute for an instrument test.

So what is a polarity test?

Basically it is a test that creates a circuit using the phase conductor and the single pole device in question, breaking the circuit when operating the device, means that the reading on the instrument will change, and thus confirming that that device must be connected in the phase conductor. Simple!

This test is a dead test therefore like the 7 before it, the supply must not be disconnected. A low resistance Ohmmeter is used to carry out the test.

There are 4 different scenarios that require a polarity test, these are.

- Ω All single pole devices (fuses, switches and circuit breakers) are connected in the **PHASE** conductor only.
- Ω The phase conductor must be connected to the centre terminal of an Edison screw lamp holder (with the exception of E14 & E27 lampholders, these are European and occasionally crop up in the exam)
- Ω All polarities of socket outlets (ring & radial) must be verified.
- Ω The polarity of the mains supply must be correct, using an approved voltage tester. (this is done with the supply connected, therefore carried out at a different stage then the above three)

Hint

In number 2 above, for ring final circuits, if you have carried out the ring final test, (Test 2) then the polarity test will have already been conducted. The only additional requirement is that you test the switches on the sockets. (flicking them on & off)

A visual test will also be needed if the test has been carried out to the front of the sockets, and not behind them, i.e., removing the faceplate screws and testing from behind.

Test methods

There are 2 methods that can be adopted when conducting a polarity test. These are described below.

Method 1

This method is exactly the same as test method one for '**Continuity Of Protective Conductors**' if we take a lighting circuit as in figure 1, by putting a temporary link between phase and cpc, at the consumers unit and our instrument at lamp holders themselves, we are creating a circuit. When we operate the light switch, the instrument changes, and then changes back to the original reading on operation of the switch again. If the reading did not change, then the switch is likely to be connected in the Neutral. (Not good!)

With a little foresight this could be carried out at the same time as the continuity test. The only difference

being, **for radial circuits every point must be tested.**

The main benefit with this is it allows you to conduct 2 tests at the same time, polarity and **R1 + R2.**

Method 2

This method, like wise is similar to test 2 of the continuity test, we simply use a wander lead as the return lead. (see figure 2).

There is little use for this method, within the polarity test. Method 1 is less clumsy, and is far more flexible and useful.

A Note on radial socket outlets

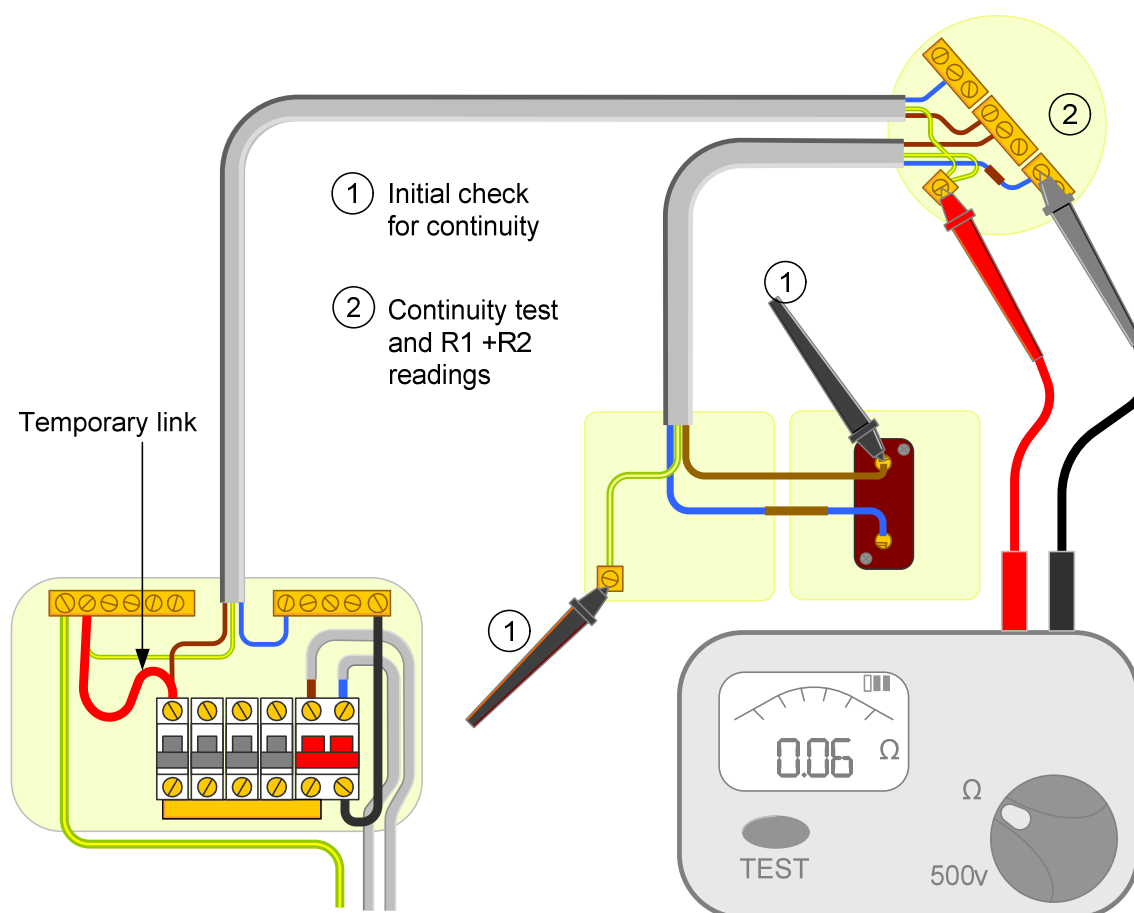
We have covered ring final circuits, but radial final circuits involving sockets can prove to be little more involved.

Why? You may ask, well simply because doing a polarity check using method 1, will not uncover a phase to cpc reversal. If the phase and cpc were reversed at the socket, the instrument will still provide a reading (Figure 3).

It will however tell you if you have a phase to neutral reversal (you wouldn't have a reading at the socket).

So what can we do to expose a phase – cpc reversal? We can simply link the phase and neutral together at the board, and put our instrument across phase and neutral at the socket, if the cpc and phase have been reversed, then no reading will be recorded on the instrument. This one takes a while to get your head around so take a look at the pics below.

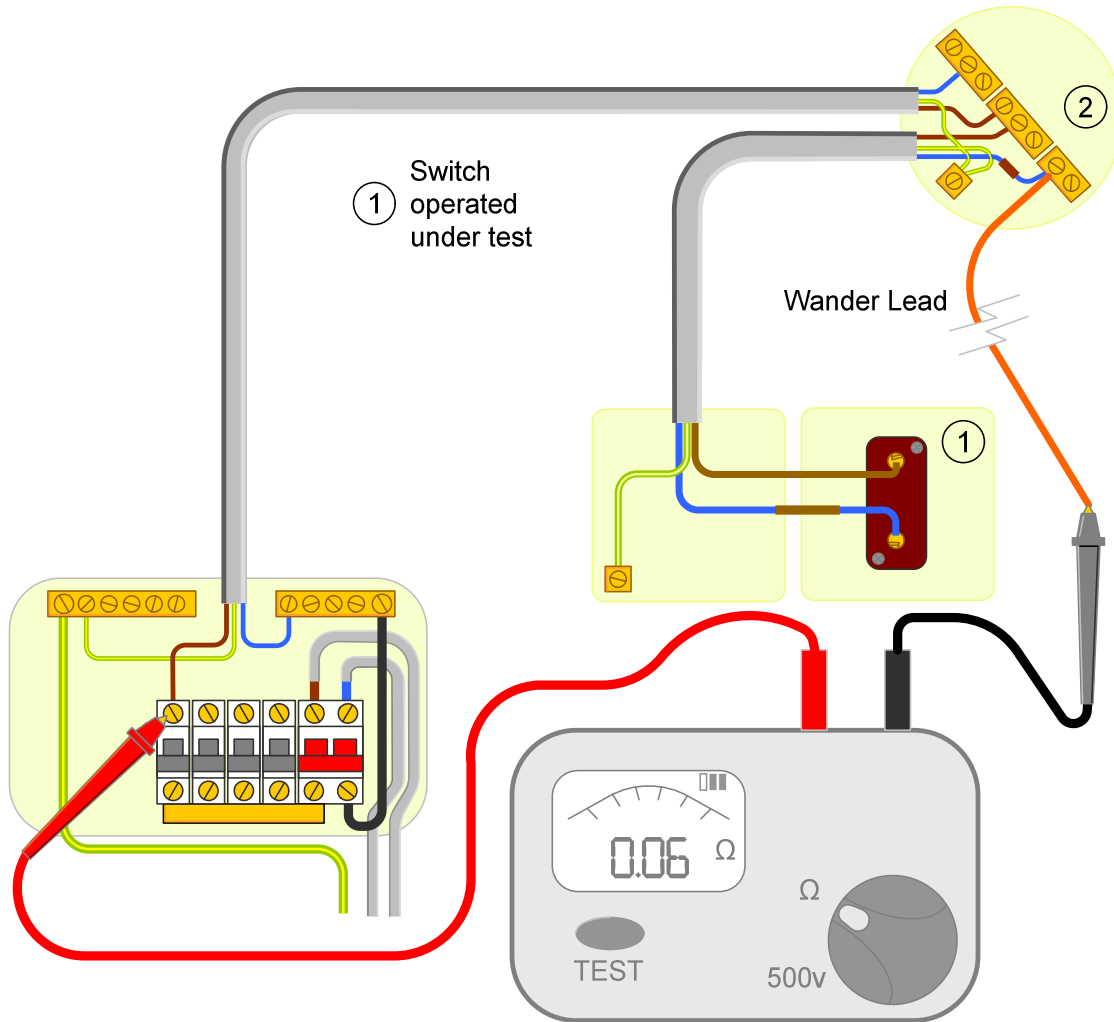
Figure 1 – Test Method 1



Method

1. Create a temporary link between the phase and the CPC within the consumer unit
2. At each point on the circuit, connect the low resistance ohmmeter to the phase and CPC
3. Operate the switches

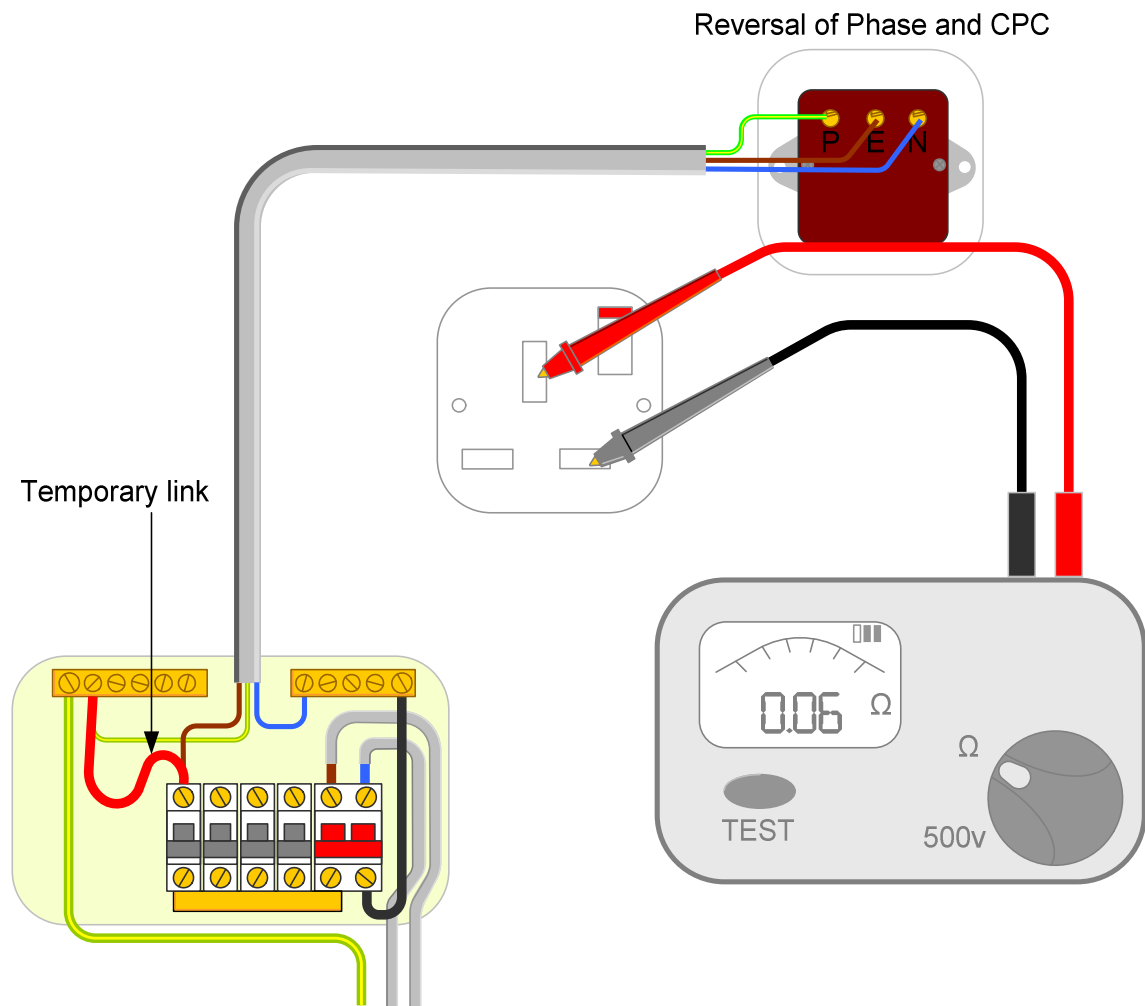
Figure 2 – Test Method 2



Method

1. Connect the wander lead to the phase conductor at the furthest point at each point on the circuit
2. Connect the low resistance ohmmeter to the phase conductor within the consumer unit
3. Operate the switches

Figure 3 – Reversed Phase and CPC at socket outlet



Solution

Figure 3 shows a reversed phase and CPC at the socket outlet. This can be checked by moving the temporary link between phase and neutral at the consumer unit and testing between phase and neutral at the socket outlet.