

PRESS RELEASE

Why the winter chills can make your test equipment turn into a killer

What would you do if your test equipment suddenly didn't work one morning? Maybe you've been in that situation before and wondered why, today of all days, your equipment is playing up...

Every year when the nights draw in, the mercury falls and the frost appears (or, in recent years, the snow) a

wave of equipment heads for the repair shop. Apart from the inconvenience of having to put your equipment in for repair, and therefore not having your kit available to work with, there is also the cost of the repair work itself. You can never completely remove the possibility of break-downs, but many faults can be avoided by taking a little more care with the equipment you rely on for testing.



COLD START: OUR TOP 5 TIPS

- Carry spare batteries – preferably in a warm place like the internal pocket of a coat.
- Don't leave equipment in a freezing vehicle/garage for long periods or overnight.
- If equipment is moved to a warmer location, allow it time to acclimatise before using it.
- Take care when touching 'live' equipment with condensation on its surface.
- If equipment fails, warm it up and dry it out before trying to use it again.

Most electronic devices – particularly ones using batteries for power - are affected by extremes of temperature (manufacturers note the acceptable range of operating temperatures in the manual). The upper limit – usually around 40°C - is never likely to be an issue in the UK, but testing equipment often has to work in cold environments, particularly in the winter, and since the lower end of the scale is usually around 0°C, the cold is definitely a problem area.

This doesn't mean that you have to leave your tester at home just because it's a bit chilly outside, but it does mean you should take some precautions so that any affect the ambient temperature may have on its performance (and any damage that might result) is kept to a minimum.

KEEPING THE POWER FLOWING

Batteries produce electrical power using a chemical reaction – and this can be severely affected by temperature. Different types of batteries are affected to a greater or lesser extent but a drop of 10°C can lead to a 50% cut in output. Generally speaking, the lower the temperature, the slower the reaction and the lower the power output. Your tester will still work, but the point at which the battery appears to run 'flat' will come much sooner. There are two solutions here – choose the right batteries and, if possible, keep spares with you.

The batteries which perform best in the cold are Lithium and Lithium-ion rechargeable batteries – these are more expensive than alkaline batteries but they have the additional benefits of a much longer life than (up to 7 times longer) and

they are much lighter (about half the weight). Bearing in mind that even Lithium batteries will be affected by the cold to some degree, it's best to keep spares with you. To get the best out of the batteries you have it's best to keep them warm – and warming up apparently 'flat' batteries will restore the chemical reaction and therefore the power output.

DISPLAYING THE RESULTS

Very cold conditions also affect the LCD screen – it will start to refresh more slowly than usual and the display and the backlight will also become darker / dimmer too – the screen may even stop working. This is as a result of the liquid crystals used in the display becoming slow and unresponsive when at low temperatures and failing to respond to the signals used to power them. The display can even freeze if the temperature is low enough. In terms of preventative measures, there's little you can do other than try to keep the tester and the screen warm, but both the backlight and the LCD screen will usually recover as the temperature rises and there should be no long-term damage.

KILLER CONDENSATION

The most dangerous problem – to both the equipment and you, the user – is caused by moving equipment between cold and less cold environments: condensation. When warm air (which can hold more water vapour than cold air) hits a cold surface, water condenses out of the air and forms water droplets on that surface. So when you bring your cold equipment into a warmer environment (out of the car or van and into a warm room, for example), condensation will form on it.

You will see the damp coating form on the outside of the meter, but it will also condense inside – and this moisture can short circuit the electronic components. The high voltages generated inside the units (which can reach 400 Volts) can create sparks between conducting parts formed by the condensation, resulting in severe damage.

It is also possible to cause yourself some serious harm. The condensation which forms on the outer casing can form an unbroken film to the sockets and can easily conduct the output electric current straight into you, giving you an electric shock. Since an insulation tester, for example, can generate 1000 Volts in output, you need to take particular care when handling your testers – particularly when handling and removing the test leads.

THERMISTOR TROUBLES

Aside from any low-powered batteries, LCD failures and short-circuiting caused by the issues above, working in a cold environment or with cold equipment can also cause problems simply starting up the equipment. Most power supplies use a thermistor to limit the inrush of current when the power is turned on in a cold environment. The job of the thermistor is to raise the resistance when the temperature is low, but if the temperature is too low, and the resistance is correspondingly too high, the power supply simply won't start and neither will the tester it powers.

It's not all bad news, though, and many testers get through an entire winter without any problems, even though this winter (so far, anyway) seems to be testing even the most steadfast of meters, with temperatures of -18°C recorded recently.

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More about AMECaL:

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