

PROwave

Application note 0004-AN-0001

Solderpot earthing in specialist wavesolder applications

The PROwave pallet needs a good 'earth' connection to the solderpot in order to record electrical contacting of the molten solder with the measurement probes as the pallet passes through the wave(s).

In the majority of applications, this connection is reliably made by the 'earthing bar', the long titanium strip embedded into the underside of the pallet. The earthing bar makes contact with the molten solder whilst the measurements are taken, effectively earthing the pallet to the solderpot.

Some wavesolder set-ups can prevent the earthing bar from making contact at the appropriate times, resulting in contact data being missed.

An example of such a situation is where the solder wave is not set at 90° perpendicular to the board conveyor, the wave might have been arranged at an angle so as to yield better quality soldering of fine-pitched or high density surface mounted devices on the underside of a board. In this situation, the measurement probes at one edge of the pallet may be contacting the solder wave whilst the earthing bar is entirely clear of the wave.

The best solution is to provide an additional means of grounding the pallet to the solderpot.

The steel enclosure around the PROwave electronics is a suitable and convenient place to make a ground connection to the pallet. A connection should be made between any of the enclosure screws and a suitable grounding point on the soldering machine. One effective method is to attach a spring to the pallet such that it makes contact with the feed fingers of an edge-feed conveyor. Alternatively a length of wire and a crocodile-clip can be used in more difficult situations although care must always be taken to avoid the wire becoming entangled in the conveyor.

Notes:

- It is important to check that the new grounding point for the PROwave and the solderpot itself are both at the same ground potential, at least within 400mV, voltage differences greater than 600mV could damage the PROwave electronics. It is possible that leakage currents or switching spikes from solderpot heaters could result in undesirable voltages appearing between the solder and the conveyor. If any doubts exist about the integrity of the earthing, additional grounding straps should be installed between the solderpot, the conveyor and the power supply earth.
- Each PROwave probe sources 230uA DC current into the solder when it makes contact, pulling the probe pin from 700mV down to 0mV, the switching threshold roughly equates to a 3K resistive load. The total current due to the PROwave through the ground point is negligible by comparison with the currents in the solderpot and board pre-heaters. The PROwave-to-ground connection does not therefore need to be particularly heavy duty but the solderpot-to-conveyor connection could carry high currents and so may need to be properly bonded.

A kit of parts which can be adapted to provide additional earthing in various circumstances is available under part number 200322 'PROwave Earthing Kit'

The kit contains:

1. A length of high temperature resistant silicone insulated flexible wire, terminated with ring tag and crocodile clip.
2. A length of 302 stainless steel rod which can be cut and formed into suitable spring contacts.

Typical example of a spring formed from stainless rod, designed to make contact with the fingers of an edge-feed conveyor:

