

Case Study 2

0.25 W Resistor lead to lead cross wire weld - Monitoring Weld Misalignments

This case study explores the “operator error” fault detection features of the weld monitor unit using a real world cross wire welding example as the means to demonstrate the ability to detect misaligned components.

As for Case Study 1, we have chosen a simple setup welding two ¼ Watt resistor leads together using a Unitek CD 125 and an 80F Thin Line weld head.

The electrodes are copper chrome zirconium which have been machined so as to have two flat edges.

The welding conditions are set as follows :-

Pre-condition Pulse 1 : 3.0 W/S
Main Weld : 14 W/S

Nominal Welding Force : 45N

N.B. Voltage sensing leads are connected to the Weld Monitor using crocodile clips since we want to measure power at the weld. Crimps are better!

From Case Study 1, we know we can readily detect :

- Small errors in the force setting (+/- 3N)
- Small errors in the force setting (+/- 0.1 W/S)
- Over welding of joint
- Missing component

A good weld in this scenario occurs when the resistor legs are perpendicular to each other.

Exploring the sensitivity of the weld monitor in detecting misalignment, we can see that a small angular error in placing the resistor leads one upon the other, leads to a slightly different shape in the weld because there is a slightly different contact and dynamic resistance. **Angular error detection of around +/- 10° is possible.**

The energy at the weld therefore changes and an error is detected by the weld monitoring unit.

