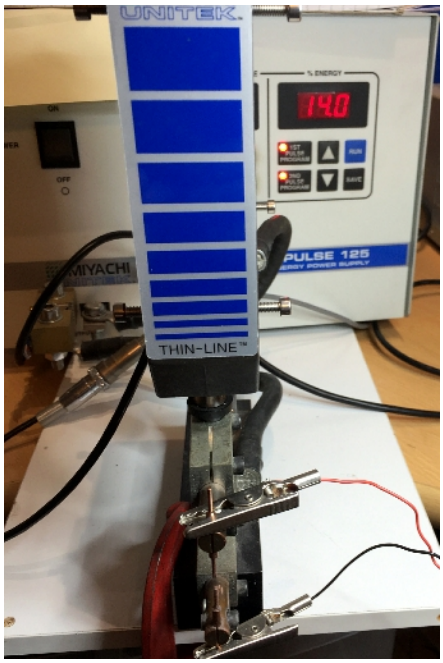
Case Study 1

0.25 W Resistor lead to lead cross wire weld

This case study explores the fault detection features of the weld monitor unit using a real world cross wire welding example as the means to demonstrate effectiveness and sensitivity.

For this study we have chosen to weld two ¼ Watt resistor leads together using a Unitek CD 125 and an 80F Thin Line weld head.



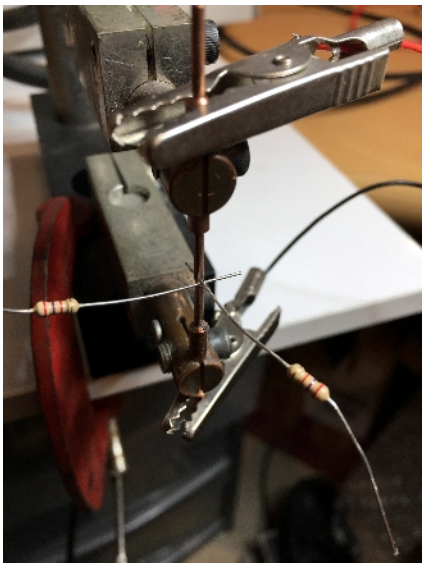
The electrodes are copper chrome zirconium which have been machined so as to have two flat edges.

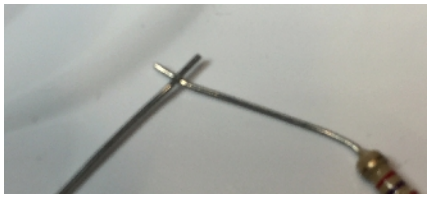
The welding conditions are set as follows :-

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

Nominal Welding Force : 45N

N.B. Voltage sensing leads connected to the Weld Monitor allow the actual energy at the weld to measured.





Consistent results after a 100 sample welding trial

With the conditions above, the pre-condition pulse measures 625A for 2mS and the main weld pulse 2 measures 1440 Amps. Following repeated welds, the weld monitoring unit readily and reliably detects the following fault conditions simulated by changes to the welding conditions.

1. A **3N Increase** in Force : this decreases the joint resistance, decreases the weld energy and results in a **LOW LIMIT ERROR** from the weld monitoring unit.

2. A **3N Decrease** in Force : this increases the joint resistance, increases the weld energy and results in a **HIGH LIMIT ERROR** from the weld monitoring unit.

3. A **0.1 W/S change** in either the pulse 1 or pulse 2 settings, yields a **HIGH** or **LOW LIMIT ERROR** as would be expected.

4. An **over weld** on a pre welded joint yields a **LOW LIMIT ERROR** as expected. The joint resistance is lower, hence the energy at the weld is lower.

5. A **missing resistor lead** yields a **LOW LIMIT ERROR** as expected. The joint resistance is lower, hence the energy at the weld is lower.

6. A **misplaced lead** against the electrode yields a **HIGH LIMIT ERROR** since the mechanical fit up produces a higher resistance and hence more weld energy is present.