The Motion Tech News

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Another solution found!

Hard face welding axis motion, made easy

3 axis cantilever linear motion

An Australian engineering company requested supply of a 3 axis linear stage for hard face welding. This welding technique is normally done with a plasma powder welder which the company supplied. The scope of supply was simple slow motion on X axis of 2mm/sec, Y and Z axis being manual jog moves to place the welding torch in the correct postion. Once again a ballscrew driven linear stage was used for X and Y axis, fitted with planetary gearboxes and brushed DC motors. The DC brushed motors were purely used to keep costs down though they do provide good velocity motion in extreme conditions as that experiend with the heat of a welding machine. Due to budget restraints the Z axis actuator was made with an affordable linear actuator.

However, to make the Z axis actuator "non rotatable" a linear rail and recirculating linear bearing were used by mounting to the actuator with clamps. This then stopped the head of the actuator from rotating and additionally gave a simple plate that the customer could mount their plasma wedling torch too.

The operation by opeator was via a simple control pendand fitted with selector switches for each axis for manual job motion on Y and Z axis. The X axis selector switch started an automatic cycle. The pendant was also fitted with a rapid traverse button for X axis along with a speed control knob for varying the feed speed during welding.

Under Control

Motion Technologies designed and constructed the control cabinet. All control panels are made to Australian Standards which far exceed CE standards. You can see in the picture a large 23VDC power supply for running the motors. Beneath this is 4 relays and 2 tiny drives for X and Y axis motors. These drives are from Electromen which specialise in affordable H Bridge drives for Brushed and Brushless motors up to 40 amps. These drives are 90mm x 45mm in size and run a motor to 20 amps continuous. The reasons these drives were chosen was for their ability to sense amperage. On the Y and X axis we needed to fit end of travel switches, though we did not. We used the current sensing capability of the drive to stop the axis at end of stroke and allow motion only in the other direction. This control technique is called hardstop. The Control requirment of the X axis was starting from home switch the axis moves until a proximetity switch is seen and then the axis does a rapid return back to the home switch. The proximity which is adjustable to allow the customer to set length of weld. Again the Electromen drive has a function that allows continuous operation between limit switches of which we fitted a relay latch at home cycle to stop continuous motion occuring.