



# Power Hydraulic Engineers

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GSTIN: 05ABAFP6082A1ZN

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## Friction Stir Welding Machine

### **Machine General Specifications**

- Floor Area covered : 3100mmx 1900mm
- Panel size to weld : 2500mmx 650mm
- Max. welding speed : 1200 mm/min (Maybe upto 2400mm/min, on demand)
- Recommended aluminium sheet thickness : 3mm-5mm
- Job Clamping System : Hydraulic Operated
- Mode of operation : Manual and Automatic

### **Deliverables**

- Machine bed with Tool spindle & Gantry Assembly.
- Hydraulic Power Pack with Air cooled oil cooler.
- Electrical control Panel with Manual and Auto Mode operation (HMI— optional)
- Operation and Maintenance manual with Product warranty certificate.
- General service tool kit—one set.
- Spare FSW tool two assemblies.

### **Construction Features of the machines**

**Gantry Drive system:** Keeping the machine bed stationary the gantry with spindle & pressing roller assembly will move through gear and pinion drive on heavy duty LM Guides.

**Tool drive System:** A heavy-duty spindle with BT40 tool holder flange and ER –Collet chuck is coupled to the driving motor inline. Spindle up & down movement is controlled by a vertically mounted hydraulic Cylinder.

**Tool inclination provision:** for the best result of solid-state welding there is a provision of mechanically tilting the FSW tool in the vertical plane on the welding axis.

**Job clamping System:** The machine has been provided with ten points vertical and five-point horizontal clamping of the job controlled through hydraulics.

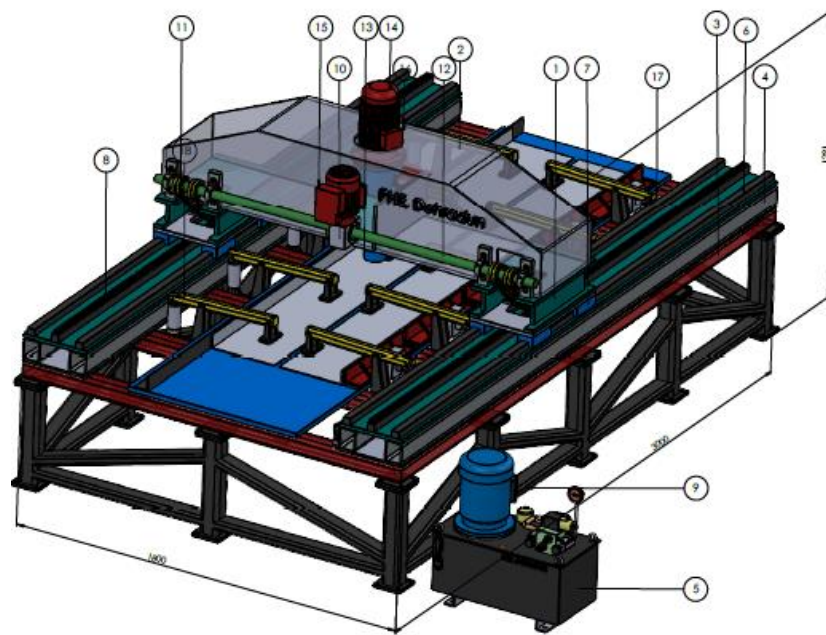
**FSW Tool and weldment cooling provision:** There is a provision of forced air cooling of the tool shoulder and the weldment to avoid softening of the tool and enhancing the microstructure of the welded joint for better result.

**Welding Quality:** The weld surface is very aesthetically smooth with almost no burs on the longitudinal edges. The tensile strength of the weldment comes around seventy percent of the parent material. The backside of the butt-welding joint would be perfectly flat matching the two joining edges of the panel.

### Scope of customization

- Two axis welding provision can be implemented.
- Welding speed may be increased up to 2.4 m/min if required.
- HMI for data logging and controlling the operating parameters may be provided.
- Gantry movement through servomotor for precise welding position controlling.
- Provision of LM Guide safety covering

**Provision of Servicing:** The machine will be provided with two complementary services after successful commissioning within the warranty period of one year. Service call will be attended on urgent basis.



| S. No. | Name of Component                           |
|--------|---------------------------------------------|
| 1.     | Gantry column                               |
| 2.     | Gantry Beam                                 |
| 3.     | Machine Bed                                 |
| 4.     | Track Base                                  |
| 5.     | Hydraulic power pack                        |
| 6.     | Linear Guide Rail                           |
| 7.     | Linear Guide Block                          |
| 8.     | Rack & Pinion                               |
| 9.     | Machine Table                               |
| 10.    | Centre worm drive gear box                  |
| 11.    | Belt & pulley arrangement                   |
| 12.    | Drive shaft                                 |
| 13.    | Milling Head                                |
| 14.    | Tool drive motor                            |
| 15.    | Gantry drive motor                          |
| 16.    | Tool load hydraulic cylinder                |
| 17.    | Job vertical clamp hydraulic cylinder       |
| 18.    | Job horizontal clamp hydraulic cylinder     |
| 19.    | Electrical Control panel                    |
| 20.    | Limit switches                              |
| 21.    | Joint compression roller hydraulic operated |

### 3D Model of Friction Stir Welding Machine for Aluminum Formwork

