SPECIFICATION
FOR
SYNERGIC MIG / MAG WELDING MACHINE

1.0 APPLICATION

Synergic MIG / MAG welding machine will be used for spatter free and heavy duty welding of Carbon Steel, Alloy Steel, Stainless Steel, Inconel etc on continuos duty cycle

2.0 TECHNICAL SPECIFICATION

(i)	**Type**	:	Digital Microprocessor controlled soft-ware based inverter type power source.
(ii)	**Shielding medium**	:	Argon + Co_2 gas mixture and / or CO2
(iii)	**Output Current range**	:	10 to 550 A
(iv)	**Welding Current rating at 100% duty cycle (10 minutes) at 40 ˚C**	:	440 A (minimum)
(v)	**Welding Current rating at 60% duty cycle (10 minutes) at 40 ˚C**	:	550 A (minimum)
(vi)	**Variation of set current**	:	< +/- 1%
(vii)	**Open circuit Voltage**	:	65 v (minimum)
(viii)	**Wire feed speed**	:	Up to 25m/min
(ix)	**No load Power Consumption**	:	< 75 W
(x)	**Type of Cooling**	:	Forced air cooled
(xi)	**Degree of Protection**	:	IP 23
(xii)	**Input Supply**	:	415 +/- 10 % Variation, 3 Phase 50 H +/- Variation

(xiii) Working Condition :

a) Ambient Temp. Variation 3^0 to 50^0 C
b) Relative Humidity - 95% (maximum) during rainy season.
c) Continuous heavy duty welding in dusty Fabrication Shop

3.0 TECHNICAL FEATURES

(i) Light weight, Trolley Mounted, Sturdy, Compact, rigid and dust proof construction.

(ii) Single knob Synergic Control through in built programs. Only base metal, wire diameter and shielding gas composition will be selected by Welder and rest all parameters will be automatically selected by the Synergic control system.

(iii) Digital display of all parameters.

(iv) In-built programmes for welding various combinations of base metals like carbon steels, alloy steels, stainless steels, Inconel etc. & from thin to heavy joint thickness.

(v) Warning and operational LED indications for over/under voltage and over temperature.

(vi) Hold function to check pre-set and actual major welding parameters after welding is over.

(vii) Gas test button to check gas flow rate before welding.

(viii) Error code display for maintenance purpose (Error diagnostic function).

(ix) Automatic Arc length correction control to compensate welder's hand movements.

(x) Built - in protective system to sense the water flow in the torch and prevent burning of Torch incase of insufficient /stoppage of water flow.

(xi) Short circuit and Single phase protection.

(xii) Auto-Cut off device built -in the power source to prevent use of higher current than rated capacity at 100% duty cycle in order to avoid burring of Torch / Components.

(xiii) Auto-Cut off built-in the power source in case of over heating.

(xiv) Fitted with built in cooling unit as single unit. The capacity should be such that the pump will be able to maintain coolant flow rate at a height of 6-7 m welding height, so that the torch does not get heated beyond specified limit.

4.0 SCOPE:-

Standard Synergic MAG welding machine will consist of following items with Individual price and Identification No.

(i) **Power Source** with controls as per technical specification and technical features (refer clause 2.0 and 3.0)

(ii) **Cooling Unit :-**

- Integral Water Cooling unit suitable to keep the Torch cools during continuous welding at rated capacity.
- The cooling unit should be interfaced with the Power Source so that in case of interruption in the flow of coolant through cable hose/Torch, no welding can be done as a precautionary measure. Accordingly error message should be indicated on control panel.

(iii) **Wire Feed Unit:-**

- Light weight, compact and rigid wire feeder with 4 all powered and grooved Roller drive and suitable for continuous smooth wire feeding with wire dia 1.2 mm and 1.6 mm Solid/Flux Cored Wire.
- Wire spool mounting arrangement with braking device for national/ international standard wire spools properly covered or housed inside the wire feed unit to prevent direct contact from moisture and dirt.
- Welding Torch Adaptor should be Euro Connection type.
- Digital display of major weld parameters like current, voltage, wire, speed, programme no w.r.t. material / thickness etc.

(iv) **Welding Torch :-**

- Ergonomically designed Water Cooled Torch fitted with 4.0 m flexible & light to handle cable hose and Euro connector.
- Torch will be fitted with 2/4 step on-off switch and Up/Down switch for finer adjustment of current, if required, during welding.
- Provision for Torch neck swiveling and locking to suit positional welding & welding in difficult areas.

(v) **Cables and Hoses :-**

- Interconnecting cable/hose assembly (15.0 m long) between Power Source and Wire Feeder Unit.
- Earthing cable (5.0 m long) with Plug/Connector.
- Input cable (10.0 m long) with Plug.
- All Cables will be made of Copper

(vi) **Accessories :-**

- Pressure regulator and flow meter built-in with unit.
- Trolley with Handle for portability of the unit.
- Any other accessories as recommended by vendor for better efficiency and maximum utilization.
- Tool Kit consisting of Nozzle Cleaner, Alley keys, Plier for cutting wire etc.

(vii) **Consumables :-**

Following consumables as applicable for offered Torch model should be offered with Individual price and Identification no.

- Various gas nozzles, Spatter guard, diffuser, fixing sleeve, insulation ring, liners, contact nozzle etc.
- Offered consumables will be w.r.t. dia 1.2 mm solid wire and dia. 1.6 flux cored wire..

(viii) **Spares:-**

a) Complete list of all the components used in the machine, clearly marked on the schematic diagram of the machine with identified part nos. for power source, wire feeds, cooling unit & torch.

b) Individual price of all components (with identification no.) as mentioned in (a) above should be given in price bid.

5.0 Five sets of operation and maintenance manuals consisting of following documents: -

(i) Operation and Instructions.

(ii) Maintenance Instructions.

(iii) Do's and Don't' s.

(iv) Assembly diagrams of Power Source and wire feeder with identification nos.

(v) Split diagrams of welding Torch with identification nos.

(vi) Electrical and electronic circuit diagrams, including PCB's with wire nos.

(vii) Wirings diagrams with wire nos.

(viii) Trouble shooting and remedies.

(ix) Details of in-built programs.

(x) Complete list of spares with identification nos., make, model rating & price of all the items.

6.0 Commissioning and trials at BHEL works by vendor.

7.0 3 days Training to operational and maintenance personnel at BHEL works.

8.0 3 years guarantee for smooth and trouble free working after commissioning.

9.0 After Sales Service:-

9.1 Prompt after sales service during and after expiry of guarantee period and response time should not be more than 48 hours.

9.2 Vendor has to furnish the details of the Indian agent & contact of the nearest service centre for reporting machine break down.

10.0 IMPORTANT NOTE:-

10.1 Offer should be complete, point wise as per specification, along with complete supporting technical details, leaflets of offered model for technical assessment of the offer.

10.2 Offered scope should be complete and price to be given individual items as per scope.

10.3 Spares availability to be ensured by vendor for at least 10 years for the offered model.

11.0 <u>QUALIFICATION CRIETERION</u>:

Offer of only those vendors will be considered who have supplied minimum 10 nos. MIG / MAG Welding Machines of this rating or of higher rating and such machines must be working satisfactorily for the last 5 years from the date of opening of tender). Along with their offer vendor must submit list of such customers with their address / e-mail address / phone nos., year of commissioning alongwith model and broad specifications of the machines supplied to them. Vendor should also submit copy of commissioning certificates of these machines from their customers.