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IMPORTANT INSTRUCTIONS TO TENDERERS FOR FILLING TECHNICAL BID

1.0 Bidders are required to give clause wise comments on the technical specifications, confirming compliance/non-compliance with details of deviations if any along with their effect on the performance. Back references to be avoided, offers are likely to be ignored in case of non-compliance of these instructions for furnishing the information.

1.1 Unless otherwise stated, latest alterations/ revisions of specifications/ standards/ drawings shall be applicable. In respect of safety standards and environmental standards relevant to the machine, the machine manufacturers shall ensure compliance with international (CE/ISO/DIN/JIS)/National standards (IS) (wherever applicable).

1.2 Tenderers shall offer and quote for all the specified concomitant accessories, as these are considered essential for commissioning and utilization of the machine. Even if bidder does not recommend the purchase any of these accessories, the price must be quoted for comparison purposes and their recommendation/suggestion indicated in the offer. Tenderers shall also quote for optional accessories, spares and consumable spares as asked in the specifications.

1.3 In case, any item is required in sets, please specify nos./pieces per set. This is essential for proper technical evaluation of the offer. Offers received without this may be considered as incomplete and liable to be rejected.

1.4 The bidder shall quote only for the specified make of sub-assemblies and equipment wherever specified. Makes of sub-systems other than the specified ones will normally not be acceptable. In case, some other make is quoted, specific reasons for the same including its features/advantages over specified makes must be brought out in the offer.

1.5 In case there is a contradiction in any information provided (some parametric values given in the specification and those given in the brochure or some other document enclosed by the tenderer), unless specifically mentioned in the deviation cum confirmation statement the values as given in the specification shall be taken as confirmed by the tenderer and offer evaluated accordingly.

1.6 The Purchaser may accept internationally accepted alternative specifications which ensure equal or higher quality than the specifications mentioned in the Technical Specification. However, the decision of the Purchaser in this regard shall be final.

1.7 Purchaser reserves the right to verify the details submitted by the bidder by actual site visits.

1.8 Other terms & condition of the contract will be as per Indian Railway Standard conditions of contract.

1.9 Tenderer not submitting the requisite information may note that his offer is liable to be ignored.

2.0 PURPOSE

High Speed TIG Welding machine is required for defect free welding of sheet metal & root runs for carbon steel, Alloy steel, Stainless steel, Inconel, Aluminium etc. material with digital weld process control using AC current or DC Current as may be applicable for use in Shell Shop. It will reduce the logistics and time involved in repairing/rectification work out in Shell Shop of Rail Coach Factory, Kapurthala.

3.0 DESCRIPTION AND SCOPE OF SUPPLY

3.1 The scope covers design, manufacture, supply, installation and commissioning of High Speed TIG Welding machine as per below specifications and major parameters given in the Schedule-I.

3.2 The supply shall also include all equipments and accessories which the manufacturer considers essential to make the equipment fully functional when installed and put into operation.

3.3 Other concomitant accessories/ equipment which the manufacturer considers essential to make the machine fully operational when installed and commissioned with requirement of utilities, etc if any, shall be clearly indicated by tenderer in the offer.

3.4 The total value of the offer will be calculated on.

i. The cost of the basic machine.
ii. Cost of the concomitant accessories according to tenderer specification.
iii. Cost of any other accessory treated as concomitant accessory.
iv. Application duties and taxes, insurance, freight and installation and Commissioning charges.
v. Cost of CAMC for period 05 years. However, this will not form part of Contract Value.

3.5 Technical experts of the manufacturer during commissioning of machine will fully and adequately train the operators/ maintenance staff nominated by the consignee including repairs of electronic gadgets, sub-assemblies and Printed Circuit Boards up to component level.

4.0 GENERAL FEATURES

4.1 The machine shall be Digital Microprocessor Controlled IGBT Inverter based programmable ACDC TIG welding Power Source with cold TIG feeder.

4.2 The machine shall be portable, lightweight, sturdy, with easy maneuverability to work at shop floor condition.

4.3 The machine shall have minimum IP 23 degree of protection, Insulation Class: F or better, minimum S class Environmental safety class with higher electrical hazard.

4.4 The power shall be integrated with liquid cooling system for cooling the TIG Torch.

4.5 The machine shall have feature of continuously adjustable welding power and Step less control of current settings.

4.6 The machine shall have in-built safety measures against open circuit, short circuit, phase fault etc.

4.7 The machine shall have facilities for storing welding parameters and activate those stored parameters for repetitive type welding.

4.8 The machine shall have function selection switch for DC TIG, Pulsed TIG welding.

4.9 The machine shall have in-built protection/tripping device to avoid any damage to the machine at higher current range than specified and shall also have over temperature protection.

4.10 The machine shall conform to: IEC 60974-1, 2, 3, 5, 10.

4.11 For TIG Welding power source:

4.11.1 The **TIG Welding power source** shall have following in-built features:

- Welding processes: MMA & TIG
- HF Ignition Facility / Contact Ignition facility in TIG mode
- TIG / Pulsed TIG / Double Pulsed TIG / MIX TIG (only in AC) / TIG SPOT
- Wave Form Control in AC mode: Sine, Rectangle, MIX (Combination of traditional Sine & Square)
- AC Balance control

- Automatic Gas Pre-flow & Post flow
- Gas test function
- 2 / 4 Step (2T/4T) operation
- Welding current Up-slope / Down-slope
- Welding End program for Crater fill function
- Welding Start Current / End Current

4.11.2 The **TIG Welding power source** shall have following functions and values:

- Gas Pre-Flow: 0-30.0s
- Gas Post Flow: 0-30.0s
- Upslope: 0-10s
- Down slope: 0-10s
- Ignition current: 0-250A
- Ignition Time: 0-25ms
- Start Program current: 3-Max Amps.
- Start Program duration: 0-10s
- End Program current: 3-Max Amps.
- End Program duration: 0-10s
- Pulse time: 0.01-25.0Hz.
- Pulse Down Slope time: 0.00-2.00s
- Pulse Up Slope time: 0.00-2.00s
- Double Pulse Freq.: 1-20 kHz.
- Spot Welding duration: 0.01-300s
- Pause Duration: OFF, 0.01-30s.
- Synergic TIG Function: by selecting material thickness, gas flow rate and electrode diameter, power source shall display suitable parameters for defined wire feed speed or welding current.

4.12 The machine shall be compatible to **Cold TIG feeder unit** and operate in synchronized manner which shall have following features:

- The TIG cold wire feeder shall be combined with the TIG welding power source to be used both for manual welding and integrated with automation systems.
- It shall be possible to control the wire feed speed from the torch itself.
- Interconnection cable assembly between power source and wire feed unit shall minimum be 8 meters.
- The cold TIG feeder shall be light in weight and of compact in size to make it portable and ergonomic in design.
- The cold TIG feeder shall be light in weight and of compact in size to make it portable and ergonomic in design.
- The wire feeder unit shall have geared Four Roll Drive unit for positive feeding.
- The Drive motor of the feeder shall have encoder to precisely control the wire feeding as per the set parameters.
- The wire feeding control shall have two modes: Manual & Synergic. In synergic control with pulsation the TIG filler wire shall automatically start and pause in synchronization with the pulsing of the current. In manual control the TIG filler wire shall feed intermittently with respect to the set ON Time and OFF Time.
- The Operation Panel of the TIG feeder shall have following controls:
  a. Wire feed speed control
  b. Wire feed sequence control
  c. Synergic control
  d. Setting of wire feed ON/OFF control.

e. Wire fwd. / Rev. inching

- The wire feeder shall be fully compatible with the TIG power source and have provision for interfacing with automated system.
- The wire feeder shall have at least 15 memory channels to store the welding parameters for different welding applications.
- The wire feeder unit shall have following functions and values
  a. Wire feed speed: 0-8m/min.
  b. Wire pulsation ON & PAUSE time: 0.5-20s
  c. Wire delay time: 0-20s

4.13 The machine shall have highly flexible, ergonomically designed, light weight **liquid Cooled welding Torch** with swivel mounted handle, flexible and light hose. It shall be fitted with press and release type switch suitable for 2/4 step operation and push / pull connector with locking system. The TIG welding torch shall be equipped with following features:

- The TIG welding Torch shall be designed for TIG welding applications along with filler wire.
- The TIG welding torch shall be designed to interface with the TIG wire feeder with the functions to deliver the welding current and the wire feed.
- The torch shall be equipped with on-torch remote controls for start/stop of the welding and controlling the wire feeding.
- The torch cable shall be flexible and made of heat & wear resistant material to prevent damage due to spatters, hot material and other harsh objects.
- The TIG torch shall be provided with wire feeding kit for convenient housing of the wire conduit and the contact tip.
- The wire conduit shall be made of material to suit ferrous and non-ferrous filler wire and smooth feeding with minimum friction. Bidder shall provide technical details with pictorial explanation of the torch design.
- The TIG welding Torch shall have following specification:
  a. Current rating: 400Amps @ 100% duty cycle (Ar Gas)
  b. Cooling: Liquid cooled
  c. Length:4m
  d. Electrode dia.: 1.0 – 3.2mm
  e. Wire dia.: 0.8 – 1.6mm

4.14 The machine shall be equipped with **Display system** which shall have colored alphanumeric display of functions & parameters:

- Welding voltage & current
- Operating mode
- Welding parameter values like Gas pre-flow and post flow time, down slope and up-slope time, Pulse time, Pulse pause time, ignition current, main current, start current, end current, synergic functions etc.
- The operation panel shall be Menu driven for selecting a defined welding parameter / sequence.

4.15 The machine shall be equipped with **Liquid Cooling unit** which shall have following features:

- The liquid cooling unit should be integrated with the power source and the power supply of the cooling unit should be from the power source. No external power cabling will be acceptable.
- The cooling unit should have coolant flow switch to monitor the liquid flow and the welding should stop with error message in case of any low coolant level or interruption in liquid flow.
- The cooling unit shall have tank capacity of 3 liters or above and water hose connectors shall be provided with quick release connectors.

4.16 The machine shall be capable of working in normal Indian Railways workshop environment with maximum ambient temperature up to 55^{o}C and maximum relative humidity up to 98%.

5.0 MAKE

5.3.1 The supplier shall clearly mention whether the system quoted is Indian make or imported. If Indian make, the tender shall be accompanied by duly sanctioned factory license & relevant documents & also produce records of installation & satisfactory aftersales service performance of their equipment from at least one govt. Institution of similar or large size for duration at least 3 Years duration.

5.3.2 If imported item, the OEM firm shall be registered for operations in India for a minimum period of last 3 years. In case this is not so, the dealer shall be authorised regional supplier & service provide for the late 3 years. He shall also produce installation & satisfactory after sales service record of duration at least last 3 years from at least one govt. Institution for a system of similar or larger size. Further the tender shall be accompanied by authorization certificate from OEM.

5.3.3 The supplier shall furnish the complete details of Model No. Make & Manufacturer's details/ address, Country and authorization details of Dealership.

6.0 CONCOMITANT ACCESSORIES

6.1 The machine shall be supplied along with following concomitant accessories. The cost of each listed concomitant accessory shall be quoted separately. Wherever for any reason the cost of any concomitant accessory is included in the basic price of the machine the same shall be specifically mentioned.

- TIG Power Source with built-in HF system and integrated liquid cooling system as per technical specification
- Cold TIG Feeder as per technical specification
- Liquid Cooled TIG Torch with 4.0m cable/hose with wire feeding conduit kit as per technical specification
- Interconnection cable assy. Between power source and Cold Tig feeder.
- Input Cable with Plug 10.0m
- Interconnecting Hose between Gas Cylinder & Machine – 5.0M
- Earthing Cable with Clamp – 5.0m
- Argon Gas Regulator and flow meter with connecting nipples for Indian standard Argon Cylinder
- Wire Conduit: 1.0 / 1.2 / 1.6mm dia. For Steel / stainless steel / Aluminium: 2 nos. each.

6.2 Any other accessory, which in the opinion of the tenderer can contribute to higher performance, shall be indicated and quoted separately.

6.3 A maintenance tool kit consisting of nozzle cleaner, Allen key. Spanner etc is required to cover all the fasteners of all sub-assemblies of the equipment.

7.0 SPARES & CONSUMABLES

7.1 The tenderer shall furnish details of spares covered under warranty.

7.2 List of important spare parts and accessories with their part number and costing.

7.3 The tenderer shall be furnishing the price list of spare parts required for two years normal maintenance of the equipment. Sources of supply of spares used other than that of manufacturer shall be furnished by the tenderer.

7.4 List of recommended spares for normal maintenance after expiry of warranty period to till useful life of the equipment and these spares shall be readily available in the market with your authorized stockists.

7.5 List of recommended consumables for two years shall be quoted separately.

7.6 Useful life estimated/expected for each equipment and its sub assembly shall be indicated by the tenderers.

8.0 OPTIONAL ACCESSORIES

Any other accessory, which is in the opinion of the tenderer can contribute to higher production rates, shall be indicated and quoted separately mentioning prices of each accessory.

9.0 INSPECTION OF EQUIPMENT & TESTING AT MANUFACTURERS WORKS

9.1 Manufacturers must have suitable facilities at their works for carrying out various performance tests on the equipment. The tenderer shall clearly confirm that all the facilities exists and shall be made available to the inspecting authority.

9.2 A load and functional test must be carried out at the manufacturer's works. Reliability of the equipment shall be demonstrated to the satisfaction of the appointed inspector or inspecting agency.

9.3 A sample inspection chart for inspecting the equipment shall be supplied along with the bid.

10.0 **INSTALLATION COMMISSIONING AND PROVING TESTS**

10.1 The contractor or his agent would be required to carry out a joint check at the consignee's end, along with the consignee, before unpacking is done, to avoid subsequent complaints regarding short shipment/transit damages. It is necessary that this joint inspection be done immediately on receipt of the machine by consignee to avoid commissioning delays due to shortages/transit damages.

10.2 Installation of the machine would be done under the supervision / direction of firm engineers. The contractor shall arrange commissioning of machine after installation is done. Adequate number of teams of technical experts will be made available so that the commissioning delays are eliminated. Such personnel will be required to be present as soon as the machine has been received.

10.3 The contractor or his agent shall commission the machine within 15 days from the date of receipt of machine.

10.4 The machine performance shall be demonstrated to the full satisfaction of consignee at the consignee's works.

10.5 If an assembly/sub-assembly requires to be taken back to the manufacturer's premises for repairs/replacement either before commissioning or during warranty, the manufacturer or his agent would be required to submit a Bank Guarantee. In case the entire machine has to be taken back, a Bank Guarantee would have to be submitted. The Bank Guarantee shall be of adequate value so as to cover the cost of the assembly/sub-assembly/paid up cost of the machine.

11.0 TECHNICAL LITERATURE

11.1 One copy of the printed illustrative catalogue showing technical features of the machine and its elements must be enclosed with each copy of the bid.

11.2 The successful tenderer will have to furnish, for each machine 4 copies of spare parts catalogue giving the part list number of each component with exploded views and assembly drawings of major assemblies, maintenance manual, trouble shooting guide, operational manual of the machine and all electrical circuit diagrams to the consignee directly within 3 months of the placement of order. The bidders shall provide a list of literature, they will supply along with the machine. The technical literature shall be provided for complete machine including imported and indigenously purchased components/sub-assemblies.

12.0 DEVIATIONS:

The tenderer shall clearly certify that the machine offered fully meets the specification various design features incorporated in the machine to fulfil different technical performance requirements shall be fully explained in the offer. However, minor deviations from this specification, which do not affect or in any way interfere with the stipulated performance standards, or would result in improved safety/reliability or would reduce recurring maintenance/operating cost of the machine, can be considered for acceptance.

13.0 **SERVICING FACILITIES**

13.1 Service facility in Punjab, Address and contract details including phone and fax no. to be provided. The facility should have the necessary equipments recommended by the manufacture to carry out preventive maintenance test as per guideline provided in the service / maintenance manual. Firm should provide list of equipment available for providing calibrations and routine maintenance support as per manufacturer.

13.2 Supplier will undertake for service repairs & replacement of any needed part as & when needed.

13.3 Maintenance contract to be quoted after the expiry of maintenance period quoted above with details of scheduled visits, part covered under contract & cost of parts not covered as well.

13.4 The tenderer shall clearly spell out in the offer about the facility available with him or his agent/dealer for providing adequate after sales service in Punjab during warranty period.

13.5 The contractor shall give a comprehensive spare part list with OEM details and price for all the sub systems.

13.6 The tenderer/contractor shall provide list of spares, consumables required for maintenance for 7 years after completion of warranty period as per annexure A.

13.7 Tenderer shall provide expected life for the components of the system and provide the maintenance schedule required for 10years for as per annexure -

13.8 Total up time of the system should be at least 90%. Up time shall be counted in following manner:-

13.9 Total breakdown of less than 8 hours shall be ignored for the purpose of this calculation.

13.10 Penalty may be imposed if the down time is more than 10% without any valid reasons. The levy of token penalty as deemed fit based on the merit of the case may also be considered.

13.11 Tenderer shall provide the service charges /per day/per man for deputing service engineer on the machine on requirement separately for Indian and Foreign engineer.

14.0 **WARRANTY**

14.1 As per IRS conditions or as quoted by the tenderer whichever is longer.

14.2 Warranty period for part or machine shall be extended after completion of warranty period by the duration under which the part or machine remains under breakdown during warranty.

15.0 SPECIAL FEATURES

Special features incorporated in the equipment, if any, shall be indicated separately by the tenderer, clearly indicating advantages of the features.

16.0 PAYMENT TERMS

80 % on commissioning of machine and balance 20 % after one month of observation of successful performance of machine and submission of Bank guarantee equivalent to 10% of P.O value valid up to the warranty period of the machine.

17.0 DOCUMENTS TO BE UPLOADED FOR TECHNICAL EVALUATION

Following documents must be submitted by the tenderer along with the offer:

17.1 Clause wise comments on technical specification

17.2 Detailed list of spares covered under warranty. (Annexure-A)

17.3 Details of deviations from specification if any as per Annexure-B

SCHEDULE-I

MAJOR PARAMETERS

SR NO	Parameter	Specification
	For TIG Welding Power Source	
1.	Input Supply	**415V ± 10%, 50 Hz, Three Phase, 3 wire system**
2.	Output Current Range – TIG (AC & DC):	**3A/10.1V – 400A/26V**
3.	Output Current Range – MMA (AC & DC):	**10A/20.4V – 400A/36V**
4.	Open Circuit Voltage	80V (at 400V Input Voltage)
5.	Welding Current duty cycle @ 10 minute cycle, measured at 40°C ambient	CW/ PWM
6.	Maximum Welding current at 60% duty cycle	400A, in AC & DC or better
7.	Maximum Welding current at 100% duty cycle	350A, in AC & DC or better
8.	Maximum Input current at 60% duty cycle (TIG)	20A or better
9.	Maximum Input current at 60% duty cycle (MMA)	25A or better
10.	Efficiency	85% or better
11.	Protection Class	IP23 or better
12.	Insulation Class	F or better
13.	No Load Power	40W or lesser
	For TIG Welding Torch	
14.	Current rating	400Amps @ 100% duty cycle (Ar Gas)
15.	Cooling Type	Liquid Cooled
16.	Cooling Tank Capacity	3 liters or above
17.	Length	4 m
18.	Electrode dia.	1.0 – 3.2mm
19.	Wire dia.	0.8 – 1.6mm
20.	Shielding gas	Argon
	For Cold TIG feeder	
21.	Welding current	350 A @ 100% duty cycle 400 A @ 60% duty cycle
22.	Wire Diameter	Steel & Stainless Steel: 0.8 – 1.2mm Aluminium: 1.0 – 1.6mm
23.	Wire Spool size / Weight	300mm / 15kgs.
24.	Wire feeder weight	8kgs or less.
25.	Machine dimension(max)	140 cm x 65 cm x 110 cm
26.	Materials supported	SS, MS, Carbon Steels (up to 3 mm)

SCHEDULE-II

SCHEDULE OF DELIVERY:

S N	Activity	Activity Code	Time Schedule (to be accepted by firm)
1.	Issuance of PO	D1	NA
2.	Supply of Machine	D2	D1+90 days
3.	Power Connection for the machine and other on site requirement to be provided by railways.	D3	D2+3 days
4.	Installation, Commissioning and Prove Out of machine	D4	D3+15 days
5.	Warranty	D5	D4+24 months

ANNEXURE-A

S.N.	ITEM	PART NO.	SERVICE LIFE	PRICE

ANNEXURE –B

DEVIATION STATEMENT (IF ANY)

S.N.	Specification Clause No.	Deviation (If Any)
1.		
2.		
3.		
4.		
5.		