

SPECIFICATIONS OF MACHINE

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DESCRIPTION:

Automatic Beam Welding Line Machine with full welding set up is required complete in all respect to hold and support the jobs in full length and width for automatically SAW welding of I-beam girder/H-beam girder made out of mild steel including auto setting of flange and web plate on turnkey basis.

TECHNICAL SPECIFICATION

1.1 Leading Parameters

1.1.1 Major parameters:

1.0	Power Source	
1.1	Power Source Type	: DC Thyristor based Welding Power Source 1200 Amp.
1.2	Input power supply	: 400V/415V \pm 10%, 3 phase, 50 Hz \pm 3%, 3/4 wire system with neutral solidly earthed at the source.
1.3	Welding Current	: DC@ 60% duty cycle - 1200 Amp. DC@ 100% duty cycle - 1000 Amp.
2.0	Job Size	
2.1	Web Height	: 200-3000 mm
2.2	Web Thickness	: 6-25 mm
2.3	Flange Width	: 150-1250 mm
2.4	Flange Thickness	: 6- 80 mm
2.5	Beam Length	: 13.5 mtrs.
2.6	Max. Beam Weight	: 1500 kg/m
2.7	Beam Type	: Welding of H,I,T,L, Box Beams
2.8	Assembly of Beam type	H, I, T
3.0	Welding Speed	: 0.3 m/min to 1.0 m/min
3.1	Welding wire Size	3mm to 4mm
3.2	Welding Technology	: Tandem SAW

2.0- Infeed Line

2.1- Positioning Group:

No.2-2 web positioning columns, provided with arms and positioning rolls to keep the web in correct vertical position. The columns tilts at 90° degrees on both sides by hydraulic cylinder, in order to facilitate the side loading of web and flange.

- No.1 flange centring rolls unit, provided with a precision centring system with fast hand-wheel, to keep the flange in the correct position.
- No.1 powered and lifting roll for the translation of the beam, raising and lowering are provided by pneumatic cylinders with NC electro valves controlled from the control panel.

2.2- Centring and Aligning group:

No.3+3 web positioning columns, provided with arms and positioning rolls to keep the web in correct vertical position. The columns tilts at 90° degrees on both sides by hydraulic cylinder, in order to facilitate the side loading of web and flange.

- No.2 flange centring rolls unit, provided with a precision centring system with fast hand-wheel to keep the flange in the correct position.
- No.2 powered and lifting roll for the translation of the beam, raising and lowering are provided by pneumatic cylinders with NC electro valves controlled from the control panel.

1 Remote Control Board. All operations of the infeed line are activated and controlled by means of the Remote Control Board. (9) 15
• No.1 special flange-web coupling system. The system allows placing the flange and the web in the correct position to execute the first tack welding on the front edge (entry tack welding). A hydraulic cylinder (at the bottom of the Flange) with NC electro valve controlled from the control board provides the correct contact between the flange and the web to allow an easy and quality execution of the tack welding.

2.3- Buffer Unit:

Buffer Units placed between the Entry Group of the Infeed Line and the T Beam Line including:

- o N.4 web guiding arms
 - o Powered rolls
 - o The two columns near the T welding machine, are provided with n.4 adjustable web guidance rolls, to permit the Beam to enter exactly on centre line.
- The purpose of the buffer unit is to allow the loading operations of a new beam on the Inlet Line while another beam is in the final welding phase, in

3.0- Beam Welding machine:

N°1 TBM for automatic welding in sub-arc without tack-welding. The machine include:

- o n.1 machine basement with special hopper for recovering exhaust flux, slag and small part of welding wire.
- o n.2 machine columns.
- o N.1 machine column connection.
- o n.1 Hydraulic traverse to clamp the web to the Flange during the welding; the pressure is adjustable up to 100 bars, reaching 7 T.
- o n.2 Turning welding ground devices placed on the main drive roll.
- o n.1 Main powered drive roll for the beam feeding. The speed is adjustable and controlled by DC motor and tacho-generator connected to the roll by double chain.

3.1- Flange Guiding device:

n.4 heavy-duty slides with guidance rolls, to guide the Flange inside the machine. The two on reference fix side are motorized by hydraulic motor and dimension visualize by linear transducer. The other two on the other side are motorized by hydraulic cylinder with the function to close the Flange against the reference side. A pack of spring will compensate the deformation of the cutting and when in position a light will be on.

3.2- Web Guiding Device:

n.2 heavy-duty slides with wheels, to guide the Web inside the machine and keep the Web exactly on the centre of the Flange until the end of the beam. The one on reference fix side is motorized by hydraulic motor and dimension visualize by linear transducer. The other to the other side of the machine, is motorized by hydraulic cylinder with the function to close the Web against the reference side. A pack of spring will compensate the deformation of the cutting and when in position a light will be on.

3.3- Web Guiding Device on Column:

N.2 heavy-duty slides with rolls, motorized by hydraulic cylinder, to keep the Web exactly on the centre and in square with the Flange until the end of the beam. The two slides are positioned on the two columns (right and left side). A series of tapped holes are utilized to change the device's position (up / down)

3.4- Straightening Device:

N.1 Special Straightening Device FULL PLC controlled, integrated on the basement to allows to compensate the angular deflection of the flange. Straightening is carried out by two bending rollers, that press the flange, to recover the deformation produced during the welding process; the reaction to the force operated by such rollers, is provided by the central roll. The movement and positioning of the straightening rolls is motorized by hydraulic cylinder and dimension visualize by metric index. The adjustment in height

straightening rolls, is activated by means of hydraulic cylinder, in function of flange thickness and dimension visualize by linear transducers.

The Beam Welding Machine includes N.1 hydraulic power pack to supply the oil for the hydraulic motors and the hydraulic cylinder of the traverse.

The beam is fed vertically through the T-Beam and two fillets are welded at the same time. The tack weld at the end of the beam is not necessary. The drive roll allows a variable speed ranging from 0,2 to 2,3 m/min.

3.5- Proportional guidance system for welding T- II Beams:

Guidance equipment is designed to control the position of the weld wire with respect to the joint automatically. The sensing device (N.2 LASERS) coupled to the welding torch, travels approx. 25mm ahead of the arc. As the LASERS travels along the welding joint, horizontal and vertical deviations in the joint will be sensed actuating the motorized slide, to move the torch to consistently maintain the arc in the centre of the weld.

Basic Components:

- Powered Slides: Standard powered slides are motorized by permanent magnets DC servomotors. Vertical stroke: approx. 200 mm – Horizontal stroke: approx. 200 mm
- LASERS assembly: the LASERS are placed 20 to 40 mm in advance of the arc, senses the joint to be welded and sends a signal to the motorized cross slides to maintain optimum wire position.
- Manual laser slide: the probe slide has 60mm vertical and horizontal adjustment to obtain precise wire position with respect to the probe during initial setup.

3.6- Motorised slides for multi pass:

N.2 motorized system to change each torch angle in case of multi-pass welding. The operator can change the torch angle acting on the main touch screen panel and reach the desired torch's angle in case of multi pass. The angle value is visualized on HMI panel and position can be saved by PLC.

3.7- Automatic flux recovery unit and delivery unit:

- > Nos.2 suction units, one on each side
- > Nos.2 flux hoppers to be installed on columns
- > Nos.2 intermediate hoppers
- > Flux recovery hoses

3.8- Automatic Positioning:

Database - Ethernet With the PLC Control it is possible to load a recipe previously set, or manually enter the value of the beams on the panel. Digiting OK on the panel the TBM device sets automatically on the correct position.

The PLC can be connected to an Ethernet line that allows to visualize the parameters set on the machine (on / off – alarms – position of guiding rolls – traverse pressure etc.) as well as on the back office computer of the customer.

With this computer it is possible to make a diagnosis through IP address and We can check the problems from Italy by internet connection and IP address. The customer has to provide the line from the CPU rack, to the Ethernet line.

3.9- PLC Control with database including the following:-

- n.1 PLC made by Siemens with touch screen panel 7" HMI, provided with CPU
- n.5 Linear transducer for the positioning control of:

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 NKUR SHARMA
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 Location: IREPS

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- Web guiding rolls – reference side.
- Flange guiding rolls – reference side in Infeed side of machine.
- Flange guiding rolls – reference side in Outfeed side of machine.
- N.1 right straightening roll position in function of flange thickness.
- N.1 left straightening roll position in function of flange thickness.
- n.3 Hydraulic motors –
- n.7 Hydraulic cylinders

Also included N.2 pneumatic devices to OPEN/CLOSE the flux descent on torch, activate by selector positioned Also included N.2 pneumatic devices to OPEN/CLOSE the flux descent on torch, activate by selector positioned on push-button panel.

4.0- Welding Equipment:

- ✓ Inverter based digitally controlled Welding head and Power source.
- ✓ High efficiency and high power factor – resulting in substantial energy saving over conventional SAW outfits
- ✓ Enhanced Reliability due to SMD technology.
- ✓ SAW Welding can be done in either CV or CC modes. In the Constant Current mode of SAW welding, advanced Adaptive control technology is utilized to obtain the most stable arc parameters, highest level of penetration, and excellent weld bead finish
- ✓ Inverter based power source is energy efficient giving almost 30% energy saving over conventional type of machines.
- ✓ Mains On 'Green' Colour Led Indication
- ✓ User can save and recall up to ten programs.
- ✓ 4 digit digital displays for Voltage and Current.
- ✓ Current adjustment Encoder
- ✓ Trip 'Red' Colour Led Indication of machine is Under Protection Mode.
- ✓ Better user interface having 128 X 64 character LCD display for selecting various modes and button, LED and indicator lamp, which helps in easy operation of the equipment..

Welding Machine package Included items are as below:

- 2 Nos, 1200 (I) Power Source
- 2 Nos, Meastro Controller
- 2 Nos, Wire feeder
- 2 Nos, Welding cables and return Cables
- 2 Nos, Control Cables from wire feeder to controller
- 2 Nos, Control Cables from Power Source to controller
- 2 Nos, Welding power and negative cables are included in the package.
- 2 Nos, Flux Hopper, Hose, Flux Nozzle 2 Set, Contac tips (4.0 mm), wire liners

4.1- Power Source (1200Amp.): Inverter Based

Specifications	Unit	Data
WELDING CURRENT RANGE	AMP	100-1200
DUTY CYCLE 100 % (CONTINUOUS)	AMP	1000
WELDING VOLTAGE RANGE	VOLT DC	26- 44

WIRE FEED SPEED, STEP LESS CONTROL	M/MIN	0-4
SUITABLE WELDING WIRE DIAMETER.	MM	3.15, 4.0, 5.0
CONTROL VOLTAGE (FROM POWER SOURCE)	V	42 V AC
EFFICIENCY	%	≥ 85
POWER FACTOR		≥ 0.9
INPUT POWER 415V AC @ 100 %	KVA	55
COOLING	Type	FORCED AIR
CLASS OF INSULATION		F
DEGREE OF PROTECTION		IP23
SAFETY PROTECTIONS (AUTO RESETTABLE)	OVER / UNDER VOLTAGE, SINGLE-PHASE PROTECTION OVER TEMPERATURE PROTECTION.	

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4.2- Main Working Panel:

The operator of the Machine, will be able using selectors, to operate from the main panel :

- ✓ Forward / Backward of infeed & outfeed rolls
- ✓ Up / Down of outfeed rolls
- ✓ Speed control of infeed & outfeed rolls
- ✓ Speed control of TBM
- ✓ Forward / Backward of main roll of TBM
- ✓ Open / Close flange guiding rolls of TBM
- ✓ Open / Close web guiding rolls of TBM
- ✓ Up / Down straightening rolls
- ✓ Up / Down welding heads
- ✓ Start / Stop welding
- ✓ Up / Down wires
- ✓ On / Off suction units
- ✓ On / Off hydraulic pump

4.3- Outfeed Line:

NO.3 LIFTABLE AND MOTORIZED ROLLS + NO.1 LIFTABLE AND IDLE ROLL

Rolls adjustable in height by hydraulic cylinder to follow the beam during the welding process including: Gearbox, electric motor 0,25 KW , hydraulic cylinder with relevant, check valve, hoses and fittings.

The rolls will find automatically and all together the zero level before starting a new Beam.

NO.3 HYDRAULIC POWER PACKS ARE PROVIDED TO ENSURE THE MAX. OPERATING FLEXIBILITY.

NO.3 HYDRAULIC TILTERS The tilters are suitable for T-beam and H-beam tilting after welding, and are operated by hydraulic cylinder operated from the Control Panel. The lifting rolls (and tilters) movements are controlled by the operator using the selectors placed on the TBM push-button Control Panel.

DEVIATIONS:

The tenderer shall certify that the offered machine fully meet the specification. Various ¹¹ features incorporated in the machine to fulfill different technical performance requirements shall be fully explained in the offer.

All Deviations shall be clearly indicated in the deviation statement.

6. TRAINING:

- 6.1 Free training by the firm shall be imparted in operation and maintenance of the machine. The training to be imparted shall cover operation, troubleshooting and repair of all mechanical, hydraulic, electrical & electronics equipment, PLC etc. as applicable. This training shall be provided to employees nominated by consignee, for a period of four days free of cost at the consignee premises.

Note: All training should be imparted in English/Hindi only.

7. FOUNDATION & RELATED DRAWINGS

7.1 The bidder shall be responsible for-

- iii. Construction of foundation as well as flooring (if required) of sufficient thickness suiting local soil conditions, for machine shall be completed by the bidder at the site provided by the consignee before receipt of the machine at their premises.
- iv. Provision of all tools and equipment, technical and unskilled manpower, material handling accessories/ equipment and material for installation and commissioning.
- v. Unloading of the machine on receipt (both imported and indigenous machine) and its movement to the site of installation including provision of road mobile crane.
- vi. The bidder should ensure the proper earthing for the machine and its peripherals/accessories.

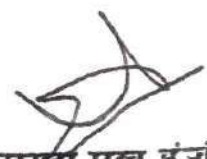
7.2 Consignee will provide only 415 V+10%-20%, 3 phase 50 Hz±3% AC supply at a single point (mains). All types of cables, connections, circuit breakers etc. required for connecting power supply point to different parts of the machine/control cabinets, shall be the responsibility of the bidder. Requirement of grounding/earthing with required material shall also be incorporated by the bidder during construction of foundation.

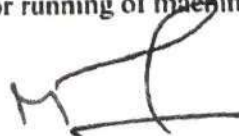
Electrical work like laying of power/electrical cables & earthing wires from mains to machine control panel (upto 20 meters) as well as within the machine, with supply of all materials shall also be carried out by the supplier.


8.0 SERVICE FACILITY IN INDIA AND TECHNICAL SUPPORT

- 8.1 The tenderer will clearly spell out in the offer the facilities available with him or his agent for providing adequate after-sales service in India during warranty period. The complete details such as organization for after sales service, availability of technically competent engineers and warehousing facilities for spares should be clearly indicated.
- 8.2 During warranty period, the supplier or his authorized agent shall attend for break down as soon as possible, but in no case later than 72 hours of receipt of intimation of the breakdown.

Note: All the accessories including PC required for running of machine will be supplied by agency.


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Dy. Chief Bridge Engineer
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