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steel mec sald  
W E L D I N G E Q U I P M E N T S



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steel mec sald has achieved excellence in welding automation by supporting its products and service with top quality engineering and training since 1953.

Narrow Gap

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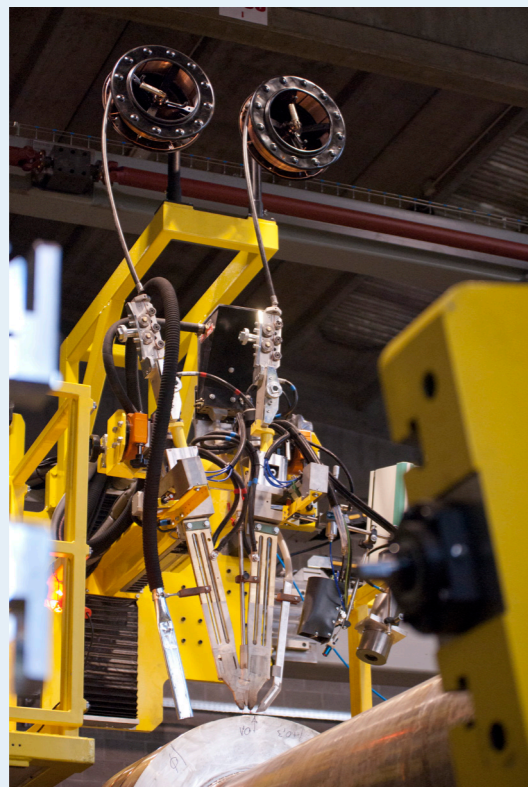
## Narrow Gap

**steel mec sald** produces state of the art welding solutions for tandem Narrow Gap Submerged Arc Welding (NGSAW).

**steel mec sald** been devoted to welding automation since 1952, and Submerged Arc Welding (SAW) is our core activity. In this context, tandem NGSAW technology is our flagship system with important awards in the nuclear field and other heavy industry applications.

We offer turnkey solutions starting from automation of the process and developing all parts of the system, included a custom narrow gap tandem SAW head and complete monitoring of the welding zone using an advanced laser scanning system for tracking and scanning of the groove.

By using an automated five axis system, it is possible to achieve the desired welding shape controlling the welding zone in real time. The Steel Mec Narrow Gap torch includes a feature to tilt the nozzle in order to respect the sidewall offset programmed in the welding shape, weld pass by weld pass.



Tandem SAW Narrow Gap Torch

Two different torch designs are available to set the sidewall offset. The simplest one is implemented with two pneumatic actuators to tilt the nozzle and setting the stroke is by two adjustable limits. More precise control is achieved with a pair of digital servomotors with encoder feedback indexed to the main electronic console that manages all the parameters of the plant.

Rotation of the workpiece is also monitored by encoder to manage the number of passes, the welding speed, the positions of the transitions and the overlap spread. These parameters are all programmable in the job page and always visible on the display of the control console.

Full job data is logged in a report that allows verification and certification of the status of the workpiece and plant.

Our experience in NGSAW covers all aspects. In fact, we can propose complete turnkey solutions starting from the first layout of the plant, providing the 3D CAD overview, and in particular, including a preheating system (if needed), the welding torches, the motorized axes, the electronic instruments (compatible with high temperature), safety devices, custom wirings, etc. etc. Keeping close to the customer, Steel Mec executes commissioning and testing confirming expectations in accordance with the project design and contract specifications.

Our commissioning services support the startup of the plant alongside the customer which results in quality service during the entire life of the activity. Narrow Groove section SAW welding is desirable for certain vessel manufacturing processes in petrochemical, shipbuilding and other heavy industries. STEEL MEC SALD has designed an automated Narrow Groove Tandem Welding Head for a maximum welding capacity on groove depths up to 350mm. The application temperature of STEEL MEC SALD welding torches is up to 340 °C.

Integral to the process is a precision tilting drive unit for both lead and trail wire that allows for the programmable, or joystick positioning, of each wire to either side.

This Sub-Arc Tandem Narrow Gap Welding equipment is supplied with a newly developed fully automatic control system with responsibility for the complete weld fill operation, inbuilt quality assurance system with detailed record of all welding parameters.

The deposition rate with tandem welding technique will almost be double that of single wire - up to 14 kg/h - and can guarantee better control of the deposit material.

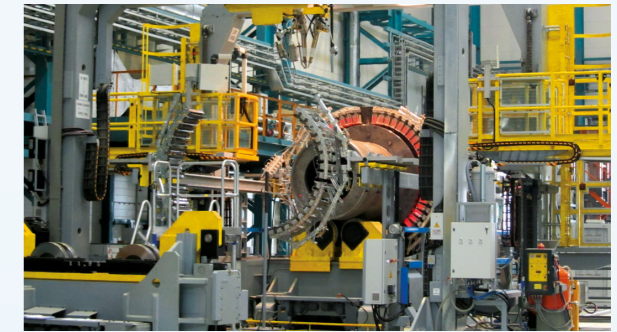
Tilting systems are pneumatic or motorized (on demand).

### OPTION

- Infrared system for preheating and heat treatment up to 350 °C (temperature control during the process, with guarantee of the welding part in continuous motion)
- C&B mounted milling head for removing material: working depth up to 350 mm, width up to 18 mm, weld temperature up to 200°C

### TECHNICAL DETAILS

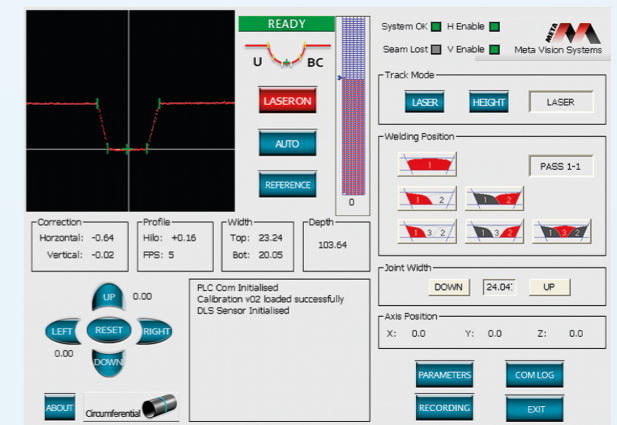
- Maximum Groove Depth – 350mm (groove bevel from 1°)
- Head Width 14mm
- Pre heating up to 340 °C
- Individual Precision Tandem Torch Tilting
  - Servo Motor Control with Precision gearbox
  - Adjustable range up to 3° inclusive
- Precision X-Z weld head motion controls
  - Horizontal stroke – 200 mm
  - Vertical stroke – 450mm
  - Precision Servo Controls for automated standoff, and seam tracking controls
- 2-axis Wire Straighteners
- Flux delivery nozzle, hopper, and mounting
- Flux recovery nozzle assembly
- Angle setting device for adjustable cross-seam tilt of entire weld head. Adjustable range 3° inclusive
- Wire Distance setting – adjusting range 30mm
- Tandem 25Kg Wire Spool Mounting and Conduit
- Tandem Wire Feeders and adjustable mounting
- Adjustable Camera
- Laser Sensor adjustable mounting arm for standoff control and cross seam tracking (cooled + special cover to guarantee working cycle up to 340 °C)



Special Equipment for Nuclear Turbine Rotors – SAW welding



Narrow gap 17 mm - Laser scan mock up



Screen Laser Control