PLASMA / TIG MACHINE RANGE

The Plasma/TIG solutions are often used to weld vessels or pipes in various domains as food, transport, petrochemical or aeronautical industries.

Lincoln Electric proposes a large range of machines adapted and dedicated to each activity sector.

2011-154

Mechanisation machines

with TIG or plasma process for automatic welding of pipes or vessels with low diameter.

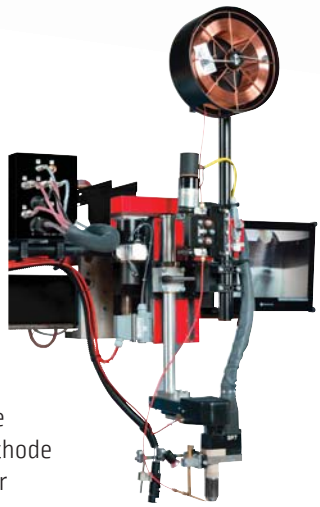
2000-343

Tricathode installation

for in line pipe welding with high productivity level.

2008-468

2013-482



2013-575

Autonomous and multi-purpose welding installation

in monocathode Plasma/TIG version or in bicathode Plasma + TIG configuration for higher productivity.

2010-596

2007-471_ret

CITOTURN lathe

with microplasma installation used for high precision welding of thin noble metals.

Plasma/TIG seamer benches

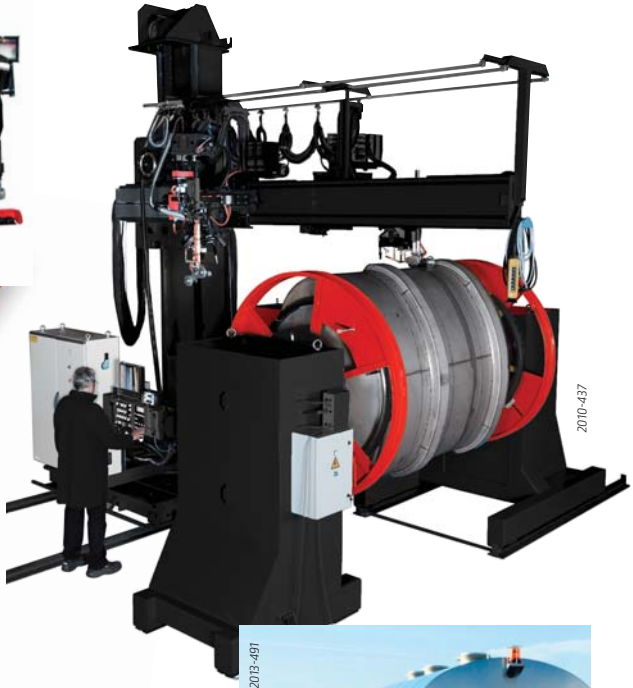
for longitudinal welding of flat sheet metal or large vessels (internal or external welding)

2016-408_ret

2013-486

Specific machines

built from standard equipment and adapted to the customer applications



2010-437

2013-491

Plasma/TIG column and booms with rotators or turntable for circumferential, cornice, flat or vertical down welding

2015-567

2000-160

TIG AND PLASMA INSTALLATION

Applications

Multi-purpose welding installation to enable the following processes to be used in automatic applications:

- DC TIG with smooth or pulsed current,
- AC TIG with variable polarity,
- DC plasma with smooth or pulsed current.

This installation meets the highest quality standards for welding and productivity for industries as diverse as boiler-making using stainless steels, aeronautics using noble metals, chemical engineering, energy production, transformation and transport as well as prefabrication of gas and petrol pipelines etc.

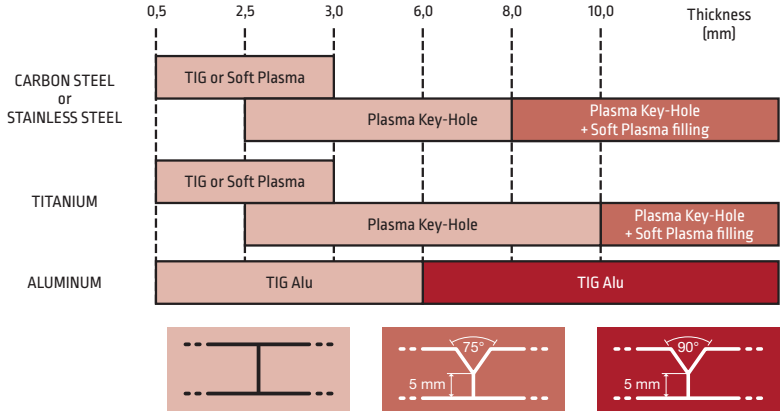
TIG / PLASMA process and performances

The Plasma process is the ideal extension of TIG for thicknesses greater than 3 mm.

It ensures the same level of quality, higher performances and 100% penetration thanks to Key-Hole technology. The diagram shows the different welding performances according to the materials and thichnesses.

Maximum thickness which can be welded in a single pass is reduced for:

- vertical down and cornice (2G) welding positions,
- small diameter and very thick tubes.

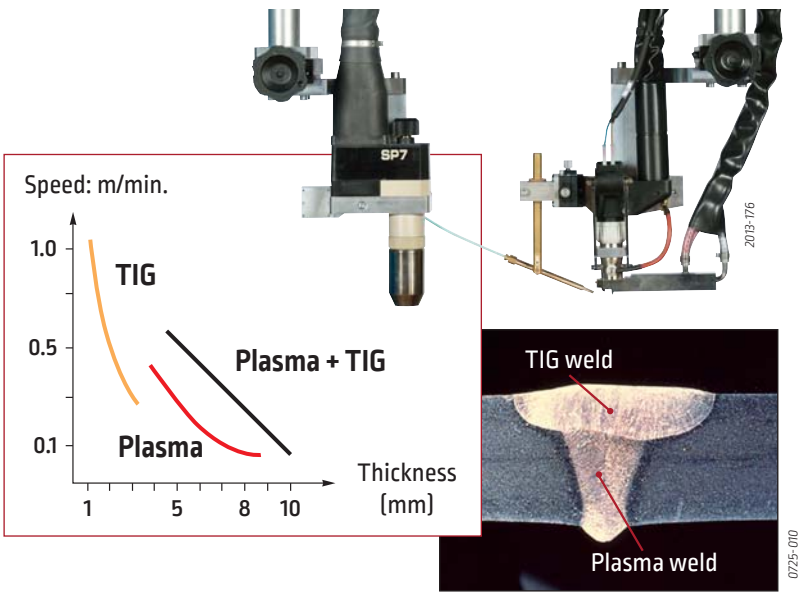


Improvement productivity with PLASMA +TIG Process

The Plasma + TIG process is specially designed for assembling panels for the prefabrication of vessels longer than 4 meters and carrying out circular welds for diameters greater than 2 meters.

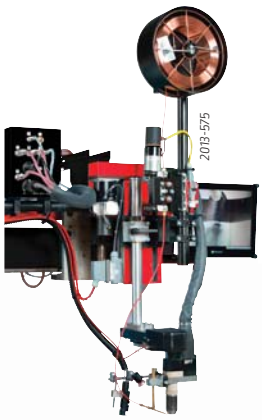
This process of using 2 torches in tandem gives a productivity gain of 30-50 % over a single-torch plasma installation.

The “plasma” arc penetrates the butt-jointed panels. The “TIG” arc equipped with filler metal, electromagnetic arc oscillation and a gas trailing shield produces a perfect surface finish which can often be left without any further treatment.



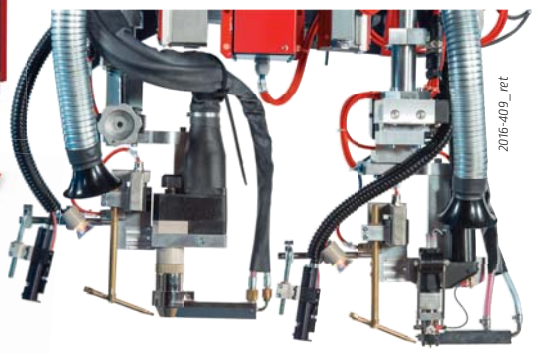
Single torch:
PLASMA or TIG


2013-582


2013-575


2013-582

Bi-cathode: PLASMA+TIG


2016-409_ret

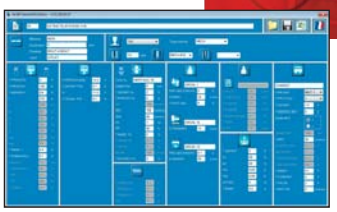
PERFORMANCES

TIG/PLASMA equipments

Lincoln Electric offers two types of control panel.

NERTAMATIC 450 Plus


2013-579



Tools edit programs and create WPS

NERTAMATIC 450 Plus integrates the management of the complete welding process controlled from a central panel, robust and easy to use with a clear text LCD screen display of 4 lines of 20 characters which allows:

- Storing of 50 welding programs (voltage, current, wire speed, plasma gas, movement speed, magnetic oscillation...),
- Parameters modification during welding,
- Cycle start/stop, manual control of gas/wire/AVC/ movement,
- Complete management of key hole closure,
- Pulse current settings for fine thickness welding and vertical or cornice welding,
- Easy integration and communication with external PLC thanks to Open PLC function,
- Import/export via USB key for uploading or downloading programs,
- Edition of programs on external computer, thanks to Off-line software.

HPW Advanced

HPW Advanced is a modern industrial PC allowing the global management of the complete welding process and machine axes. Its main characteristics are:

- Large touch screen 19" with a friendly and intuitive interface allowing the programming, controls and follow up,
- Numerical management of the welding process, its associated movements and drive units via industrial PC,
- Traceability, a program integrates all the parameters allowing the repetitivity of the welding operation,
- Vidéo monitoring integrated in control screen
- Quality follow-up in option, record and storage of the essential parameters of welding (current, voltage, gas, wire feeding, movement),
- Wireless remote control (option),
- Import/export via USB key for uploading or downloading programs and WPS edition.

Welding

Programming

Configuration

Quality *(as a option)*


2013-595

Wireless remote control

TIG AND PLASMA EQUIPMENTS

Power source

The power source **NERTAMATIC 450 Plus** centralizes the global management of the welding cycle:
the control of the current, the voltage,
the wire speed, the gases flow,
the magnetic oscillation and the welding speed.

An optional AC module can be integrated to control the current for variable polarity aluminium welding.

	Characteristics
Duty cycle	450 A @ 100%
Pulsed current	1 to 100 Hz
AC current	50 to 200 Hz
Data exchange	USB
Primary power supply	3 x 230 V - 400 V - 415 V - 440 V / 50-60 Hz
Power consumption	22 kVA
Protection class	IP23
Weight and dimensions	270 kg 1200 (h) x 500 (w) x 850 (d) mm

Torches

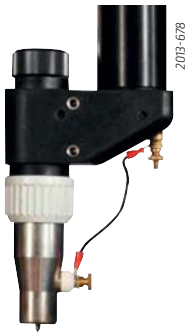
High performance water cooled torches to ensure quality and stability of the process and its equipments.

Torches are equipped with quick connection systems for easy change and maintenance.

MEC4:

For TIG welding:
- 500 A at 100%,
- standard electrode simple to replace,
- twin HF ignition for better arc striking.

Options:
- gas trailing shield to protect welds of sensitive metals,
- magnetic arc oscillation equipment.



SP7:

This torch is the reference in the market, for soft and key hole plasma welding:
- 450 A at 100%,
- Standard electrode simple to replace and self-aligning,
- Cooled nozzle ensuring long life time of consumables.

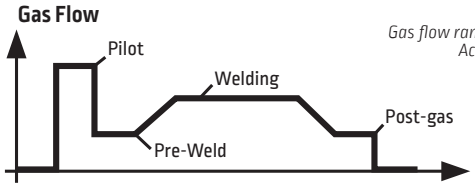
Options:
- Gas trailing shield to protect welds of sensitive metals.

PLASMA gas

For thicknesses greater than 2.5 mm, PLASMA welding uses the Key-Hole technique.

If one cuts the arc current off instantly, the key hole remains in the work piece.

In order to remedy this disadvantage on circular welding, and in order to make the Key-Hole disappear, it is necessary, before extinguishing the arc, to gradually reduce the torch's plasma gas flow simultaneously with the arc current. This made possible with a numerical valve controlling the plasma gas cycle.



Gas flow range: 0 to 10 l/min
Accuracy: 0.1 l/min

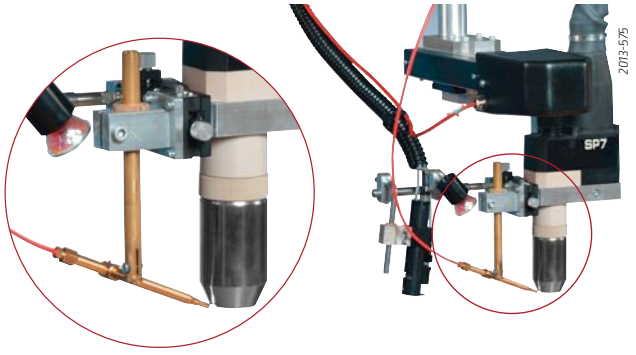
Wire feed device

It is often necessary to feed the molten pool with metal during the welding operation in order to prevent the seam from showing hollows, to supply soft steels with deoxidizing elements and for succesive seams.

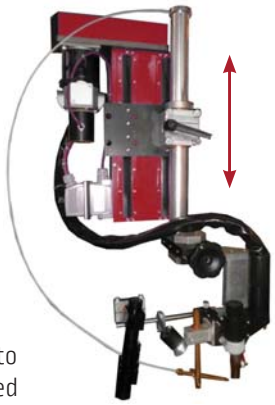
The system allows to quickly and accurately adjust the wire impact point in the welding pool thanks to micrometer slides.

The adjustment can be manual or motorised for remote control.

	Characteristics
Carbon steel Stainless steel Titanium wires	Ø 0.8 / 1.0 / 1.2 mm
Aluminium wire	Ø 1.2 / 1.6 mm
Max wire speed	6 m/min



AVC system

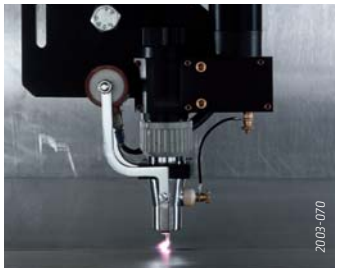


A constant distance between the torch and the workpiece is a key of quality to ensures a constant penetration and bead width.

The **Arc Voltage Control** (AVC) keeps this constant distance by automatic regulation of the arc voltage: function fully integrated into the Lincoln Electric system composed of an electrical vertical slide travel 200 mm.

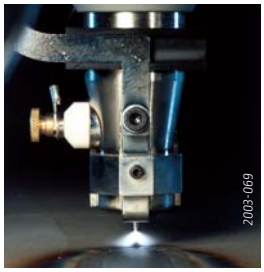
Oscillarc plus

Arc deviation



This technique is used to electrically deflect the TIG arc forward in the welding axis, increasing the speed by 30 to 50% for thicknesses of less than 2 mm.

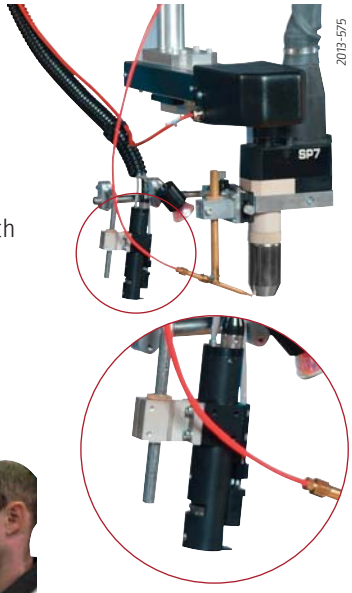
Arc oscillation



Arc oscillation is used to deposit metal over areas up to 15 mm wide to fill bevels or reconstitute surface coating.

Video camera

The TIG/plasma video system **VISIOARC VA2** can be easily integrated. It uses a greatly enlarged image which enables the precise position of the welding torch to be viewed thus making the operator's work easier and improving the quality of the welding operation.



System with large color screen 15", miniaturised camera and additional lighting

Cooling unit

The **FRIOJET 300 W** cooling unit is compact with coolant constant supply, in closed circuit, used to cool down torches.

Water circulation in closed circuit makes it possible:

- To prevent the deposit of boiler scale in conduits and in the torches to be cooled,
- To save water, to have a constant water flow-rate,
- The regulation of water temperature provides a constant production quality and extends significantly useful life of torches and of wearing parts (steady temperature).

	Characteristics
Primary supply *	230 V / 1 ph / 50 or 60 Hz
Nominal water flow rate	0.26 m3/h
Nominal water pressure	5.5 bars

** directly supplied by power source NERTAMATIC 450*

Cooling unit equipped with display of temperature and control of return flow plus coolant level.

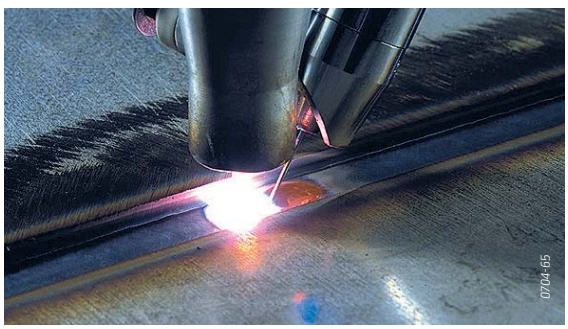
Hot wire

Productivity improvement by increasing the deposition rate

For filling bevels 40 mm deep, the use of hot fillerwire provides a good solution and is particularly suited to applications where a high specification of the welded joint is required. This special technique uses an auxiliary current to bring the end of the wire to near its melting point.

Viable for plates of thickness 10 mm and above, the use of hot filler wire enables 2.5 to 3 kg of metal to be deposited per hour for filling bevels using multiple passes or for quality hard-surfacing:

- Additional power source for the hot wire current between 60A and 120A,
- No additional wire feed thanks to direct connection on the cold wire system.



WELDING IN LINE PIPE INSTALLATION

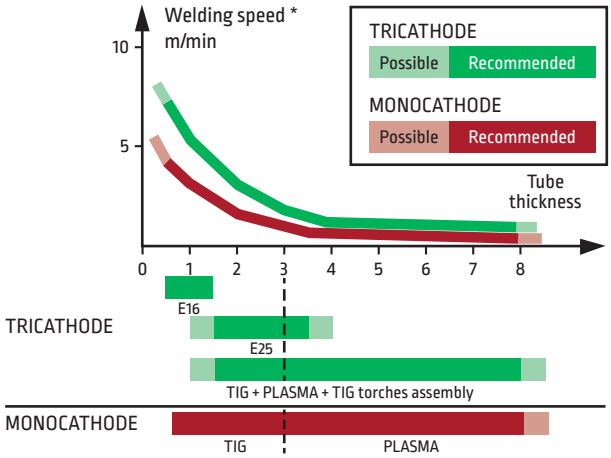
Applications

Lincoln Electric proposes solutions for in line pipe welding to be integrated into pipe mills:

- Monocathode installation with MEC4 TIG torch for tube thickness 0.5 to 3 mm,
- Monocathode installation with SP7 plasma torch for tube thickness 2.5 to 8 mm,
- Tricathode installation with E16 torch for tube thickness 0.5 to 1.5 mm,
- Tricathode installation with E25 torch for tube thickness 1 to 3.5 mm,
- Tricathode installation with combination of TIG + PLASMA + TIG torches for tube thickness 2.5 to 8 mm.

Piping: Chemical, Petrochemical, Nuclear power industry, Boilers and heat exchanger, Off shore, Cryogenic, Shipbuilding, Military and Aeronautic...
Structure: Industrial building, Commercial center...
Ornemental: Door, Windows, General railing, Furniture, Decoration...

Typical performances



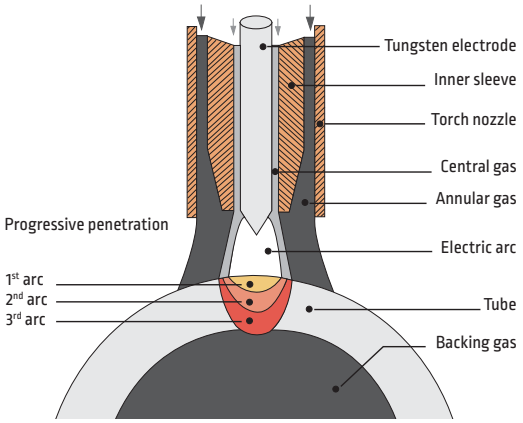
* Welding speeds are indicative and depend on the material, the quality required, and the quality of the pipe mill.

TRICATHODE process

TRICATHODE welding consists of a sequence of three dual-flow TIG processes or a combination of TIG and Key hole plasma processes using a special welding torch. The first arc is fitted with an electromagnectic arc deviation device.

Compared to other welding process used for this type of fabrication, Lincoln Electric's TRICATHODE process is of particular interest in terms of performance flexibility, investment/ performance ratio and operating costs.

Tricathode Dualgas flux process:

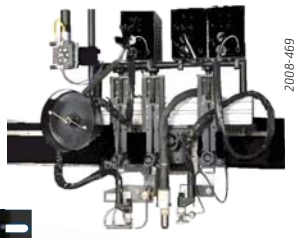


MONOCATHODE

MEC4 or SP7 torches

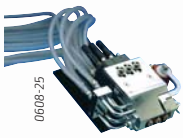
TRICATHODE

TIG + PLASMA +TIG



E16 torch

E25 torch



PERFORMANCES

Monocathode MEC4 or SP7

Package dedicated to TIG or plasma process without wire feed device and arc voltage control, the pipe line machine assuring a constant arc height.

Main components of the package:

- Power source 450 A at 100%, smooth current welding,
- MEC4 TIG torch or SP7 plasma torch,
- Remote control,
- HF starting unit.

SP7 plasma torch

- 450 A at 100%
- Typical application (wall thickness): 2.5 to 8 mm

MEC4 TIG torch

- 500 A at 100%.
- Typical application (wall thickness): 0.5 to 3 mm.

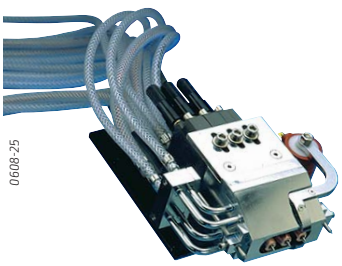
Tricathode

The basic system consists mainly of:

- 3 x power sources NERTAMATIC 450 Plus,
- 450 A each at 100%, smooth or pulsed current welding,
- Control panel with current control, digital voltage and current displays for each arc, adjustment and displays of gas flow setting,adjustment of electromagnetic arc on first electrode,
- Torches interface including HF source,
- Welding head mounting assembly.

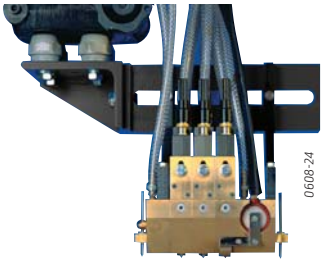
E16 torch

- Implements the dual flow tricathode process.
- 200 Amp per electrode (total 600 Amp).
- Independant adjustment of each electrode to the shoe (one piece design).
- Electrode tungsten Ø 2.4 mm and 3.2 mm.
- Typical application (wall thickness): 0.5 to 1.5 mm.



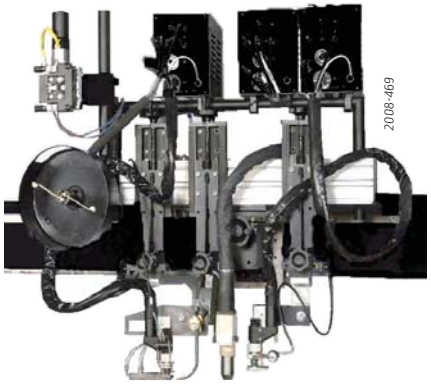
E25 torch

- Implements the dual flow tricathode process.
- 400 Amp per electrode (total 1 200 Amp).
- Independant adjustment of each electrode to the shoe (one piece design).
- Electrode tungsten Ø 3.2 and Ø 4 mm.
- Typical application (wall thickness): 1 to 3.5 mm.



TIG + PLASMA + TIG welding head

- Two MEC4 TIG torches.
- One SP7 plasma torch.
- Independant adjustment on each torch.
- Typical application (wall thickness): 2.5 to 8 mm.



TOPTIG

Applications

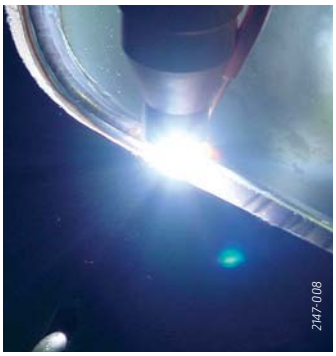
TOPTIG process is a major innovation in the world of automatic welding. Developed in the Lincoln Electric research center, **TOPTIG** is a new process development from arc welding classical solutions. This new process can be used effectively on carbon or stainless steel plates up to 3 mm or on galvanized sheets with weld brazing.

The activities sectors are:

- Automotive subcontracting,
- Fine boiler making,
- Metal furniture,
- Aeronautics subcontracting.

Process

TOPTIG allows a better accessibility for welding complex structures. It offers very good performance concerning speed, and quality (spatter free).



Installation

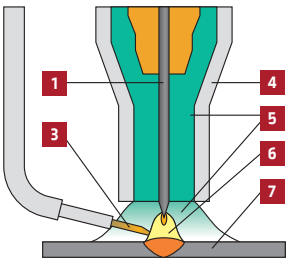
Lincoln Electric offers two types of **TOPTIG** installation with flat or pulsed current. It can drive a constant or pulsed wire feed which is synchronized with the welding current.

TOPTIG 220DC

TOPTIG 220 DC supplies 220 A at 100% duty cycle. The RC-JOB permits a complete welding cycle to be programmed. Program selection and chaining is carried out by analog signals.

TOPTIG innovative process principle

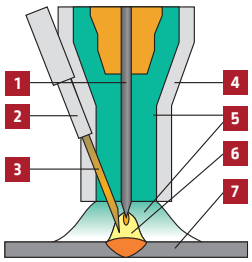
In TIG automatic welding mode, the filler wire is fed into the weld pool in front of the torch. In the TOPTIG process, the filler wire is fed through the welding nozzle in the area where the temperature is the highest. The wire therefore melts into small droplets exactly as in the MIG process. The use of a pulsed current synchronized with wire gives better control over the welding operation.



TIG process

10 000 à 16 000 °K

4 000 à 10 000 °K



TOPTIG process

1 - Electrode
2 - Wire guide
3 - Filler metal
4 - Nozzle
5 - Shielding gas
6 - Arc
7 - Base metal

Torch accessibility

Compared with a traditional automatic TIG torch, the compactness of the wire lead-in incorporated into the nozzle gives accessibility at an angle comparable with that obtained using a MIG/MAG torch.

This increases the scope for robotization and extends the range of workpieces which can be welded automatically.

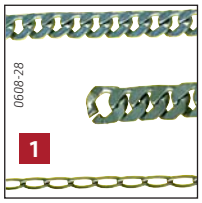
TOPTIG NERTAMATIC 450 PLUS

NERTAMATIC 450 Plus supplies 450 A at 100% duty cycle. The console permits a complete welding cycle to be programmed. Program selection is carried out by binary code, and program chaining by pulse. Torch capacity limited to 350 A at 100% using a water cooled nozzle.

MICROPLASMA

Manual and automatic welding applications

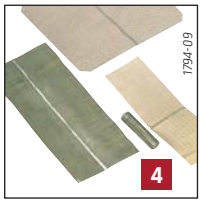
For the manual or automatic assembly of thin precious metals in the thickness range: 0.05 - 1.0 mm (stainless steels, Inconel, titanium, silver and gold alloys). For the electric and electronics components industries, small containers, metal filters and tool repairs as well as sectors of the horology, goldsmith and medical industries.



1 - Jewellery

2 - Fine sheet metal work

3 - Small containers



4 - Filters

Installation

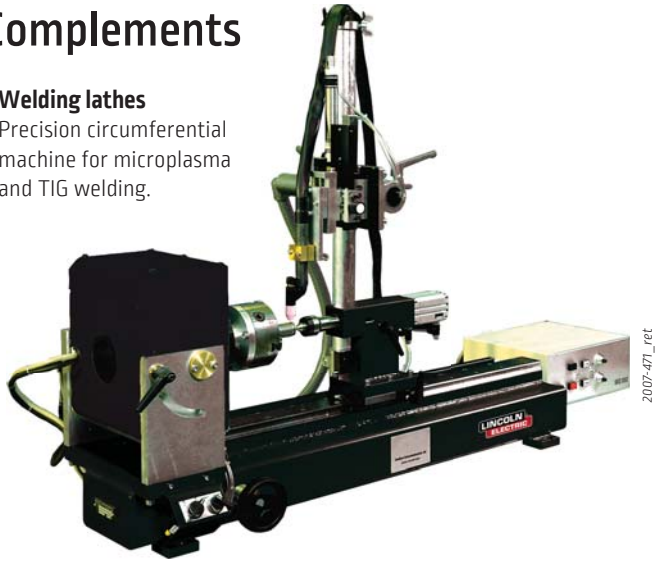
PLASMAFIX 51 Characteristics:

- User friendly front panel,
- Multilingual display,
- Programmable welding cycles,
- 100 programmes memory,
- Configuration adapted to the user's needs,
- Programme print out,
- Also for TIG welding,
- Equipped of RS 232 for coupling a P.C or printer,
- Cooling by a liquid,
- Tungsten electrodes: Ø 1.0 or 1.6 mm, 75 or 150 mm long.

Installation with cooling unit on trolley

Complements

- **Welding lathes**
  Precision circumferential machine for microplasma and TIG welding.



- **Double welding command pedal**
  (replaces the torch'trigger)

- **Trigger and current adjustment pedal**

- **Torch maintenance box with set of wear parts**

- **Trolley**
  Able to receive the PLASMAFIX 51 power source, the cooling unit and two gas bottles.

Torches

Two types of torch for use in manual or automatic mode:

SP45 automatic

SP45 manual

An SP20 manual or automatic torch can be supplied.
This weights considerably less and has a maximum current rating of 20 A at 100%.

Plasma / TIG machines

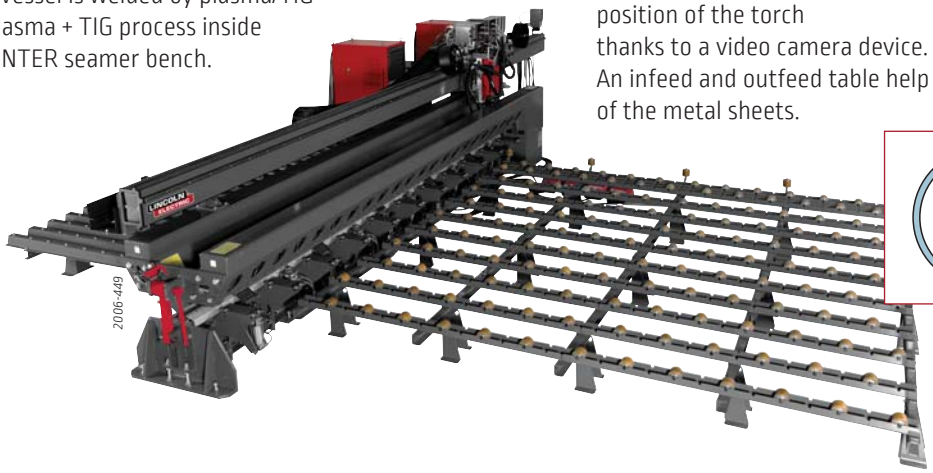
The Plasma/TIG applications are multiple and varied, here some examples of machines which answer to the main customer needs.

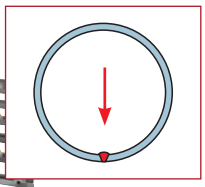
Assembly of flat sheet metal and closure of vessel sections

Seamer bench for longitudinal welding.

The vessel is welded by plasma/TIG or plasma + TIG process inside the INTER seamer bench.

The operator can see the joint and adjust the position of the torch thanks to a video camera device.
An infeed and outfeed table help setting up and handling of the metal sheets.



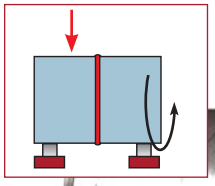


Assembly of vessels by conventional technique

Column and boom with rotators for circumferential welding.

To assemble 2 vessels, it's possible to put them on rotators and the plasma column and boom carries out the circumferential welding.

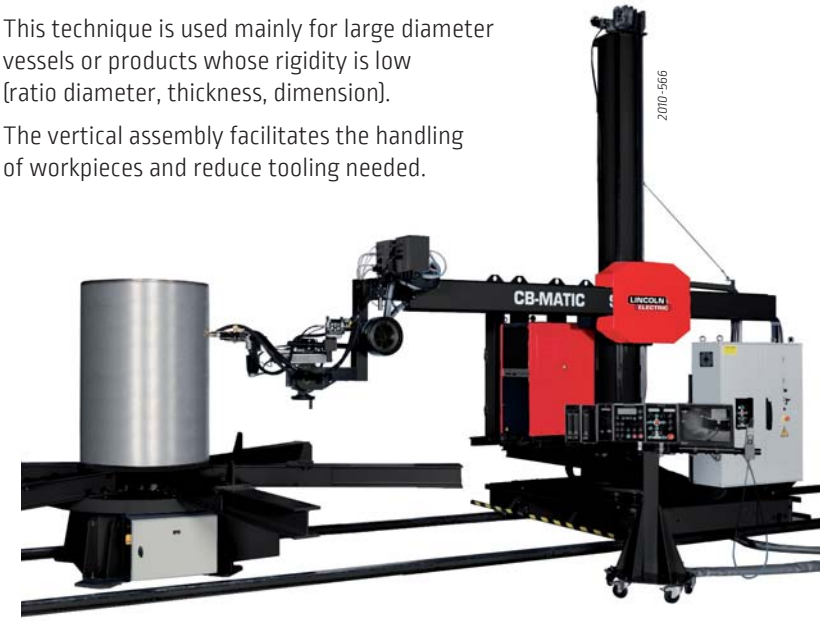
Safety and operator comfort are guaranteed thanks to the control of the welding operation from the ground.



Assembly of vessels in vertical position

This technique is used mainly for large diameter vessels or products whose rigidity is low (ratio diameter, thickness, dimension).

The vertical assembly facilitates the handling of workpieces and reduce tooling needed.



Column and boom with turntable
for longitudinal and circumferential welding:

- Longitudinal in vertical down position,
- Circumferential in cornice position.

Pipe prefabrication assembly

Mechanisation machine with plasma process and HPW control to weld pipes with elbows and flanges.

The work piece is positioned on the X-rotators and the motorised headstock carries out the rotation.

Elliptical tank

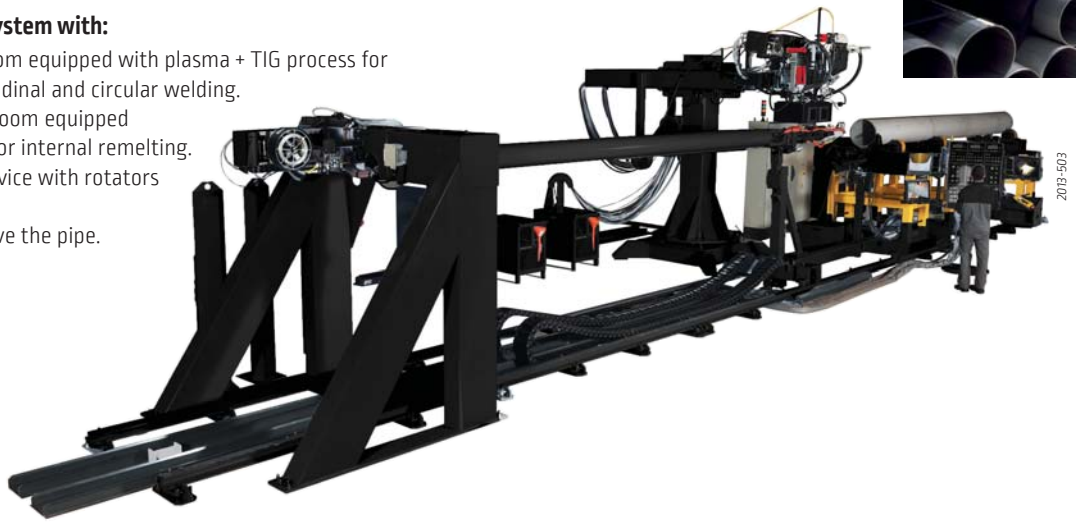
The plasma torch movement is controlled by the column and boom.

The Headstock HLM+F allows the rotation of the tank and ensures a high flexibility for the mounting and the holding of the piece.

Pipe production full automatised process according to ASME codes

Complete welding system with:

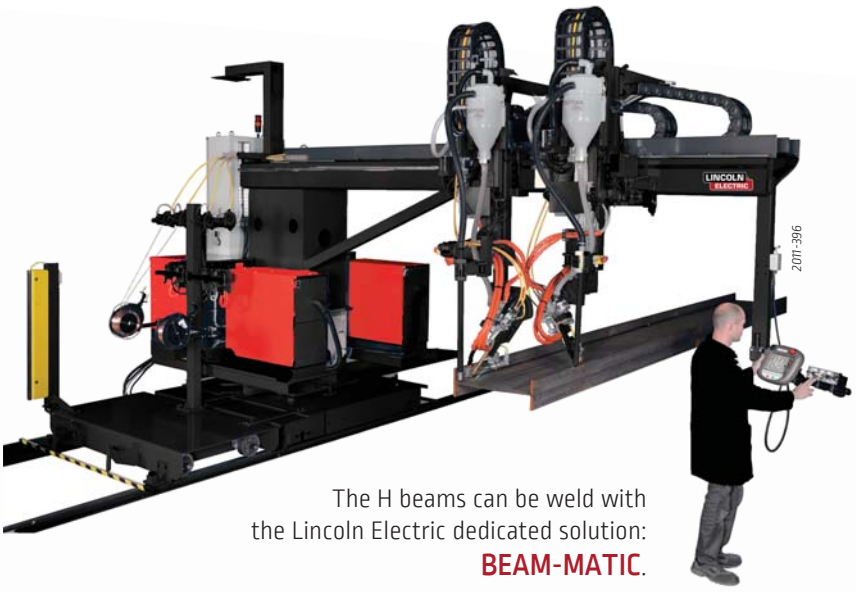
- Column and boom equipped with plasma + TIG process for external longitudinal and circular welding.
- Fixed internal boom equipped with TIG head for internal remelting.
- Pipe holding device with rotators on carriages to turn and move the pipe.



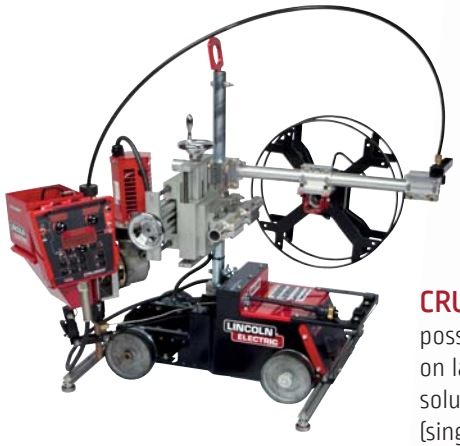
SAW MACHINE RANGE

The **SAW equipments** are used in various domains from the simple head for any autonomous installation to complete welding systems for infrastructure, energy and piping industries.

Lincoln Electric developed turnkey solutions for the main applications we can found in these sectors of activity.

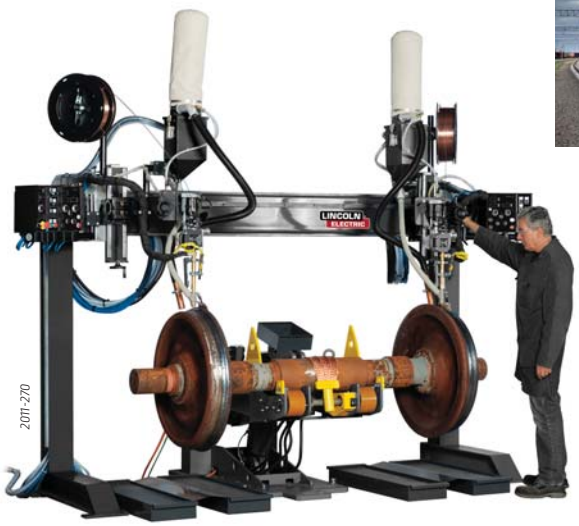


The H beams can be weld with the Lincoln Electric dedicated solution: **BEAM-MATIC**.



CRUISER SAW carriage offers the possibility to weld in restricted area and on large pieces. It is the ideal economical solution for welding on site or in workshop (single arc or tandem arc version).

The **Autonomous SAW head** can be combined with all external support.



Some dedicated plateforms exists as the **wagon wheels cladding** applications.

2012-582

Internal welding boom allowing the longitudinal helical and circumferential welding of pipes.

Weld the I-beams in vertical positions, without tackingis possible thanks to the **T-MASTER solution**.

2015-370

2014-137

Multiples arc head allowing to increase productivity in the longitudinal helical and circumferential of pipes.

2010-311

Lincoln Electric has solutions for **Windmills** applications thanks to the heavy duty SAW Column and booms and rotators.

2011-245

2356-053

2013-484

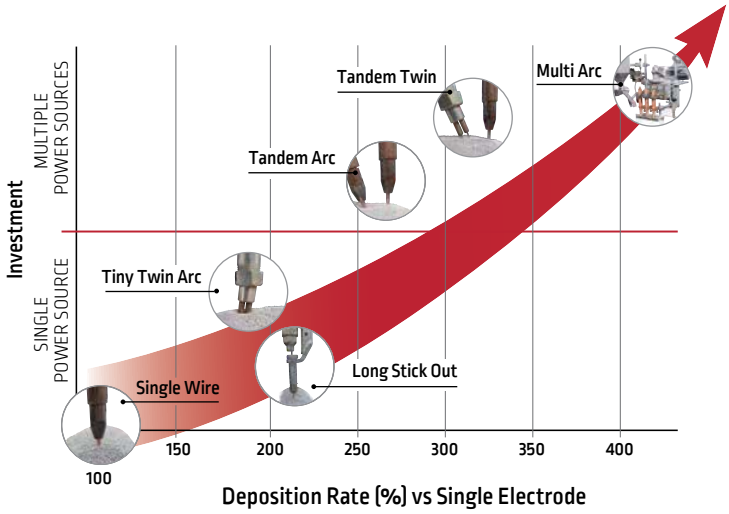
The **Lamp post machine** allows an increase of productivity in this hard competition domains.

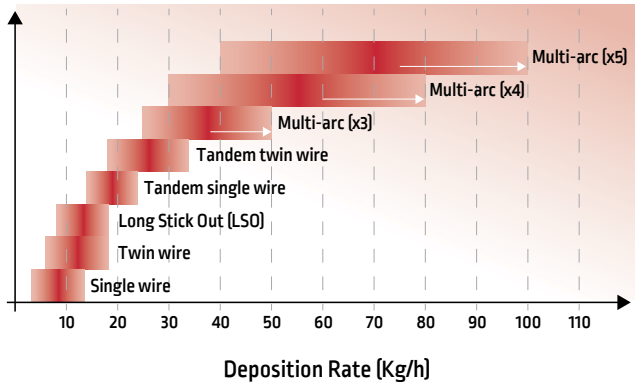
SAW SUBMERGED ARC WELDING INSTALLATION

Applications

Process for welding and hard surfacing of low alloyed carbon steel, stainless steel and refractory steel.
It combines productivity, quality and operator comfort.
It is used in thicknesses from 3 to 300 mm and provides a high welding speed and high deposition rates.
With one or more wires, it is found in many industries: infrastructure, shipbuilding, offshore pipe mill, heavy duty pressure vessels, energy...

SAW process and performances

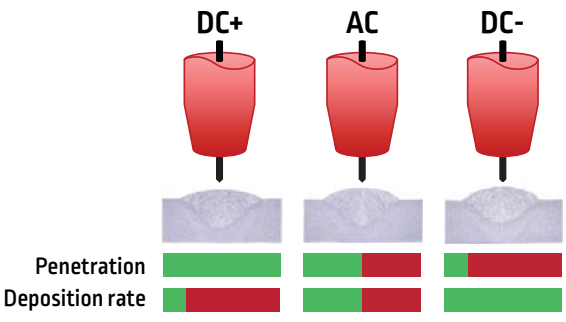


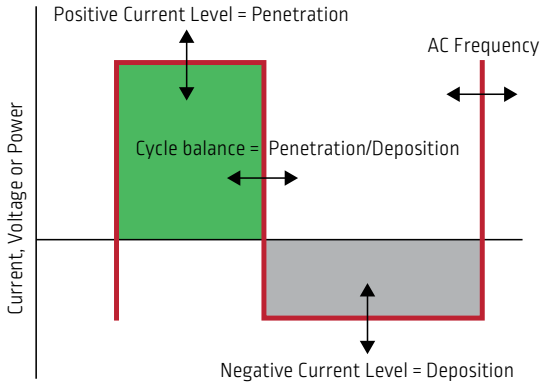


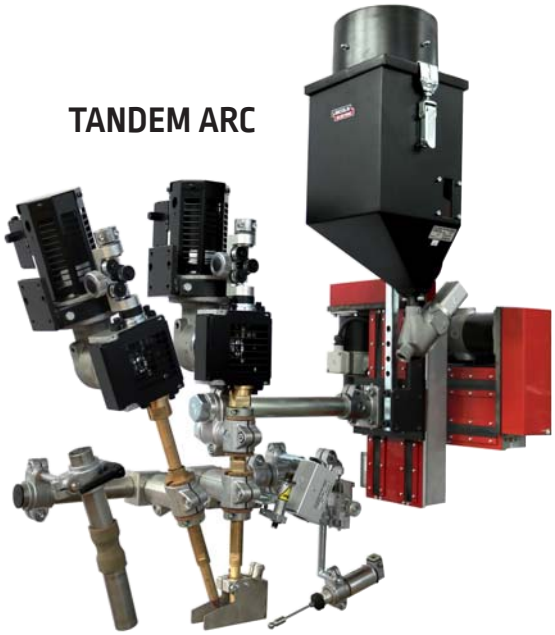
(Values are indicative and depend on the material and the quality required)

AC current management

Complete management of the AC wave form with the control of the frequency, balance and offset for a maximum flexibility of production.
Control the penetration and the geometry of the seam.
Eliminate magnetic blow arc Effects.







PERFORMANCES

SAW equipments: inverter technology Power Wave AC/DC 1000SD

The **Power Wave AC/DC 1000 SD** proposes a complete range of equipment combining performance, flexibility of use and ensuring high reliability in welding cycle management.

MAXsa 10: Mobile Console

The **MAXsa 10** associated to the **Power Wave AC/DC1000 SD** allows to manage the main welding parameters for a total control of the Submerged Arc process.

- Selection of the polarity *(DC+, AC, DC-).*
- Selection of the mode *(CV or CC).*
- Selection of the wire material and diameter.
- Management of programs and memorization.
- Manual control of wire and flux feeding.
- Power Manager software to configure the installation.
- Production monitoring and CheckPoint software for a full traceability ot the welding data.

Remote control RC-MATIC

For immediate action throw push buttons, a remote control can be added to the **D2C SAW** welding system. Connected at the welding head throw a cable of 5 m, the operator can get the useful basic function of SAW head management. Fixation of the remote control on steel basis by magnet.

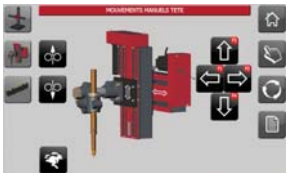
D2C SAW: Digital Cycle Control

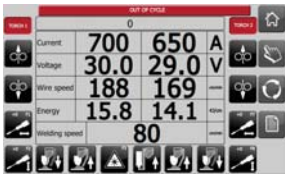
Power Wave AC/DC 1000 SD can be associated to **PLC controller D2C SAW** via analog interface *(MAXsa 10)* or fieldbus protocol *(MAXsa 19)* for a complete management of the machine with the submerged Arc process.

The **D2C SAW** thanks a large color touch screen friendly to use is able to control all the devices linked to the welding as:

- All welding and positioning axes *(Column & Boom, Rotator, Positioner, ...).*
- Crossed slides of the head.
- Seam tracking, laser spot...

The welding monitoring during the cycle is facilated thanks direct manual controls *(joystick and encoder buttons...)*
D2C SAW is easy to adapt for a particular request or specific cycle needed for the final customer application.





SAW INVERTER POWER SOURCES

Lincoln Electric offers inverter technology for DC and AC SAW applications:

- Save energy: better efficiency of power consumption which reduce your operating cost.
- High duty cycle: 1 000 A at 100% (40 °c).
- Easy to integrate from conventionnal interface to digital unit.
- Multi-purpose installation:
  - CV: Constant Voltage,
  - CC: Constant Current.

A second model of DC power source can be associated with MAXsa 10: **FLEXTEC 650X**.

	POWER WAVE AC/DC 1000 SD	FLEXTEC 650X
Power supply (3x 50-60Hz)	380-400-460-500-575 V	380-460-575 V
Effective power at 100%	55 kVA	46 kVA
Current range	100-1 000 A	40-650 A
Duty cycle at 100%	1 000 A / 44 V	650 A / 44 V
Weight	363 Kg	75 Kg
Dimensions L x l x H	1 248 x 501 x 1 184 mm	745 x 410 x 554 mm
Protection index	IP 23S	IP 23

POWER WAVE AC/DC 1000 SD

FLEXTEC 650X

Power Wave® Software Solutions

Power Wave Manager

- Check the status of every component in your welding system.
- View and easily adjust the information associated with your welding operation.
- Setup the configuration of the differents componants of the welding installation.
- Display of all real-time measurement values like voltage, ampere, wire feed speed, torque.

CheckPoint™: Welding Production Monitoring

CheckPoint's secure, cloud-based access allows key stakeholders to view and track welding operations anywhere in the world, on any device:

- Track real-time weld production data 24/7.
- Create custom custom alerts and notifications.
- Operator Arc on Time.
- Material Consumption.
- Weld and Assembly Information.

Production monitoring™

Production monitoring monitors a lot of information for the management of the customer production.

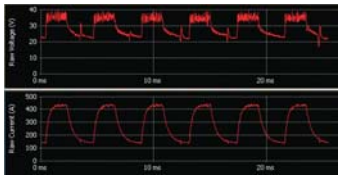
- Current status and shift analysis.
- Weld listing and downtime analysis.
- Monitoring by Weld ID, Employee ID or Consumable Lot ID.

Weldscore™

Allows you to score each weld based on a trained sample of acceptable welds.

Great for:

- Expanding quality control capabilities,
- Trade school monitoring, grading and final examinations,
- Critical welds with specific quality control requirements,
- Operator testing and certification programs or Consumable Lot ID.



SAW DC MULTI-PROCESS INSTALLATIONS

If an application requires pure welding power combined with multi-process power, then the **IDEALARC range** with smooth DC output is your best investment. Designed for Semi-automatic and automatic welding, the precise control of the **IDEALARC® DC 1000** provides superior MIG, flux-cored, submerged-arc welding and excellent air carbon arc gouging with up to 16.0 mm diameter carbons.

The **IDEALARC® DC 1500** is a multi-process DC arc welding power source for automatic welding applications. It produces outstanding arc characteristics on both constant voltage and constant current processes for great welding versatility from a single power source.

IDEALARC® DC 600

IDEALARC® DC 1000

IDEALARC® DC 1500

	IDEALARC® DC 600	IDEALARC® DC 1000	IDEALARC® DC 1500
Power supply (3x 50-60Hz)	220-380-440 V	380-440 V	
Effective power at 100%	44 kVA	74 kVA	121 kVA
Duty cycle at 100%	600 A / 44 V	1 000 A / 44 V	1 500 A / 44 V
Weight	237 Kg	372 Kg	644 Kg
Dimensions L x l x H	988 x 567 x 781 mm	991 x 567 x 781 mm	965 x 566 x 1 453 mm

NA-3 & NA-5 Control & Heads

Improve productivity with the **NA-3S** or **NA-5** automatic wire feeders. These systems have been specially designed to deposit more weld metal at faster travel speeds which eliminates bottlenecks and cuts costs.

NA-3S

Features

- Solid state controls allow precise control of welding procedures, striking characteristics, as well as bead size and shape.
- Easily adjusted for a wide range of processes, feed speeds and wire sizes.
- Compact units with excellent flexibility to fit into simple fixtures or the most complex automated production lines.
- Rugged construction minimizes downtime and maintenance costs.

NA-5

NA-5F head

SAW EQUIPMENTS

SAW welding head

Lincoln electric proposes a large range of welding heads from standard to special models for a perfect adaptation to the customer application.

Standard tubular head

Compact tubular head

Internal head

2012-641

Narrow gap head

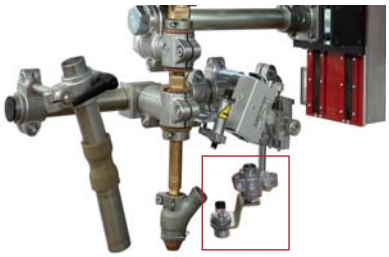
Seam tracking

TRACKMATIC device guarantees the good positioning of the torch in the joints to be welded without operator intervention.

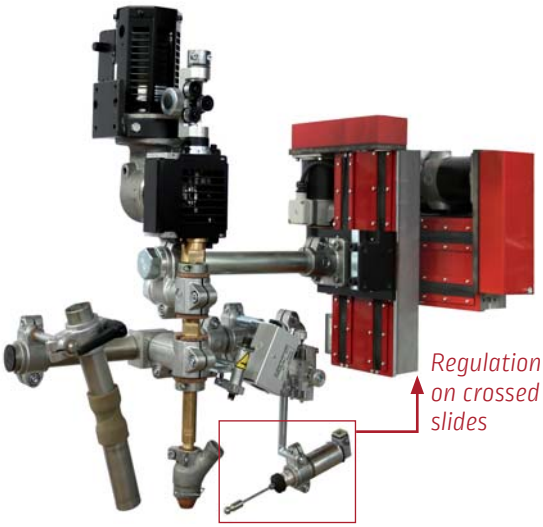
A sensing probe finger or an inductive or laser sensor detects positioning errors (height or alignment) and commands the necessary corrections required to the torch trajectory thanks to motorised slides travel 100 - 200 or 500 mm.

Whilst increasing productivity, it ensures a constant weld quality, a reduction in repair operation and easier use for the operator.

Seam tracking with sensing probe



Seam tracking with inductive sensor



Seam detection

Video camera

Combined with a laser spot, the video camera unit allows to view the welding area and can remotely control the positioning of the torch in the joint.

This is an essential tool for welding in difficult acces area like inside a tank of small diameter.

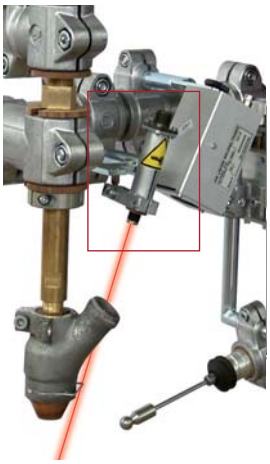
The equipment is supplied with a spot light to Illuminate over viewed area, and a color LCD industrial screen high definition 15".

2008-312

2003-035

Laser spot

To show the wire point of impact relative to the joint on the workpiece. The spot projects an illuminated point in front of the electrode wire for guiding. One spot is used for horizontal alignment and the association of two spots make it possible to monitor the horizontal position and the vertical distance between the torch and the workpiece.



Flux management

Equipment to improve productivity and ensure operator safety.

Flux recovery equipment

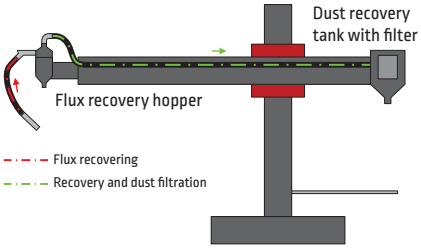
A compact unit to reduce significantly manual refilling of the flux feed hopper 10 liters powered by compressed air.
Pressure 4 to 6 bar.
Venturi device completed with tank and filter cartridge for recovery and dust filtration.

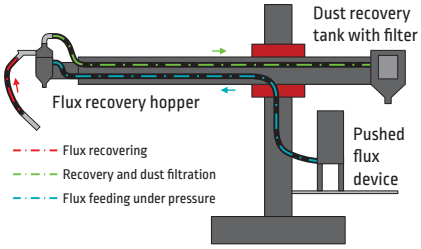
Flux supply equipment

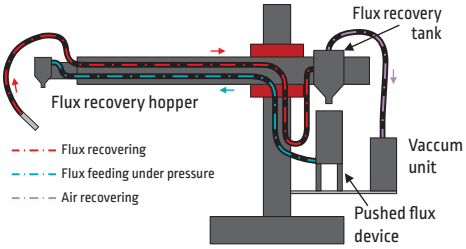
Pushed flux supply system providing a greater welding autonomy due to the flux hopper capacity of 70 L.
To avoid any risk of humidity recovery in the flux, we can propose a system equipped with a device to keep the temperature of the flux up to 50 °C.

Centralised recovery

Centralised flux recovery system through pushed flux device and electrical turbine with filtration of flux dust. Ideal system for heavy duty application with reducted flux consumption and minimum flux handling. The system can be equipped with a device to keep the temperature of the flux up to 120 or 200 °C.







Wire management

Lincoln electric proposes optimized packaging solutons for submerged arc welding.
All wires are free from any organic component limitingthe diffusible hydrogen contribution to the weld metal.

25 kg spool

100 kg coil

300 kg spool

1000 kg coil

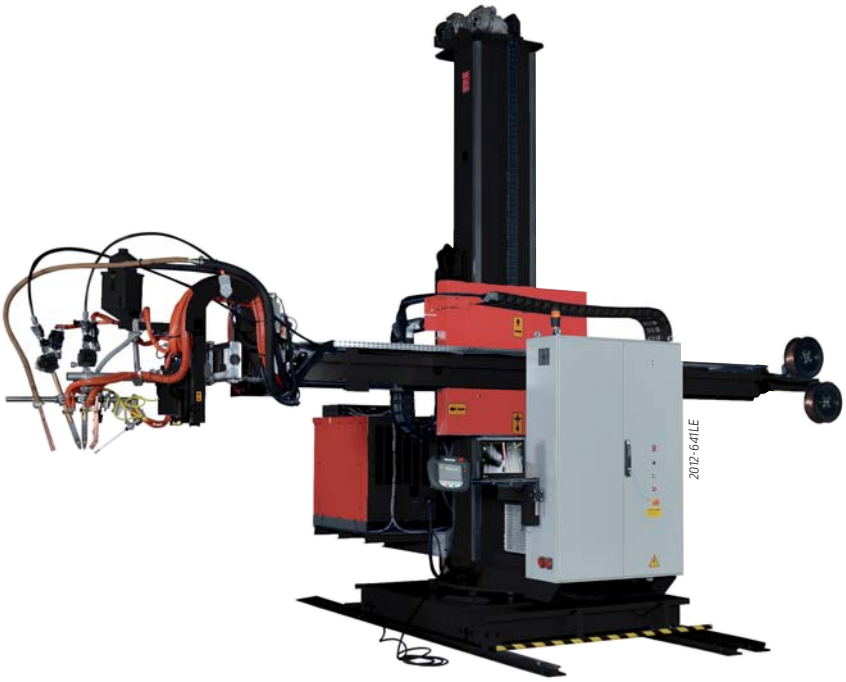
Drums from 350 to 1000 kg

Drums accessories:

Turn table designed to dispense all sizes and varieties of wire.
4-axis adjustable arm with ceramic inlet guide prevents wire shaving.
Quick disconnect allows for easy conduit connections.

The pneumatic Feed Assist
provides an economical method to assist your wire feeder in moving wire through the conduit in applications where long conduit runs are necessary.

SAW NARROW GAP



Applications

Narrow Gap process is used to weld thick walled steel plate,
mainly for the following industrial applications:
Power Generation, Nuclear, Pressure Tanks, Windmill, Petrochemical.

Process

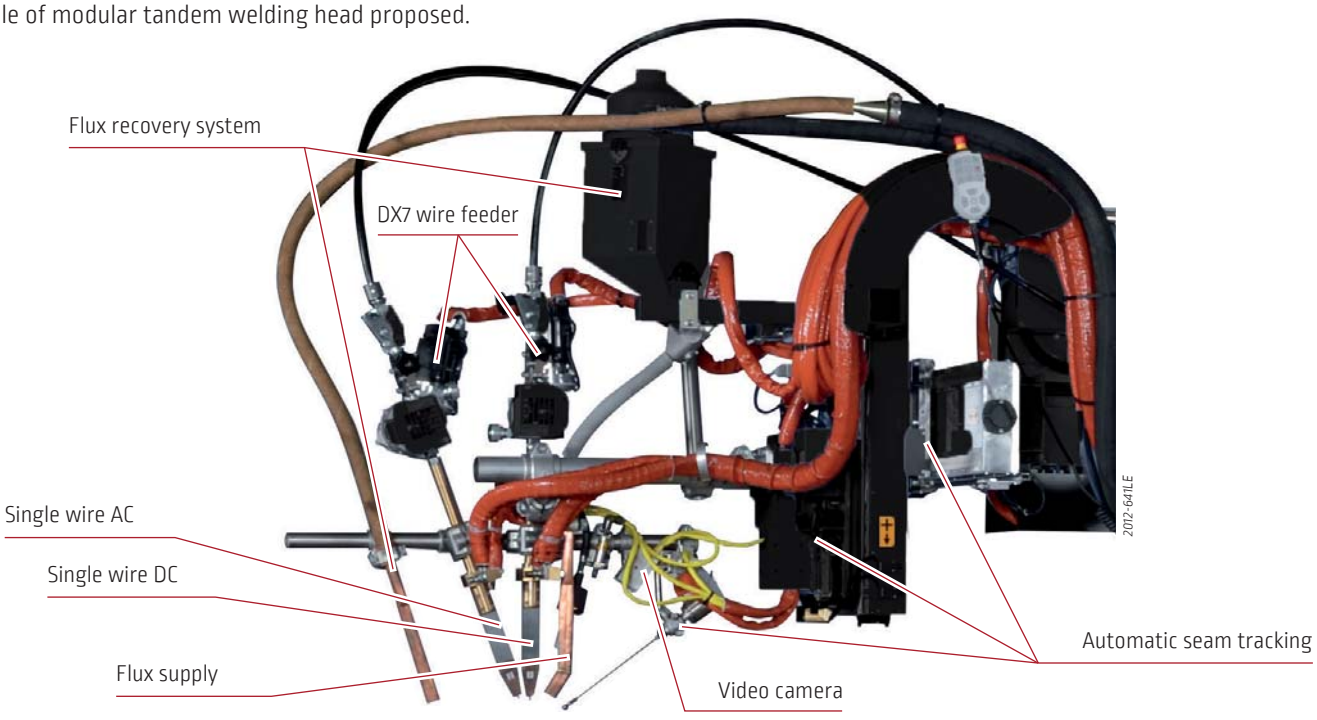
It is a Submerged Arc process with single or tandem narrow gap torch, designed to weld thick plate (generally over 50 mm) using practically parallel sides and narrow gap preparation.

Narrow gap process allows to increase productivity and to result in lower cost welding by decreasing the volume of metal needed and the welding time compared to conventional preparation with bevel.

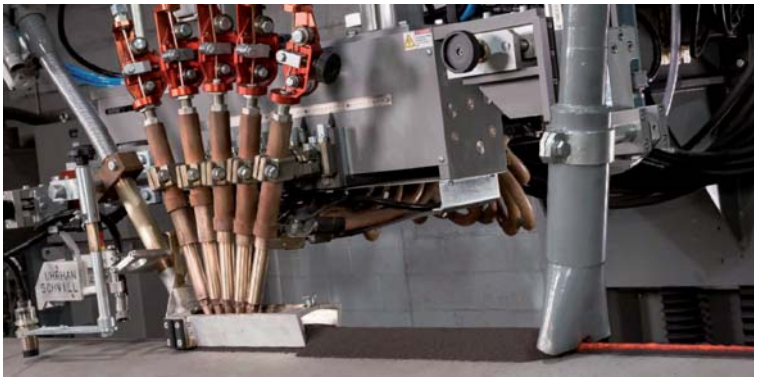
The process is adapted for both longitudinal and circumferential welding.

Equipment: LINCOLN ELECTRIC provides a full range of equipment for every application

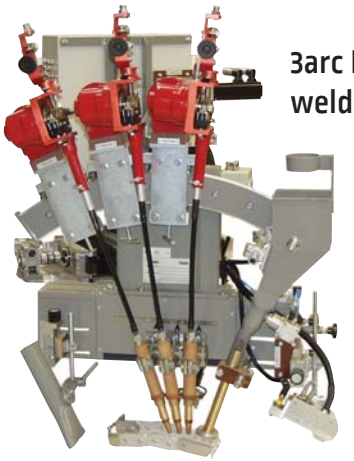
Example of modular tandem welding head proposed.



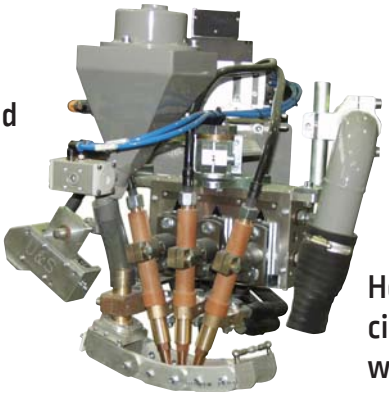
SAW MULTIPLE WIRES



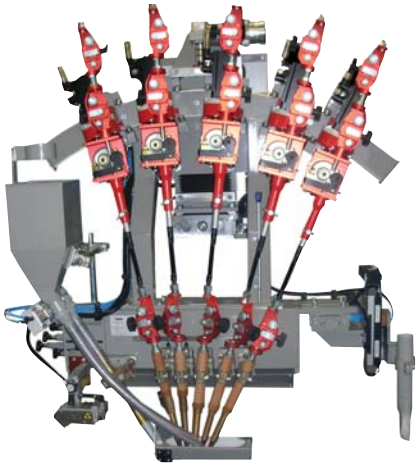
Uhrhan-Schwill SCHWEISSTECHNIK
A Lincoln Electric Company



3arc E5 welding head



Helical or circumferential welding



Longitudinal welding

PERFORMANCES

SAW MULTI-ARCS SYSTEM (heads and controllers)

The **Lincoln Electric** Automation proposes to integrate multiple wires head from Uhrhan & Schwill Gmbh company world-renowned specialist for Pipe Mills segment.

E5 system

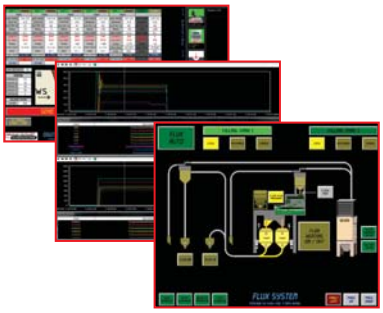
The E5 system manages all the parameters of the multi-arcs welding and it can be associated to D2C controller for a complete management of the machine:

- Single arc, Tandem arc or triple arc.
- Long Stick Out process.
- Touchscreen based remote control.
- Management of programs and memorization.
- Manual control of wire and flux feeding.
- Display of all real-time measurement values like voltage, ampere, wire feed speed, torque.

Z5 system

The Z5 system manages the complete machine componants and all the parameters of the multi-arcs welding and alit can be associated to D2C controller for a complete management of the machine:

- From single arc to multiple arc (x6).
- Long stick out process.
- Large touchscreen.
- Full control of wire and flux feeding system.
- Display and recording of all real-time measurement values like voltage, ampere, wire feed speed, torque, movement speed...
- Seam tracking by laser scanner.

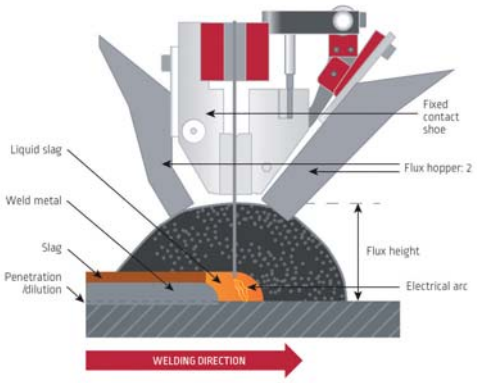


STRIP CLADDING PROCESSES

Cladding is a fundamental process in the pressure vessel industry and is applied across whole spectrum of applications, from Nuclear, Oil and Gas industries to Chemical Processing equipment and steelmaking.
Cladding is required on the process side of high pressure critical process plant equipment to provide corrosion resistance against highly severe corrosive service fluid or to increase wear resistance of a component being subjected to heavy wear and tear applications e.g. continuous casting rollers in steel mills.

Submerged arc strip cladding

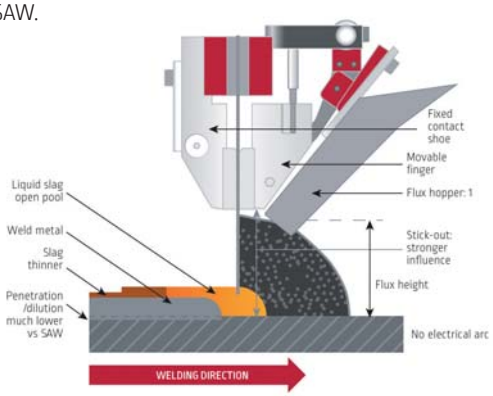
- The arc causes more penetration into the base material, resulting in dilution levels of ~20%.
- Deposition rate : 12-14 kg/h for 60 x 0,5 mm strip.
- Current range restricted to limit dilution.



Electro slag strip cladding

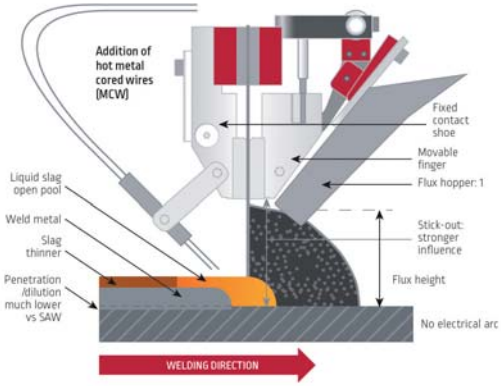
Conventional

- Arc-less process, use conductive flux and works on Joule's resistance heating principle.
- The strip current passes through the molten slag. The resulting resistance heating effect melts the strip and deposits the molten weld pool onto the base material.
- Low dilution level (9 to 12%). Process has significant advantages over SAW.



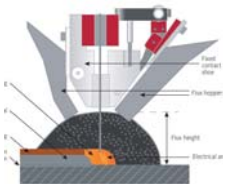
Hybrid Technique*

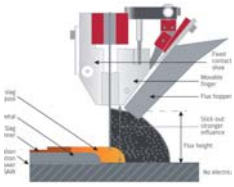
- Hot metal cored wires added to the molten pool as 3rd constituent.
- Always in single layer, coupled with high welding speed.
- Lowest dilution level coupled with the highest deposition and faster surface coverage rates.

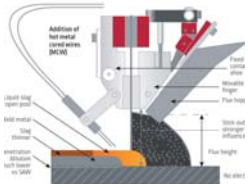


Comparison between:

- Submerged arc (SAW).
- Electro slag conventional (ESW 2D).
- Electro slag hybrid* (ESW 3D).



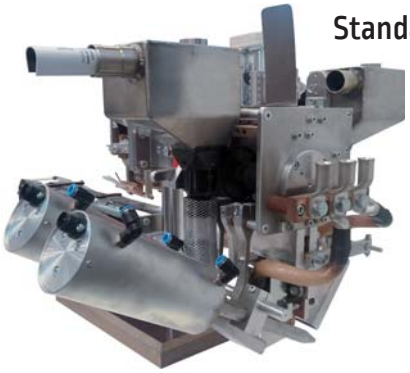




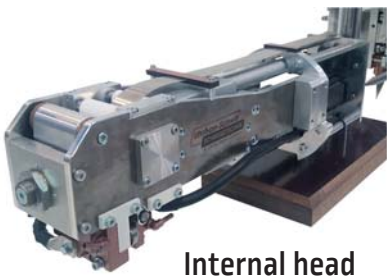
	Submerged Arc	Electro slag	
		Conventional	Hybrid*
Consumables	Strip + SAW Flux	Strip + ESW Flux	Strip + Metal Cored Wire + ESW Flux
Deposition rate (Kg/h) 60 x 0.5 mm strip	12-14	22-30	28-42
Welding speed (cm/min)	10-14	Normal speed: 15-18 High speed: 24-35	1
Minimum number of layer in Ni-625 to achieve <5% Fe chemistry	2	2	1
Flux type for high speed cladding in single layer	NA	Alloyed	Neutral

Welding heads

- In-house designed heads for strip widths 15 to 120 mm.
- Water cooled and robust modular design.
- Power cables can be added as required.
- Easily oriented for desired welding direction.



Standard head



Internal head

E5 controller

- Management of the welding process with the E5 system and its mobile console.

SAW TRACTORS

LT-7 Tractor

LT-7 Tractor
Single or twin wire

The **LT-7 Tractor** is a self-propelled mechanized wire feeder, designed for submerged arc process with track system capabilities. It is self-guiding and easy to operate. For welds butts, horizontal fillet and lap joints to the left or right side of the tractor frame.

Features

- Travel speed from 0,12 to 1,8 m/min
- Wire diameters from 2,4 to 4,8 mm
- Wire speed from 2,5 to 10,2 m/min

Cruiser Tractors

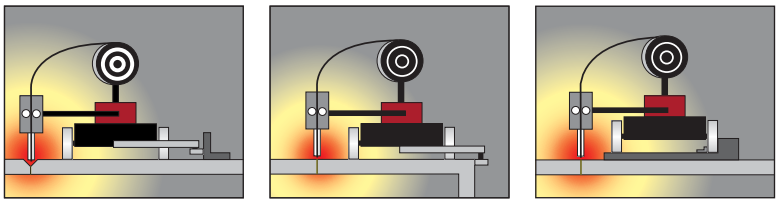
The self-propelled modular **Cruiser** and **Tandem Cruiser** travel carriages can deliver deposition rates up to 13kg per arc per hour for butt and fillet joints on lengthy plate welding applications common in bridge or barge decking, large tank fabrication or shipbuilding. It is suitable for all those positions below.

Features

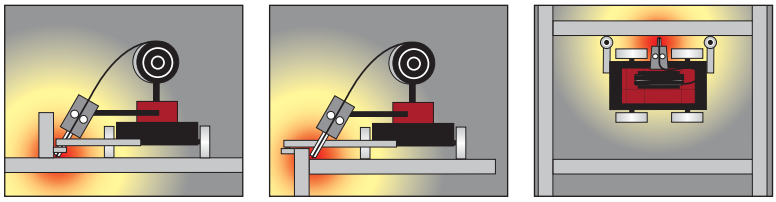
- Advanced control pendant.
- 3 or 4 wheels guiding.
- Travel speed from 0,25 to 2,5 m/min.
- Wire diameters from 2,4 to 5,6 mm.
- Wire speed from 0,4 to 12,7 m/min.

Cruiser
Single or twin wire

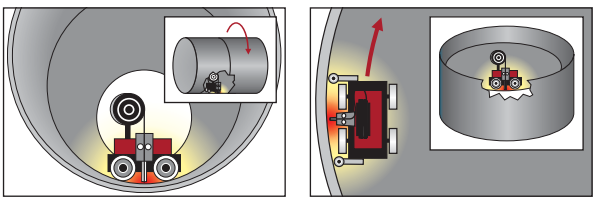
Flat butt welding

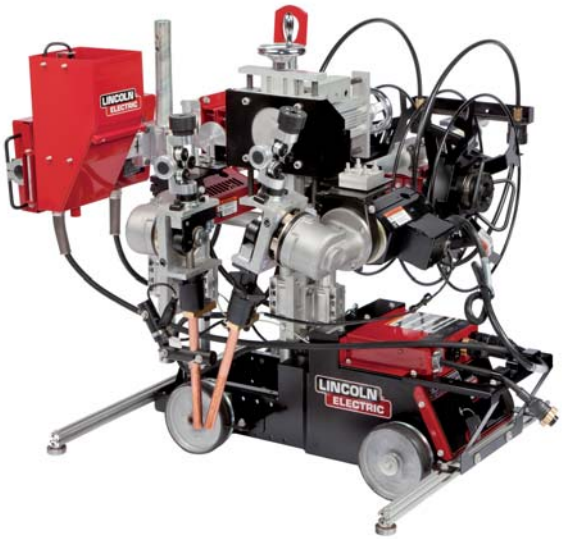


Fillet welding



Circular welding of large vessels with ø over 1 600 mm





Tandem Cruiser
Single wire

SAW INTERNAL BOOM

Lincoln Electric can propose several solutions of internal boom welding.

The main processes are:

- Pipe manufacturing by internal longitudinal welding,
- Assembling of 2 pipes by circular welding.

Once the internal weld is done, the outside weld is performed by an other equipment.

The structure and configuration of the internal boom depends of the length of the pipes.

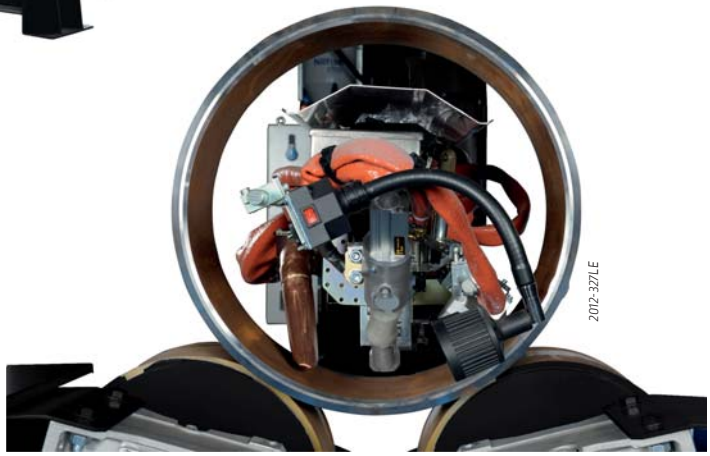
Internal boom from 4 m to 12 m stroke.

2013-485LE

2013-485LE

Internal welding head with single or twin wire, video and seam tracking.

2012-582LE



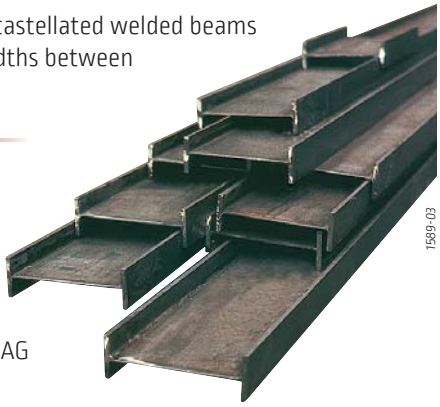
2012-327LE

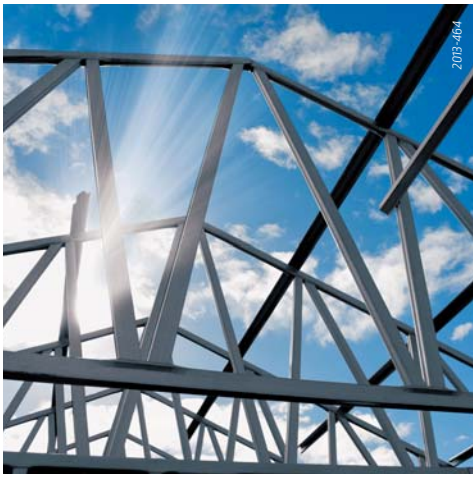
BEAM-MATIC

The automation of long workpieces welding (beams, wagons, box section constructions) requires sophisticated machines which move on rails.

The **BEAM-MATIC** system is used to weld castellated welded beams of constant or varying cross-section in widths between 220 and 2 000 mm *.

** Other dimensions on request.*





2 types of **BEAM-MATIC** are available:

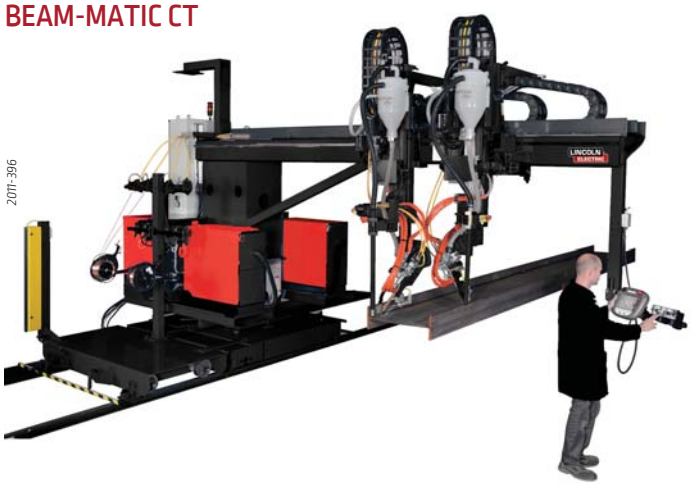
- Cantilever: CT,
- On base column and boom: LM.

The **BEAM-MATIC** allows to weld in MIG-MAG or SAW (single or twin wire) process.
In standard, the machine is equipped with a flux recovery device and a pushed flux supply.

Possibility to use wire spools or wire drums on the 2 **BEAM-MATIC**.

The torch level is fix on the **BEAM-MATIC CT** and it's possible to lift the torch level on the **BEAM-MATIC LM**.

BEAM-MATIC CT

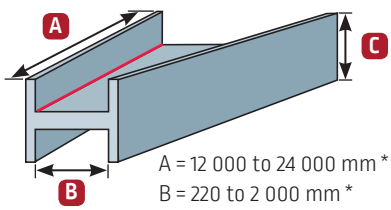


BEAM-MATIC LM

Clamping bench:

The clamping bench allows the positioning of the web and the flanges before the welding, with an additional clamping bench it's possible to save time and increase productivity.

Standard / Dimensions for clamping bench



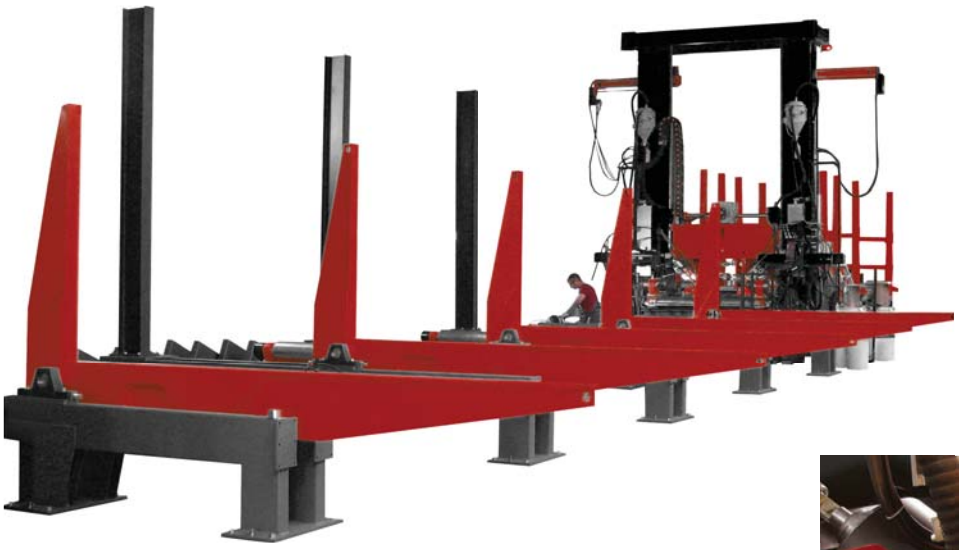
A = 12 000 to 24 000 mm *
B = 220 to 2 000 mm *
C = 120 to 500 mm *

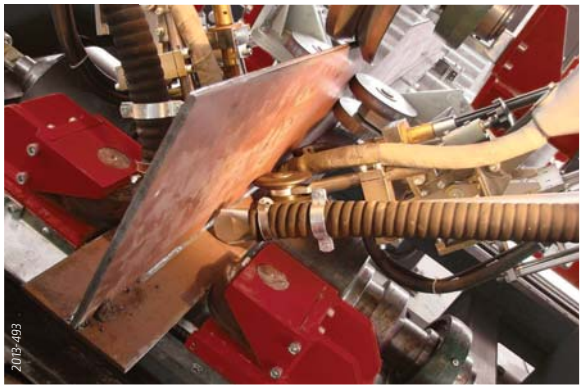
Web thickness: 4 to 20 mm
Flange thickness: 10 to 30 mm

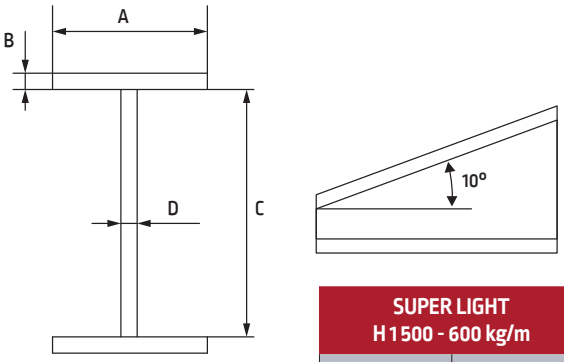
** Other dimensions on request.*

T-MASTER

The **T-MASTER** "Big size beam welding line" is designed to weld with Submerged arc process the T and I beams with the web in vertical position without need of continuous tack-welding of beam. A short tacking is only needed at the beam leading edge.







		SUPER LIGHT H 1 500 - 600 kg/m		LIGHT H 2 000 - 1 000 kg/m		MEDIUM H 3 000 - 2 000 kg/m		HEAVY H 4 000 - 3 000 kg/m	
		mini	maxi	mini	maxi	mini	maxi	mini	maxi
A: Flange length	mm	150	800	150	1 000	200	1 250	200	1 500
B: Flanges thickness	mm	5	30	6	40	8	65	8	80
C: Web length	mm	200	1 500	200	2 000	250	3 000	300	4 000
D: Web thickness	mm	5	15	6	25	8	30	8	40
L: Beam length	mm	6 000	12 000 *	6 000	12 000 *	6 000	12 000*	6 000	12 000 *
Weight / meter	kg / m		600		1 000		2 000		3 000
Taper angle	°		10		10		10		10

** additional length by 3 m*

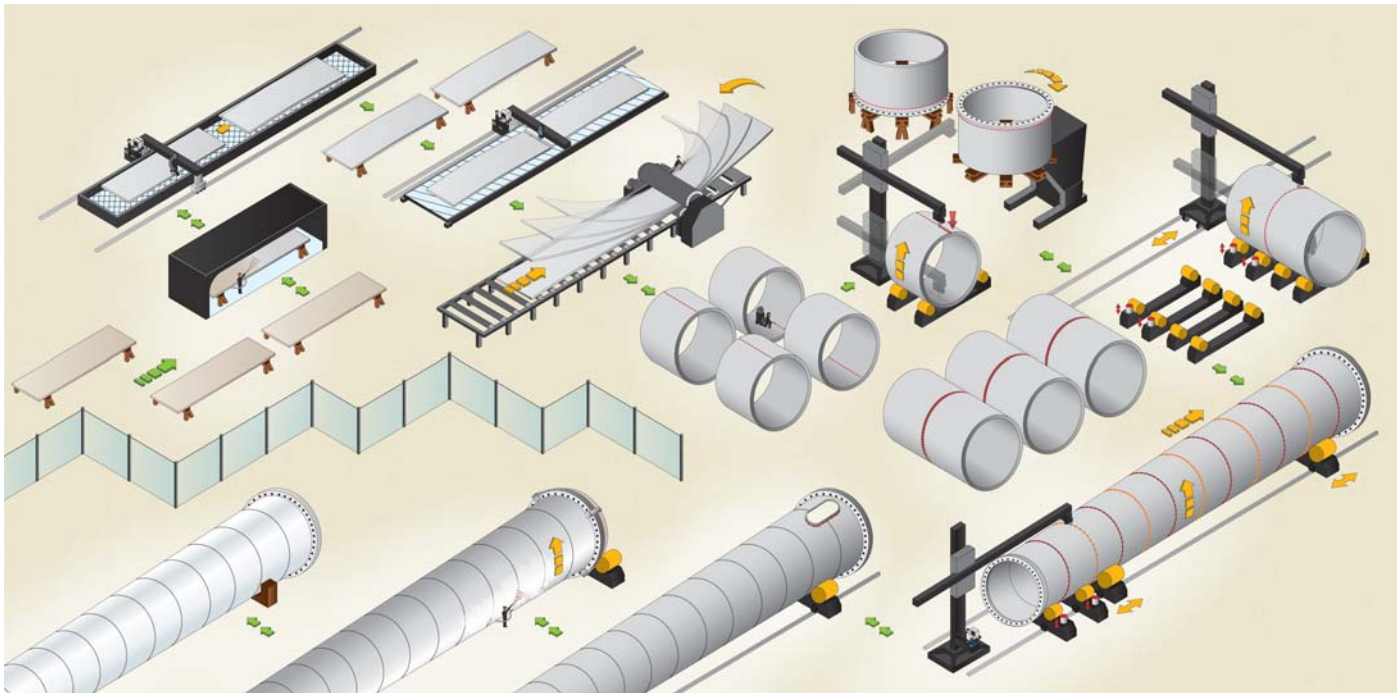
** Other dimensions on request.*

WINDMILL SOLUTIONS

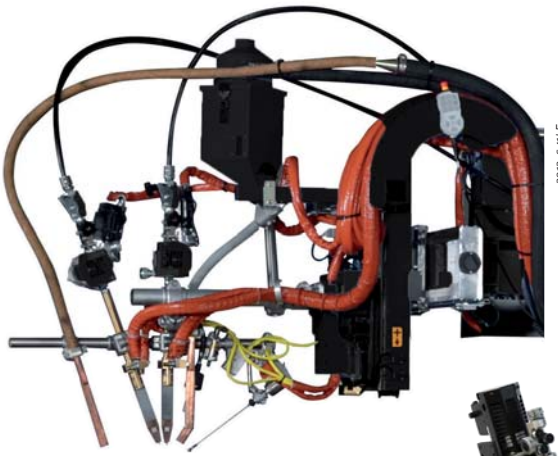
Since the beginning, **Lincoln Electric** has been involved in most mobile and fixed platform constructions in the cold waters of the North Sea and in the onshore wind-energy industry.

Working closely with engineering departments and major manufacturers in this sector, **Lincoln Electric** is constantly working to develop processes, equipments and consumables meeting the ever more demanding requirements of increasingly hostile environments.

This constant innovation has resulted in an unsurpassable range of equipment and consumable solutions specially designed for wind-power industries.



Example of layout for windmill towers fabrication.



Heavy duty welding heads:
Narrow gap or SAW tandem head.

Large column and booms, rotators and positioners are proposed in this windmills solution.

LAMP-POST SOLUTIONS

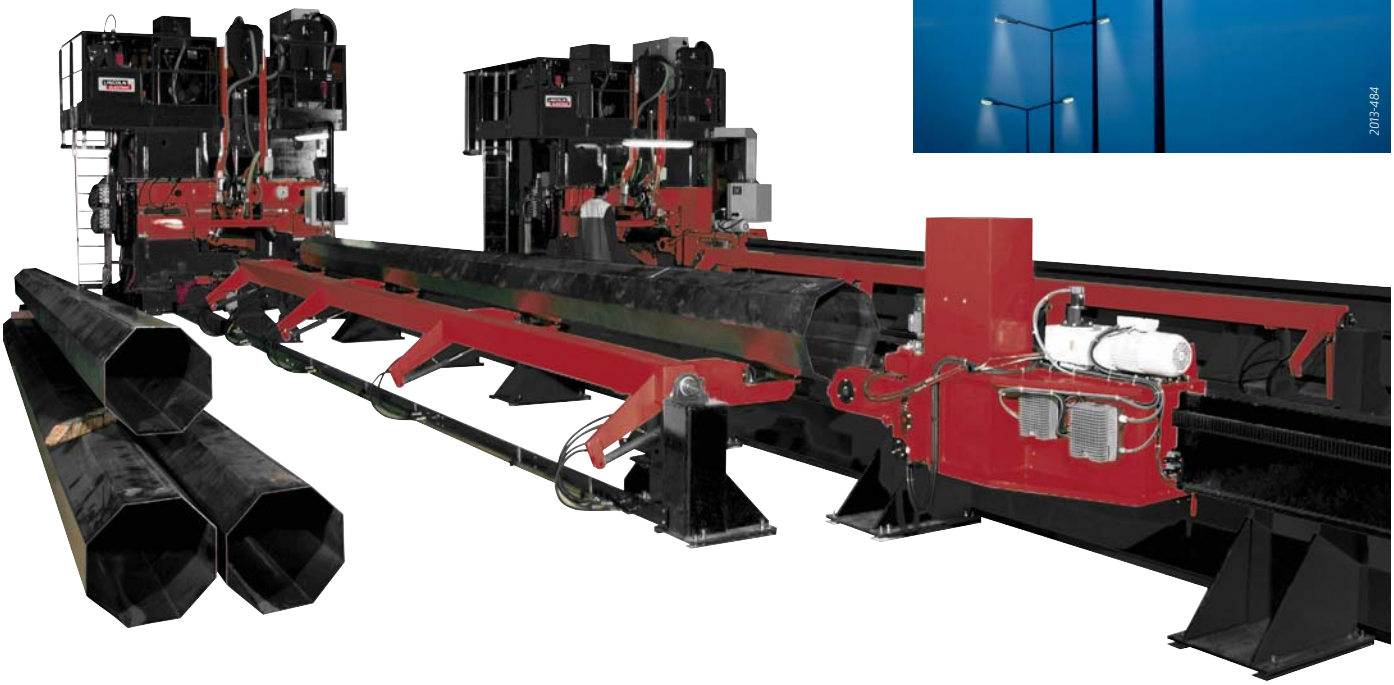
We propose some semi-automatic machines for the lamp-post welding.

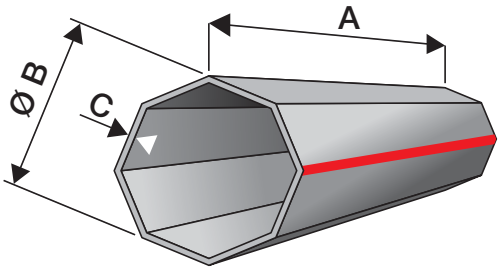
The operator positions the piece in the infeed line of the machine, once the clamping of the piece done, he adjust the joint to be welded, and then start the automatic welding of the lamp-post in SAW or plasma processes.

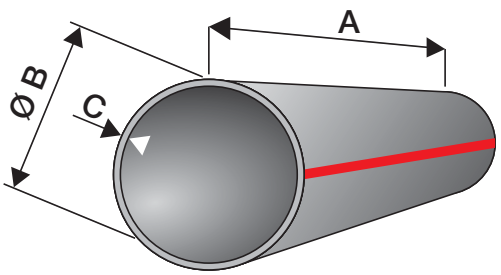
A burner ramp under the lamp-post allows decreasing the distortions.

Once the piece welded, it's evacuated thanks to a tilting device.

Several options are available on request.







A: 3 to 17 m
B: 60 mm mini - 600 mm maxi
C: 3 to 6 mm
Round conical, polygonal
(32, 16 and 8 sides)
Conicity maxi: 50%

WELDING PROCESSES

- SAW single wire diameter from 1.6 to 5.0 mm
- Plasma welding 3 or 4 heads

MACHINE CYCLE

- SIEMENS controller
- Overview and control in real time of the machine, parameters recording, remote connection

PERFORMANCES / OUTSTANDING POINTS

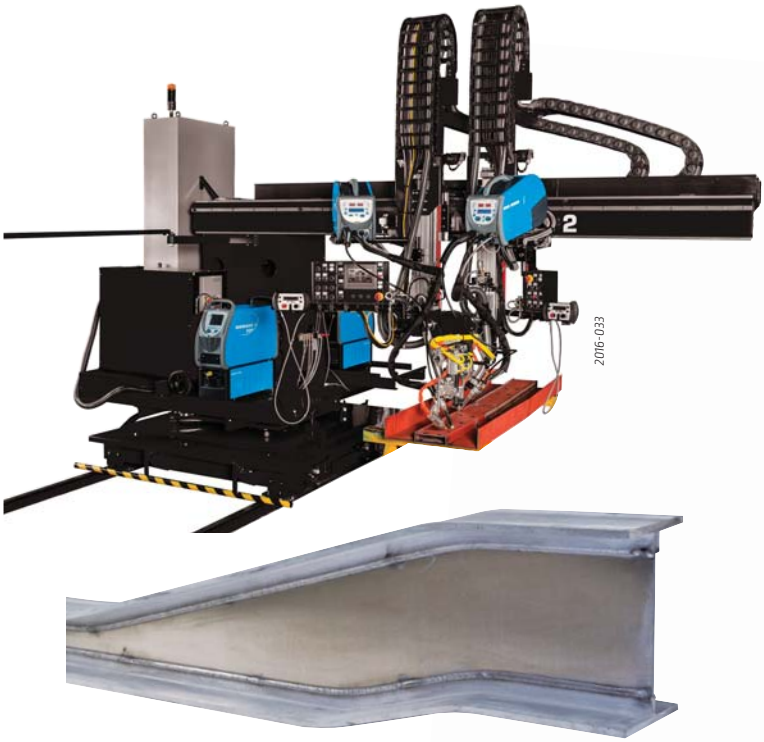
- Joint tracking with camera and operator joystick
- Only 1 operator
- Machine availability: 95%
- Fix machine / Movable piece
- Speed range: 1 m/min to 3 m/min according to process and thickness

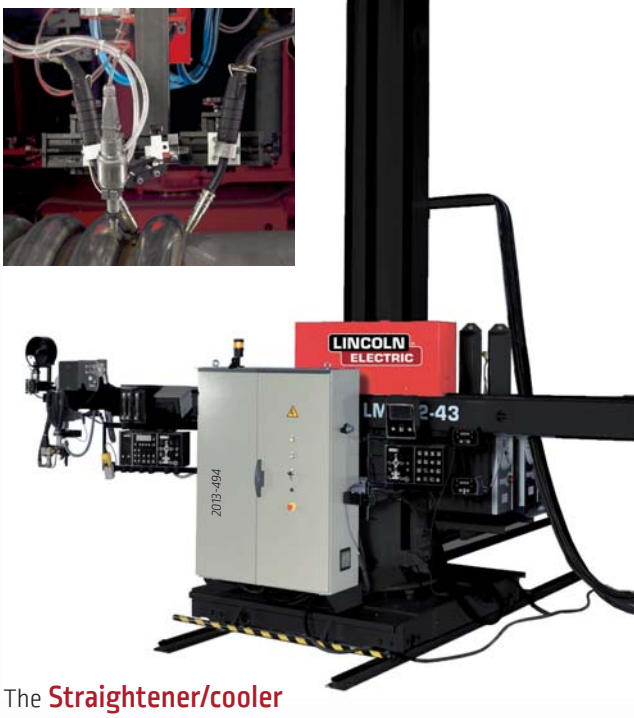
MIG/MAG MACHINE RANGE

The **MIG/MAG** applications are used in various domains from the simple carriage for shipyard industry to large gantry for train manufacturing.

The choice of the machine depends mainly on the size of the piece to weld.

Lincoln Electric propose solutions according your need.





The **Straightener/cooler MIG/MAG application** is often combined to the food tanks manufacturing with plasma process.

The MIG/MAG **Autonomous welding head installation**

The **Autonomous carriages** allow the longitudinal and circular welding of large vessels. They are also often used in the shipyard industry.

2011-317LE

MIG MAG welding aluminium Gantry with two torches to answer applications requiring a high level of productivity with large pieces such as the manufacture of railway wagons.

2231-52

2010-782LE

The **MIG/MAG welding seamer bench** allows the longitudinal weld of sheet metal or tanks.

2006-248LE

The **Turning electrode** is a simple solution for small circular welds with MIG/MAG torches.

2231-40

MIG/MAG EQUIPMENTS

DIGIWAVE III 520-R

DIGIWAVE III 520 A or R versions and wire feed unit DVU-R500
A for automation: level 1 (start/stop cycle ; analogic settings for U and I)
R for robotic: fieldbus communication

With its smart design, its color screen and its innovative communication interfaces, the **DIGIWAVE III** concretizes the most recent technologic breakthroughs and positions itself at the cutting edge of the welding techniques.

Main characteristics and advantages:

- Digital precision and outstanding welding performances,
- Full range of processes for all applications: Speed Short Arc, Pure Controlled Metal, Pulse, Soft Silence Pulse, Spray Modal, High Penetration Speed, Advanced Sequencer, MMA coated electrodes, Gouging up to 8 mm,
- More than 200 synergic curves with possibility to realize yourselves up to 50 customizable curves,
- Storage up to 100 welding programs,
- Traceability of the welding parameters,
- Control process: you set yourselves the control thresholds of the welding parameters not to go above, and you are warned in real time as soon as a fault is detected,
- User management and locking mode,
- Monitoring with USB, Ethernet,
- RC JOB II for remote control,
- DVU-R500 is only 6,1 kg and 4 rollers drive.

	DIGIWAVE III 520-R
Duty cycle at 100%	450 A (at 40°c)
Primary power supply	3 x 320 - 480 V / 50-60 Hz
Max primary consumption	28.5 A
Current range	15 to 500 A
Weight	40 kg
Dimensions (W x L x H)	273 x 736 x 1 521 mm

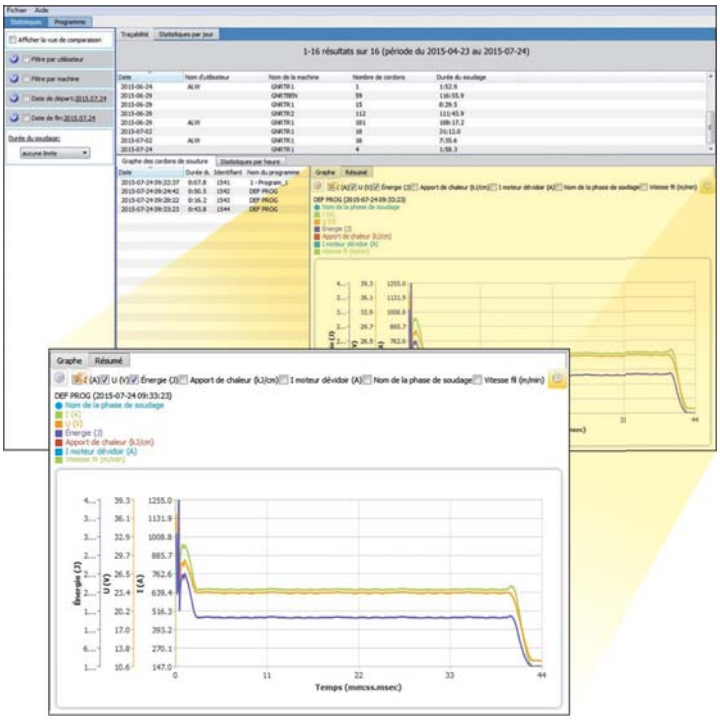
DIGIWAVE III Software solutions

SWAN

Supervising Welding Administrating Network

A software solution to allow better traceability to ensure quality level:

- Follow the production,
- Compare weld beads,
- Get curves and statistic on welding parameters,
- Heat input,
- Identification of the bead by unit number.



POWER WAVE® S500 CE

Powerful Multi-Process Capability.

The multi-process **Power Wave® S500 CE** is packed with **Lincoln Electric** performance technology for welding on thicker materials. It provides an extremely fast arc response, includes over 65 standard welding waveforms for optimized performance on almost any application and efficiently converts input power to reduce operational costs.

Power Wave® S500 CE proposes advances MIG-MAG welding process as:

- Pulse,
- Pulse-on-Pulse®,
- Power Mode®,
- RapidArc®,
- Rapid X™ (With STT® Module),
- Rapid Z™,
- Upgradable for additional processes to be developed in the future.

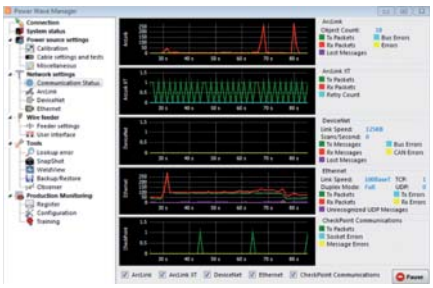
THE LINCOLN ELECTRIC GREEN INITIATIVE
Inverter Technology reduces energy demand
www.lincolnelectric.com/green

AUTODRIVE®
4R100 wire drive

User interface

	POWER WAVE® S500 CE
Duty cycle at 100%	450A / 36,5V
Primary power supply	200/208/220/230/380/400/415/460/575V 3/50/60Hz
Max primary consumption	60/54/30/27/21 A
Current range	5 to 550 A
Weight	68 kg
Dimensions (W x L x H)	355 x 630 x 571 mm

Power Wave® Software Solutions



Power Wave Manager

- Check the status of every component in your welding system.
- View and easily adjust the information associated with your welding operation.
- Setup the configuration of the differents componants of the welding installation.
- Display of all real-time measurement values like voltage, ampere, wire feed speed, torque.

CheckPoint™: Welding Production Monitoring

CheckPoint's secure, cloud-based access allows key stakeholders to view and track welding operations anywhere in the world, on any device:

- Track real-time weld production data 24/7.
- Create custom custom alerts and notifications.
- Operator Arc on Time.
- Material Consumption.
- Weld and Assembly Information.

Production monitoring™

Production monitoring monitors a lot of information for the management of the customer production.

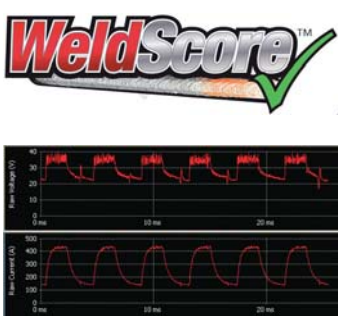
- Current status and shift analysis.
- Weld listing and downtime analysis.
- Monitoring by Weld ID, Employee ID or Consumable Lot ID.

Weldscore™

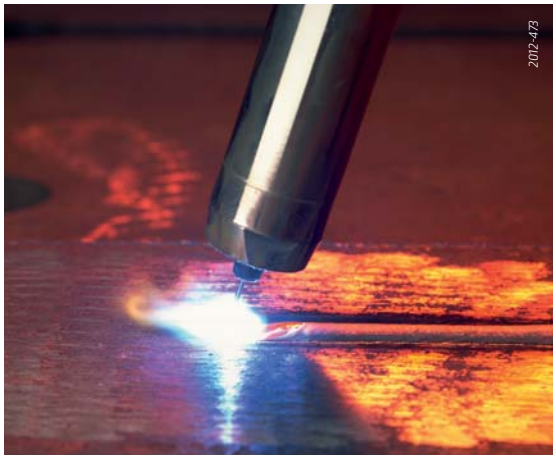
Allows you to score each weld based on a trained sample of acceptable welds.

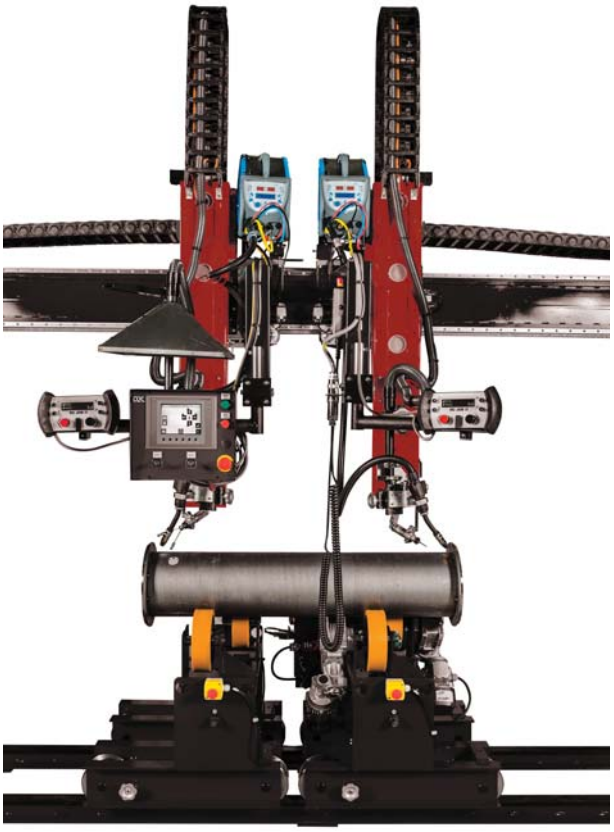
Great for:

- Expanding quality control capabilities,
- Trade school monitoring, grading and final examinations,
- Critical welds with specific quality control requirements,
- Operator testing and certification programs or Consumable Lot ID.



MIG/MAG EQUIPMENTS





Complements for all types of installation

Torches

Water cooled torches dedicated for automatic welding MIG/MAG installations.

- Excellent cooling up to the nozzle holder,
- Good gas protection with the long shape of the nozzle.

Characteristics	TM 501W	TR 600	TM 700
Duty cycle	500 A at 100%	400 A at 100%	700 A at 100%
Wire diameter (mm)	1 to 2.4	0.8 to 1.6	1.2 to 3.2
Harness length (m)	1 to 2.5	1 to 4	Without - direct connection
Version	Straight or curved 22 or 45°	Straight or curved 22 or 45°	Straight
Option	-	-	Additional gas protection for light metal alloy

Seam tracking

TRACKMATIC device guarantees the good positioning of the torch in the joint to be welded without operator intervention. A sensing probe finger or an inductive sensor detects positioning errors (height or alignement) and commands the necessary corrections required to the torch trajectory. It ensures a constant weld quality, an increase of productivity, a reduction in repair operation and easier use for the operator.

Video camera

The video system **VISIOARC VA2** including protection against spatters and fumes, can be easily integrated. It uses a greatly enlarged image which enables the precise position of the welding torch to be viewed thus making the operator's work easier and improving the quality of the welding operation.

System with large color screen 15'',
miniaturised camera and additional lighting.