

# Welding automation solutions: essential for growth

Following the establishment of Cosmo Automation Solutions as a Level 2 B-BBEE entity under the umbrella of the Cosmo Group of Companies, *African Fusion* talks to Petrus Pretorius general manager of Cosmo Industrial, about the wide variety of Lincoln Electric automation solutions now available through the new company.

**A**s a comprehensive welding solutions provider, Cosmo Industrial strives to deliver the highest levels of value and productivity for customers, no matter how small or big their needs. "Among these needs, we believe that manufacturing must move towards high productivity solutions in order to lower unit costs and become more competitive," says Pretorius.

"So, with the help of Lincoln Electric, Cosmo Automation Solutions has been established to deliver total automatic welding and cutting technology solutions for South African manufacturers and fabricators," he begins.

"Through Lincoln Electric and the brands under its ownership, we have access to a vast range of the world's most advanced welding and cutting technologies to improve the welding and cutting capabilities of our customers and to better position our manufacturing capabilities as globally competitive.

"Depending on needs, we can install customised solutions to suit the volumes and investment capabilities of companies of any size: to help pressure vessel manufacturers, chemical plant fabricators, railway contractors, fuel and storage tank constructors, pipeline

construction companies, and many more," Pretorius tells *African Fusion*.

## Automated TIG and plasma welding solutions

Pretorius first focuses on Lincoln Electric's new TOPTIG process, designed to make the TIG process easier to automate and more productive.

"TOPTIG is a major innovation in the world of automatic welding," says Pretorius. "It is a new variant of the classic TIG welding solution, which is still a preferred process for high integrity welding work," he adds.

The underpinning idea behind TOPTIG is enabling automatic and robotic TIG welding to be as fast and as convenient as the automatic MIG/MAG process. TOPTIG therefore offers better accessibility for robot and automatic welding of complex structures: very good performance with respect to speed and the high quality, spatter-free welding associated with the traditional TIG process.

This is achieved via a new compact torch design that feeds filler wire through the welding nozzle and into the hottest zone of the TIG arc, causing the wire to melt into small droplets, exactly

as in the MIG process. The use of a pulsed current along with synchronised pulsed wire feed also enables better control and more flexibility.

"This new process can be used effectively on carbon or stainless steel plates of up to 3.0 mm or on galvanised sheet with brazing wires. It is ideal for use in the automotive, fine boiler making, metal



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furniture, aeronautics, chemical process and plant installation sectors," says Pretorius.

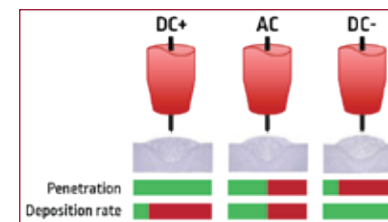
Lincoln Electric offers two types of TOPTIG installation with steady or pulsed current driving synchronised steady or pulsed wire feed. The TOPTIG 220 DC power supply and its associated RC-JOB controller power and control the system, and the innovative torch and push-pull wire feeder can be attached to any robot or fixed automation installation.

Also in Lincoln Electric's offering are its automatic Plasma/TIG welding systems, which offer multiple and varied high quality seam welding solutions to suit the needs of vessel, tank and column fabricators.

At the starting point of the assembly of large vessels is the seam welding of flat sheet to the exact dimensions required. Lincoln Electric's Seamer bench for longitudinal welding is ideal for this purpose, offering either the single torch plasma/TIG keyhole process or, for longer seam lengths and higher productivity, the dual torch plasma + TIG process.

The INTER seamer bench can include the in- and out-feed tables for material handling to further streamline production and a video-based vision system can be incorporated to help the operator to guide the torches along the weld seam.

As well as seamers, column and boom systems with rotators are available for circumferential welding of closing seams of rolled fabrications as



Lincoln Electric's POWER WAVE AC/DC 1000 SD welding power sources enable optimal simultaneous control of weld penetration, geometry and deposition rate.

well as the dished end joints of pressure vessels, for example. Once the vessel or vessels are on the rotator, the plasma column and boom carries out the circumferential welding, while the operator controls the welding operation in safety and comfort from the ground.

Large diameter vessel assemblies with low rigidity can also be accommodated by a vertical turntable with the TOPTIG torch mounted on a column and boom to the side – and such systems can accommodate all the longitudinal and circumferential welding seams.

Automatic plasma and plasma+TIG systems are also available for welding elliptical tanks, pipe prefabrication assemblies and for automatic pipe production, and these can include all the holding devices, rotators and carriages necessary to turn and move the assemblies.

## Submerged-arc welding installations

Lincoln Electric's submerged-arc welding (SAW) equipment is among the most advanced in the world and the process is most suited to automation, being a high deposition rate process ideally suited to thick section welding and hard surfacing of low-alloyed carbon, stainless and refractory steels.

"Automated SAW combines productivity, quality and operator comfort. It is used for material thicknesses from 3.0 to 300 mm and provides high welding speeds and high deposition rates," notes Pretorius.

Lincoln Electric offers a number of novel process variants for use with one or more wires. Using a single power source, these include ESO (Extended Stick-Out); Narrow Gap Deep Groove; Large Wire Twinarc® and Tiny Twinarc, which feed two wires into the same arc; as well as traditional single wire options.

Also available for those seeking even higher deposition rates are Tandem arc; Tandem Twin and Multi-arc SAW options, which involve multiple power

sources and the option of depositing multiple wires simultaneously.

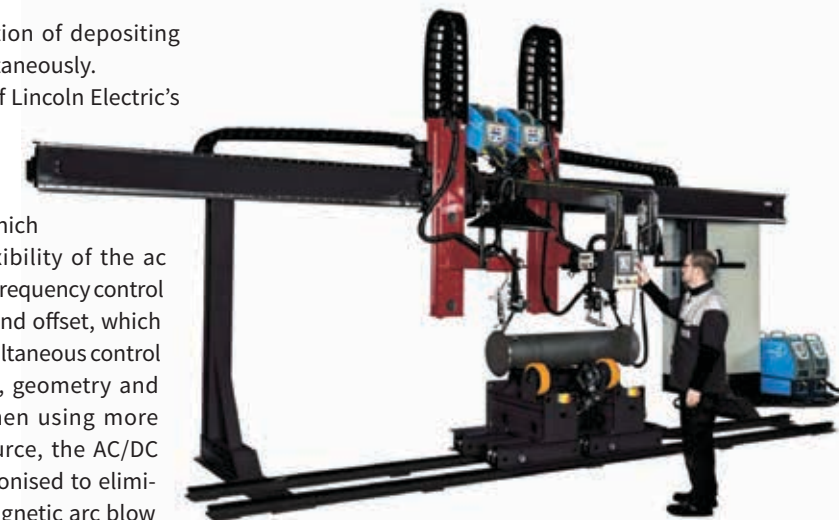
At the pinnacle of Lincoln Electric's SAW solutions is its POWER WAVE AC/DC 1000 SD welding power source, which offers complete flexibility of the ac waveform: including frequency control and the ac balance and offset, which enables optimal simultaneous control of weld penetration, geometry and deposition rate. When using more than one power source, the AC/DC 1000s can be synchronised to eliminate the effect of magnetic arc blow for example.

Positioners and manipulators for SAW include solutions at all levels of sophistication, from the CRUISER SAW carriage – an economical solution for welding large workpieces on site or in workshops with restricted areas – to dedicated platforms, such as systems to clad railway wheels; Lincoln Electric's BEAM-MATIC H-beam fabrication solution; and its T-MASTER system for fabricating I-beams in the vertical position, without the need for tacking.

"SAW is used in many industries: infrastructure, shipbuilding, pipe mills, heavy duty pressure vessels, the energy sector and many more," notes Pretorius, lifting out the company's wind and lamppost fabricating systems in particular. "For lamp posts, Lincoln has a high productivity machine that can be equipped with SAW or plasma welding equipment. No tacking of parts is required and dedicated software manages the entire production process, including automatic positioning of the pole edges before welding according to the shape and conicity of the end product. It even has a pre-heat burner under the system to reduce welding distortion," he tells *African Fusion*.

## MIG/MAG automation systems

MIG/MAG is still the dominant process used robotic automation and Lincoln Electric has numerous fixed automation solutions for all types of fabrication. Positioners, manipulators, rotators, Lincoln's high-tech range of Powerwave inverters and wire feeders, along with water-cooled torches dedicated to automatic welding, seam tracking systems such as the TRACKMATIC and video systems such as VISIOARC VA2 all combine to give better productivity, reduced repair rates and far better weld quality.



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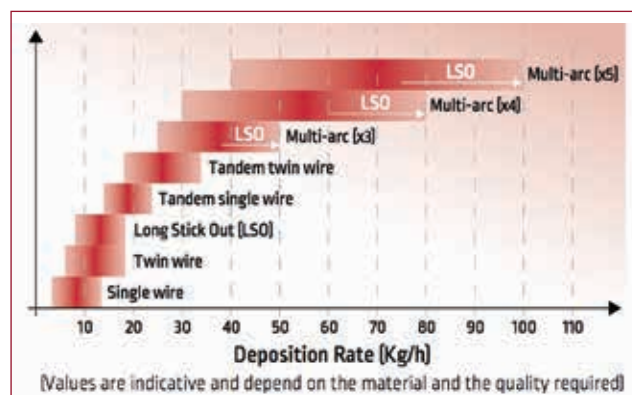
At the entry level for MIG/MAG automation are a range of custom-built MIG/MAG welding carriages: WELDYOCKET; WELDYPACK; WELDYSTIFFENER and WELDYPACK that, thanks to their modular design, can be used in several different configurations.

From there, since control and manipulation of the welding arc is the key to achieving quality end products, Lincoln Electric offers a full range of positioning equipment: turntables; headstocks; rotators and positioners, which can be combined with column and boom, seam benches and gantry machines to form highly complex and effective automation systems. As an example, Pretorius lifts out a customised gantry based MIG/MAG automation systems with a rotator for welding the two end flanges onto a pipe section at the same time.

Also included in the automation portfolio of Cosmo Automation Solutions are welding robots from Fanuc, which can be integrated into fixed automation installations for both welding and materials handling tasks. "I recently visited the Fanuc factory in Japan to look at its new technology and there are some very exciting developments emerging for welding," Pretorius tells *African Fusion*.

"Welding automation offers consistent weld quality, significantly reduced rework while enabling the productivity that is essential for South African fabricators and manufacturers to be globally competitive.

"If we want South Africa to grow, we have to adopt automation and Cosmo Automation Solutions is now ready and willing to be part of this growth," he concludes. ■



Lincoln Electric offers a number of novel SAW process variants that use one or more wires and multiple power sources to achieve higher deposition rates.