

Automation Simplifies Plasma Cutting Systems

Built-in technology maximizes performance, setup and use of multi-gas cutting systems.

Unlike oxy-fuel systems that require nearly constant monitoring, a modern plasma system with the latest automated controls allows the operator to step away to perform other tasks while the machine is running. (Photo courtesy ESAB)



and then adjust the regulators to obtain the appropriate gas flows and pressures. While not significantly time-consuming, this manual process relied on the operator to make adjustments as the conditions changed. Automating this process ensures such adjustments are made automatically and consistently.

An internal database and microprocessor controls have replaced the pages of printed cutting data and manual controls used in the past. Once the torch is set up and the cutting process is selected, the operator simply hits the start button.

The world market has a growing interest in the plasma cutting process because of its high productivity, cut quality and reliable cutting results. Users are moving from the simple, more low-tech oxy-fuel process to conventional mechanized plasma systems that are not only more budget friendly, but deliver a higher level of functionality and flexibility. Helping to fuel this trend is technology built into modern systems that maximizes plasma's performance and makes this process easy to set up and use by operators at any skill level.

Automated Setup—Modern plasma systems do not require the operator to monitor multiple setup parameters to ensure consistent cut quality. These parameters—current, gas flow, pressure—are automatically set by the system and optimized for the power level, material thickness and consumables. In the past, the operator would need to manually set these parameters, put the system in gas test mode

and then adjust the regulators to obtain the appropriate gas flows and pressures. While not significantly time-consuming, this manual process relied on the operator to make adjustments as the conditions changed. Automating this process ensures such adjustments are made automatically and consistently.

When the cutting cycle is initiated, the operator does not need to closely monitor or adjust the process and can step away from the controls to accomplish other tasks while the machine is running. In contrast, setting up an oxy-fuel torch requires more training and skill, as well as nearly constant monitoring and frequent intervention during the cutting operation. As a result, in this process, cutting results vary greatly with the operator.

The ease-of-use factor is increasingly important with a less skilled workforce. Repeatability is equally critical as manufacturers demand repeatable process results from all shifts, work centers, production facilities and outside suppliers.

Though an automated setup does not necessarily improve
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ESAB Cutting Systems, Florence, S.C., produces a wide range of welding and cutting equipment and consumables. For more information, call 800-372-2123 or visit www.esabna.com.

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the plasma cut quality that can be achieved with a properly set up manual system, it does prevent the likelihood of errors. As such, the repeatability and reliability of the process is improved, which helps ensure consistent cutting results with fewer secondary operations.

Process Control / HMI—Increased automation to simplify the use of plasma systems is a driving force in the design of process controls. This is accomplished through the use of:

- An intuitive, one-step graphic user interface.
- Automatic gas control.
- Automatic settings for transitioning between cutting, gouging, mechanized and handheld processes. Required process parameters for each mode of cutting are stored in the internal database, and the necessary process sequence adjustments are automatically managed by the process control.
- A context-driven help screen, which prompts the operator for required action. Instead of simply reporting that one or more conditions are out of range, the process control assesses the dynamic conditions and timing from a wide variety of sensors. This assessment is used to generate a meaningful help message and recommended actions.
- Graphic displays to assist setup and operation.

Torches / Process—Use of automation and enhanced manufacturing processes continue to improve consumable life, cut quality and thickness capabilities of plasma systems. Improved cut quality and consistency helps reduce or eliminate costly secondary operations. Advanced consumable technologies extend consumable life, which reduces the cost per part.

Power Blocks—Modern power supplies utilize high-speed gated transistors, digital bus connected controls and highly optimized transformers to yield tight process control and high operating efficiency for plasma systems. High electrical efficiency reduces power costs. Tight process control improves the consumable life and ensures repeatable cutting results.

Advanced Diagnostics and Process Monitoring—Self-diagnostics are performed automatically at startup and continually throughout the cutting process. Meaningful, context-sensitive help messages prompt required action by the operator or by maintenance. System operating parameters can be viewed and monitored on the unit's display or remotely on systems that are connected to a factory network. ■