The Aristo MIG 4004i from ESAB is a pulse power source that can be used for various processes. It includes gas metal arc welding (GMAW), pulsed spray transfer (including modified pulse spray processes such as ESAB’s Super-Pulse process), gas tungsten arc welding (GTAW) and shielded metal arc welding (SMAW).

In addition to its versatility, the Aristo MIG has a footprint that is 80% smaller and weighs 70% less than conventional technology power sources with a similar output. The Aristo MIG has an output range of 4 to 404 A at 410 A/25 V and a 100% duty cycle at 300 A/32 V, and the machine operates from a 380 to 460 V (+10%) three-phase supply at 50/60 Hz. Its compact size and light weight help fabricators who want to move their welding system around a large workroom, especially if they have limited space in their welding cells or want to mount the power sources on a mezzanine or pedestal to get them off the factory floor. Inverter technology also means that the Aristo MIG can help lower utility bills, as it has energy efficiency of 88% and a power factor rating of >0.94 with a 1.0 power factor being the best possible.

Built-in intelligence

The real benefits, however, come from the system’s advanced capabilities, many of which are controlled from the U6 or U8 panel. For example, they offer up to 250 pre-programmed synergetic lines. Operators start by selecting the welding process, followed by wire type by AWS classification, shielding gas type and wire diameter. Once the selections are made, the system sets the optimum welding parameters for those variables using its synergetic lines. It then displays the data on the panel interface. The ESAB-designed synergetic lines also help the operator avoid globular regions between short arc and spray arc where the arc becomes unstable and generates excess spatter.

With each synergic line, there are start and stop routines set as default. Some of these functions (creep start, hot start and crater fill) can be activated by using the keys on the interface. To further fine-tune the control settings, the user can program the start and stop data can be customised and sub-programmed easily.

Quick-set functionality

In a fabrication facility with 10 operators working simultaneously, this can save time. To optimise setup, the machine starts by setting parameters, checks the data and generates excess heat while ‘burning out’ the alloying elements, which can severely degrade the material’s ability to inhibit corrosion. Conversely, aluminium, because of its excellent conductivity, is highly prone to weld through and - in what may seem like a contradiction – incomplete fusion. The potential for poor fusion occurs because the weld pool solidifies too quickly and, because the short arc, process cannot maintain sufficient heat to penetrate through the root of the weld. This is especially notable in square butt joints and fillet welds.

Pulsed spray and Super-Pulse (technically a modified pulsed spray transfer process) overcome the limitations inherent in the direct-current short-circuit GMAW and conventional spray transfer processes. With the pulsing processes, the Aristo MIG 4004i pulses the arc between a high peak current that promotes metal transfer and a low background current where no metal transfer occurs but the arc does not become extinguished. By varying the amplitude, duration and frequency of the peak and background currents, the system can more efficiently control metal input while ensuring excellent fusion.

Not only does the process reduce spatter with little to no post-weld clean-up required, but it also enables all position welding and uses a banding tool to provide a consistent weld appearance. In short, the process can increase productivity and quality while reducing weld costs in many operations.

To harmonise parameters between the machine operation and the welding cells or lines, the Aristo MIG incorporates the Quick-set artificial intelligence system into the machine. This means that the operator can select a combination of pre-programmed welding processes, including gas metal arc welding (GMAW), pulse spray transfer (including modified pulse spray processes such as ESAB’s Super-Pulse process), gas tungsten arc welding (GTAW) and shielded metal arc welding (SMAW). These welding processes are then displayed on the panel, with the data saved for future use.

The Quick-set artificial intelligence system also means that the machine remembers the last weld, allowing the operator to quickly and easily recall the weld parameters. This can save time and improve productivity, especially in high-volume welding operations. The Quick-set artificial intelligence system also includes a built-in diagnostic tool that can help the operator identify and solve welding issues, reducing downtime and improving productivity.

Conclusion

The Aristo MIG 4004i pulse power source pairs with the Aristo Feed 3004 wire feeder and the U6 or more advanced U82 control panel to form a complete welding system. This system offers a range of features, including a pulse spray transfer process, which can be used for gas tungsten arc welding (GTAW) and shielded metal arc welding (SMAW). The Aristo MIG 4004i pulse power source pairs with the Aristo Feed 3004 wire feeder and the U6 or more advanced U82 control panel to form a complete welding system.