

I-CAR[®] ADVANTAGE Online™

Technical Information For The Collision Industry

Digital GMA (MIG) Aluminum Welders

Like other technology throughout the automotive industry, aluminum welding technology is constantly changing. Welder makers have developed machines that are controlled internally by computer processors. Computer-controlled welders are programmable, allow for very precise adjustments, and are consistent. Computer-controlled, or digital, GMA (MIG) welders have become a popular choice for vehicle makers for use when repairing their aluminum vehicles (see Figure 1).

Digital GMA (MIG) welders have been used in manufacturing for quite some time. The technology is now starting to become economical enough to be designed into welders for use in the collision industry. As a matter of fact, some of the digital GMA (MIG) welders that are being recommended for repair are the exact welders that are used during manufacturing of the vehicle. This alone is a substantial benefit in achieving a quality repair after a collision.

Digital GMA (MIG) welders are now becoming popular in the collision industry for repair of aluminum because they are programmable, allow for very precise adjustments, and are consistent. Aluminum is less forgiving than steel during welding. Compared to steel, the range of material that can be welded at a given welder setting is narrower. With the growing use of aluminum in vehicle structures, a new emphasis on consistent weld quality has to be given, no matter who is completing the repair.

THE PROGRAMMING EDGE

The ability to program the welder for a specific weld is one of the biggest benefits to using digital technology. Vehicle makers and welding engineers can work together to develop programs with specific parameters for every weld that is done during the repair. Among welders that are available, some come with the programs pre-installed and some require the technician to install the program before the machine is used.

The benefit of digital technology is that the technician does not always need a set of parameters from the vehicle or equipment maker to set up a program. They can create a program on their own for a welding application specific to their needs. This feature helps to reduce setup time and error for the technician. For example, if the digital welder was purchased with vehicle-specific programs installed to make lap and butt joints on three-millimeter thick aluminum, it does not mean that this material is all that the welder may be used for. The technician may manually adjust the welder to make welds on other alloys and thicknesses. After finding the correct parameters for the weld, the settings on the internal computer can be saved as a program for future use. Some welders have room for up to 100 different programs.

Some of the parameters that can be programmed on a digital GMA (MIG) welder include voltage, amperage,



Figure 1—The Fronius TPS2700 digital GMA (MIG) welder is a programmable computer-controlled welder for use on aluminum.

wire speed, aluminum alloy and metal thickness, electrode alloy and diameter, arc length, gas pre- and post-flow, and pulse to name a few (see Figure 2). Some welders use a multi-step trigger in the welding torch that allows setting the current for different sections of the weld. The start current can be set to eliminate a cold start at the beginning, and the end current can be set to help eliminate the crater at the end of the weld. The welder is switched between these different currents by squeezing the trigger during the weld.

What is not programmable is the technician welding technique. Every technician welds with a slightly different technique. Most of the digital GMA (MIG) welders with preset programs allow for some adjustment in the program to compensate for minor welding technique differences.

PRECISE CONTROL SETTINGS

Another benefit to using a digital GMA (MIG) welder is the high precision control of the settings. The displays for the parameters are digital and easy to read (see Figure 3) and allow for more accurate settings compared to the conventional dial with a number scale. In some cases, the dial and number scale setting has nothing to do with the actual parameter being adjusted. For example, the number "4" on the voltage dial does not necessarily mean the welder is set to weld using four volts. This precision

works well when welding the sometimes sensitive aluminum alloys that require exact parameters to make a successful weld.

POWER CONSISTENCY

The last major benefit to using a digital GMA (MIG) welder is the power consistency. In most collision repair facilities, the power supply to the wall outlet fluctuates depending on the electrical demand, the time of day, and the distance the outlet is from the main power supply. This presents problems with weld quality when the specified input amperage cannot be maintained during welding. Some welder makers are using new power supplies that allow the machine to accurately identify the input power and adjust it internally to the required amount. This allows the welder to create a consistent output to the welding torch every time a weld is made.

CONCLUSION

Digital GMA (MIG) welders are relatively new technology to the collision industry. With the programmable features, precise adjustments, and power consistency, this technology is valuable to technicians completing the repairs, especially when used on aluminum vehicles. If you have a chance, become more familiar with this process because it might be the solution to welding problems that you may have, both now and in the future.



Figure 2—Multiple parameters and programs on the Lincoln Power MIG 300 allow the technician to adjust the welder to the specific job.



Figure 3—The easy to read digital display on the Lincoln Power MIG 300 allows precise adjustment for welder setup.