Aluminum Alloy Repair

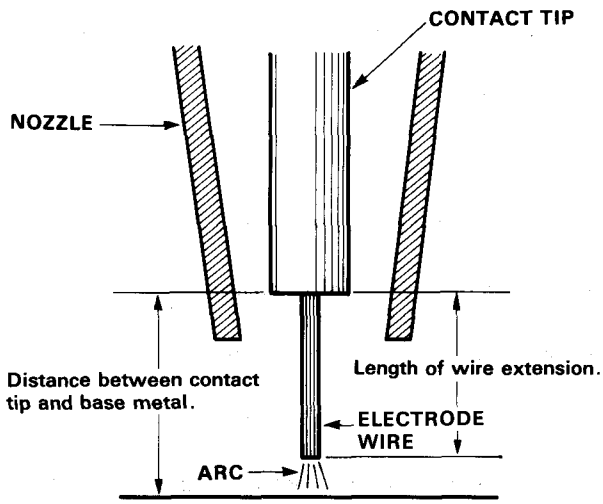
MIG Welding Conditions

MIG welding can be performed under virtually the same conditions as for the carbon dioxide gas arc welding of steel plate mentioned previously. The differences are outlined below.

The factors which affect deposition at the welding location and serve as the welding conditions for carbon dioxide gas arc welding of steel plates are:

- Welding current,
- Welding voltage (automatically adjusted for HTP MAXI MIG),
- Electrode wire speed,
- Distance between contact tip and base metal,
- Gun angle,
- Gun feed speed,
- Volume of shielding gas.

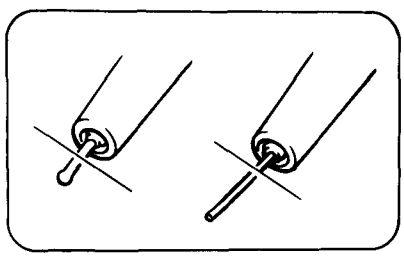
NOTE: Distance between contact tip and base metal: 8~15 mm (0.3 ~ 0.6 in.).



Arc generation

As with steel-plate welding, an arc is generated and welding starts once the torch switch is thrown.

- Welding startup is impaired if the electrode wire extends too far out or if the end is spherical. In such cases, cut off the end of the wire with a pair of wire cutters.



CAUTION:

- **The torch switch must not be thrown with the electrode wire in contact with the base metal.**
- **When cutting the end of the electrode wire, point the torch downward and cut near ground level to protect the eyes from the cut end.**

Sound of arc when welding under proper conditions:

- With aluminum alloy MIG welding, there is a quiet and continuous humming sound similar to that heard during carbon dioxide gas arc welding.
- A small amount of soot is formed along the bead during MIG welding. This is caused by magnesium contained in the electrode wires.

1. Differences in welding conditions

When comparing the welding of aluminum alloys and steel plate using the same welder, the thickness range of plates which can be welded is less for aluminum alloys. In other words, the welder setting conditions must be adjusted more finely for welding alminum alloys.

- 1 .Welding current, electrode wire speed

Under the same welding current conditions, the electrode wire for aluminum alloys needs to be fed faster than that for steel plates.

-2. Distance between contact tip and base metal

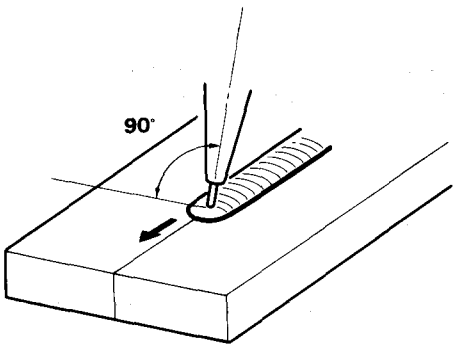
As for steel plate welding, the distance ranges from 8~15 mm (0.3 ~ 0.6 in.). The gas shielding effect is enhanced by positioning the gun closer to the surface.

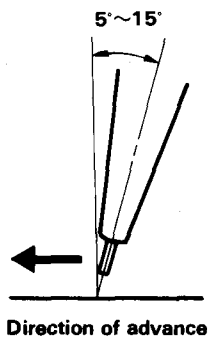
-3.Gun angle

The gun is held perpendicular to the welding surface. It is tilted at a 5~15° angle in the direction of the welding advance. Compared with steel plate welding, the gun angle is slightly more vertical.

-4 Direction of gun advance

Either a straight sequence or back-step can be used when for welding steel sheets. With aluminum alloys, however, only the forehand welding method is used.





-5. Gun travel speed

Welding of aluminum alloys progresses at a much faster rate than for steel plate. The speed increases as the welding progresses.

-6. Volume of shielding gas

About 50% more gas is required than for steel sheet welding.

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MIG Welding Conditions (cont'd)

2. Nozzle and contact tip

Compared with the carbon dioxide arc welding of steel plates, spattering adheres more readily at the end of the nozzle and the contact tip.

- Adhesion of spattering can be reduced by using an anti-spatter compound. This makes it easier to remove spatter as well.
- The nozzle and contact tip are subjected to greater wear than with steel plate welding.

3. Electrode wire setting

Since the cable inner liner is made of teflon, be sure not to mark or scratch it.

- Use sandpaper to smooth the edge of the end of the electrode wire before feeding it through by hand.

4. Adjustment of electrode wire drive roller tension

Tension is adjusted to a setting less than that for steel plate welding. When the electrode wire is held lightly at the contact tip area and the torch switch is on, the wire is set so that it will slip in the drive roller area. If the tension is set too high, the aluminum alloy electrode wire will be twisted. If it is set too low, the wire speed will not be constant.

NOTE:

- The tools used for aluminum alloy welding should be kept completely separate from those used for steel plate.
- Use a stainless steel wire brush.
- Use sanding tools which have been reserved especially for use with aluminum alloys, (If the same tools are used for steel plate as well, iron deposits will remain on the surface of the aluminum alloy contaminating the welding locations.)
- Proper storage of electrode wire is important for best welding results.
- Store electrode wires where they will not become dirty or scratched and where they will be free from contact with oils and greases.
- When electrode wire is being used, ensure that it is wound properly on its spool. Use clean gloves to seal wire in airtight vinyl bags and store at a constant temperature in a location where it will be dry at all times.
- Take steps to ensure that the covers sealing electrode wire containers are not opened until actual use.