

Work Example: Passenger Car Sheet Metal Welding - FL-LCW

RSD-SUNMAX Series
SUNMAX LASER

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Work Example: Automotive Sheet Metal Welding

- Read this document only after you understand the basic operation of the machine.
- Always read the instruction manual.
- For basic operating procedures, refer to the instruction manual.

Automotive Sheet Metal Welding

Sheet metal welding on passenger cars is performed with the laser welding machine. The butt welding and spot welding required when replacing a quarter panel are carried out with the laser welding machine. Compared with conventional electric welding (MIG welders and spot welders), laser welding applies heat locally, only to the parts of the base material that need it, so welding with less distortion than conventional methods is possible.

Butt Welding

The quarter panel joint is welded by butt welding. Panels are often cut manually with an air saw, so this welding method assumes a gap of about 1 mm at the joint.

Always use welding wire for this weld. In laser welding, it is important to select a wire diameter appropriate for the open gap. For example, if the gap is 1 mm, select a 1 mm welding wire. If the gap can be kept below 1 mm, use 0.8 mm welding wire.

Select the wire diameter according to the gap.

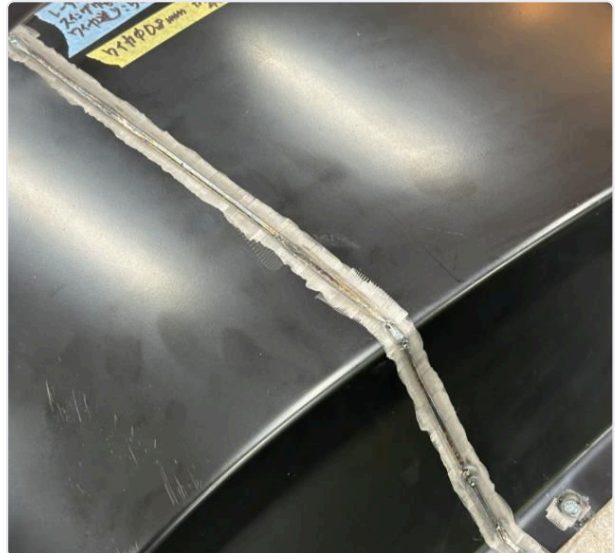
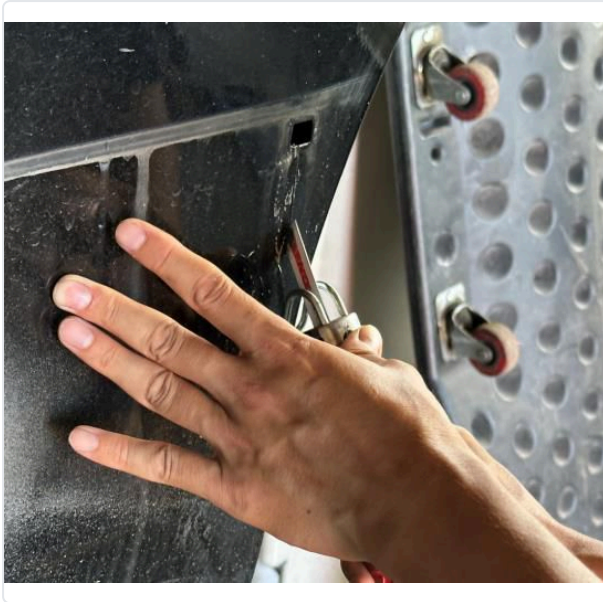


Fit the welding wire into the gap (the gap cut with the air saw) and weld in that state. The gap acts as a guide, so you can weld in a straight line without drifting.

Key point: keep the gap uniform, and keep the gap width to no more than about 1 mm even at its widest.

Note: To prevent the base materials from shifting during welding, perform tack welding at several points before the final weld.

Note: To minimize distortion, use nitrogen gas as the shielding gas.



Spot Welding (Single-Sided)

This is single-sided spot welding performed by laser welding. By emitting the laser from one side, two sheets (or more) can be melted together and welded. This weld is not a plug weld: it is a two-sheet overlap weld performed without drilling any holes (more than two sheets are also possible).

Select an appropriate wire diameter according to the material and thickness of the base material to be welded. Spot welding requires sufficient penetration, so using wire that is thicker than necessary may result in insufficient penetration. Use a wire diameter of no more than 1.2 mm.

Start welding with the base materials to be spot welded held in close contact with each other. When welding wire is used, the recoil of the wire feed normally causes the laser gun (welding torch) to move automatically; for spot welding, however, hold the gun so that it does not move while welding. Although it depends on the sheet thickness and welding settings, keep the laser on the spot for several seconds to complete the weld.

Also, if paint remains on the base material, continuity from the ground clamp may not be detected correctly. In that case, provided that safety is ensured, you can attach the ground clamp to a metal part of the torch to force laser emission and perform the weld.

Example

Item	Value
Material	Ultra-high-tensile steel sheet, 0.8 mm
Swing speed	300 mm/s
Swing width	2.5 mm
Laser power	400 W
Wire feed speed	40 cm/min
Wire diameter	0.8 mm
Welding time	5 seconds

