

Shunting Pliers



DF-SP360



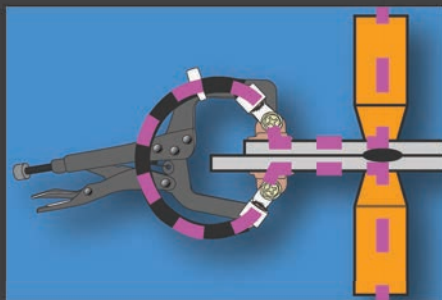
STRSW
E-COAT

4 Gauge
Copper Wire

High Conductivity
Copper Pads

Shunting Pliers
(DF-SP360)

Squeeze-type resistance spot welding (STRSW) panels sometimes requires additional measures to create a successful spot weld. This is due to the non-conductive coatings on steel such as E-Coat, a corrosion-resistant primer applied to parts by the manufacturer. With out shunting pliers the panel requires removing the E-Coat on the mating surfaces to achieve a spot weld. This timely step can be skipped and the E-Coat on the mating surfaces can be saved when STRSW with the use of the DF-SP360 Shunting Pliers.



Simply remove the coating from the outside surfaces, position the shunting clamp at the spot weld site, and the spot weld is made at the adjacent site. The current chooses the path of least resistance when confronting the non-conductive E-Coat, the shunting pliers facilitates the electrical current from one side to the other. The E-coat at the mating surface burns away. The process is quick and despite most of the current flows between the electrode tips the current detour was brief but necessary. On to the next one!

DF-619



ALSO AVAILABLE
COMBI WEDGE

**DENT
FIX
EQUIPMENT**

SHUNTING THE CURRENT WHEN SPOT WELDING

The squeeze-type resistance spot welding (STRSW) process sometimes requires initial help in the form of shunting the current flow. If you have ever used STRSW equipment for repairs you have likely done some shunting, either knowingly or not. A sound spot welding repair requires being aware of when shunting the current is taking place and how to shunt properly.

STRSW PROCESS

To understand how shunting works and why it is sometimes necessary, consider how a resistance spot weld is made. A short burst of current flows between the electrode tips when the spot weld trigger is pressed. The nature of current is to flow through the path of least resistance. If there is a conductive surface between the copper-based electrode tips, such as bare steel, that is the path of least resistance. But since steel is not as good of a conductor as the copper electrode tips, there is resistance to the current flow, enough resistance to heat the steel to a molten state. Pressure applied to the electrode tips both before and after the short burst of current helps contain the molten steel to that spot (see Figure 1).

SHUNTING COATED STEEL

Conductive coatings on the steel, such as zinc or weld-through primer, increase the resistance but still allow a spot weld to be made. Nonconductive coatings do not allow a weld to be made. The most common of these is E-coat, the factory corrosion-resistant primer applied to every original and replacement body panel.

Most of the E-coat on the mating surfaces can be preserved when replacing a part with STRSW through the use of a shunting clamp. The E-coat only has to be removed on the outside surfaces. The shunting clamp is positioned at the first weld site and the first spot weld is made at the adjacent site.

When the spot weld trigger is pressed, current flows from one electrode tip. When the current meets the nonconductive coating at the mating surface, it looks for the nearest conductive path which is through the top workpiece, around the shunting clamp, and back through the other electrode tip. The E-coat at the mating surfaces burns away. This is all happening very quickly. In fact, the majority of the current, in the short burst of current, travels between the electrode tips. The detour through the shunting clamp was only a brief, but necessary, diversion (see Figure 2).

Note that the E-coat does not have to be removed between the spot weld sites on the exterior of the flange. The current traveling through the coated workpiece is like current traveling through a wire coated with insulation.

Successive welds should not require a shunt. The previous spot weld serves as the initial conductive path. In fact, any other clamps used for joint fit-up should have the jaws wrapped in tape for insulation (see Figure 3). A shunt is again required when another series of spot welds are started.

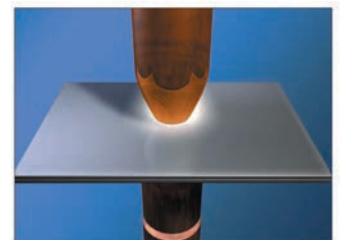


Figure 1 – The steel between the copper-based electrode tips creates enough resistance to the current flow to make a fusion weld.

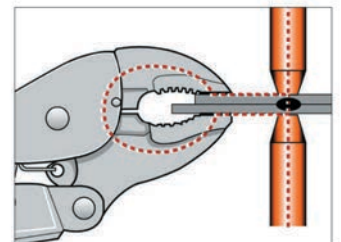


Figure 2 – When shunting, current flows through the shunting clamp first, but most of the current flows between the electrode tips.



Figure 3 – Any other fit-up clamps should be insulated with tape to prevent unintentional shunting.