

Theory

Short-Arc is a wire transfer method which is frequently used for welding thin materials less than 3mm and is by nature a welding process that produces spatter which can adhere to parts, welding jigs, inside the nozzle requiring additional clean up time. Most of the spatter is produced when the process changes state between shorting and arcing which can occur over one hundred times per second. This change results in huge changes in the arc phenomena which causes the explosion of spatter out of the welding arc. The goal of advanced waveform is to control the volatility during the change of state between short and arc to control the amount and size of the spatter generated.

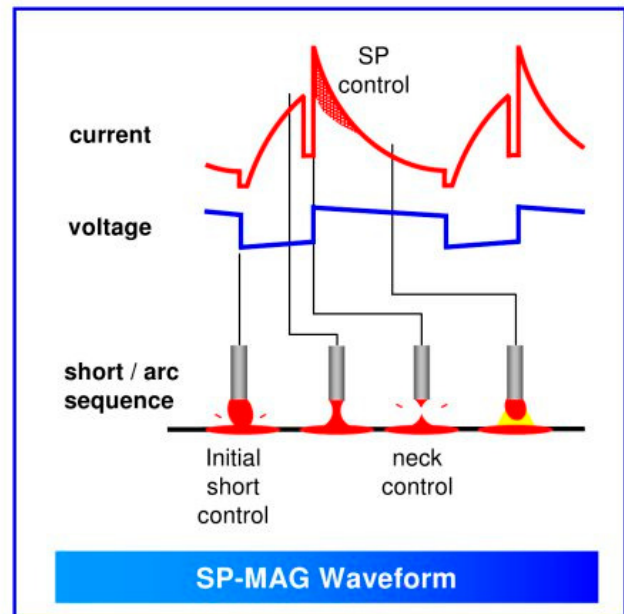
SP-MAG is an advanced waveform specifically designed to reduce the volatility of the arc through using a high end hardware set controlled by software. The process precisely monitors the amperage and voltage feedback to reactively control the welding waveform based upon the immediate arc activity.

Initial Short Control reduces the amperage immediately after the wire shorts which stabilizes the short, minimizing the spatter caused by wire chattering.

Neck Control detects the moment droplet detachment begins to neck then quickly reduces the amperage before short releases. Releasing the short at a lower amperage reduces fuse effect energy.

SP Control increases amperage directly after the short release. Adding amperage quickly burns the wire to prevent secondary shorting. The faster burn off creates the droplet faster and reduces total arc time which increases frequency and provides a crisp and clean arc.

HS (Hyper Stability) Control suppresses weld pool vibration preventing secondary shorting.



Installation

YAHATA SEIKO (Osaka Japan) manufacturing parts for construction machines welds thin to thick mild steel. They currently use four TAWERS in their automated robotic production. Mr. Yamashita (Manager, Manufacturing) says "I have chosen Panasonic since TAWERS is capable of welding materials from thick to thin without compromising any performance. Before introducing TAWERS, I had to change welders between different thickness jobs". He also says "SP-MAG arc is very stable with minimal spatter generation and TAWERS unitary voltage performs very well which made my arc development much easier. Most of my SP-MAG parameter is using unitary voltage".

There latest installation was Hi-Power TAWERS which is the 450A version. This machine will mainly work on thicker jobs using HD-Pulse but still capable of welding thin jobs using SP-MAG when needed. "Even though the capacity is different, weld parameter developed for TAWERS 350 can be used with TAWERS 450 on a fly. Since we manufacture multiple products this feature makes our production planning very flexible".



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