

## Welding Machine

Welding is an operation whereby two or more parts are united using heat or pressure or both. It is usually used on metals and thermoplastics but can also be used on wood. There are many welding operation types for various applications, for example, TIG, spot, arc welding, etc.

Manual Metal Arc Welding (MMAW) is a type of welding process using an electric arc to create heat to melt and join metals. A power supply creates an electric arc between a consumable or non-consumable electrode and the base material using either direct (DC) or alternating (AC) currents.

Tungsten Inert Gas welding (TIG) can be used to weld copper, titanium, even two dissimilar metals, and is handy for making tricky welds (e.g. s-curves, or welds on round parts) TIG generates heat via an arc of electricity jumping from a (tungsten metal) electrode to the metal surfaces you intend to weld - usually aluminum or steel.

This process is carried out by a welding machine which has various settings for different types of welding application. The choice of a welding power source depends upon the process of welding. There are two types of welding power sources.

1. Constant current power sources.
2. Constant voltage power sources.

DC welding machines, with a rectifier on the secondary side of the transformer, are more expensive but are immune to

inductive voltage drop. They are also suitable for three-phase supplies, which provides a more balanced load on the mains and allows higher powers to be taken. It is nowadays also common to provide a DC supply using a medium-frequency inverter.

This reduces the size of the transformer and provides more rapid control of the current and so better control of the welding process

The choice of a welding power source depends upon the process of welding. A constant current power source is used in MMAW and TIG welding processes. *See Figure 1.*

In a Welding machine, the AC signal is amplified using multiple components and a transformer. An EMI filter suppresses the incoming electromagnetic interference from the mains line by using X2 and Y2 capacitors. Then the rectifier converts the AC signal into pulsating DC signal and the PFC circuit also maintains the power factor by a PFC capacitor and PFC circuit. Next, a snubber capacitor compensates the voltage and current spikes generated from the switching device. Next, the DC link capacitor links the power switching and High-Frequency inverter. Next, the inverter converts the DC signal to the AC signal, and all the transients generated from the switching device are absorbed by the snubber capacitor. Lastly, a transformer amplifies the AC signal and gives the user output on the contact weld head. *See Figure 2.*

Figure 1

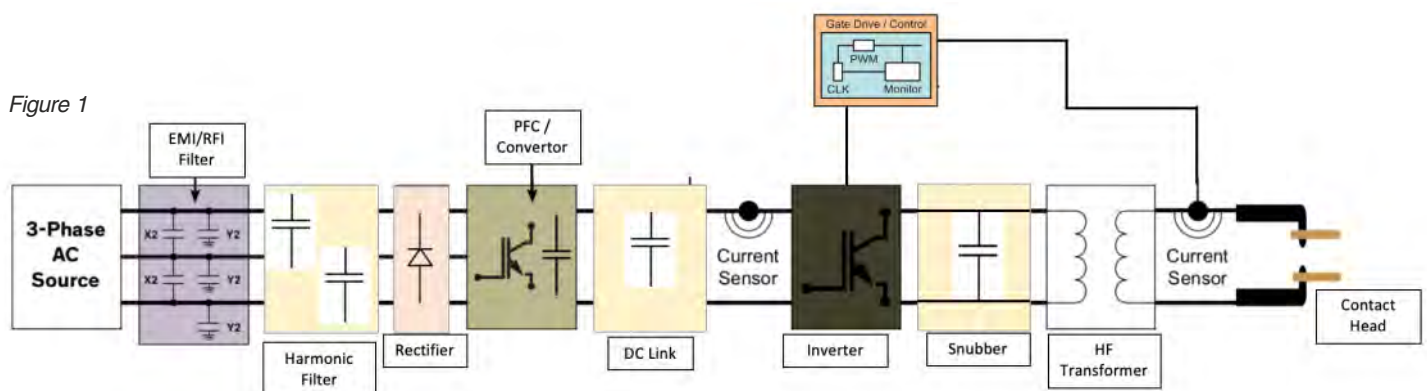
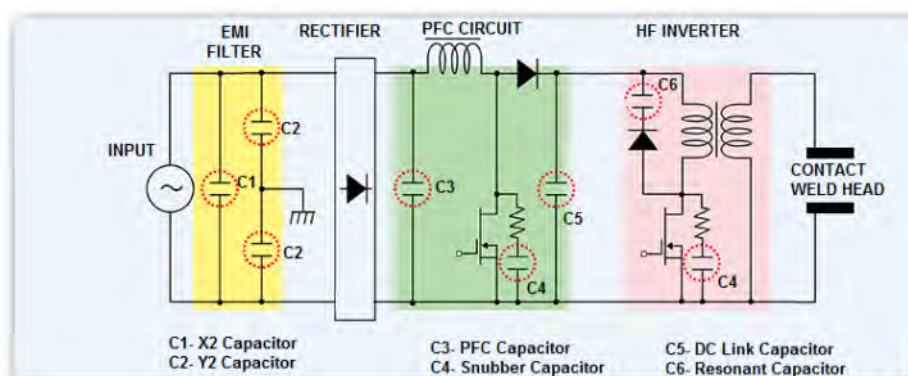


Figure 2



## Welding Machine

### Deki Capacitors Range for Welding Machine Application

Series Name	Deki Series Code	Capacitance Range	Rated Voltage
Interference Suppression Capacitor Class X2	07, 20	0.01 to 10 $\mu$ F	275 VAC, 310 VAC
High Capacitance Stability Interference Suppression Capacitor Class X2 High Humidity Resistant Grade	151	0.01 to 10 $\mu$ F	275 VAC, 310 VAC
Interference Suppression Capacitor Class Y2	33, 133	0.00022 to 0.033 $\mu$ F	305 VAC
Metallized Polypropylene Film Capacitor (MPP-AC)	17, 22, 112	0.01 to 2.2 $\mu$ F	275 VAC - 440 VAC
Metallized Polypropylene High Capacitance Stability Film Capacitor (MPP-AC-S)	117, 122	0.022 to 2.2 $\mu$ F	305 VAC - 500 VAC
Metallized Polyester High Capacitance Stability Film Capacitor	23, 24	0.1 to 1 $\mu$ F	310 VAC
Metallized Polypropylene DC Link Capacitor	91	1 to 120 $\mu$ F	450 VDC - 1100 VDC
Metallized Polypropylene IGBT Snubber Capacitor	121, 150	0.047 to 10 $\mu$ F	700 VDC - 3000 VDC