Reasons to adopt greenWave® welding inverters

voestalpine Böhler Welding's Selco research centre has developed an innovative inverter design called greenWave® that combines all the benefits and reliability of inverter technology with a power factor equal to, or approaching, unity.

Conventional inverter power sources draw three-phase current in pulses, leading to a high level of harmonic distortion with a large reactive component. The result is a low power factor (PF) typically around 0.65. Compare this to modern greenWave® inverter technology from voestalpine Böhler Welding where, in greenWave® welding inverters, the current drawn is kept almost sinusoidal, with the result that power factor for three-phase machines approaches unity, that is, PF≈0.95, while single phase power sources deliver a PF = 1.

This makes the technology ideal for discerning users wishing to combine respect for the environment with the significant benefits offered by modern inverter-based welding technology. Some other advantages include:

- Reduced levels of pulse spikes and harmonic distortion ensure better protection for internal electronic circuits and keep the welding process independent of electrical supply conditions. This is particularly important when fluctuating mains supplies or on-site gensets are being used.
- greenWave® welding power sources adapt automatically to three-phase mains supply voltage without any manual intervention.
- By adopting greenWave® technology, the mains supply can be sized for a lower current draw, or an increased number of welding machines for the same installed power. As an example, on a 64 A mains supply, a 400 A pulsed MIG/MAG welding process using a conventional inverter power source (PF = 0.65) would draw a current of 59 A. An equivalent greenWave® power source would only draw 32 A.
- International bodies have long been advocating the enforcement of standards aimed at reducing harmonics. With the introduction of standard EN 61000-3-12, limitations have been placed on harmonic current disturbance in professional and industrial welding industries. greenWave® welding power sources already conform to EN 61000-3-12 and do not, therefore, require any further verifications.
- A unity of near unity power factor means lower current draw. This in turn means less stress on circuits and components, with clear benefits in terms of power source durability and reliability.
- Owing to the reduction in current draw, Joule effect losses are also reduced along power lines. To power, for example, three conventional MIG/MAG welding inverters each working at 200 A, would draw 15 A from the network. If that power is distributed using a 6.0 mm power cable 200 m long, an energy loss of about 1 150 W would result – equivalent to a total annual loss of 1 380 kWh based on five hours of welding every day for 230 days a year. Three greenWave® power sources, drawing only 10 A per machine reduce this power loss to 510 W, 612 kWh/year, delivering an annual saving of 768 kWh.
- Another indirect benefit is the ability to improve the overall availability of the electrical supply. The use of welding equipment that draws less current helps to avoid exceeding maximum permitted load, thus avoiding peaking surcharges or costly shutdowns.
- greenWave® welding power sources completely eliminate reactive power consumption with single phase power supplies, and dramatically reduce it with three phase supplies. Reactive power causes unwanted current flows and additional losses on ac transmission lines, helping utilities such as Eskom to deliver power more efficiently.
- Because greenWave® power sources draw less current, they make a major contribution to reducing energy losses along power lines. This means lower CO_2 emissions. Choosing an ecological greenWave® power source is therefore a way of taking collective responsibility for the environment – a choice that should be made not only by government agencies, but also by companies and industry in general. 1 000 greenWave® power sources operating at 200 A/28 V for 1 200 hours a year deliver a reduction of about 110 t in CO_2 emissions.

URANOS series machines are powered by greenWave® inverters and are easily recognisable from the greenWave® logo (Inset).

voestalpine Böhler Welding's greenWave® range of power sources is designed to interconnect across a network using Weld@Net® software, so a number of machines can be controlled, with their welding parameters displayed and programmed simultaneously.

With over 100 years of experience, voestalpine Böhler Welding is a global specialist in delivering welding joints, weld repairs, hardfacing, cladding and brazing solutions.

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