# WS2003 Weld Processor Timer

ENTRON™

Plug in compatible replacement for the British Federal Weldstar and WS2000

The WS2003 weld processor is an advanced resistance welding controller which is designed to control a wide range of resistance welding machines. The design is compact with a very extensive range of features. A number of different 'add on' accessories are available which make this controller one of the most versatile on the market.

The WS2003 weld controller is designed for use in almost any resistance welding application including Spot, Seam, Multi-weld, Projection, Automation and Robot welding. Because of its highly modular construction, it lends itself to integration into customer control cabinets and retrofits, as well as completely self contained resistance welding control applications.

All connections to the unit are plug-in and the complete assembly is held in place by two quick release ball catches, resulting in a change over time of a few seconds with no tools being required.

WS2003 Applications:
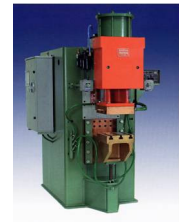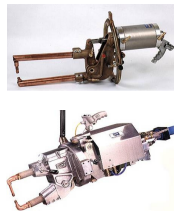
Spot
All types of spot welding, including single, repeat, pulsation, single electrode, multi-electrode, and series welding.

Projection
All types of projection welding including multi-projection, annular-ring (spud), single projection and weld nut, including multi-electrode management and dressing.

Seam
All types of seam welding, including continuous, pulsation and wire.

Multi-weld and Cross Wire
All types of multi-welding including spot or cross wire welding, with single welding transformer and multiple welding heads or multiple transformers each with multiple welding heads or multiple transformers with single heads.

Robots and Automation
Robot welding with single gun and multiple guns with gun changer, including features for multi-electrode dressing and management.

Cable Guns and Integrated Transformer Portable Stations
The WS2003 can integrated into suspended welding stations to drive traditional cable guns. Alternatively the control can be floor or gantry mounted. Suitable safety devices can be added to the control as required.

Transformer Guns
The control can be fitted with options depending on customer requirements which will protect the operator and the system from a number of potential hazards such as transformer breakdown, damaged cables or poor machine earthing.

Headline Features:

Standard features:	64 Programs, single/dual gun, multi-weld counters, heat steppers, output and input mapping, 64 monitor programs, single, repeat, seam and pulsation sequences.
Control Methods:	constant current and phase angle control.
Welding Types:	spot, seam, projection, cross wire, manual transformer guns, portable guns, multi-welders, robot guns and automation.
Additional Features:	built-in machine sequencer, proportional valve controller and event programming
Network Options:	Ethernet, ProfiBus-DP, InterBus-S, DeviceNet etc.
Communication:	RS232 is included as standard.

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WS2003 Weld Processor— Feature Table

Standard Features x 64

Spot / Repeat / Roll-spot / Seam (dual heat)/Seam (pre-heat) welding.

Single, dual or multi-gun operation.

OHMA (Air over Oil) gun operation.

Dual weld intervals plus pulsation, upslope and downslope.

Constant current regulation.

Up to 64 programs (internal or external selection).

Measurements log keeps history of recent welds.

Current monitoring (high/low/pre limits), programmable blocking.

Proportional valve controller (0..10V or 4..20mA).

Up to 3 analogue inputs (2 x 0..10V, plus 1 x 0..10V / 4..20mA).

Pressure monitoring (high/low limits).

Programmable outputs (events).

Machine sequencer logic.

Welding programs may be linked together for multiple spot sequences.

Retract/high-lift control.

Electrode management functions, including stepping, counting and tip-dressing, with programmable blocking and preset curves.

Contactor timer.

Head-lock function.

All inputs and outputs 24V DC.

Toroid and PV calibration functions.

Toroid test function.

Disable edit (key-switch) function.

Linked Programs - Up to 63 in any one sequence

External plug-in programming pendant with large backlit 4x20 LCD display, and data backup facility.

RS232 port, for PC communications.

Expandable via plug-in option cards (Ethernet, ProfiBus, DeviceNet, InterBus-S, ModBus +TCP/IP etc).

Counter x 16

Actual count (0..9999).

Terminal count(0..9999).

Stop/continue at end.

Tip-dressing (On/Off).

Maximum dressings(0..9999).

Dressings done(0..9999).

Reset stepper to(0..99999).

Sequencer

Up to 250 statements

Cascade

Number of SCR's - Up to 16

Number of Cascade Schedules - 16

Number of programs in a schedule - 16

Number of air valves - 1/SCR or 16 maximum

Global Parameters

Sequence (Spot / Roll-spot / Seam(2-heat) / Seam (pre-heat)

Heat range (High/Low

Supply Frequency (50/60 Hz)

Single gun / Dual gun / OHMA gun, multi-gun

Discrete/Fieldbus I/O

Retract (x2): (Simple / Hi-lift+ / Hi-lift- / OHMA)

Program select (Binary / 1-of-4)

Contactor time (0..200 s)

Blanking (On/Off)

Toroid test (On/Off)

On Fault (Continue/Stop/Head-lock/EOS/No EOS)

Sequencer (On/Off)

Toroid attenuation factor (1..4).

Sync counter with log (On/Off).

Analogue output (PV/Current).

Pressure units (kN/lbf).

Calibration x 16

Toroid sensitivity(100..2000 mV/kA)

S/P ratio (1:1..199:1)

S/P Trim(-10..+10%)

Pressure (2 points, kN/V)

Output Map

Normal/Event/Sequencer/Fieldbus (x12)

Input Map

Normal/Sequencer (x14)

Stepper x 16

Stepper on/off

Stop /continue at end

Curve(10 point, interpolated)

Weld Program x 64

Pre-squeeze (0..99 cycles)

Squeeze (0..99 cycles)

Weld1 (0..99 cycles)

Cool1(0..99 cycles)

Weld2 (0..99 cycles)

Cool2(0..99 cycles)

Pulses(0..9)

Hold(0..99 cycles)

Off(0..99 cycles)

Upslope(0..99 cycles)

Downslope(0..99 cycles)

Pressure (0..100%)

Heat 1 (0..99.9%)

Heat 2 (0..99.9%)

Current 1 (0..60kA)

Current 2 (0..60kA)

Balance (seam only)

Normal/Link program

Mode 1 (PHA/CCR)

Mode 2 (PHA/CCR)

OHMA gun open(0..99 cycles)

OHMA gun close(0..99 cycles)

OHMA retract open (0..99 cycles)

OHMA retract delay (0..99 cycles)

OHMA retract close (0..99 cycles)

Monitor Limits x 64

Current monitor On/Off

Low limit,weld1 (0..99%)

High limit,weld1 (0..99%)

Pre-limit,weld1 (0..99%)

Low limit,weld2 (0..99%)

High limit,weld2 (0..99%)

Pre-limit,weld2 (0..99%)

Pre-limit count (0..99)

Pressure monitor On/Off

Pressure low limit (0..99%)

Pressure high limit (0..99%)

Events x 64

4 x 4 trigger points

Electrical Characteristics

Power supply: 24 volts DC

Quiescent Current: 300mA

Outputs:
　　Total Number of Outputs = 12
8X
　　Voltage　　　　　　= 24 Vdc or 110 Vac
　　Current　　　　　　= 100 mA
　　Type　　　　　　　= current sourcing
4X
　　Voltage　　　　　　= 24 Vdc
　　Current　　　　　　= 500 mA
　　Type　　　　　　　= current sourcing
　　Functions　　　　　= 2 x WAV+2 x HAV

Note:　Both WAV circuits include a safety relay

Inputs:
　　Total number of Inputs = 14
　　Voltage　　　　　　= 24 Vdc
　　Current　　　　　　< 10 mA
　　Type　　　　　　　= current sinking

Dedicated inputs :
　　Stop　　　　　　　　=
　　Transformer thermostat =　⎫ As above
　　Weld on/off　　　　　=　⎭

Analogue Inputs:
　　Prop Valve = 0-10V or 4-20mA input
　　Sensor 1　　= 0-10V
　　Sensor 2　　= 0-10V

Analogue Outputs:
　　Prop Valve = 0-10V or 4-20mA output