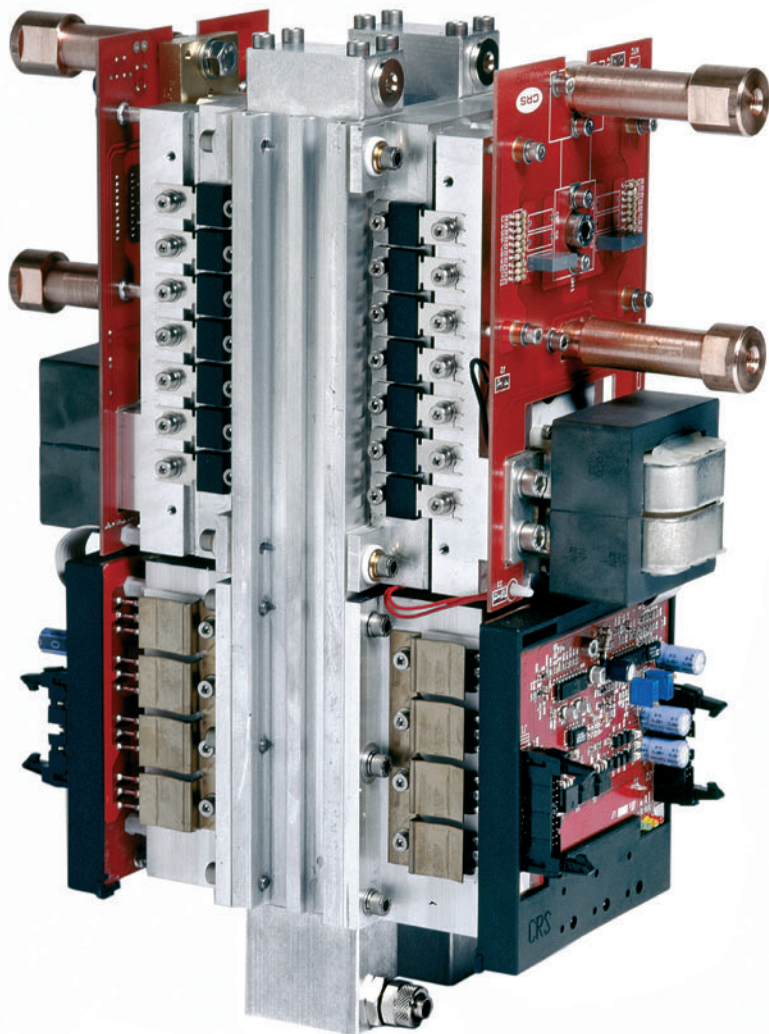


CRS

INDUSTRIAL POWER EQUIPMENT

INVERTERS
FOR WELDING



CRS_Inverters_for_Welding_ENG_20101008

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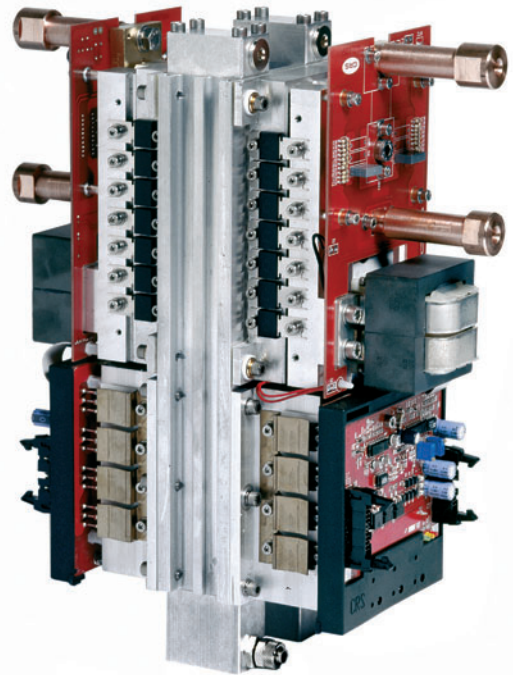
INDUSTRIAL POWER EQUIPMENT

Introduction

Easy to integrate into automated processes, these inverter power supplies can control the energy for the welding process with almost any kind of required pulse shape. The main voltage is first rectified and then passed through a controlled rectifier inverter and a transformer to provide direct voltage. Feedback results of the primary and secondary voltage and current are provided, thus permitting perfect process control.

In addition to output current, cycle rate is also an important process-determining parameter when selecting an inverter. The higher the cycle rate, the more effectively the device delivers pulses with high edge steepness and optimum control performance.

As output increases, these requirements become less important, allowing lower frequencies to be used.



They also feature high-performance and easy-to-use software to carry out complex control functions.

Our software has been developed with real processes in mind and offers a range of powerful tools:

- > Current control
- > Voltage control
- > Power control
- > Limitation of control values
- > Creation of controlled advanced pulses
- > Part conditioning
- > Weld to electrode displacement
- > Data recording for process analysis

HSW Mini

The Hot Spot Welding mini is a complete system enclosed in one unit (430 x 420 x 150 mm) for resistor welding applications. It is composed of:

- > Primary inverter
- > High frequency transformer
- > Power diodes
- > Shunt
- > Control Processing Unit with RS232 serial line
- > Operator control panel with 1 line by 16 characters display
- > Main switch

Controlled via RS232 serial line by a PC/PLC or CRS remote control unit (*Part Number: REM305 or REM306*).



HSW Mini Specifications	Unit of Measurement	<i>CW-AH01</i>	<i>CW-WH01</i>
		Air – 2500A 7.5V / 7%	Water – 2500A 7.5V / 10%
Max welding output voltage (Max load)	Volt	7.5	7.5
Max output current (Peak value)	Ampere	2500	2500
Instant power	W	18750	18750
Continuous duty cycle	%	7	10
Short term (10 cycles) duty cycle	%	15	15
Peak primary current required	A/ac	54	54
Minimum primary current requirement	A/ac	25	16
Adjustment precision (In line conforming with EN50160)	%	2	2
Number of welding profile phases	each	3	3
Max time for each phase	Ms	2000	2000
Number of transformers incorporated in ferrite E70	each	2	1
Working frequency on the primary stage	kHz	15	15
Working temperature	°C	30	40
Interface RS232		Present	Present
Short circuit protection		Present	Present
Overheating protection		Automlimit	Autolimit
Phase loss detection		Present	Present
Graphic memorization A + V real time		Present	Present
Mains voltage	Vac	400	400
Mains frequency	Hz	50 - 60	50 - 60
Cos ϕ		1	1

HSW Power Module

The power module for Hot Spot Welding (HSW) applications is a device operating with a PWM technique at 50kHz equipped with a parallel type interface hardware (20 pole bus with flat cable). This interface facilitates the parallel interconnection of more than one power module.

Power modules can be integrated in automated welding systems.

Required in addition to the power module:

> Control Processing Unit (Part Number: CPU063)

CPU card that interconnects with the power modules via 20 pole bus. It is equipped with RS232 serial communication line to connect either a PC/PLC or a CRS remote control unit (REM).

> Auxiliary transformer card (Part Number: MIN001)

Power supply of the CPU card.

> Remote Control Unit (Part Number: REM305 or REM306)

Remote control unit with operator control panel.

> Flat cable - from CPU to MOD (Part Number: CBF105 or CBF106)

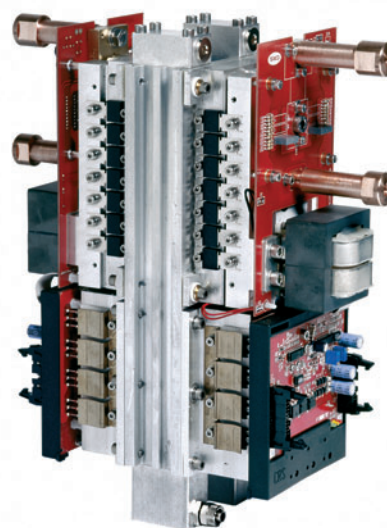
Standard 20 pole flat cable to connect power module to CPU card.

> Flat cable - from MOD right to MOD left (Part Number: CBF103)

Standard 20 pole flat cable to connect both sides of the power module. Not needed in case of using only half power module.

> RS232 cable - CPU to REM

Standard cable for RS232 serial communication line to connect CPU card to REM.



Optional:

> Operator panel kit (Part Number: OPP001)

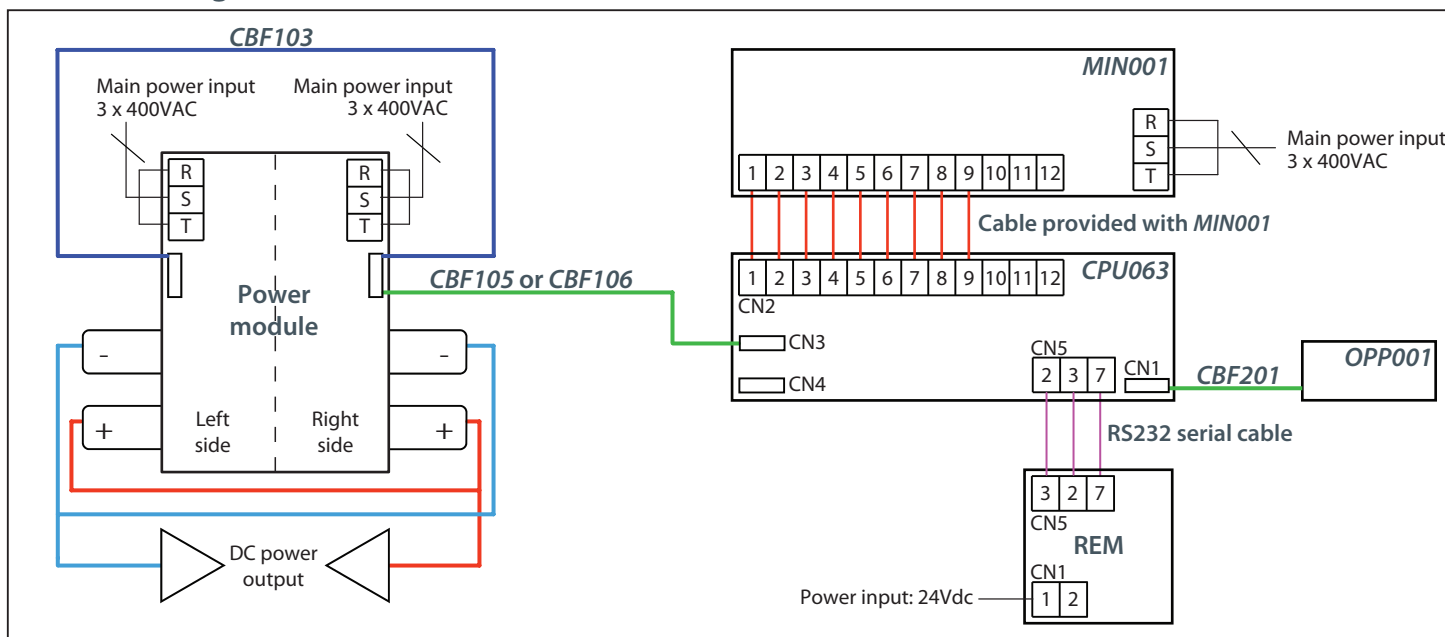
Front display card used for configuration set-up and check. If installed, debug jumper of the CPU card must be turned ON.

> Flat cable - from CPU to OPP (Part Number: CBF201)

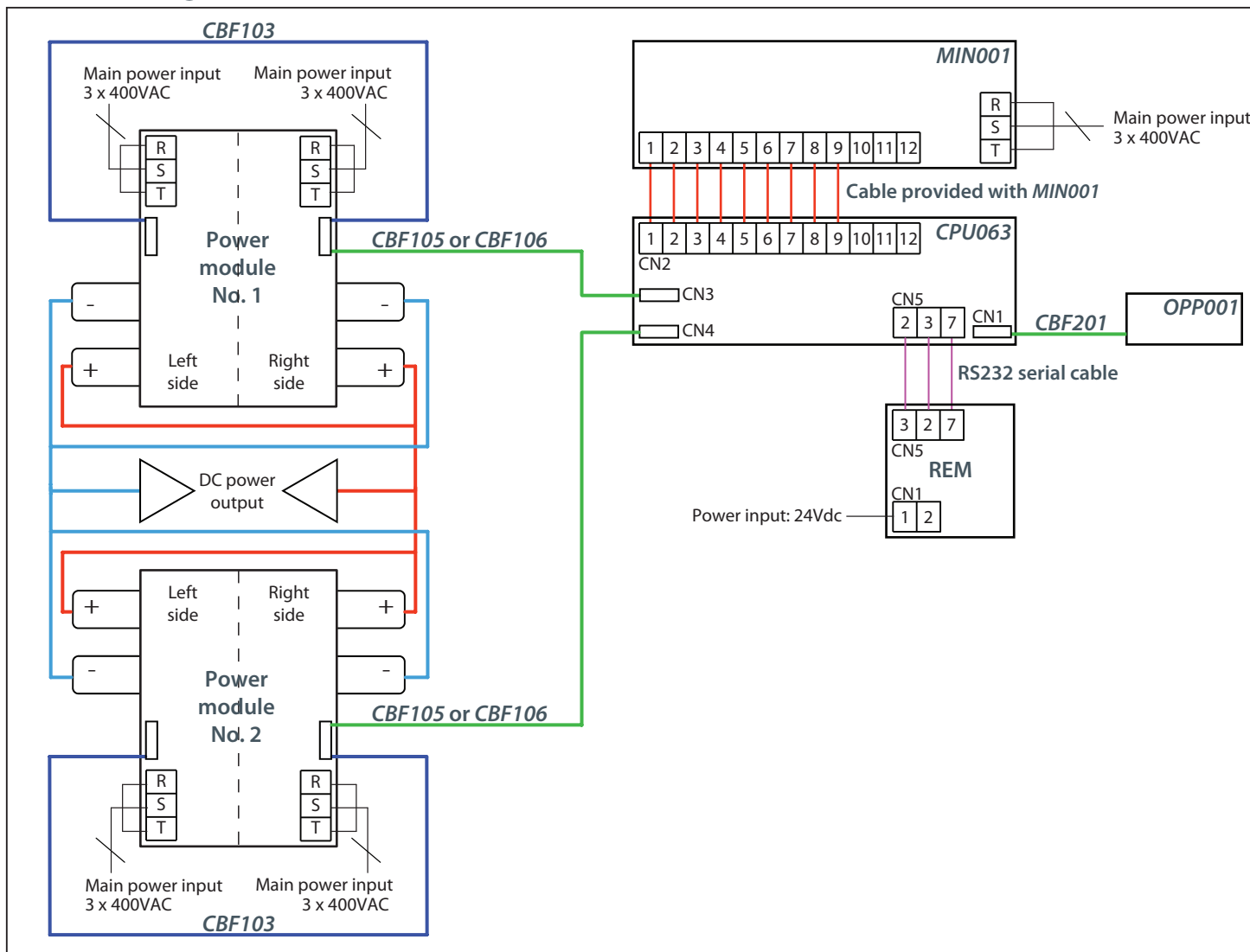
Standard 34 pole flat cable to connect CPU card to operator panel.

HSW Power Module Specifications	Unit of Measurement	CWM-A02	CWM-W03	CWM-W01
		Air 2500A 7.5V / 7%	Water 2500A 7.5V / 10%	Water 5000A 7.5V / 5%
Max welding output voltage (Max load)	Volt	7.5	7.5	7.5
Max output current (Peak value)	Ampere	2500	2500	5000
Instant power	W	18750	18750	37500
Continuous duty cycle	%	7	10	5
Short term (10 cycles) duty cycle	%	15	15	10
Peak primary current required	A/ac	54	65	130
Minimum primary current requirement	A/ac	25	16	110
Adjustment precision (In line conforming with EN50160)	%	2	2	2
Number of welding profile phases	each	3	3	3
Max time for each phase	Ms	2000	2000	2000
Number of transformers incorporated in ferrite E70	each	2	1	2
Working frequency on the primary stage	kHz	15	15	15
Working temperature	°C	30	NA	NA
Interface RS232		Present	Present	Present
Short circuit protection		Autolimit	Autolimit	Autolimit
Overheating protection		Present	Present	Present
Phase loss detection		Present	Present	Present
Graphic memorization A + V real time		Present	Present	Present
Mains voltage	Vac	400	400	400
Mains frequency	Hz	50 - 60	50 - 60	50 - 60
Cos ϕ		1	1	1

HSW Block Diagram (1 Power Module)



HSW Block Diagram (2 Power Modules)



AWS Mini

The Arc Welding System mini is a 100V/50A continuous current mode switching power generator with an embedded header driver. Included with the machine is one ignition coil to be placed near the target. The machine can drive up to two ignition coils.

The most important and unique characteristic of this machine is that it allows the welding to take place without any added material (tin or brazing alloys); instead, the welding takes place due to the fusion of the parts.

This method is an improvement versus the conventional tin immersion method in that it works without mechanically touching the parts being welded and thus avoiding any mechanical stress or disturbance. More over, since the welding process takes less than 50ms, the thermal stress is reduced to an area of 1mm².

AWS mini is enclosed in a case and is controlled by a microprocessor to permit the connectivity with robotized systems to obtain perfect synchronization for highly automated welding systems.

AWS mini also monitors every single welding (shot) by storing in the local memory the waveform profile of current and voltage and is communicated via the serial port to the host system to be analyzed.

The most popular applications for this technology are:

- > Relay terminals
- > Solenoid terminals
- > Lamps terminal
- > Thermocouple

Controlled via RS232 serial line by a PC/PLC or CRS remote control unit (Part Number: REM305 or REM306)



AWS Mini Specifications	Unit of Measurement	CWA-A01 Air - 50A 100V / 50%
Max welding output voltage (Max load)	Volt	100
Max output current (Peak value)	Ampere	50
Continuous duty cycle	%	50
Short term (10 cycles) duty cycle	%	100
Minimum primary current requirement	A/ac	16
Adjustment precision (In line conforming with EN50160)	%	2
Max number of heads	each	2
Number of welding profile phases	each	3
Max time for each phase	Ms	999
Working frequency on the primary stage	kHz	25
Working temperature	°C	40
Interface RS232		Present
Short circuit protection		Autolimit
Overheating protection		Present
Graphic memorization A + V real time		Present
Mains voltage	Vac	400
Mains frequency	Hz	50 - 60
Cos ϕ		1

The welding process is as follows:

- > One cathode tungsten (negative polarity) is placed at 0.6mm from the target.
- > The target to be welded is connected to the anode (ground).
- > The machine through the control of the embedded header driver brings up the voltage to 15000V and ionizes the gas (air or inert gas) between anode and cathode.
- > When the spark is started the power supply generator drives the current to generate and maintain the plasma arc according with the time and current parameters set in the memory.

CPU Software List

Software	Rev	Product		Comm. Protocols		Description
		HSW	ASW	CRS ASCII	Modbus-RTU	
Q63HSW3C	1:01	●		●		Software driven by CRS remote control unit (REM) via CRS ASCII protocol.
Q63HSWKI	1:01	●		●		Software driven by an external PC or PLC connected through RS232 communication port via CRS ASCII protocol. It is able to record current and voltage values every 1ms and transmit the recorded data to the PC or PLC for a real welding waveform graphic display or analysis at the end of the welding operations.
Q63HSWMB	1:01	●			●	Software driven by an external PC or PLC connected through RS232 communication port via Modbus-RTU protocol. It is able to record current and voltage values every 1ms and transmit the recorded data to the PC or PLC for a real welding waveform graphic display or analysis at the end of the welding operations.
Q63AWSKI	1:01		●	●		Software driven by an external PC or PLC connected through RS232 communication port via CRS ASCII protocol. It is able to record current and voltage values every 1ms and transmit the recorded data to the PC or PLC for a real welding waveform graphic display or analysis at the end of the welding operations.
Q63AWSMB	1:01		●		●	Software driven by an external PC or PLC connected through RS232 communication port via Modbus-RTU protocol. It is able to record current and voltage values every 1ms and transmit the recorded data to the PC or PLC for a real welding waveform graphic display or analysis at the end of the welding operations. An emergency input from a N.C. external contact is provided for emergency Power Off of the AWS inverter.



Remote Control Unit (REM)



The remote control unit (REM) is an electronic card that communicates with the Q500 rectifier, up to 100 meters away, via serial communications (through CRS-ASCII or Modbus-RTU protocol) or analogue control.

It is a versatile unit with a simple and functional operating interface which enables to control the external hardware of the welding system (pedal, approach contact, etc.) and lead in the meantime the power inverter. It can be easily installed on a synoptic lectern and it is custom-programmed upon request.

INCLUDED:

- > A mounting frame or a plastic case
- > An operator control panel which includes:
 - 8 keys
 - 8 LED indicators
 - 4 lines by 16 characters display

Specification	Part Number
With plastic case (240 x 190 x 90mm)	REM306
With mounting frame	REM305

REM Software Available

Software	Rev	Product	Description
R30HSW3C	1:02	HSW	Up to 32 different welding waveforms (max 3 phases each) can be saved . The software also handles all the required HSW system input/output signals. Connection to the HSW machine is through the RS232 serial connection working at 19200 bauds.
R30HSWCC	1:01	HSW	Special software for a machine working in a system with a load cell. Up to 25 different welding waveforms (max 3 phases each) can be saved. The software also handles all the required HSW system input/output digital and analogue signals for measuring crushing forces (Newton/meter). Connection to the HSW machine is through the RS232 serial connection working at 19200 bauds.
R30AWSMB	1:01	AWS	Standard software which handles all required arc welding system (AWS) input/output digital and analogue signals.

Technical Specifications

Supply voltage	24Vdc
Power consumption	0.75A max
INPUT	
Number of digital/analogue input lines	4
Number of digital input lines	6
Analogue entry level	0 - 10V
Steps	1024
Low logic entry level (digital mode)	5V
DIGITAL OUTPUTS	
Number of digital outputs	8
Contact's max current with resistive load	0.1A
Contact's max voltage rating	48Vac
ANALOGUE OUTPUTS	
Number of analogue outputs	2
Analogue outputs level	0 - 10V
Steps	256
WELDING PRE-PROGRAMMED FUNCTIONS	
Approach SQD	1/100s
Approach SQZ	1/100s
Phases (weld1)	See data (WPH)
Preservation time	1/100s
Acceptability for voltage and current	0 - 100%
DEFINITION OF THE WELDING PHASE (WPH)	
Ramp (slope)	0 - 255ms
Current value	0 - Base scale A
Sampling value	0 - 15V
Time	0 - 255ms
WAVEFORM PROGRAMMING	
Binary or keyboard selection	
COMMUNICATION PORTS	
Number	2
Type	N.01 RS232 + N.01 RS485

CRS

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