

resistance welding

STA Series

Single Phase AC Resistance Welding Control

- Constant primary and secondary current feedback
- Built-in current and conduction angle monitoring
- Spot, seam and roll spot capability
- NEMA style cabinet
- Electronic pressure regulator option
- Voltage monitoring option
- Communication option



Applications

- Consumer appliances
- Nut and stud welding
- Electronic and automotive components
- Aircraft components
- Office furniture
- Automotive sheet metal

Features

- **Primary and secondary constant current** – provides closed-loop feedback and delivers superior control and improved welding results.
- **Built-in weld monitoring** – the control will monitor the delivered RMS current for the weld period and conduction angle. Limits can be set and alarms generated if out of limits.
- **Dual Pulse with programmable upslope/downslope** – upslope and downslope can be programmed for both Weld 1 and 2 to accurately control the heating rates of the materials and provide success with difficult welding combinations.
- **Voltage monitoring option card** – when welding in constant current the RMS voltage can be monitored to provide a useful quality indicator.
- **Current stepping** – a versatile stepping function allows the current to step automatically to compensate for electrode wear and ensure consistent welds.
- **Electronic pressure regulator and differential pressure monitoring option** – force can be set electronically as part of the weld schedule, limits can be set on actual firing force.
- **Simple, intuitive programming** – large LCD, logical software and push button layout allows easy programming and viewing of weld schedule information.

The STA-100A is a compact single contactor unit designed to mount to a single weld head; the STA-200A – 800A are packaged in “NEMA” style cabinets and can be fitted with multiple SCRs for cascading multiple weld heads or gun assemblies. The standard STA includes valve drivers for up to four user-programmable valves; an optional valve driver expansion board can take this number to twelve. The STA-200A – 800A include a water-cooling assembly tailored for the number of SCRs. The STA Series has 64 weld schedules and a unique linking function that allows the user to program complete welding sequences, including multiple weld schedules, providing complete flexibility in production. All the STA’s are equipped with comprehensive I/O for easy interface to a PLC or machine.

Model	No. of SCR
STA-100A	1
STA-200A	1 – 2
STA-400A	1 – 4
STA-600A	1 – 6
STA-800A	1 – 8

Operation Modes

- **Percent Heat (%)** – allows programming of the % of each half cycle during the individual weld periods in 1% increments. The control software will automatically scale output percentages over the number of cycles for up and downslope.
- **Primary Constant Current RMS** – acquires feedback from an internal primary coil and therefore requires no secondary coil. Useful for robotics, programs in RMS values. Current can be set in kA. The control software will scale output for up and downslope.
- **Secondary Constant Current** – acquires feedback from a secondary coil. Most accurate control of current and response to weld dynamics. Current can be set in kA. Provides the best welding control. The control software will scale output for up or downslope.



Typical Coils	Description
MB-400K	Toroidal coil – 1X sensitivity, flexible, 5 in. inner diameter with a metal fastener.
MB-400L	Toroidal coil – 1X sensitivity, flexible, Approx 4 in. inner diameter with leather cover. 400mm laid out flat.
MB-800K	Toroidal coil – 1X sensitivity, flexible, 10 in. inner diameter with a metal fastener.
MB-800L	Toroidal coil – 1X sensitivity, flexible, Approx 9 in. inner diameter with leather cover. 800mm laid out flat.

Application of Technology

Constant Current

The STA Series can be programmed for Secondary Constant Current, where the control will take measurements of current every half cycle and adjust the output in order to maintain current at the set level during the weld period.

Advantages

- Delivers the same current regardless of resistance changes
- Compensates for part thickness changes
- Programmable upslope for round parts or to reduce splash or marking
- When welding in Constant Current, monitor current or voltage

Built-In Monitor

The STA will monitor the actual RMS current delivered during the weld period. This can be a useful quality indicator as secondary circuit degradation or inductance may cause the actual value not to match the set value. Percentage limits can be set on monitored RMS current; also a conduction angle limit can be set which is another useful indicator of changes in the process.

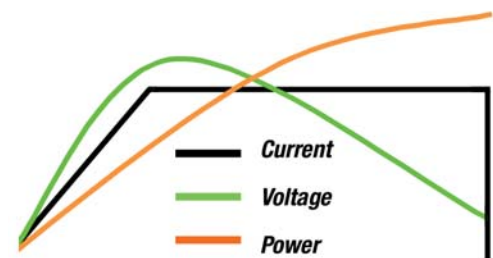


Illustration shows a typical weld for round wires.

SCHEDULE #	CURR (KA)	COND	VOLTS	FORCE (LBS)
W1	01.9	079°	2.88	START END
W2	02.0	079°	2.88	0000 0000
	LO HI	HI HI	LO HI	LO HI
W1	050% 150%	150°	2.75 3.02	2000 7000
W2	050% 150%	150°	2.75 3.02	

Counts ↗

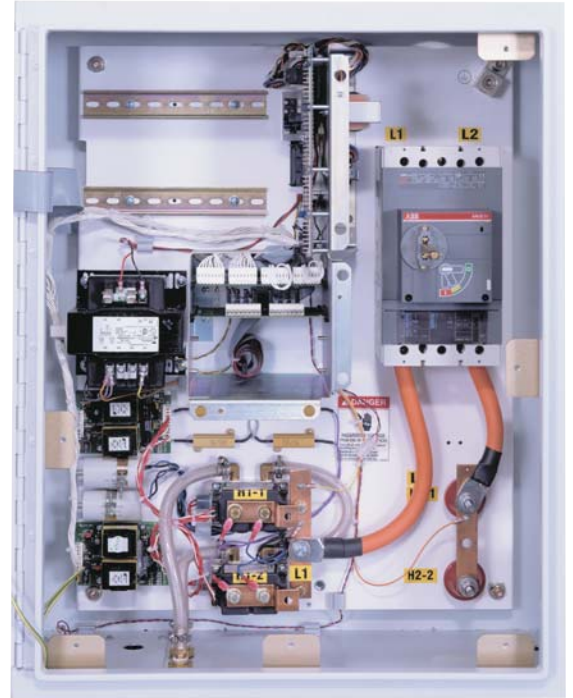
STA Monitor Screen – displayed in Run mode.

Designed for Reliability & Performance

Inside the STA . . .

The STA Series is designed to perform in the harshest of environments. Inside the “NEMA” style cabinet, the power supply is logically laid out in a modular fashion and manufactured to the highest quality standards. Key features are as follows:

- **Accessory Mounting** – space has been allowed in the design to accommodate PLC controls and ancillary devices for automation purposes.
- **I/O** – All I/O is labeled and located on removable terminal strips.
- **Robustness** – Miyachi Unitek products are well respected within all types of manufacturing industries for their durability and robust performance over time, a reputation that is well deserved and valued by our customers.
- **Reliability** – Miyachi Unitek controls are designed with reliability in mind. Component selection and unit testing is completed to the highest standards, ensuring years of trouble-free service.
- **Easy Maintenance** – with ease of maintenance in mind, the STA series was designed with modules that perform specific tasks. Each module can easily be extracted with minimal fasteners and quick-disconnect wire harnesses. Any module can be changed in less than 7 minutes. Given this unique design, down time is minimized.



STA build quality and design excellence

Programming Made Easy

- **Precise Energy Delivery and Timing** – The STA Series provides the user complete flexibility in waveform programming. All time periods are programmed in cycle increments. Single or dual pulse waveforms with upslope and downslope can be tailored to the needs of the application. Cool time can be programmed between pulses.
- **Schedule Screen** – 64 schedules can be set. Valves can be dedicated to schedules. Linking schedules permits complex machine control to be easily achieved.
- **Squeeze Delay, Squeeze, Hold and Off** – Complete valve timing sequences can be set.
- **Valve Screen** – Enables specific valves for each schedule. Chaining schedules provides Forge capability.
- **Mode Screen** – Allows programming for spot, successive and chaining functions. Seam and roll spot are also available.
- **Monitor Screen** – Allows monitoring variables to be viewed and limits set.



```

SCHEDULE #13      MODE
START=MAINTAINED
WELD MODE=CHAINING
LINKED SCHED ↵
GO TO SYSTEM VALUES SCREEN 1 ↵
GO TO SYSTEM VALUES SCREEN 2 ↵
GO TO SYSTEM VALUES SCREEN 3 ↵
    
```

Mode Screen

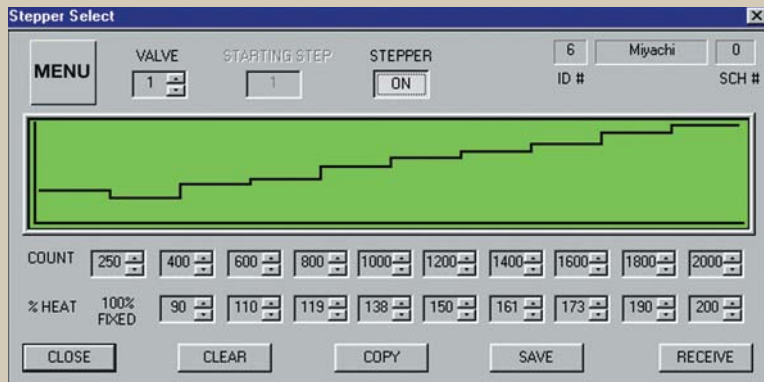
```

SYSTEM VALVE STATUS
VALUE CNT RESET SCR
1 00000 ↵ 1
2 00000 ↵ N/A
3 00000 ↵ N/A
4 00000 ↵ N/A
    
```

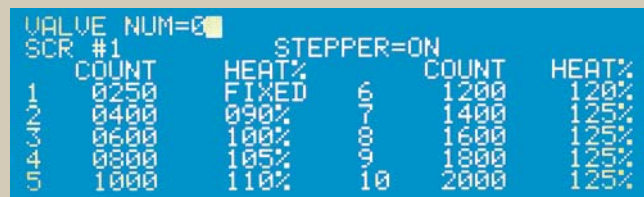
Valve Status Screen

Stepper Functions

The STA Series controls have sophisticated steppers for varying the heat delivered to the weld over multiple welding sequences. Users who are familiar with their electrode wear and oxidation cycles are able to further increase the time between routine electrode maintenance by taking advantage of the advanced stepping functions. The STA is able to execute up to nine steps in a single sequence with user programmable step counts. Steps can be a fixed percentage heat increase or decrease after a certain number of welds. Step routines can be programmed directly using the STA's front panel or remotely using WeldLab™ software.



WeldLab Stepper Screen

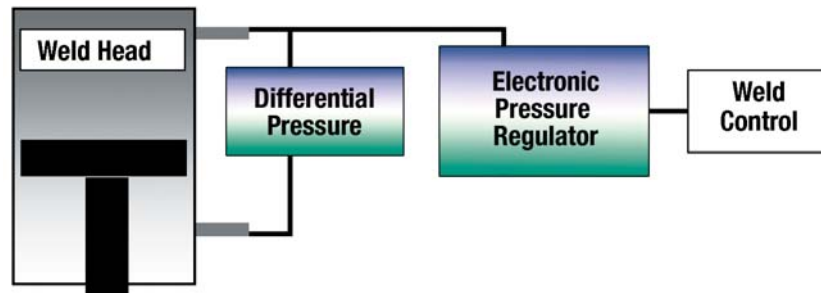


STA Stepper Screen

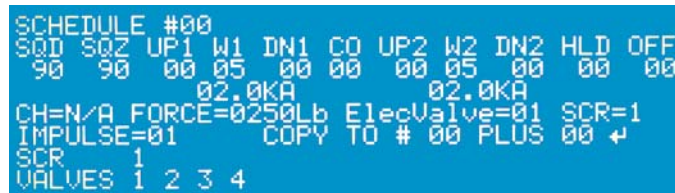
Force Control and Monitoring Options

One of the most important variables in the weld process is electrode force. Miyachi Unitek offers two options which allow the user to control force using an electronic pressure regulator and monitor and/or set firing force using the force board's built-in differential pressure sensor.

- Electronic Pressure Regulator** – Force can be programmed as part of a weld schedule. The STA will output a 0–10 volt signal to an electronic pressure regulator. Simple calibration allows force to be programmed in lbs.
- Differential Pressure Monitoring** – Firing force can be programmed as part of a weld schedule. The STA pressure sensor will measure the differential pressure on the top and bottom of the cylinder and fire the control when the correct force is reached. Simple calibration allows firing force to be programmed in lbs. Limits can be set to alert operators to potential force problems. Welder may be fired without squeeze time to enhance the cycle time.



Simplistic system layout



Force is part of the weld schedule.



Force calibration in Lbs.

Secondary Voltage Monitoring Option

When welding in Constant Current mode the current is held constant during the weld by the STA control algorithms. Monitoring the secondary voltage can provide useful quality indicators, as voltage changes can be associated with resistance changes during the weld.

Pre-Weld Check – The STA control allows the user to program a low energy current welding pulse prior to the main welding pulse. The voltage during this first pulse can be monitored and limits applied. As the current is constant the voltage represents the resistance during the check pulse. Limits allow the unit to detect the following:

- Missing Parts
- Material changes or misalignment
- Nut/projection incorrect or upside down.

Advanced Functions – The STA voltage monitor can be set to measure either RMS or PEAK voltage during the weld. An advanced setting allows the monitor to measure just the last cycle of the weld. This can provide a more focused measurement reflecting the final resistance during the last cycle and provide a greater degree of measurement resolution.

SCHEDULE #	CURR (KA)	COND	VOLTS	FORCE (LBS)
W1	01.9	079°	2.88	START END
W2	02.0	079°	2.88	0000 0000
	LO	HI	LO	HI
W1	050%	150%	2.75 3.02	2000 7000
W2	050%	150%	2.75 3.02	

Counts #

Monitor and Limit Screen showing Voltage

** HIGH VOLTAGE ALARM **
W1 voltage out of limits during weld.
Check Process.

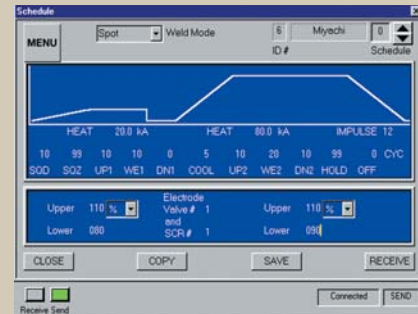
Secondary Voltage Alarm

Current, Voltage, and Conduction Angle – The STA's built in monitor keeps track of all electrical variables. These are key as they reflect the changes in resistance from weld to weld. Data is sent via RS-485 for every weld and can be collected from multiple controls in a network. The Miyachi WeldLab™ software facilitates two-way communication between a host computer and the welding controls.

Networking, Remote Programming

The STA Series can be equipped with a communications option board that provides two-way RS-485 communication protocol. Users can remotely send commands to the control and collect weld data. Multiple STA welding controls can be connected to a network host computer. The Miyachi Unitek WeldLab software accomplishes multiple remote programming and data collection functions that include:

- Remote schedule programming and transfer to the control
- Error detection and notification
- Data collection and export to Excel®
- Stepper sequence programming
- Menu modes programming
- Valve programming



Remote programming



Network welder status

SPECIFICATIONS

		STA Series	
Power Source	201 to 270 VAC or 402 to 540 VAC, 50/60 Hz, single phase		
Control Method	AVC		
Weld Schedules	64		
Time Settings	Squeeze Delay	0-99 cycles	
	Squeeze	0-99 cycles	
	Upslope 1, 2	0-99 cycles	
	Weld 1, 2	0-99 cycles	
	Downslope 1, 2	0-99 cycles	
	Cool	0-99 cycles	
	Hold, Off	0-99 cycles	
	Impulses	25	
Heat Settings	Heat 1	80 kA	
	Heat 2	80 kA	
Current Monitor	High limit 100-150%, low limit 50-100%		
Conduction Degree Monitor	0 to 180°		
Current Steppers	1 stepper per valve		
Valve Outputs	4 standard valve driver outputs		
Modes	Chaining, Successive, Spot, Roll Spot, Seam, Repeat		

	STA-100A	STA-200A*	STA-400A*	STA-600A*	STA-800A*
Weight Lbs. (Kg)	35 (16)	134 (61)	194 (88)	250 (113)	335 (152)
External Dimensions	18 x 10 x 10	30 x 25.4 x 10	36 x 31.4 x 12	42 x 31.4 x 12	60 x 37.4 x 12
H x W x D Inches (mm)	(457 x 254 x 254)	(762 x 645 x 254)	(914 x 798 x 305)	(1067 x 798 x 305)	(1524 x 950 x 305)

*Custom sizes available.

OPTIONAL FEATURES

Primary Current Control	Primary current control w/current transformer
Secondary Current Control	Secondary current control w/toroidal coil
Secondary Current Coils	MB-400K, MB-400L, MB-500-15, MB-800K, MB-800L
Multi-Valve Driver	8 additional valve outputs
Valve Power Supply	24 VAC
Power Transformers	50 VA (STA-100A only), 150 VA, 250 VA (500VA available for STA-200, 400, 600, 800A)
Security Lock	Program lockout
SCR	300 amp air cooled (STA-100A only)
	600 and 1200 amp water cooled (1800 amp available for STA-200 and above)
Terminal Block	L2 terminal
Voltage Monitor Card	4-channel card for secondary voltage measurement
Force Output Card	8-channel 0-10V outputs for electronic pressure regulator
Force Input Card	Single channel card for differential pressure measurement (up to 8 channels)

Your Local Representative



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