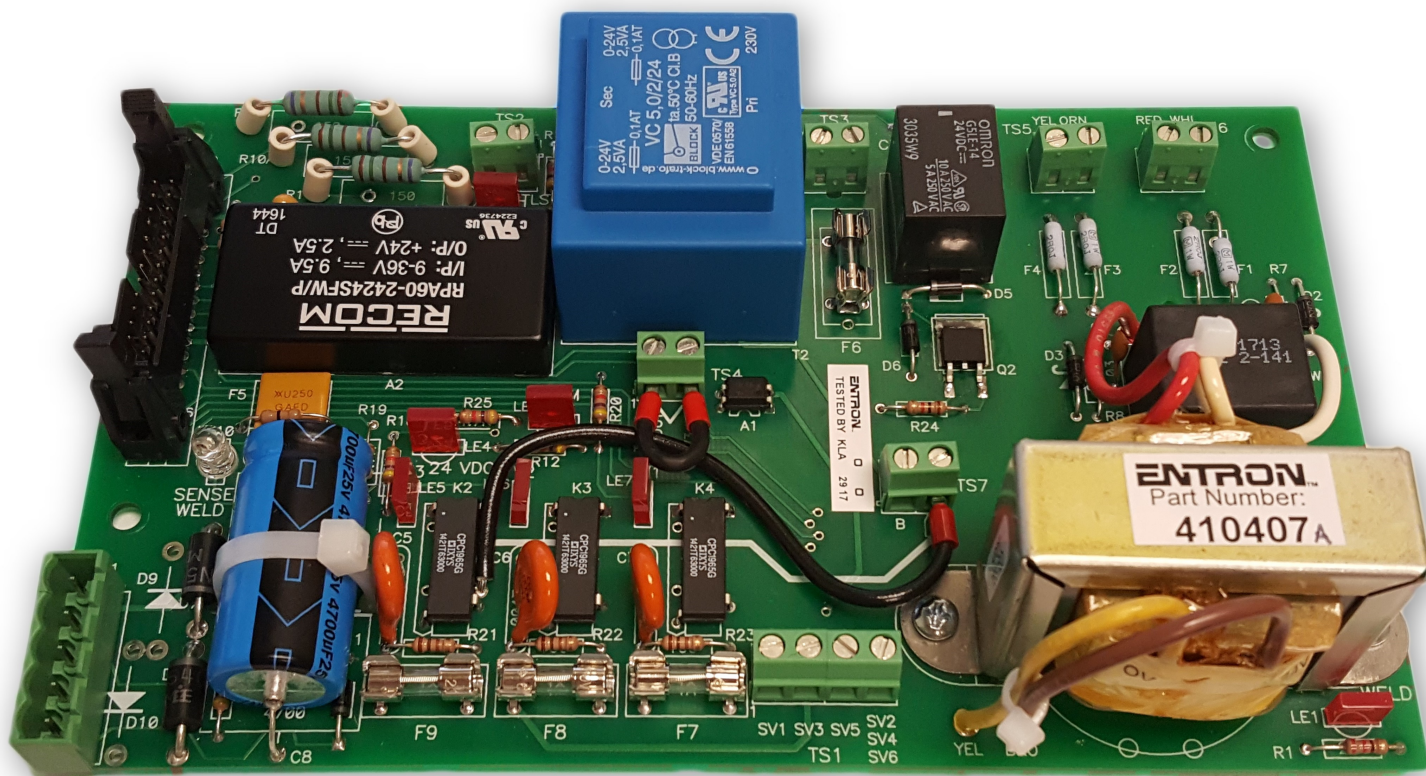


# EN6001

Retrofit Kit for EN1000 & EN1001



## ENTRON

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**RWMA**  
MEMBER

# Important Safety Instructions

**READ THIS MANUAL COMPLETELY  
BEFORE ATTEMPTING TO INSTALL OR OPERATE THE CONTROL.  
STORE THIS TECHNICAL INFORMATION IN A PLACE  
TO WHICH ALL USERS HAVE ACCESS AT ANY TIME**

ENTRON Controls follows the practices of the RWMA for precautionary labeling. See RWMA Bulletin #1 and AWS J1-1 for a complete description. Observe the WARNING, DANGER, and CAUTION labels affixed to control to maintain safe operation. ENTRON Controls, LLC. and its affiliates are not responsible for any harm caused by non-compliance of instructions associated with the aforementioned labels or signal words to follow.

The signal word **DANGER** is used to call attention to immediate or imminent hazards which if not avoided **will result in immediate, serious, or personal injury or loss of life**. Examples are: *exposed high voltage; exposed fan blades*.

The signal word **WARNING** is used to call attention to potential hazards which **could result in personal injury or loss of life**. Examples are: *not using proper personal protection; removal of guards*.

The signal word **CAUTION** is used to call attention to hazards which **could result in non-life threatening personal injury or damage to equipment**. **CAUTION** may also be used to alert against *unsafe practices*.

The term **NOTICE** is used for making recommendations on use, supplementary information, or helpful suggestions. Non-compliance with these recommendations **may result in damage to control, welding machine, or workpiece**. ENTRON Controls, LLC. and its affiliates are not responsible for damage caused by such non-compliance, and warranties may be voided accordingly at the discretion of ENTRON Controls.

**WARNING:** Individuals with cardiac devices should maintain a safe distance due to strong magnetic fields arising from resistance welding. The function of cardiac pacemakers and defibrillators may be disturbed, which may cause death or considerable health damages to persons concerned! These persons should avoid the welding system unless authorized by a licensed physician.

# My Control Information

Filling out the following information (and keeping it readily available) may allow for future technical service of equipment to be conducted more efficiently:

Model #: \_\_\_\_\_  
Serial #: \_\_\_\_\_  
OEM/Distributor: \_\_\_\_\_  
Contact #: \_\_\_\_\_  
Purchase Date: \_\_\_\_\_

## Hardware Connections

P1—2, Foot Switch #1 \_\_\_\_\_  
P1—3, Foot Switch #2 \_\_\_\_\_  
P1—4, Emergency Stop \_\_\_\_\_  
P1—5, No Weld Signal \_\_\_\_\_  
P1—6, Programmable Input #1 \_\_\_\_\_  
P1—7, Programmable Input #2 \_\_\_\_\_  
P1—8, Programmable Input #3 \_\_\_\_\_  
P1—9, Programmable Input #4 \_\_\_\_\_  
P1—10, Programmable Input #5 \_\_\_\_\_  
P1—11, Programmable Input #6 \_\_\_\_\_

P2—2 / TS1-SV1, Solenoid Valve #1 \_\_\_\_\_  
P2—3 / TS1-SV3, Solenoid Valve #2 \_\_\_\_\_  
P2—4 / TS1-SV5, Solenoid Valve #3 \_\_\_\_\_  
P2—5, Programmable Output #1 \_\_\_\_\_  
P2—6, Programmable Output #2 \_\_\_\_\_  
P2—7, Programmable Output #3 \_\_\_\_\_  
P2—8, Programmable Output #4 \_\_\_\_\_

P3 Sensing Coil

☐  
Not Used

☐  
Primary

☐  
Secondary

# Weld Schedule Worksheet

Filling out the following information (and keeping it readily available) may allow for future technical service of equipment to be conducted more efficiently. Please duplicate and complete this page for each utilized schedule:

**SCHEDULE #:** \_\_\_\_\_

Squeeze Delay: \_\_\_\_\_ cycles \_\_\_\_\_ KVA or \_\_\_\_\_ %

**Squeeze:** \_\_\_\_\_ **cycles** **Valves:** \_\_\_\_\_

Weld 1: \_\_\_\_\_ cycles \_\_\_\_\_ KVA or \_\_\_\_\_ %

Cool 1: \_\_\_\_\_ cycles

Slope: \_\_\_\_\_ cycles

**Weld 2:** \_\_\_\_\_ **cycles** \_\_\_\_\_ **KVA** or \_\_\_\_\_ **%**

Cool 2: \_\_\_\_\_ cycles

Impulses: \_\_\_\_\_ cycles

**Hold:** \_\_\_\_\_ **cycles**

**Off:** \_\_\_\_\_ **cycles**

Cycle Mode: \_\_\_\_\_

Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Tap Setting: \_\_\_\_\_ Pressure: \_\_\_\_\_ Machine: \_\_\_\_\_



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# Functions

- Constant current regulation
- Primary or Secondary feedback
- Current Monitoring with high, low, and pre-limits
- Up to 64 programs (internal or external selection)
- On Timer Membrane Keyboard with backlit 128x64 (8 lines) LCD graphic display
- Six (6) inputs and four (4) outputs with output protection on CPU
- Electrode management functions; including stepping, current counting, tip-dressing, and preset curves
- Welding programs may be linked together for complex schedules (chained or successive)
- USB-capable firmware refresh
- AC 60/50 Hz welding support
- Spot / Pulsation / Seam welding / Flash or Butt welding / Brazing
- Multiple weld intervals plus pulsation, upslope and downslope
- Air-over-oil gun operation
- Water Saver (contactor timer)
- Head lock function
- Program lockout (key switch) function
- Operation mode switch (program lockout and Weld/No Weld)
- Error reset switch
- Optional plug-in Ethernet card provides PLC compatibility with Modbus and EtherNet/IP

# Specifications

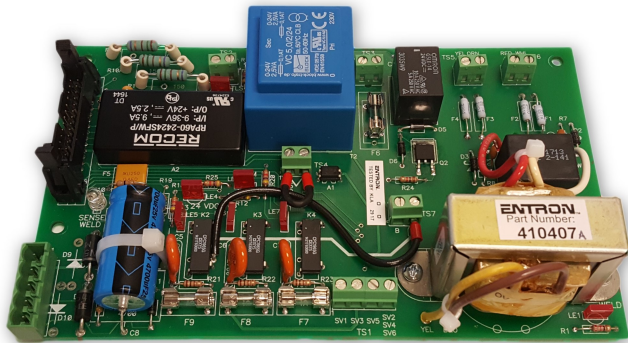
## Environmental Conditions:

Operating Temperature	0°C to 60°C
Storage/Transport Temperature	-25°C to 70°C
Air pressure	0 to 2000m above sea level
Humidity	no dew point excursion allowed
Enclosure Ratings	NEMA 1 and NEMA 12

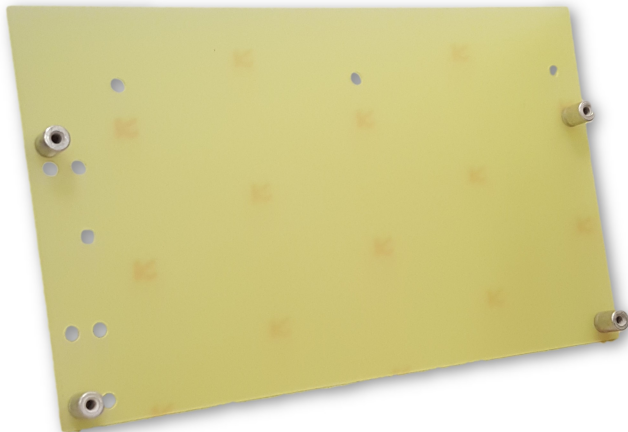
## Electronics Ratings:

CPU operating voltage (without I/O)	24 VDC $\pm 5\%$ at 220 mA
Rated current (without I/O) at 24V	SV1-SV3: ~500 mA
	PO1-PO4: ~500 mA
Discrete I/O:	
Input	+24V $\pm 15\%$
DC Output	24 VDC, 0.5A max
AC Output	120 VAC, 1A max
Supply I/O:	24 VDC $\pm 5\%$

# Kit Includes



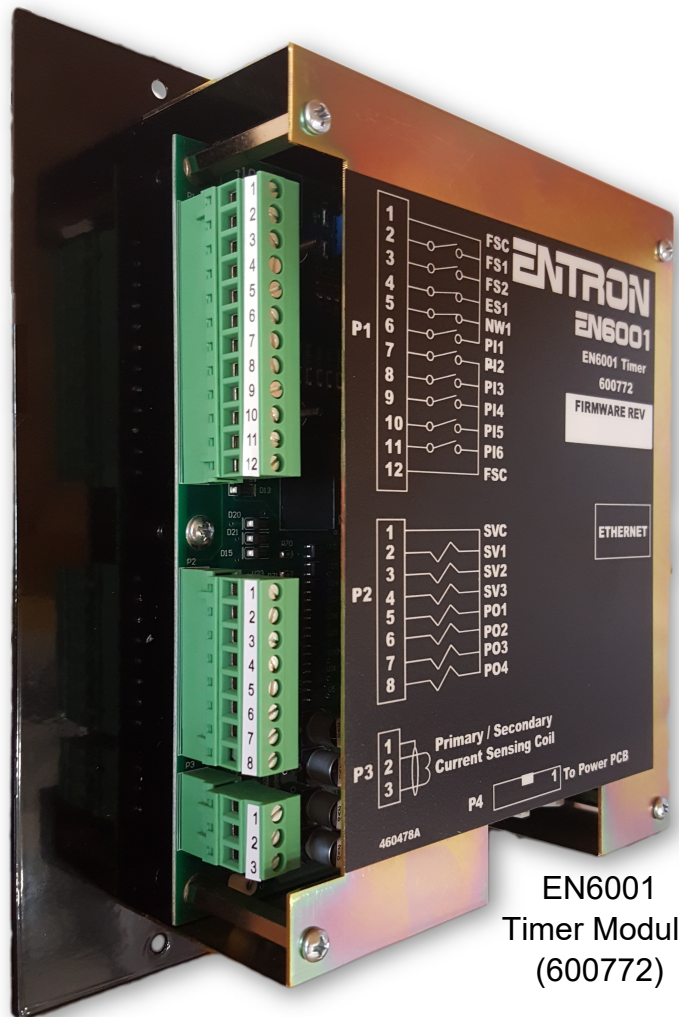
Retrofit Board  
(410407)



Adapter Plate  
(510318)



Insulated Quick Connect  
(345058) x 4



EN6001  
Timer Module  
(600772)

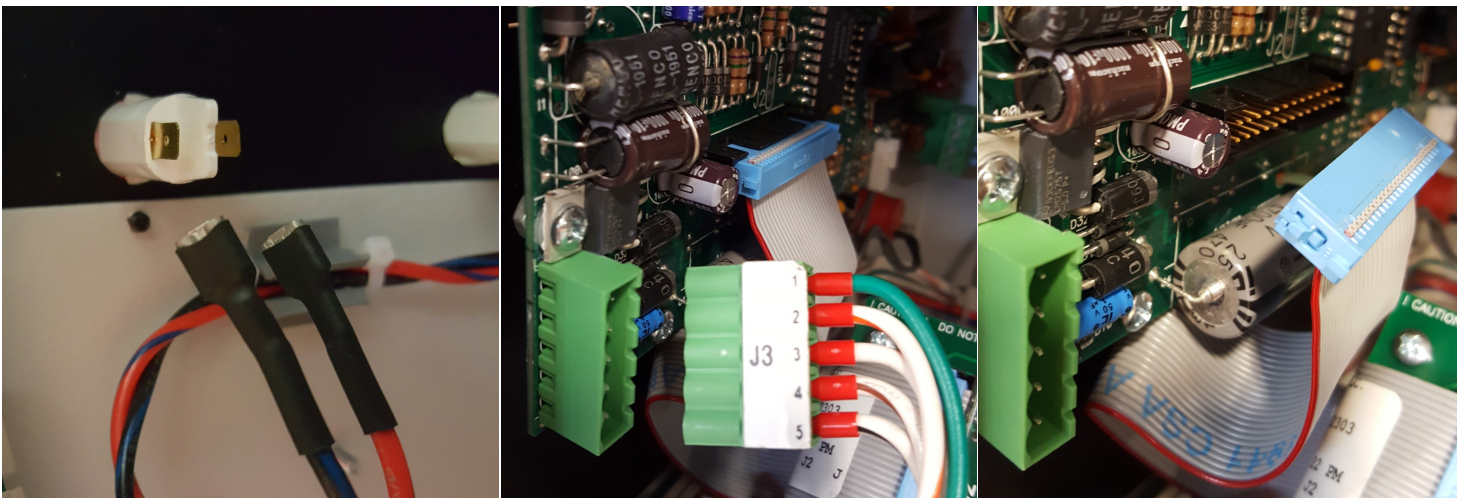
# Installation

**Step 1:** Record weld schedule information and hardware connections

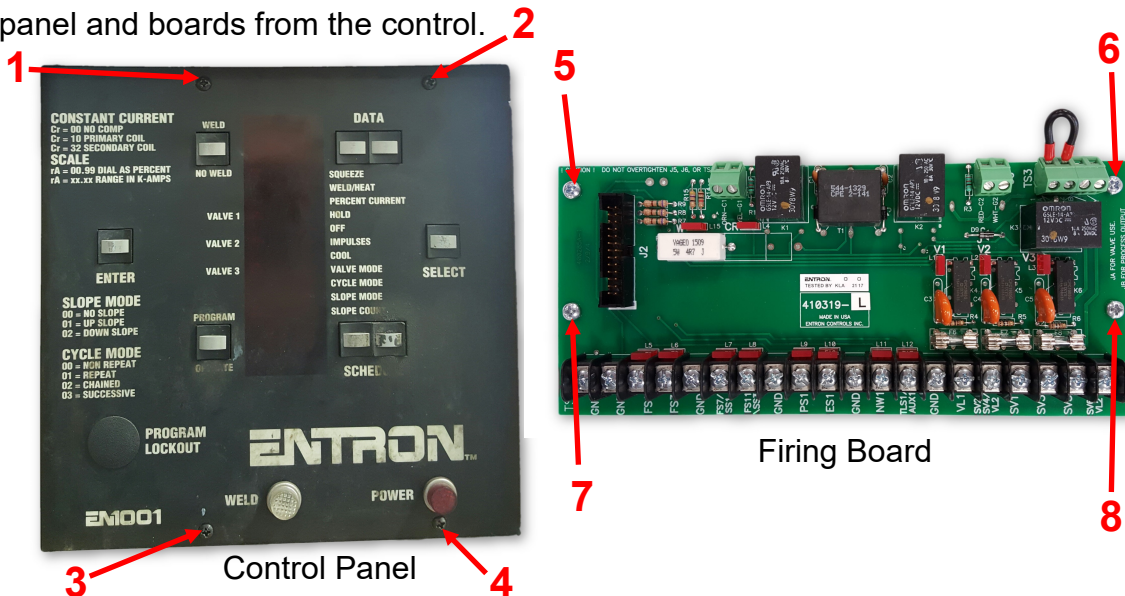
**Step 2:** **DANGER** Remove all power sources from the control before making any modifications



**Step 3:** Remove all electrical connections to the control panel and the firing board.



**Step 4:** Remove mounting screws (1-8) for the front panel and the firing board. Then remove the panel and boards from the control.

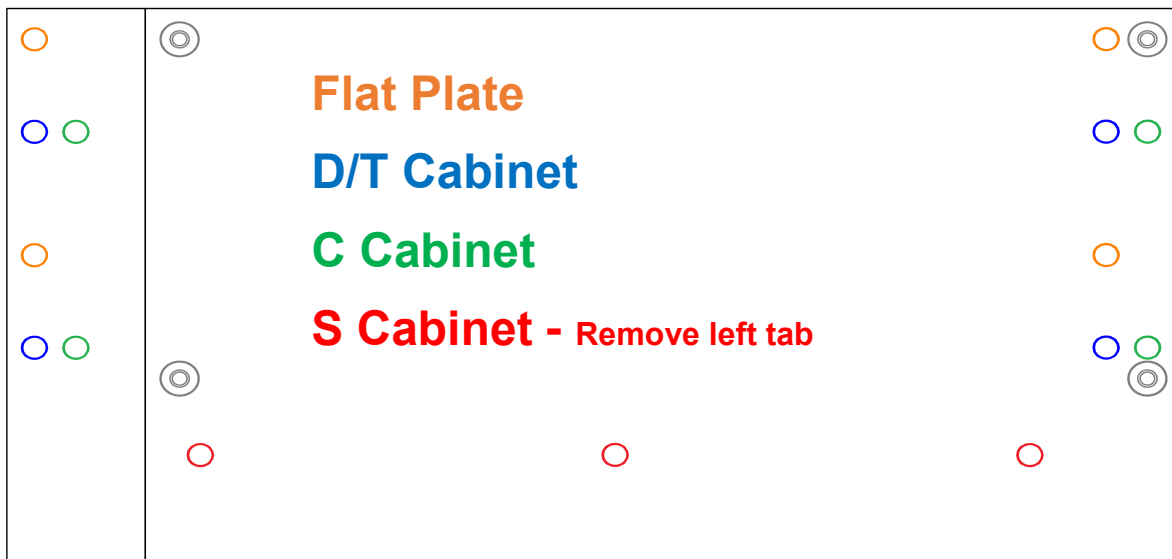




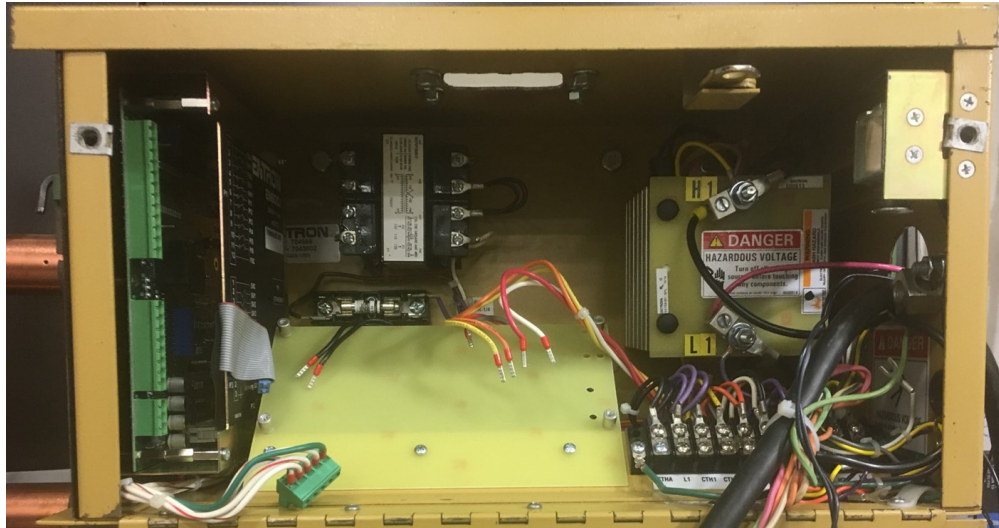
## Installation (continued)

**Step 5:** Install the EN6001 timer module into the control board's previous position using the previously-removed screws.

**Step 6:** Mount the adapter plate into the cabinet using the corresponding mounting holes. The adapter plate can be installed using the previously-removed screws.



"S" Cabinet Shown  
(Actual layout  
may vary)



**Step 7:** Mount the retrofit board onto the adapter plate's studs



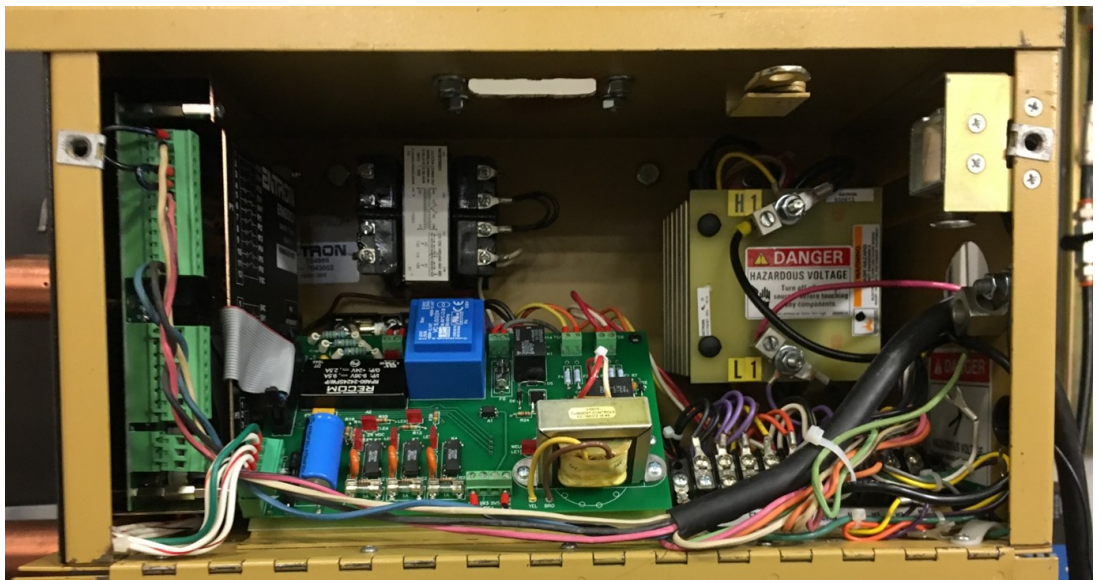
## Installation (continued)

**Step 7:** Mount the retrofit board onto the adapter plate's studs

**Step 8:** **CAUTION** Insulate the four connectors to previously-removed LEDs using the provided quick-connects in order to prevent electrical shorts. After insulating the terminals, place the wire ends under the adapter plate in order to minimize future manipulation.

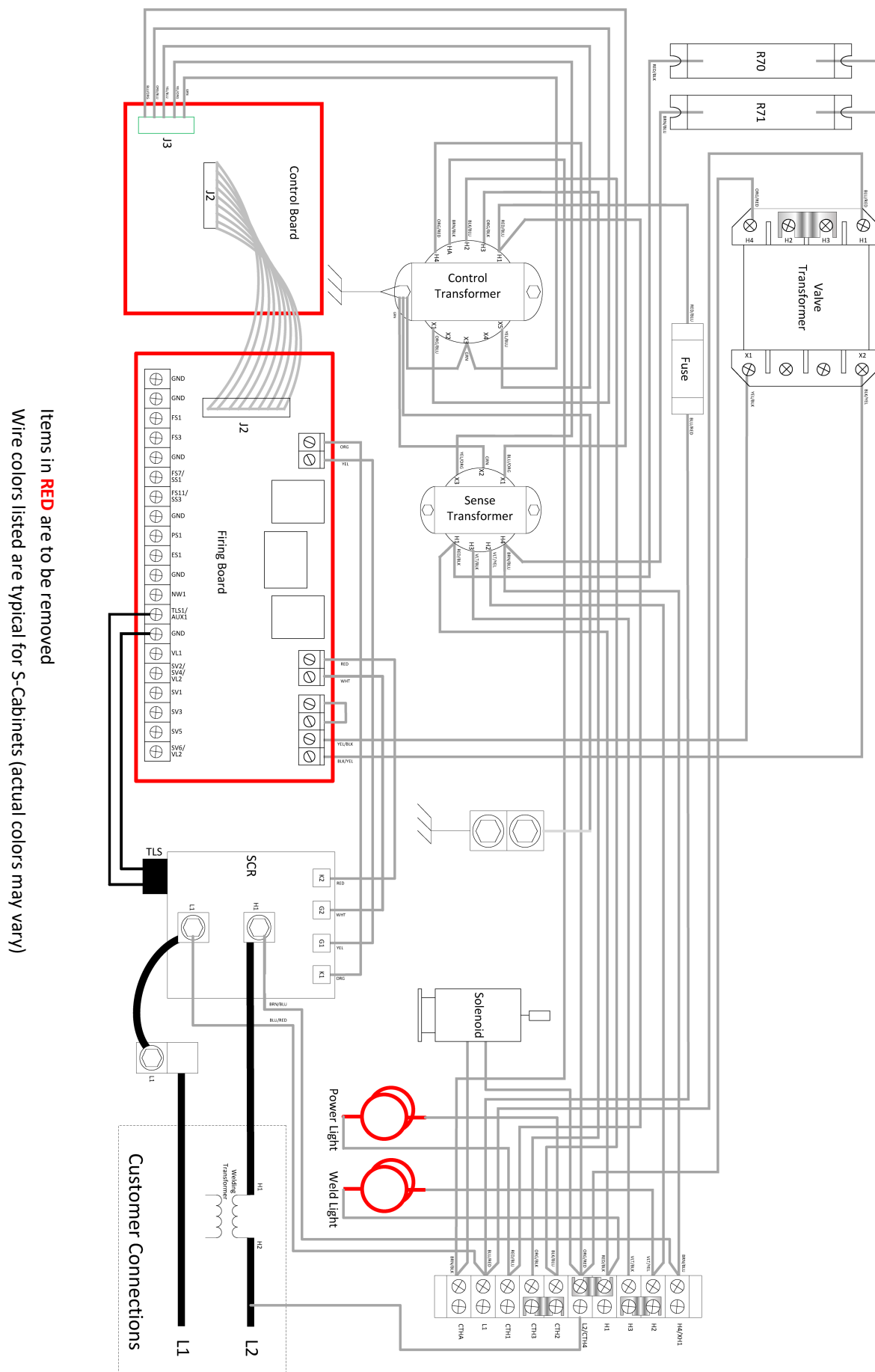
**Step 9:** Connect the remaining disconnected wires (including the ribbon cable) to the retrofit board and timer module using as shown in the wiring diagram on [page 13](#). (See [page 14](#) for DC connections)

“S” Cabinet Shown  
(Actual layout  
may vary)

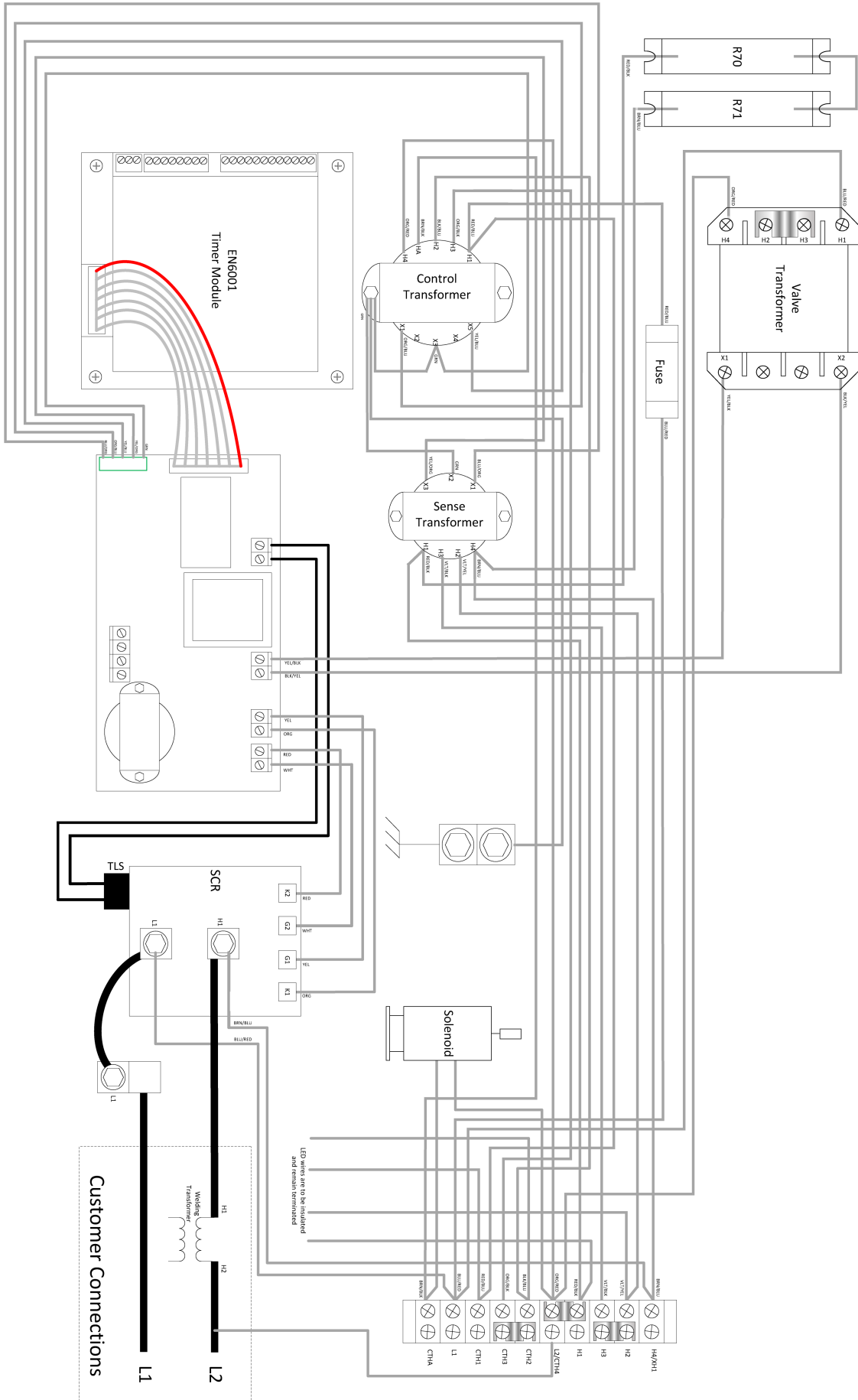


**Step 10:** Reapply power and load recorded weld schedule onto the EN6001 control panel.

## EN1000 Disconnect



# EN6001 Install

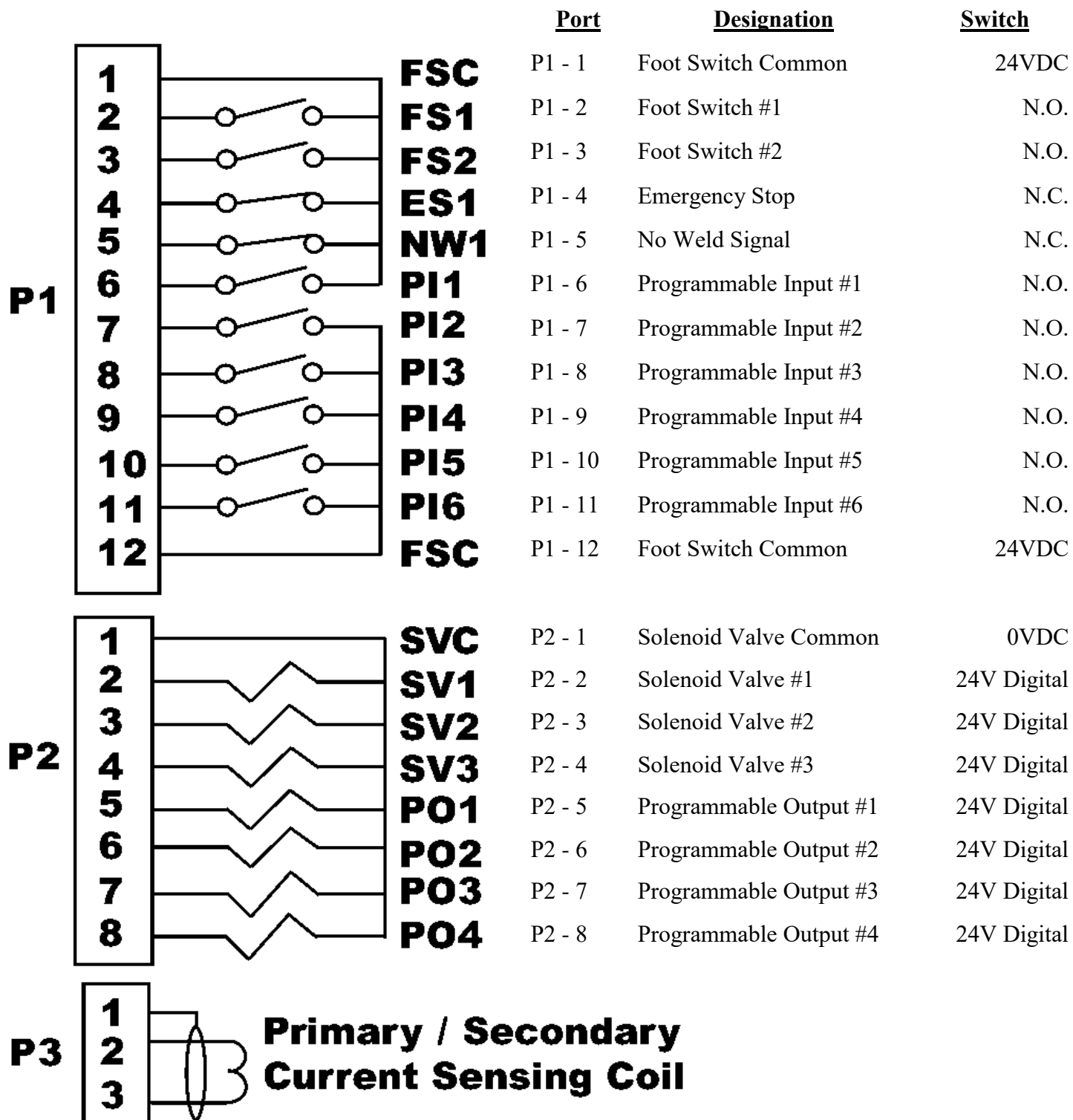


Jumper positions shown are for 460v power supply.

Typical installation will not require adjustment of jumpers (unless supply power is different)

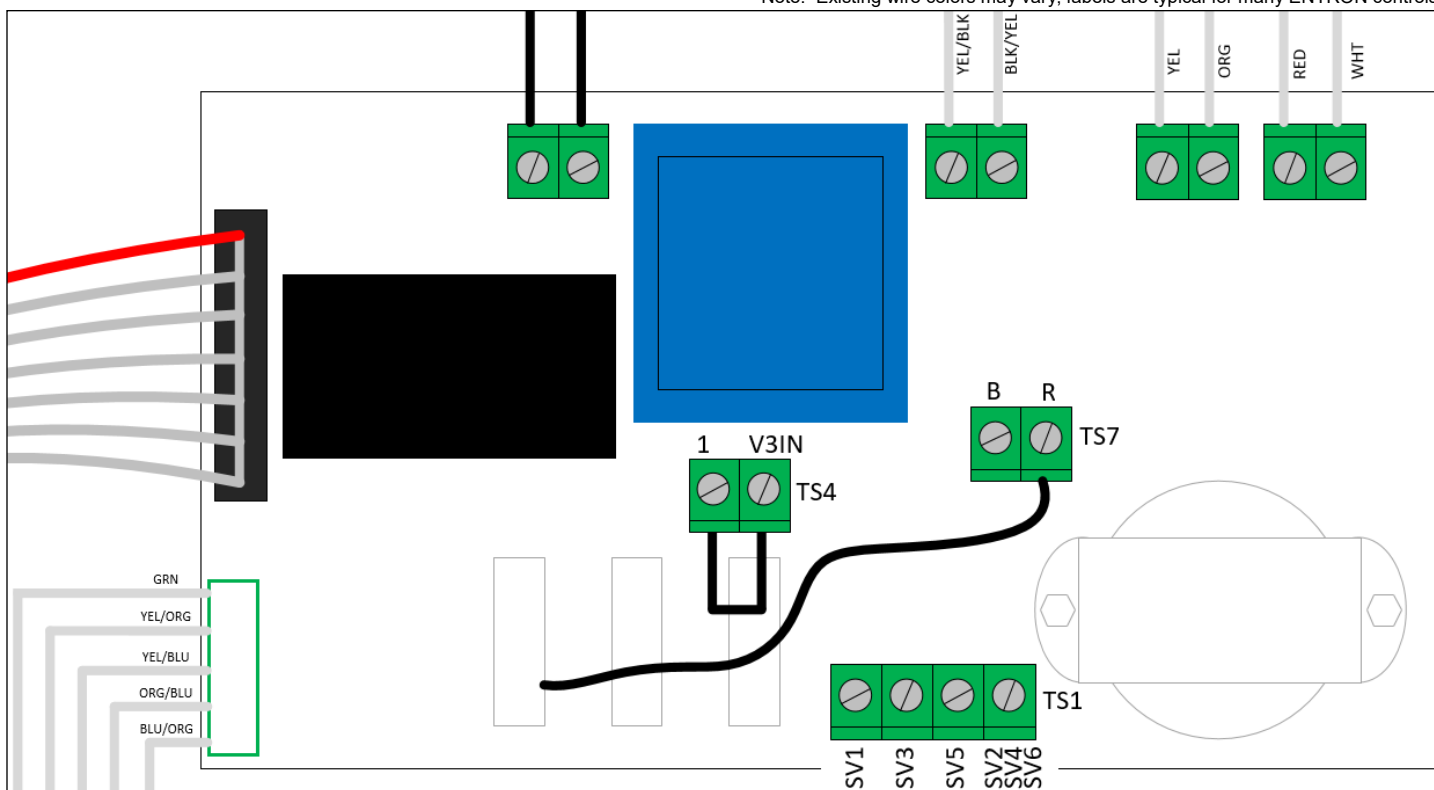
Wire colors listed are typical for S-Cabinets (actual colors may vary)

# DC User Connections



# AC User Connections

Note: Existing wire colors may vary; labels are typical for many ENTRON controls

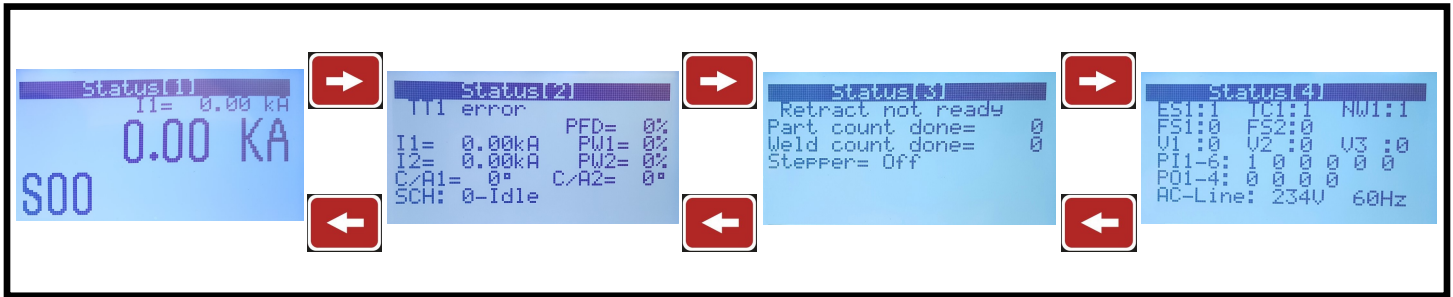


<u>Port</u>	<u>Designation</u>	<u>Switch</u>
TS1 - SV1	Solenoid Valve #1	AC Analog
TS1 - SV2	Solenoid Valve #1 Common	0VAC
TS1 - SV3	Solenoid Valve #2	AC Analog
TS1 - SV4	Solenoid Valve #2 Common	0VAC
TS1 - SV5	Solenoid Valve #3	AC Analog
TS1 - SV6	Solenoid Valve #3 Common	0VAC
TS4 - 1	Output from P2 - 4 (Valve #3 control signal)	24V Digital
TS4 - V3IN	Optional connection to replace “P2 - 4” signal from timer module with an alternatively desired 24VDC signal. (For example, “P2 - 5” programmed to “Retraction” could be connected when using an AC retraction valve.)	Default - Jumper Connected to TS4 - 1
TS7 - B	Bypass Solenoid Valve #3 Safety Relay	Default - JW6 Disconnected
TS7 - R	Solenoid Valve #3 Safety Relay	Default - JW6 Connected

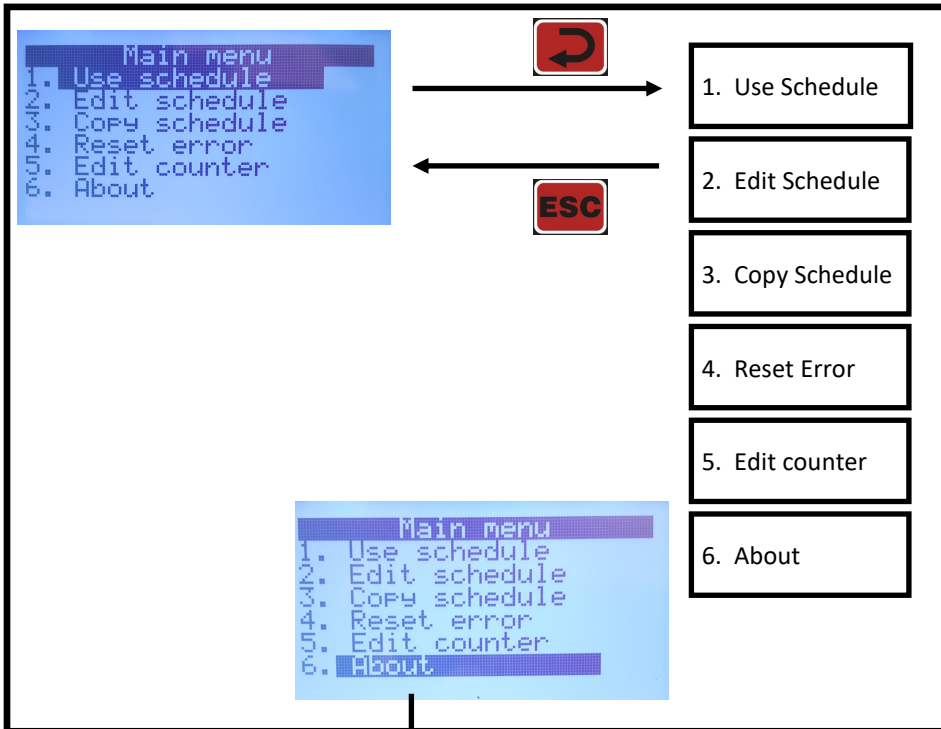
**WARNING** Bypassing the safety relay will result in the valve control being independent of FS1 or FS2 after initiation. This should NOT be done with valves connected to pinch points such as the primary welding force valve.

# Menu Navigation

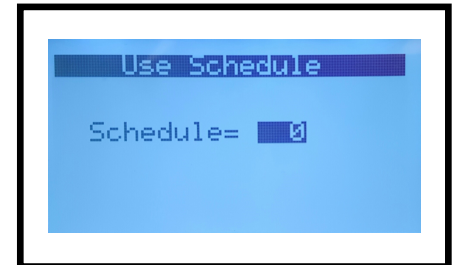
## Status Page List (Default)



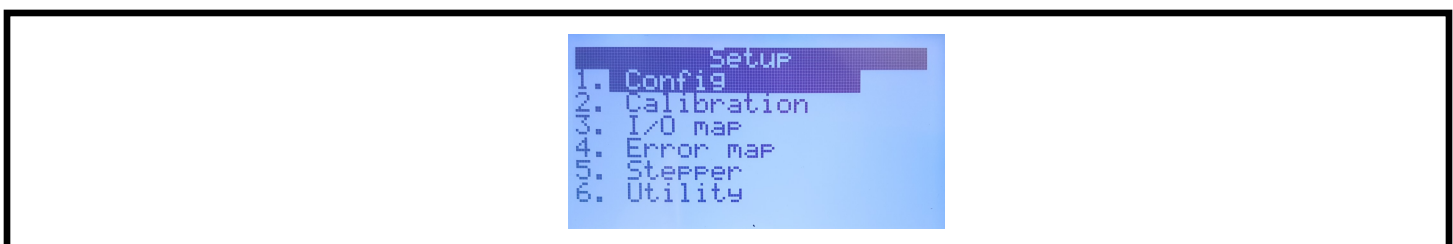
## Main Menu



## Schedule Select



## Setup Menu

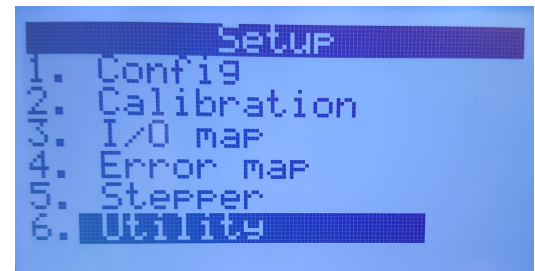




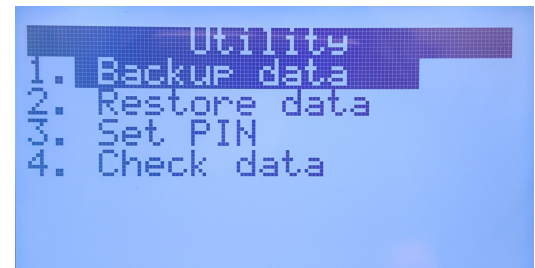
# Saving Weld Schedules


Step 1: Insert a formatted USB drive into USB port on the control panel

Step 2: From the 'Setup Menu' (see Menu Navigation for details) select "Utility".

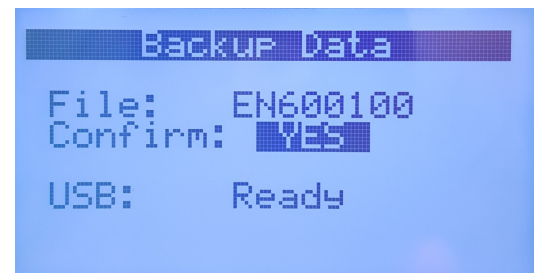



Step 3: Select "Backup data"

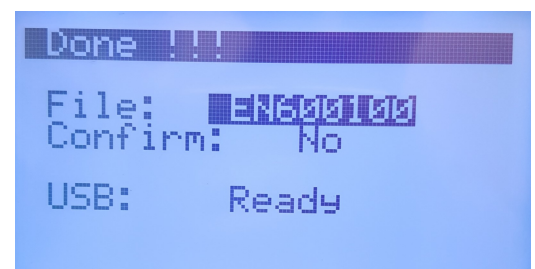


Step 4: Rename file (desired) using  and 

Step 5: Set "Confirm" to "YES" using  and 



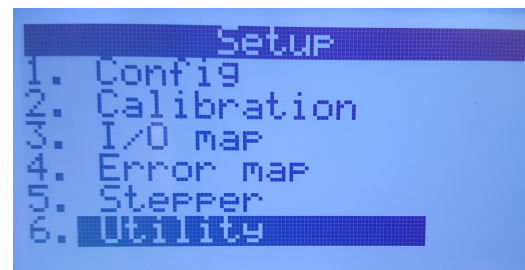
Step 6: Press  and verify that "DONE!!!" appears in the top left corner of the title bar.



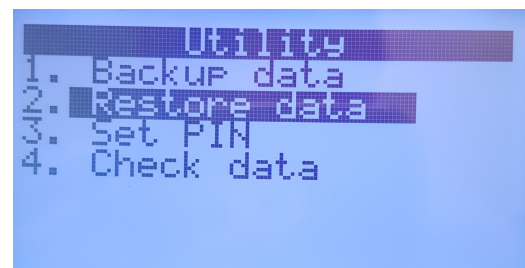
# Loading Weld Schedules

Step 1: Insert USB drive with a previously saved backup file\* into the USB port on the control panel.


Step 2: From the 'Setup Menu' (see Menu Navigation for details) select "Utility".

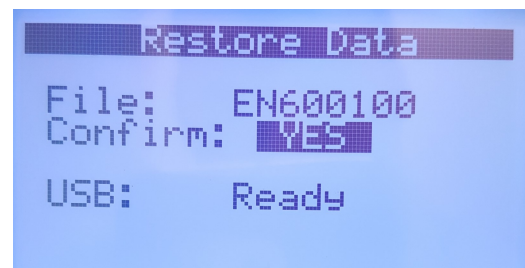



Step 3: Select "Restore data"

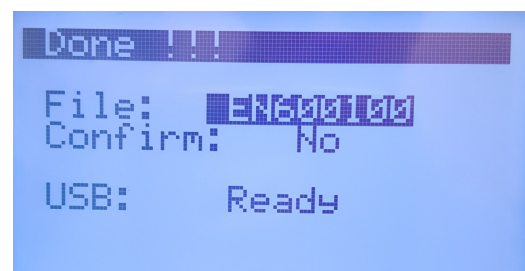


Step 4: Select the desired filename\* using  and 

Step 5: Set "Confirm" to "YES" using  and 



Step 6: Press  and verify that "DONE!!!" appears in the top left corner of the title bar.







\*Note: The backup file must be on the root directory of the USB drive. And the filename must be EN6001**00**.EN6 to EN6001**99**.EN6

# Updating Firmware

Step 1: Ensure the control is completely powered down.

Step 2: Insert USB drive with EN6001 firmware file into USB port on the control panel.


Step 3: Press and hold  and 

Step 4: Power on the control. Once the Bootloader Menu (shown right) appears, release  and 

Step 5: Select “Refresh firmware”


Step 6: Select the desired filename\* using  and 

Step 7: Set “Confirm” to “YES” using  and 

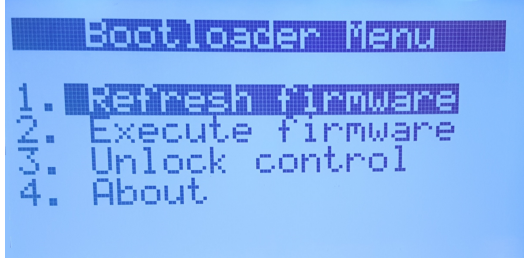
Step 8: Press and  the control will begin updating.

Step 9: In order to return to the “Main Menu”, either

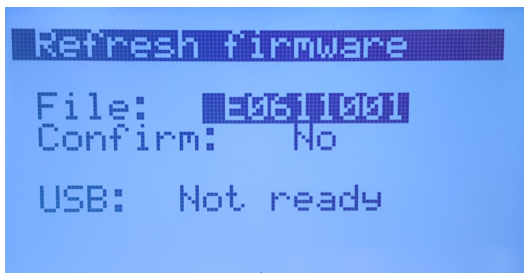
1. Temporarily power down the control

2. Go back to “Bootloader Menu” by pressing  Then, select “Execute firmware”, then select “YES”.

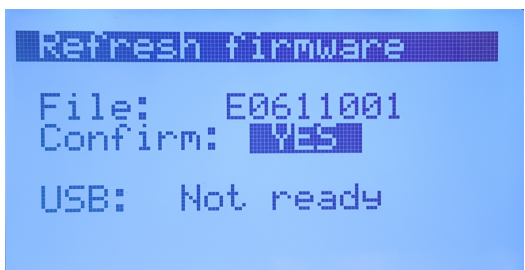
\*Note: The firmware file must be on the root directory of the USB drive, and the filename will be E061**1001**.BIN to E061**9999**.BIN (this may requiring the extraction of a zip file)



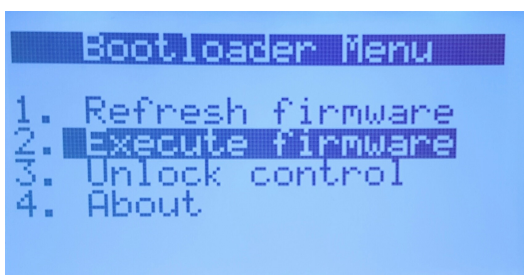
```
Bootloader Menu
1. Refresh firmware
2. Execute firmware
3. Unlock control
4. About
```



```
Refresh firmware
File: E0611001
Confirm: No
USB: Not ready
```

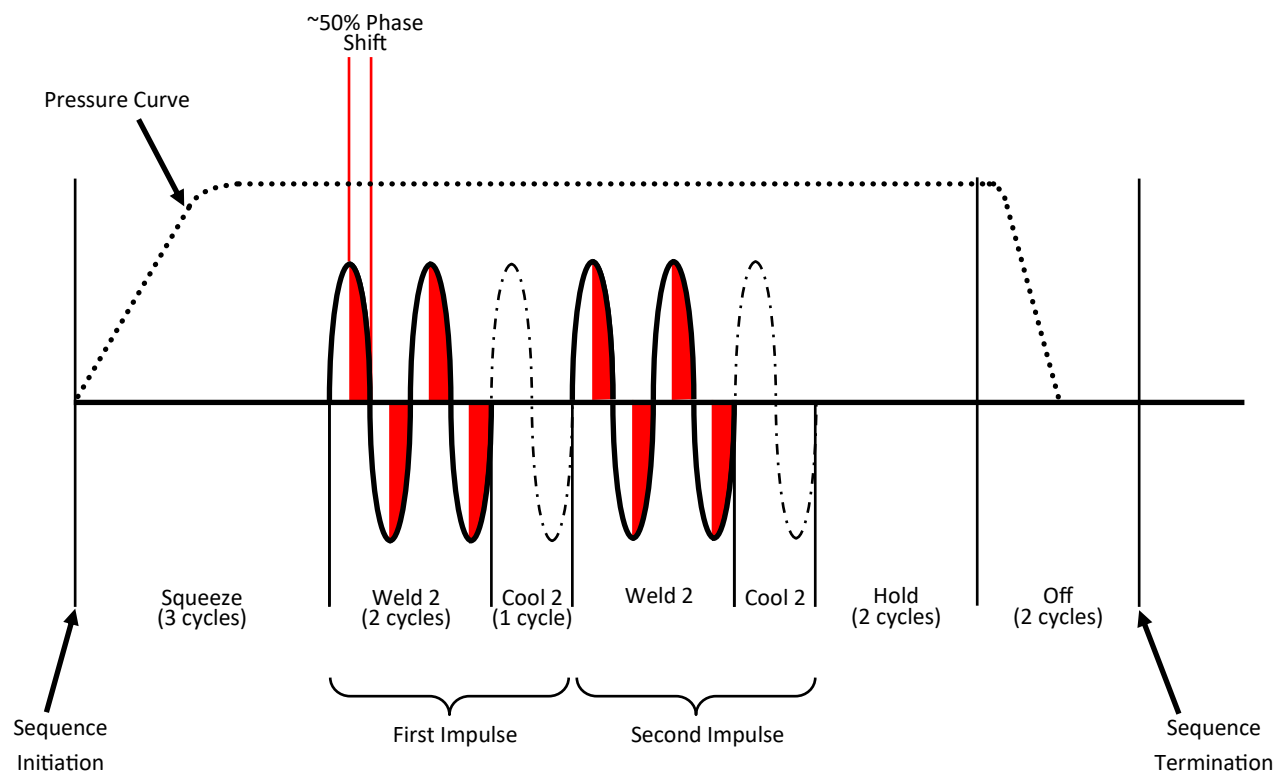


```
Refresh firmware
File: E0611001
Confirm: YES
USB: Not ready
```



```
Bootloader Menu
1. Refresh firmware
2. Execute firmware
3. Unlock control
4. About
```

# Weld Timing Cycle




<u>PARAMETER</u>	<u>SETTING</u>
Squeeze Delay	0 cycles
Squeeze	3 cycles
Weld 1	0 cycles
Cool 1	0 cycles
Slope	0 cycles
Weld 2	2 cycles
>Mode	Phase Shift
>Heat	50 %
Cool 2	1 cycle
Hold	2 cycles
Off	2 cycles
Impulses	2 cycles

The diagram above is intended to demonstrate a resulting welding timing cycle using the attached parameters; it is not recommended as part of a functional weld schedule.

# Parameter List

## Main Menu

<u>Sub Menu</u>	<u>Parameter</u>	<u>Input Range</u>	<u>Description</u>
1. Use Schedule			
	Schedule	[0-63]	Default = 0
2. Edit Schedule			
	Advance	[0-99] cycles	Default = 0 This option only appears when 'air-over-oil' configuration is selected.
	Intensify	[0-99] cycles	Default = 0 This option only appears when 'air-over-oil' configuration is selected.
	Block Delay	[0-99] cycles	Default = 0 This option only appears when 'air-over-oil' configuration is selected.
	Schedule Number	[0-63]	Default = 0 In order to accept changes made to any field, the  button must be pressed. It is important to make sure that the correct schedule number is selected AND accepted BEFORE completing all of the corresponding settings to follow.
	Squeeze Delay	[0-99] cycles	Default = 0 Additional time delay to be added to 'Squeeze'. This is usually utilized when 'Cycle Mode' is set to repeat. The squeeze delay will only be applied to the first weld of the repeating cycle.
	Squeeze	[0-99] cycles	Default = 0 Time delay between the signal to the programmed valve(s) and weld initiation.
	>Valve	None 1 2 3 1+2 1+3 2+3 1+2+3	Default = None Selection of valve(s) to be activated
	Weld 1	[0-99] cycles	Default = 0 Also referred to as "pre-heat"
	>Mode	Phase Shift Const Current	Default = Phase Shift
	>Heat	[0-99] %	Phase shift %; does not apply when 'Mode' is set to Const Current
	or		
	>Current	[0.00-60.00] kA	Weld current setting does not apply when Mode is set to Phase Shift
	>I1 Monitor	On Off	Default = Off Must be enabled in order to track/report current errors
	>PW1 Monitor	On Off	Default = Off Must be enabled in order to track/report phase shift abnormalities.
	Cool 1	[0-99] cycles	Default = 0 Time delay between 'Weld 1' and 'Weld 2'. Designed to give an impulse effect.

# Parameter List



## Main Menu (continued)

<u>Sub Menu</u>	<u>Parameter</u>	<u>Input Range</u>	<u>Description</u>
2. Edit Schedule (continued)			
	Slope	[0-99] cycles	Default = 0 The number of additional cycles between 'Weld 1' and 'Weld 2' in order to transition between the two gradually. A larger 'Weld 1' will result in a downslope; whereas a larger 'Weld 2' will result in an upslope.
	Weld 2	[0-99] cycles	Default = 0
	>Mode	Phase Shift Const Current	Default = Phase Shift
	>Heat	[0-99] %	Phase shift %; does not apply when '>Mode' is set to Const Current
	or		
	>Current	[0.00-60.00] kA	Weld current setting does not apply when Mode is set to Phase Shift
	>I2 Monitor	On Off	Default = Off Must be enabled in order to track/report current errors
	>PW2 Monitor	On Off	Default = Off Must be enabled in order to track/report phase shift abnormalities.
	Cool 2	[0-99] cycles	Default = 0 Primarily used when applying multiple impulses; time delay following each 'Weld 2' impulse.
	Hold	[0-99] cycles	Default = 0 Time delay during which the electrodes remain in contact with the part being welded to allow weld nugget to congeal.
	Off	[0-99] cycles	Default = 0 Time delay following 'Hold' cycle in which the valve(s) release; the next schedule/sequence will not begin until the 'Off' cycle is complete.
	Impulses	[1-99] cycles	Default = 1 Number of times to deliver Weld 2, Cool 2. (Impulses do NOT apply to Weld 1, Cool 1)
	I offset	-1 % 0 % +1 %	Default = 0 Adjustable increase or decrease to total current delivered by a sequence. This is one of the few adjustable parameters when control is locked. Parameter is only visible when 'Max I offset' is not "0".
	>Change all	No Yes	Default = No No – 'I offset' will be applied to the current schedule Yes – 'I offset' will be applied to all schedules'
	Block Delay	[0-99] cycles	Default = 0 This option only appears when 'air-over-oil' configuration is selected.



# Parameter List

## Main Menu (continued)

Sub Menu	Parameter	Input Range	Description
2. Edit Schedule (continued)			
	Cycle Mode	Non-Repeat Repeat Chained Successive Wait Here	Default = Non-Repeat Non-repeat – Control can be initiated for only one sequence/ schedule even if initiation remains closed. Repeat – Sequences/ schedules will continue if initiation remains closed. Chained – Schedules are chained together so that consecutive schedules can be sequenced from one initiation. Successive – Schedules are chained together so that consecutive schedules will be sequenced from separate initiations. Wait-Here – only applies when 'Weld2' is set to 99 cycles. This allows infinite Weld 2 duration until Escape is trig-
3. Copy Schedule			
	Copy From	[0-63]	Schedule # to be copied
	Copy To	[0-63]	Schedule # to be replaced
	Confirm	Yes No	Must select "Yes" and press the  key to complete the above copy/replace. "DONE!!!" will appear in the title bar once complete.
4. Reset Error			
	Confirm	Yes No	Must select "Yes" and press the  key to complete the above copy/replace. "DONE!!!" will appear in the title bar once complete.
5. Edit Counter			
	Counter	Enable Disable	Default = Disable Enable – 'Weld count done' will increment with each weld delivered. Error "ER25" will be reported when 'Max part count' = 'Part count done'
	Max part Count	[0-60,000]	Default = 60,000 Number at which the 'part count done' reports error "ER25"
	Weld per part	[1-9,999]	Default = 1 The number of welds to increment 'part count done' by one.
	RST Counter	None PCTR WCTR Both	Default = None Resets counter PCTR – part counter WCTR – weld counter

# Parameter List

## Setup Menu

<u>Sub Menu</u>	<u>Parameter</u>	<u>Input Range</u>	<u>Description</u>
1. Config			
	Weld Mode	Spot Seam1 Seam2	Default = Spot Spot – Standard squeeze, weld, hold and off sequence. Seam1 – When FS1 or FS2 input is toggled, control will run 'schedule' from 'Squeeze Delay' through 'Cool 2'. If FS1 or FS2 input is held, control will repeat 'Weld 2' and 'Cool 2'. Seam2–FS1 initiation implements same function as in Seam1. FS2, schedule 20, schedule 40 and schedule 60 will always initiate "Spot" Weld Mode
	Retraction	Off Maintained Momentary	Default = Off Maintained – Retraction output directly reflects retraction input Momentary – Retraction output changes state with an impulse of retraction input. This parameter is ignored if 'Beat_Mode' is enabled.
	On Error	Continue Head Lock Stop	Default = Continue Continue – Further welds are permitted regardless of previous weld status Head Lock – On error, valve signal(s) are held on. Additional welds are not permitted until Error Reset occurs. Stop – On error, valve signal(s) turn off as normal. Additional welds are not permitted until Error Reset occurs.
	Sch Select	Internal External	Default = Internal Internal – FS1 will initiate the programmed weld schedule number External – FS1 will initiate the weld schedule number according to the binary value represented by PI3, PI4, PI5, and PI6. (FS2 will always initiate weld schedule 20.)
	I-Feedback	Primary Secondary	Default = Secondary This setting should correspond to the physical location of the sensing coil.
	Air-over-oil	Off Mode 1 Mode 2	Default = Off Mode 1: air-over-oil setting without retraction Mode 2: air-over-oil setting with retraction enabled using 'Retract Open' and 'Retract Close' settings
	Retract Open	[0-99] cycles	Default = 0 Time delay to allow for retraction from "pre-weld" position to "fully open" position Sub Menu only appears when 'air-over-oil' is set to "Mode 2"
	Retract Close	[0-99] cycles	Default = 0 Time delay to allow for closure from "fully open" position to "pre-weld" position Sub Menu only appears when 'air-over-oil' is set to "Mode 2"


# Parameter List

## Setup Menu (continued)

Sub Menu	Parameter	Input Range	Description
1. Config (continued)			
	Beat mode	Off Squeeze Sqz. + Weld Wait-Here	Default = Off Off – Sequence/Schedule will complete with a momentary activation of FS1 or FS2 Squeeze – Sequence/Schedule requires continuous activation of FS1 or FS2 until the squeeze sequence is complete, otherwise the sequence will terminate. Sqz. + Weld – Welding sequence requires continuous activation of FS1 or FS2 until the weld sequence is complete, otherwise the sequence will terminate. Wait-Here – Welding sequence requires continuous activation of FS1 or FS2 until the weld sequence is complete, otherwise the sequence will temporarily pause (retraction will not occur). This setting requires the active schedule's 'Cycle Mode' to also be set to "Wait-Here".
	AVC	Disabled Max [1-10] %	Default = Disabled Automatic Voltage Compensation – Will add additional percentage to phase shift in order to compensate for diminished supply voltage. (only works with schedules using "Phase Shift" Mode to regulate current)
	AVC nom.	[187-633] volts	Default = 480 Supply voltage on which the control is designed to operate. Parameter is only visible when 'AVC' is enabled.
	Voltage monitor	Off On	Default = Off On – High and Low Voltage errors are enabled using the following parameters.
	>High	[160-690] volts	Default = 690 Error "ER23" will be triggered if supply voltage is above the set value Parameter is only visible when 'Voltage Monitor' is "On"
	>Low	[160-690] volts	Default = 160 Error "ER24" will be triggered if supply voltage is below the set value Parameter is only visible when 'Voltage Monitor' is "On"
	Max I offset	[0-15] %	Determines the input range for 'I offset' parameter. For example, if 'Max I offset' is 6%, 'I offset' input range is -6% to +6%
	Water Saver	[0-199] sec	Default = 0 Time delay following a weld in which the water saver output is turned off.
	87° delay	Off On	Default = Off On – The first half cycle is delayed 87degrees (51.6% max) phase shift in order to minimize saturation of the weld transformer
	Half Cycle	Off + - AC	Default = Off + – Only the positive half cycle is output - – Only the positive half cycle is output AC – Alternating positive/negative half cycles are output

# Parameter List

## Setup Menu (continued)

Sub Menu	Parameter	Input Range	Description
1. Config (continued)			
	Power factor	[0-99] %	Default = 75 0 – "Automatic Power Factor" mode 1-99 – Manual power factor delay. Value must be determined by the Power Factor Delay and will vary for each machine. If a primary or secondary coil is NOT installed, a manual power factor of 80% is recommended. Automatic Power Factor may react abnormally if enabled without a coil.
	Blanking	[0-99] cycles	Default = 0 The number of weld cycles to exclude from measurement and limit testing
	Display return	[0-10] min	Default = 0 0 – Disabled Length of time before the display returns to 'Status Page 1'
	Clear	None I/O Map Calibration Config Stepper Counter Schedule All	Clearing data from this menu does not require a confirmation. "DONE!!!" will appear in the title bar as verification.
2. Calibration			
	Toroid	[135-165] mV/kA	Default = 150 For accurate current monitoring
	Max I	[20-60] kA	Default = 20
	AC line scale	[0.8-1.2]	Default = 1.0 For accurate voltage monitoring
3. I/O Map	(see page 23)		
4. Error Map	(see page 24)		
5. Stepper			
	Stepper	Disable Heat	Default = Disable Heat – Stepper function enabled with current compensation
	Tip dress	[0-9,999]	Default = 9,000 When 'Count Done'='Tip dress', error (ER31) will trigger
	RST stepper	No Yes	Selecting "Yes" and pressing the  key will reset the 'Count done' to zero

# Parameter List

## Setup Menu (continued)

<u>Sub Menu</u>	<u>Parameter</u>	<u>Input Range</u>	<u>Description</u>
5. Stepper (continued)			
	[01-10]:Count	[0-9,999]	Default = 0 The number of welds required to move onto the next step
	>Heat+	[0-99] %	Default = 0 Additional phase shift to be added to Weld 1 and Weld 2 'Heat' settings Only applies when the weld 'Mode' is set to "Phase Shift."
	>Current+	[0.00-99.99] kA	Default = 0 Additional current to be added to Weld 1 and Weld 2 'Current' settings Only applies when the weld 'Mode' is set to "Const Current."
6. Utility			
	Backup Data	(see <a href="#">page 17</a> )	
	Restore Data	(see <a href="#">page 18</a> )	

# I/O Map

## Setup Menu (continued)

<u>Input/Output</u>	<u>Options</u>	<u>Description</u>
PI1	TT1 2nd stage Back step PCTR	TT1 – Temperature Limit Switch (also called TLS) 2nd stage – For valve closure before squeeze; to ensure good electrode position Back step – Return to previous schedule in “Successive” Cycle mode PCTR – Part counter reset
PI2	Edit lock PS1 Interlock WCTR Reset	Edit lock – closed = control locked; open = control unlocked PS1 – Pressure switch signal Interlock – Signal to authorize weld; used with PO4 Interlock WCTR – Weld counter reset
PI3	Error reset Sch. Select 1 Stepper reset 2nd Stage	Error reset – Clear error in order resume function Sch. Select 1 – Binary value of “one” for externally selecting schedule Stepper reset – Return stepper to “Zero” position 2nd stage – For valve closure before squeeze; to ensure good electrode position
PI4	Interlock Sch. Select 2 Error Reset (Not Used)	Interlock – Signal to authorize weld; used with PO4 Interlock Sch. Select 2 – Binary value of “two” for externally selecting schedule Error reset – clears error in order resume function
PI5	Back step Sch. Select 4 Retraction (Not Used)	Back step – Return to previous schedule in “Successive” Cycle mode Sch. Select 4 – Binary value of “four” for externally selecting schedule Retraction – Retract input command for release of valves
PI6	Stepper Reset Sch. Select 8 Edit lock Escape	Stepper reset – Return stepper to “Zero” position Sch. Select 8 – Binary value of “eight” for externally selecting schedule Edit lock – closed = control locked; open = control unlocked Escape – command to escape current weld schedule/sequence
PO1	Any Error Retraction Force Error Major Error	Any Error – Major or minor error is detected Retract Output – Command to retract (in addition to programmed valves) Force Error – Pressure switch is not detecting proper electrode force Major Error – Major error detected; determined by “Error Map” settings
PO2	AVC Error Contactor Error Step End EOS	AVC Error – Automated Voltage Compensation is insufficient Contactor Error – Energy is being shunted; (typically set to trip a breaker) Step End – Programmable step has completed its count EOS – 0.5sec signal at the end of each weld sequence
PO3	Current Error Any Error Count end Water Saver	Current Error – Constant Current Control in insufficiently compensating Any Error – Major or minor error is detected Count end – ‘Max part count’ has been reached Water Saver – signal turns off after a set time following the last weld
PO4	Step End Current Error AVC Error Interlock	Step End – Programmable step has completed its count Current Error – Constant Current Control in insufficiently compensating AVC Error – Automated Voltage Compensation is insufficient Interlock – “Request to weld” signal from external source; used with PI4



# Error List

#	Name
1	Config error
2	Calibration error
3	Schedule error
4	Use Schedule error
5	
6	Counter error
7	Stepper error
8	I/O Map error
9	E-stop error
10	TC1 error
11	P1-No weld
12	PS1 error
13	SCR short
14	2nd stage error
15	TT1 error
16	Interlock error
17	
18	
19	High current1
20	Low current1
21	High current2
22	Low current2
23	High voltage
24	Low voltage
25	Counter end
26	Stepper end
27	High PW1
28	Low PW1
29	High PW2
30	Low PW2
31	Tip dress pre-warn
32	AVC error

#	Name
33	Starts/Retract @ RST
34	SYNC error
35	PNW error
36	DC Safety relay err.
37	AC Safety relay err.
38	
39	
40	
41	
42	
43	Pre-high current1
44	Pre-low current1
45	Pre-high current2
46	Pre-low current2
47	
48	
49	
50	
51	
52	
53	
54	
55	
56	
57	Retract open error
58	
59	Retract input closed
60	PS not ready
61	Retract not ready
62	2nd stage not ready
63	
64	Interlock not ready

Note: All error defaults are set to “Minor errors”. Error handling should be set under the configurations menu and by utilizing the “Any Error”, “Contactor Error”, and “Major Error” options available for the programmable outputs in the I/O Map.

# Warranty and Service Policy

**ENTRON takes great pride in offering its customers a quality product that is built to withstand numerous industrial conditions. The products are built to last, and in return for customer loyalty, we offer a limited warranty on all new control panels.**

ENTRON Controls, LLC., warrants that all ENTRON control panels except Mid-frequency Inverter controls, silicon controlled rectifiers (SCRs), insulated gate bipolar transistors (IGBTs), SCR and IGBT assemblies, circuit breakers, and electro-mechanical contactors, are free of manufacturing defects for a period of **TWO YEARS** from the date of original purchase and, in the event of a manufacturing defect, ENTRON will repair or replace, at its discretion, the defective part without any cost for parts or labor.

All SCRs, IGBTs, SCR and IGBT assemblies, circuit breakers, and electro-mechanical contactors in ENTRON control panels are covered by a **limited warranty from the original manufacturer**. If these parts fail because of a manufacturing defect, they will not be repaired or replaced by ENTRON, but will be returned by ENTRON to the original manufacturer in accordance with said manufacturer's warranty.

ENTRON Controls, LLC., warrants that all Mid-frequency Inverter controls are free of manufacturing defects for a period of **ONE YEAR** from the date of original purchase and, in the event of a manufacturing defect, ENTRON will repair or replace, at its discretion, the defective part without any cost for parts or labor.

To obtain repairs or replacement parts under this warranty, the defective part must be returned, prepaid, to ENTRON Controls, LLC., 1402 S. Batesville Road, Greer, South Carolina 29650. Please send your repair to the attention of "Service" with a description of the problem you are experiencing, contact person and phone number.

**EXCLUSIONS: This warranty does not cover damage by accident or misuse, unauthorized repair or modification to any control assembly by the customer.**

The warranty period is considered from date of shipment and is tracked by ENTRON's serial numbering system.

**USE OF OUT OF WARRANTY REPAIR SERVICE:** To obtain service for any printed circuit board assembly or welding control after the warranty period, send the assembly or control, prepaid, to ENTRON Controls, LLC., and ENTRON will repair the printed circuit board assembly or control and return it to you without further warranty. Additional service charges will be invoiced at time of shipment.

Thank you for using ENTRON Controls.

Your ENTRON Controls, LLC., Original Equipment Manufacturers (OEMs), Dealers and Distributors are your first response contact to secure technical assistance on control or welding problems. Should they be unable to assist you, please contact your ENTRON sales representative or the factory directly. Contact the factory at 864-416-0190.