DIRECTION BOOK

SOLUTIONi

POWERFULLY **INTUITIVE**

SOLUTION*i* Specification Chart

FUNCTION	DESCRIPTION	RANGE
Weld Programs	Each program is a complete RWMA Schedule including **Forge Delay**, **Pulsation**, and **Special Sequences** for welding galvanized steel and other coated metals.	800 Customer Set 100 RWMA Preset
Display	Bright blue vacuum fluorescent, full alpha/numeric.	80 Characters
Welds Counter	Keeps track of welds made.	1-65,500
Parts Counter	Keeps track of finished parts made.	1-65,500
Batch Counter	Stops welder when batch is completed.	1-999
Master Setup Program	Quick setup of system programs using **Wizard Tutorial.**	-
AVC	Automatic line voltage compensation. Maintains welder output with variations of incoming line voltage.	1% Max. Variation with +/-10% Line Voltage Change
Keyboard Lock	Prevents unauthorized changes in welding schedules or setup values.	3 Security Levels
Heat Stepper	Computerized curve for welding galvanized steel. Just enter total welds and last heat % increase.	999 Welds
Tip Force Calculator	Displays required pressure regulator setting needed to produce requested electrode force.	0-99 psi
Line Service	Single selector wire to match line voltage. Keypad entry for line frequency.	115V - 575V 50/60Hz
Dual Program	Assigns any weld schedule to one of two initiation inputs.	-
Initiation Modes	Single level, dual level, anti-tiedown; holding or momentary.	-
Low Water Flow	Input from external water flow switch.	-
Light Curtain	Input for light curtain, factory programmed.	-
Soft Touch Function	Exclusive UNI*TROL* operator pinch point protection safety system. Requires Soft Touch hardware kit.	-
SD Slot	Copy programs, install programs, modify operating system.	-
Anti-tiedown Initiation	Requires closing of two hand switches within 1 second to start weld.	-
Pressure Transducer*	Starts weld when selected electrode force has been reached. Locks electrodes on part at end of weld if force exceeds customer-set limit to prevent cold welds.	0-99 psi
Current Monitor*	Compares RMS current to program high/low range. Locks electrodes closed if out of range.	10KA - 200KA
Constant Current*	Accurately provides program-selected secondary current. Current values are directly entered in amps.	0-200KA +/-1% Range F.S.
Communication Port*	Export of weld results; upload / download schedules.	RS-232 or RS-485
Electronic Pressure Regulator**	Automatically sets pressure regulator to provide program-selected electrode force.	0-99 psi

* included with **SOLUTION*i*QC** controls ** optional feature

UNITROL

UNI*TROL* ELECTRONICS, INC.
Northbrook, Illinois
847-480-0115 / info@unitrol-electronics.com
www.unitrol-electronics.com

RWMA

SOLUTION*i* DIRECTION BOOK

TABLE OF CONTENTS

SECTION A

SOLUTION*i* INSTALLATION

SOLUTION*i* INSTALLATION

Take your time installing this new SOLUTION*i* control. Be sure that all connections are tight and that no chips get into the control

A1. UNPACK: Carefully unpack system and inspect for damage. Report any problems to the factory at once. If damage is obvious from outside of carton, photograph the damage and report to carrier immediately.

A2. LOCATION: Select location for power supply cabinet being sure that the cabinet door will clear all welder components when open. It is usually an advantage to locate this cabinet as close to eye level as possible for easy installation and servicing.

A3. MOUNTING: Select the model number group:

A3.1 FOR 9180i, 9180iD, AND 9180iL, SERIES CONTROLS:

Drill welder to match the four mounting ears mounted to the cabinet. Install cabinet.

A3.2 FOR 9180iM SERIES CONTROLS: Side mounting brackets are supplied with the system.

a. **SIDE MOUNTING**: You can mount the control from the left or right side as desired using the two mounting brackets supplied with this control. Mount these brackets using the screws that presently hold the side panel in place per the photo at the right. Mount cabinet.

b. **BOTTOM MOUNTING**: Alternately, by drilling holes in the four foot pads on bottom of this enclosure, you can mount the control to the top surface of the welder or to a table top.

IT IS IMPORTANT THAT NO METAL CHIPS ENTER ANY OF THE ELECTRONIC COMPONENTS IN THE CABINET! PROTECT POWER SUPPLY AND CONTACTOR DURING THE FOLLOWING DRILLING AND INSTALLATION OPERATIONS. WHEN COMPLETE, REMOVE ALL CHIPS FROM THIS CABINET BEFORE APPLYING POWER.

A4. LINE VOLTAGE CONNECTION:

A4.1 POWER CABLE HOLE: Drill or punch power cable hole either through the back, side or bottom of the cabinet. Drill or punch a second hole to handle the return cable to the welder transformer.

When doing any punching or drilling in the control cabinet, be sure to protect the control components from metal chips. After drilling or punching holes, be sure that all filings are fully removed!

A4.2 INCOMING POWER CONNECTION: **See the hookup diagram in the back of this book A that matches your welding control style**. Bring two line voltage wires into the control from the factory source being sure to use conduit and flexible conduit to match local electrical codes. Consult local codes for proper wire size. Wire should be sized for at least a 50% duty cycle load.

If your control has a built-in circuit breaker, connect the wires to the top terminals marked L1 and L2 on the circuit breaker.

If you control does **not** have built-in circuit breaker, connect one incoming power wire to the terminal on the SCR contactor marked **L1.**

For controls in a **hinged-door** cabinet, connect the second incoming power wire to the terminal block marked **L2.**

For controls with M in the model number (screwed-together enclosure), connect the second power wire directly to one leg of the welding transformer. Include a 16-gage wire from this junction to be brought into the welding control cabinet and connected to the small terminal block marked **L2.**

A good source for selecting the proper wire sized is the RWMA bulletin #16, charts 1.7.15 and 1.7.16 (www.rwma.org). These charts show the recommended wire sizes, fuses sizes, and disconnect switch sizes. Remember that resistance welding transformers require different sizing of these components than regular power transformers.

A5. GROUND WIRE:

Do not operate this resistance welder without a proper ground wire and connection. The ground wire must be a separate wire that comes into the control through the same conduit as the two power wires. Grounding cannot be from a conduit connection.

The ground wire has to be sized to handle a MINIMUM of 50% of the amperage-carrying capacity of the two main power wires coming into this control.

The ground wire must be connected to the ground stud inside this welding control. Look for the stud with the DANGER sign as shown in the photo to the right.

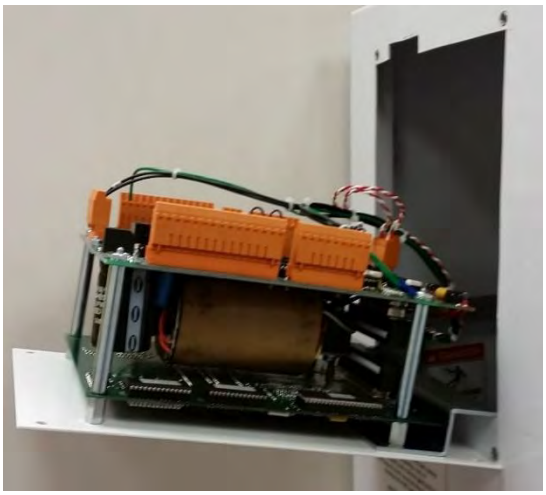
A6. CONNECTION OF CONTROL WIRING:

A6.1 INITIATION AND SOLENOID HOLES: Drill or punch access holes to handle the foot pedal or palm buttons, limit switches, and solenoid valves. These should be at a convenient location in the bottom or back of the cabinet. Install liquid tight or approved cable through appropriate box connectors.

When doing any punching or drilling in the control cabinet, be sure to protect the control components from metal chips. After drilling or punching holes, be sure that all filings are fully removed!

A6.2 WIRING 9180iM, 9180iL, and 9180iD series CONTROLS:

Remove the four outer screws on the control face plate. Lift the white faceplate up slightly and carefully rotate the front panel from the top to expose the wiring terminals. A bracket is provided to prevent the panel from going more than 90^0 as shown in the photo to the right. Connect wires in this position. This will make wire installation easier, and be sure that the panel will be able to rotate outward in the future should service be required.



A6.3 CONNECTION FOR ALL CONTROLS:

Connect foot pedal, palm buttons, or machine contacts per HOOK-UP DIAGRAM in the back of this book A.

a. If limit switch, pressure switch, and/or transformer thermostat is used, connect per HOOK-UP DIAGRAM. If switches are PNP solid-state, check the appropriate section on the HOOK-UP DIAGRAM.

b. If you are connecting two hand buttons for anti-tiedown initiation, there are two choices:

   i. Both of the switches have to have two NORMALLY OPEN contacts and are wired per the HOOKUP-DIAGRAM.

   ii. If your switches do **NOT** have two NORMALLY OPEN contacts, connect them to a Unitrol part #9181-56 ANTI-TIEDOWN INTERFACE. If this board was not ordered with this control it can be easily field installed for this purpose.

c. If any of these are **not** being used, install jumpers as shown on the HOOK-UP DIAGRAM. These jumpers are normally installed at the factory.

A7. SCR CONTACTOR OVERTEMPERATURE SWITCH:

This surface thermostat switch has been factory installed. It will open if the temperature of the cooling block on the SCR contactor exceeds the switch setting. At that time the control will display:

No operation of the control is possible until this switch input has been closed.

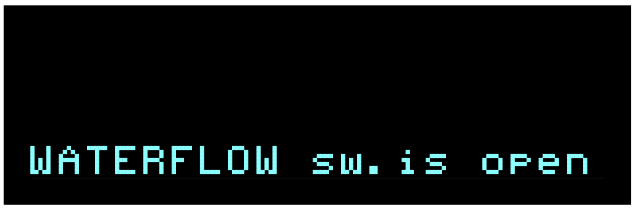
A8. TRANSFORMER OVERTEMPERATURE SWITCH: If your welder transformer has a thermostat that **opens** on temperature rise, remove the factory jumper and connect it to terminals #3 and #4. Before connecting, be sure that the contact is CLOSED. Some of these switches are used for turning on cooling water solenoid valves and close on temperature rise.

When this input is opened, the display will show:

No operation of the control is possible until this switch input has been closed.

A9. LOW WATER FLOW SWITCH: If you have a WATER FLOW switch that opens a contact when water flow is low, connect this switch to terminals #13 and #14 (RT1 – RTC). Then assign **RT1** this input to operate as a **WATER FLOW SWITCH** by pressing:

and pressing **5** as directed. When the weld is started, if this input is open, the display will flash:



No operation of the control is possible until this switch input has been closed.

A10. WATER TO SCR CONTACTOR: If your control has a WATER-COOLED SCR CONTACTOR, connect water hoses to the ¼" NPT fittings. Direction (in/out) is not important as long as this control does **not** have a built-in WATER FLOW safety switch. If it **does** have a WATER FLOW safety switch, observe the IN and OUT labels on the water ports.

SOLUTION*i* INSTALLATION

BE SURE THAT THE PIPE FITTING THAT YOU THREAD INTO THESE PORTS IS NON-METALLIC. IT CAN BE PVC OR NYLON. ANY METALLIC FITTING (GALVANIZED, BRASS, ETC.) PUT INTO THESE PORTS CAN EVENTUALLY CAUSE A HOLE IN THE WATER-COOLED JACKET THAT WILL FLOOD THE CONTROL WITH WATER AND DESTROY THE SYSTEM. WARRANTY IS VOID IF METALLIC FITTINGS ARE INSTALLED IN THESE PORTS!

SKIP If your control does NOT have a remote console as shown in the photo below, skip to A12.

A11. MOUNTING THE REMOTE CONSOLE:

A11.1 LOCATION: Select a location on the welder to mount the remote console. Ideally this should be at eye level and close enough for easy data input on the keypad.

A11.2 BRACKET: Bolt the U bracket supplied with the console to a secure surface on the welder and mount the console with the two ¼" thumb screws supplied. Be sure that the location allows the console to swing both ways.

U bracket mounted to console. Notice that the top of the bracket has the threaded insert.

A11.3 PLUG IN CONSOLE: Plug the cable into the socket at the back of the remote. HAND tighten the two jack screws.

DO NOT TIGHTEN THESE SCREWS WITH A SCREWDRIVER OR PLIERS. EXCESS FORCE WILL BREAK THE SOCKET FASTENER AND VOID THE WARRANTY!

A11.4 ROUTE CABLE: Route this remote console cable to the power supply cabinet and push the excess cable into the large compression fitting supplied on the cabinet top. Be sure that there is enough of a loop at the console to allow full movement of the console. Tighten strain relief fitting.

SOLUTION*i* INSTALLATION

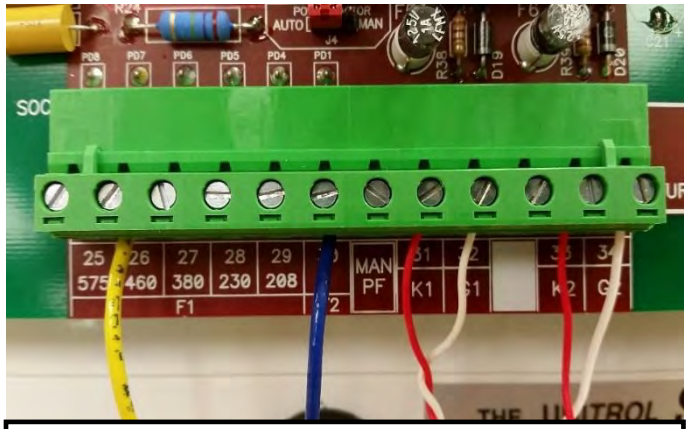
A11.5 CLOSING UP: Secure all wires inside power supply cabinet and check to be sure that connections are made correctly and that no loose strands of wire are at any terminal point. If you have rotated the control out of the enclosure earlier, carefully rotate it back and secure with the original four screws.

A12. LINE VOLTAGE SELECTION: If your line voltage was known to Unitrol when this control was manufactured, it was factory connected to match that voltage.

BEFORE TURNING POWER ON, verify that this was done correctly. Check to see if the YELLOW wire on power supply terminal is connected to a terminal that most closely matches your line voltage. See photos below for your type of welding control.

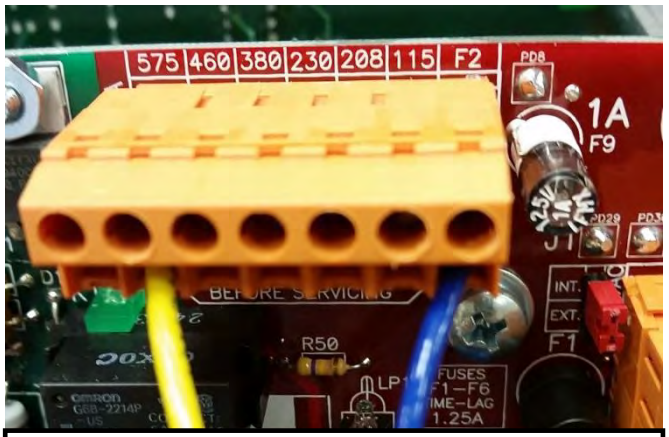
Note: Controls shipped to Canada have two black wires connected to the voltage input terminals. One will be marked F2. This goes to the F2 terminal.

IF THE ACTUAL LINE VOLTAGE IS MORE THAN 20% HIGHER THAN THE TERMINAL MARKING, PERMANENT DAMAGE CAN OCCUR TO THE SYSTEM. DAMAGE CAUSED BY OVERVOLTAGE IS NOT COVERED BY WARRANTY.



CONTROLS WITH REMOTE CONSOLE

EXAMPLE IN THIS PHOTO IS SET FOR 460V.



CONTROLS ALL IN ONE ENCLOSURE

EXAMPLE IN THIS PHOTO IS SET FOR 460V.

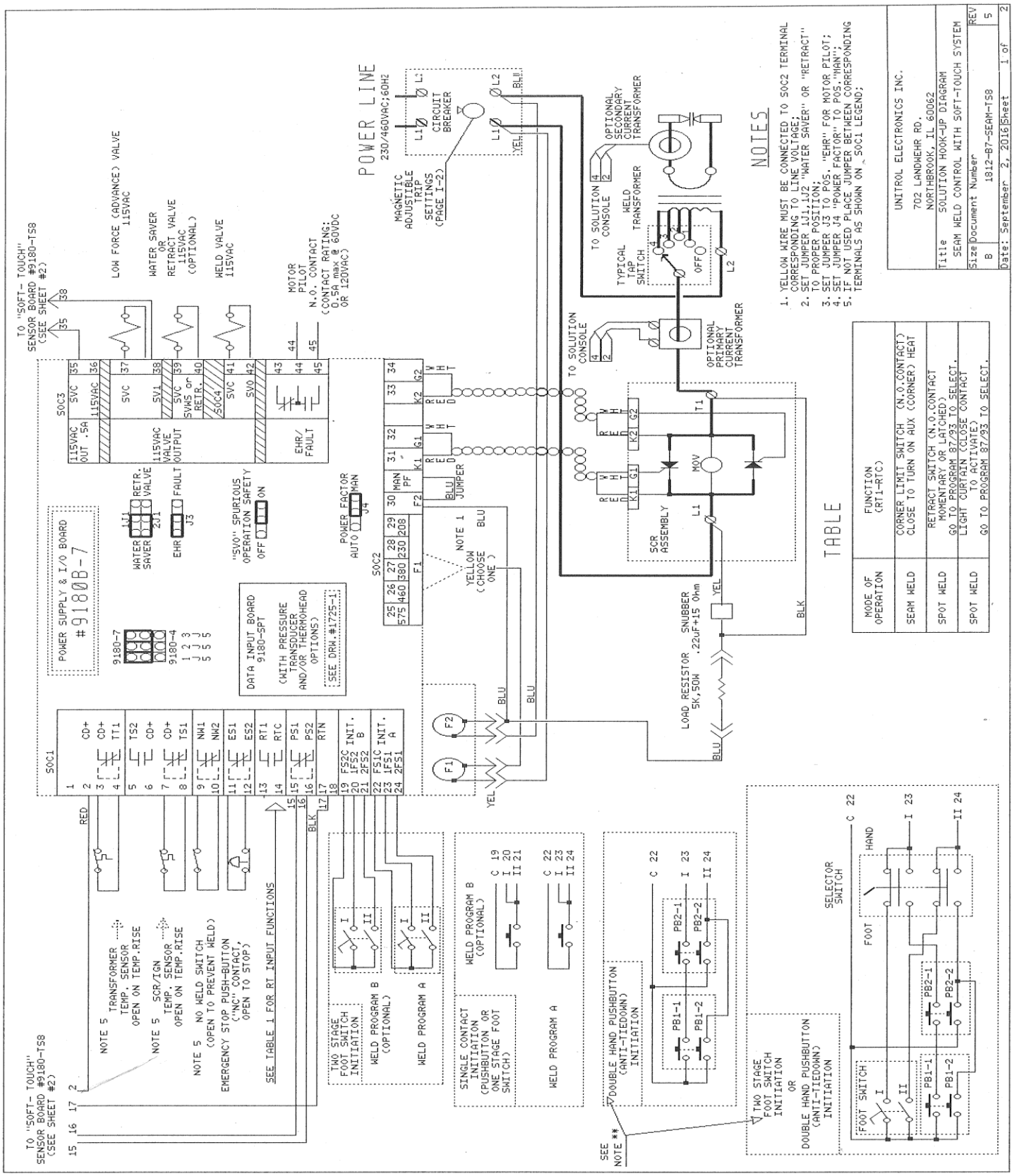
For **400V – 412V** line voltages, set the yellow wire on the **380V** terminal.

SUPPORT: If you have any doubts when installing this control, contact UNITROL technical support 9:00 – 5:00 central time, M-F. We want to be sure that your installation goes smoothly!

By phone: 847-480-0115 **By Email**: support@unitrol-electronics.com

HOOK-UP DRAWINGS

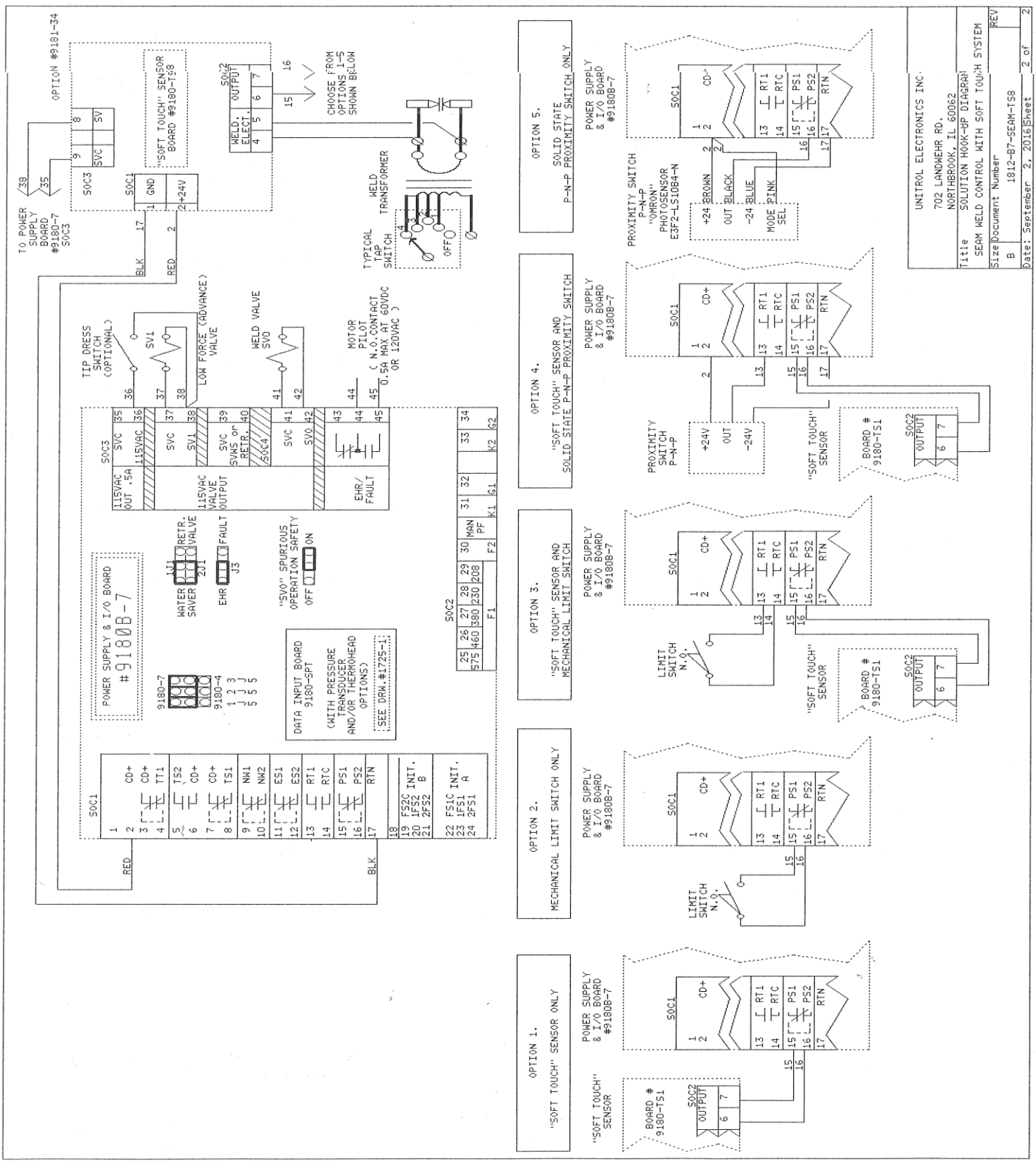
FOR CONTROLS WITH REMOTE CONSOLES, PAGE 1 OF 2.



SECTION A, PAGE 8

HOOK-UP DRAWINGS

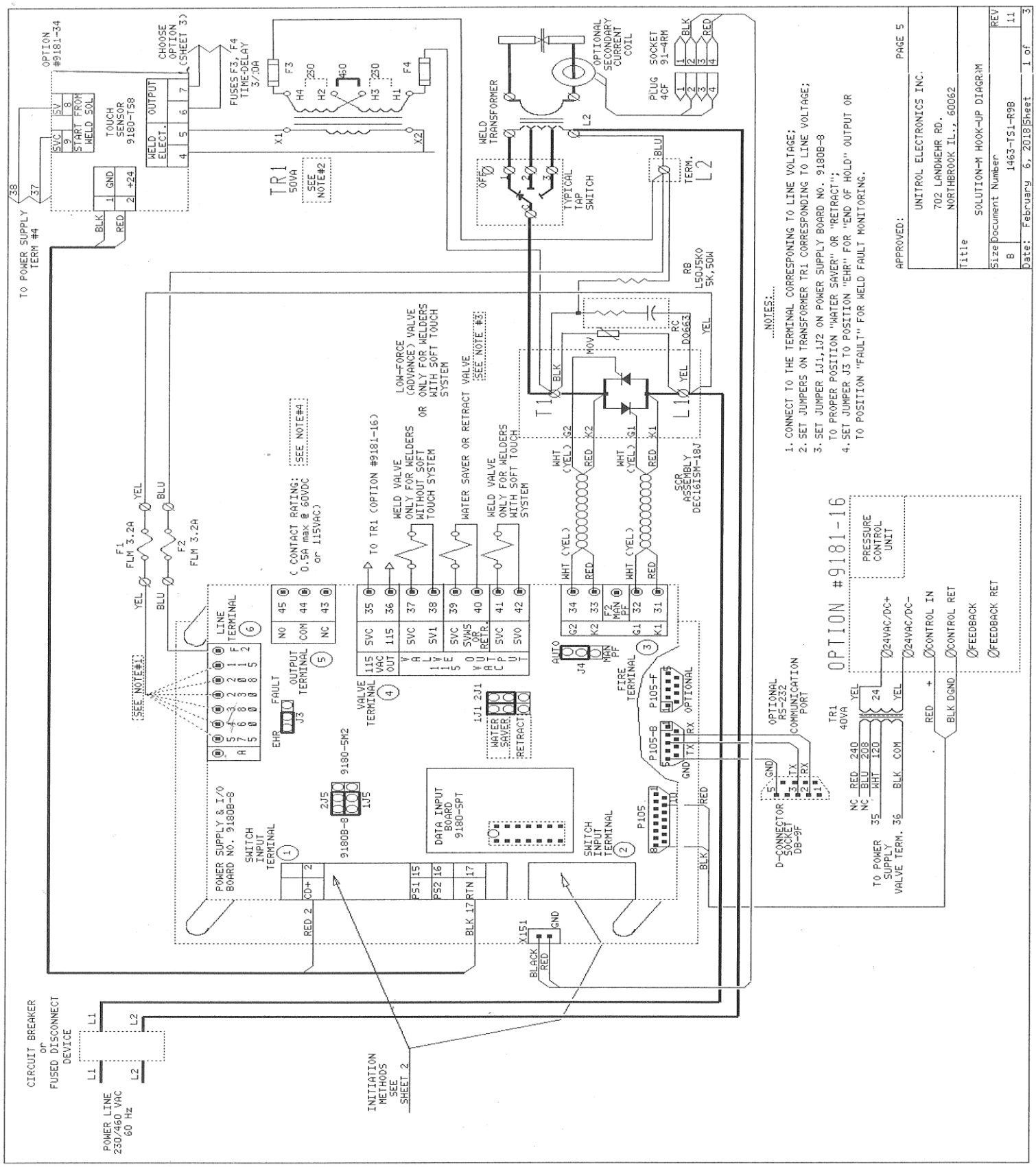
FOR CONTROLS WITH REMOTE CONSOLES, PAGE 2 OF 2.



SECTION A, PAGE 9

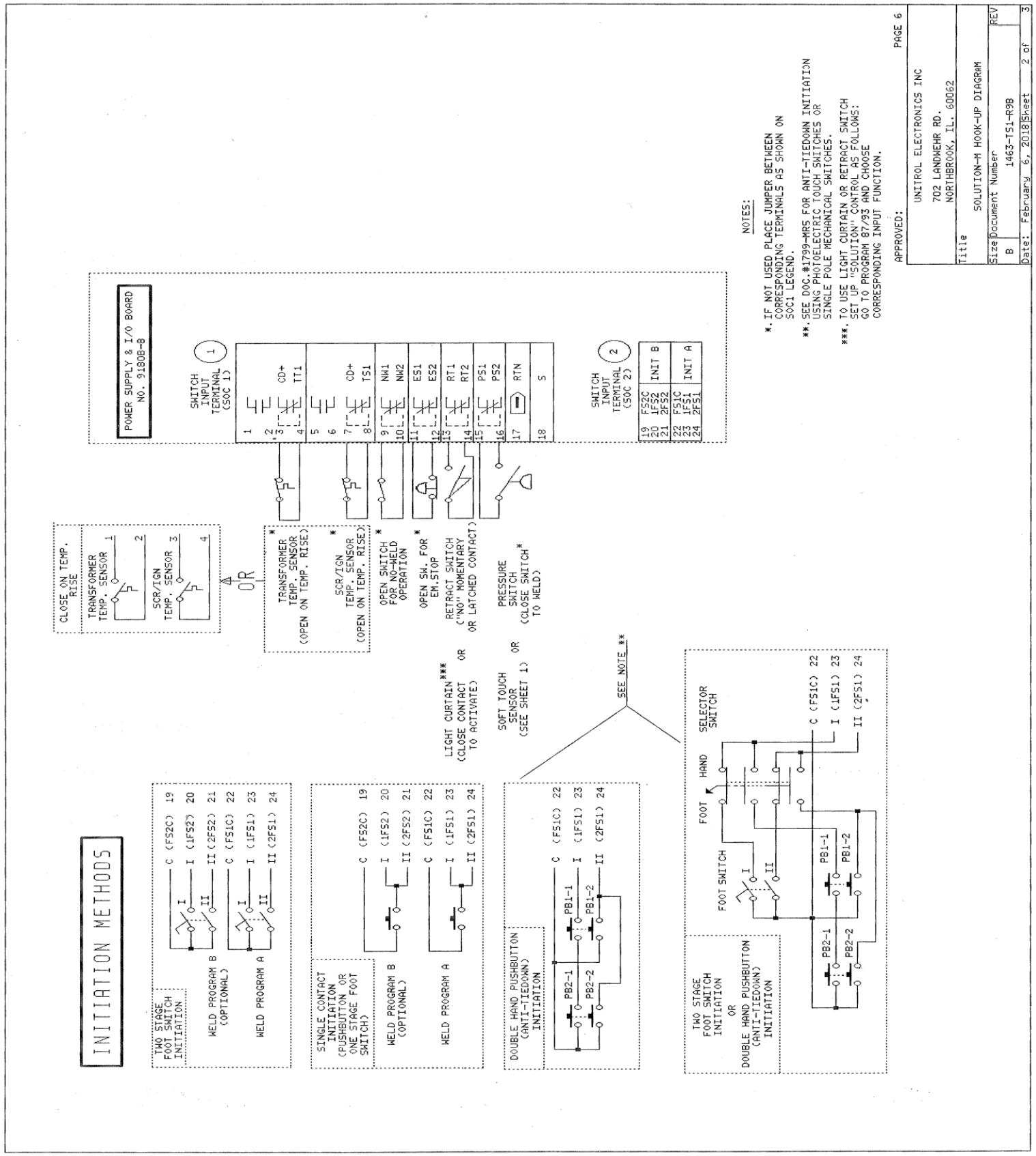
HOOK-UP DRAWINGS

FOR CONTROLS WITH ALL COMPONENTS IN ONE CABINET, PAGE 1 OF 3.



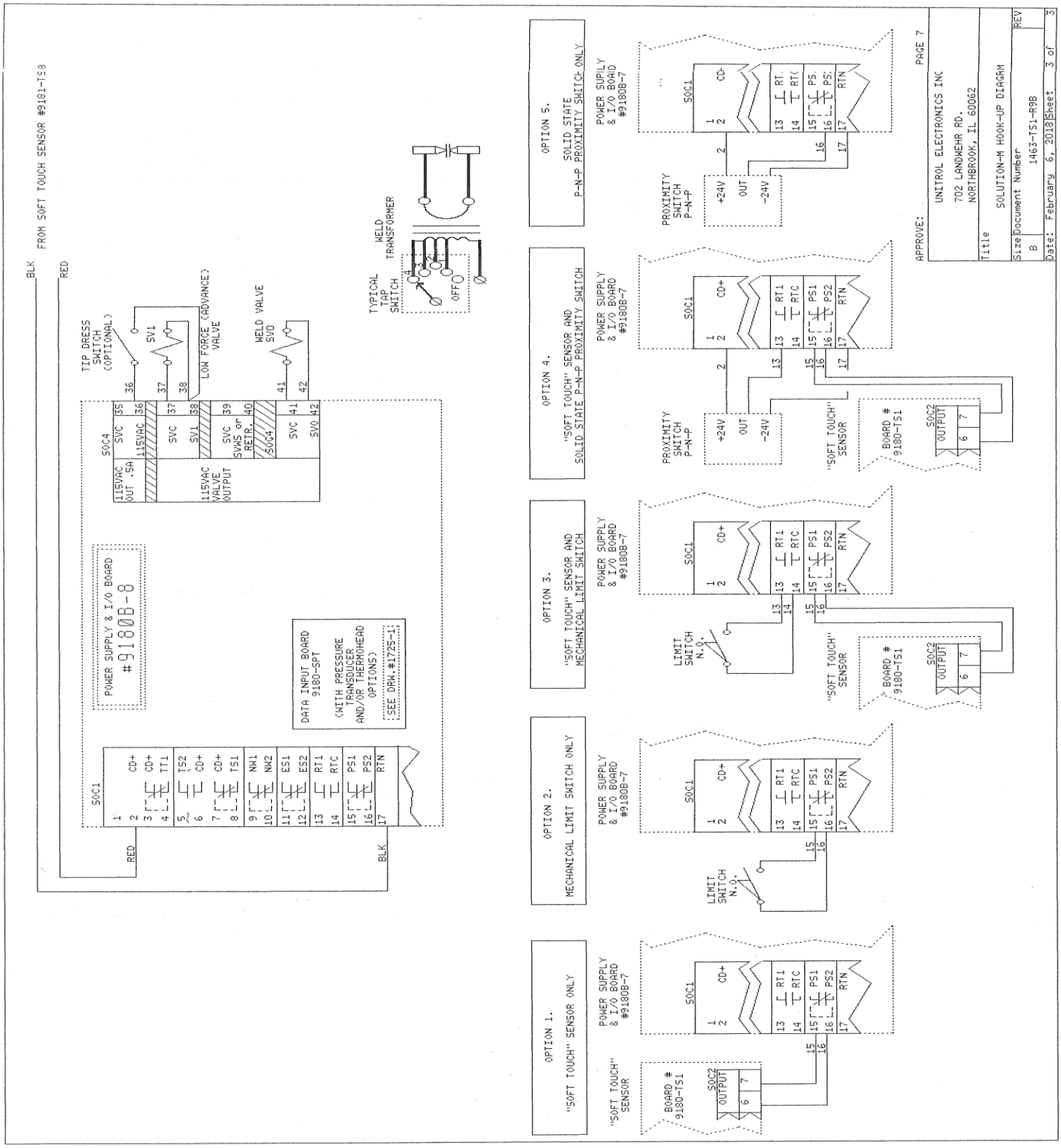
HOOK-UP DRAWINGS

FOR CONTROLS WITH ALL COMPONENTS IN ONE CABINET, PAGE 2 OF 3.



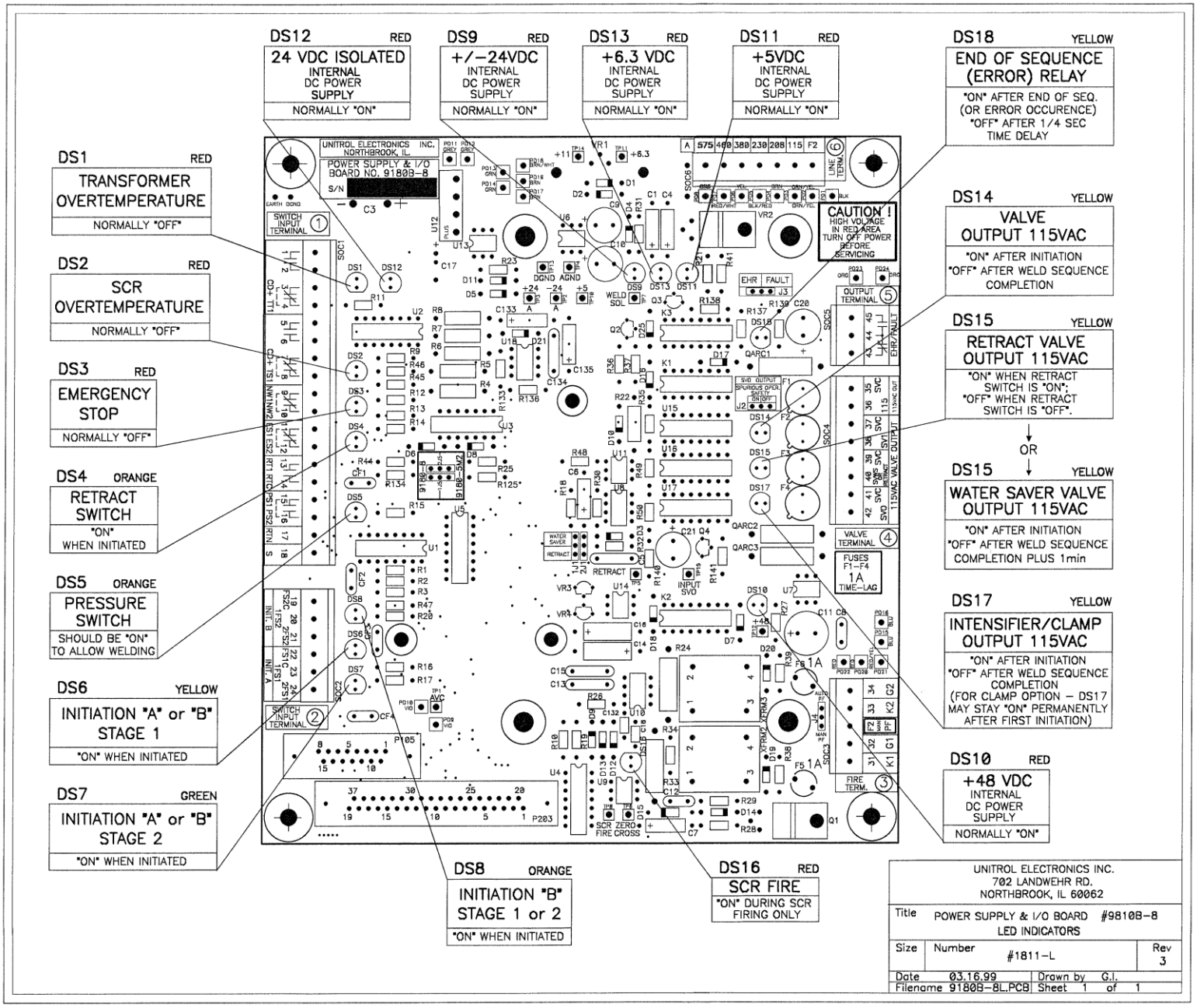
HOOK-UP DRAWINGS

FOR CONTROLS WITH ALL COMPONENTS IN ONE CABINET, PAGE 3 OF 3.



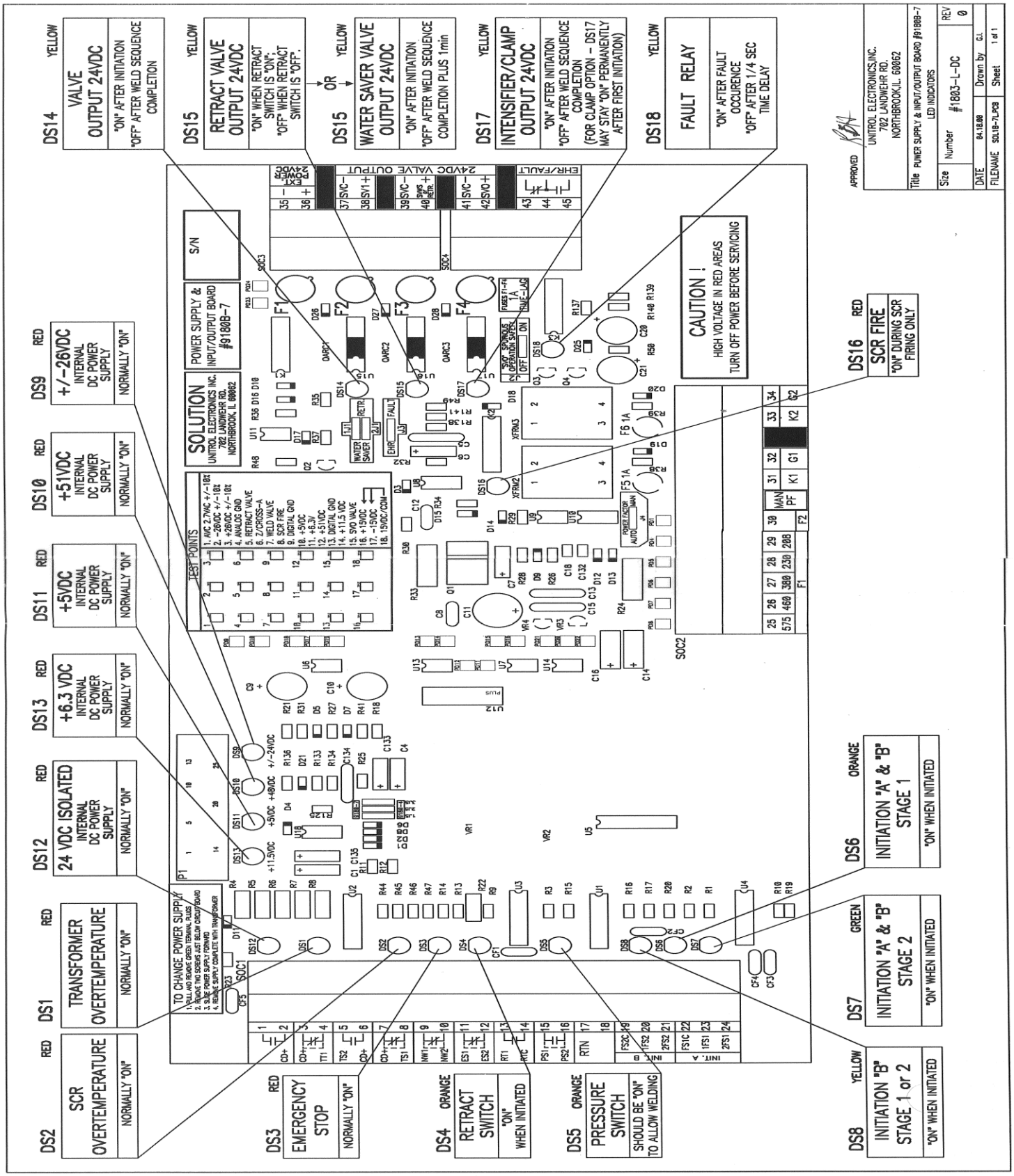
TROUBLE SHOOTING DRAWINGS

LED TROUBLE SHOOTING DRAWING, ALL IN ONE CABINET CONTROLS



TROUBLE SHOOTING DRAWINGS

LED TROUBLE SHOOTING DRAWING, CONTROLS WITH REMOTE CONSOLES



Unitrol Electronics, Inc.
702 Landwehr Road
Northbrook, IL. 60062
WEB: unitrol-electronics.com
Email: techsupport@unitrol-electronics.com

SECTION B

HELLO, I'M YOUR NEW SOLUTION*i*
INTUITIVE WELDING CONTROL

in·tui·tive (in tū'i tiv) ***adj.***
1. Using or based on what one feels to be true even without conscious reasoning; instinctive.
2. Easy to use and understand.

Welcome to the **SOLUTION*i*** resistance welding control. The "*i*" in the name stands for **INTUITIVE.** This direction book will walk you through steps to set up the control for the first time. After that, you should be able to do most things on the control without looking at a direction book.

The display will ask questions and then tell you what to do for the next step or operation. It "thinks" like you do! It is ***INTUITIVE.***

A unique MASTER SETUP PROGRAM button on the keypad can be used to reach all setup programs without having to remember program locations.

FAULTS: When a fault condition occurs, the **SOLUTION*i*** control will tell you what to do next. You don't need any codes or printed sheets to get you back into production!

Whenever you see  pay extra attention to the idea shown.

This symbol will tell you that you should skip this section if the directions do not apply to your model control.

NEED HELP? Contact the Unitrol technical support team Monday through Friday between 9:00am and 5:00pm CT. As with all Unitrol products, we provide **free** technical support for the life of your **SOLUTION*i*** control. **Please have your model and serial numbers ready and, if possible make your call when you are standing at the welder.**

Email support: techsupport@unitrol-electronics.com
Phone support: 847-480-0115
FAX support: 847-480-0932

Unitrol Electronics, Inc.
702 Landwehr Road
Northbrook, Illinois 60062
www.unitrol-electronics.com

FIRST TIME CONTROL SETUP

Do the following steps to set up your **SOLUTION*i*** control when it is first installed in your factory **even if it was shipped mounted on a tested welder**. Changes need to be made to match your factory's power system. This will also be a check to make sure that it was set up properly.

Let's get started

Use the MASTER SETUP PROGRAM button to make changes in all of the SOLUTION*i* control control's setup programs. Since this section is for SETUP purposes only, descriptions of functions will be covered later in the **USE** section of this direction book.

B1. Press: MASTER SETUP PROGRAM The display will show:

```
UNITROL SOLUTIONi
MASTER SETUP PROGRAM
Select=YES, Skip=NO
Exit =SINGLE,NW,RUN
```

As prompted in the display above:

- Pushing YES will let you use **that** setup program.
- Pushing NO will skip **that** setup program and go to the **next** setup program.
- Pushing SINGLE, NO WELD or RUN REPEAT will exit out of the MASTER SETUP PROGRAM
- And if you went too far, pushing BACK will go back to the previous screen.

Push MASTER SETUP PROGRAM or wait about 10 seconds.

The display will now show:

```
900-Enter ALLOY
and GAUGE to select
 RWMA weld schedule
SELECT=YES, SKIP=NO
```

This program will be used during production as described in the USE section of this direction book.

FIRST TIME CONTROL SETUP

B2. SETTING TIP FORCE SYSTEM

Press: NO **6 times.** The display will show:

```
979-SETUP for TIP
FORCE CALCULATOR and
 TIP FORCE WINDOW.
SELECT=YES, SKIP=NO
```

YOU CAN ALWAYS GO DIRECTLY TO ANY SET-UP PROGRAM

Notice that there is a number **979** at the start of this display. That is the **direct access number** for this particular setup program.

For example, you can go directly to this program by pressing:

PROGRAM | 9 | 7 | 9 | STEP / ENTER

If the number shown has a / (example: **987/71**), press:

PROGRAM | 9 | 8 | 7 | STEP / ENTER | 7 | 1

Also, if you have worked with **SOLUTION** controls in the past, the basic setup programs for SOLUTION*i* are the same but with the number **9** added in the front.

B3 PRESSURE VARIATION.

Press: YES The display will show:

```
Maximum AIR PRESSURE
VARIATION= +/-00 PSI
After entering data
     Press YES
```

If the 9181-05C DIFFERENTIAL PRESSURE TRANSDUCER option is installed in this control, this number is the maximum change above or below the air pressure target that will be allowed before a fault is displayed. If you leave it at **00,** no fault will be shown.

For a typical welder, press: 0 | 3 - | YES

B4. CYLINDER AREA

Press: YES and the display will show:

```
Area of CYLINDER is
 00.0 SQUARE INCHES.
After entering data
     Press YES
```

FIRST TIME CONTROL SETUP

Use the following sections to identify your type of welder air cylinder and calculate the area (SQUARE INCHES) to be entered.

SINGLE PISTON AIR CYLINDER

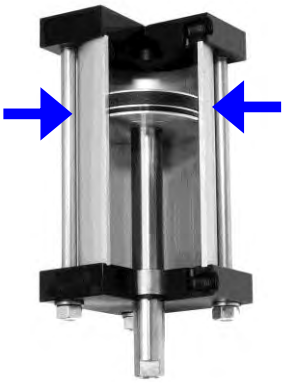
B4.1 AREA OF SINGLE-PISTON CYLINDERS:

If your welder has a **single piston** air cylinder, the **AREA of CYLINDER** can be found on the chart below.

AIR CYLINDER INSIDE DIAMETER (INCHES)	AREA of CYLINDER (SQUARE INCHES)
2	3.1
2-1/2	4.9
3	7.1
3-1/2	9.6
4	12.6
4-1/4	15.9
5	19.6
5-1/2	23.7
6	28.3
8	50.1
10	78.5
12	113.5*

TYPICAL ROCKER ARM WELDER WITH A STANDARD SINGLE-PISTON AIR CYLINDER BEHIND WELDER

TYPICAL PRESS WELDER WITH A STANDARD SINGLE-PISTON AIR CYLINDER ON TOP OF WELDER



* For cylinders over 99.9 in^2, change the range as shown on the next page.

For non-standard diameters or metric cylinders, this value can be calculated as:

AREA of CYLINDER = .785 X INSIDE DIAMETER X INSIDE DIAMETER

Example: For a 4” inside diameter cylinder:

AREA = .785 X 4” X 4” = .785 (16”) = 12.56 square in.

To estimate the INSIDE DIAMETER of a single piston cylinder, subtract 1/8” from the OUTSIDE DIAMETER of the cylinder body and round. Typical U.S. manufacturers use diameters in ½” increments (3”, 3-1/2”, 4”, 4-1/2”, 5”, etc.).

SKIP — **For welders with a CYLINDER AREA *less* than 99.9 square inches, skip to B5.**

FIRST TIME CONTROL SETUP

B4.2 CYLINDERS OVER 99.9in^2

***For cylinders over 99.9 square inches, exit out of this set up program by pressing:** SINGLE

Then press: 9 8 7 STEP/ENTER 9 + 1

The display will show:

```
CYLINDER AREA RANGE
Is 0-99.9 SQUARE IN.
Want to change? PUSH
The YES or NO button
```

Press: YES and the display will show:

```
CYLINDER AREA RANGE
Is 0-999 SQUARE IN.
Want to change? PUSH
The YES or NO button
```

And then it will return to:

```
PROGRAM NUMBER ___
```

To get back to the setup previous setup program press: MASTER SETUP PROGRAM **7 times.**

The display will show:

```
979-SETUP for TIP
FORCE CALCULATOR and
 TIP FORCE WINDOW.
SELECT=YES, SKIP=NO
```

Press YES one time and then press NO one time.

The display will show:

```
  Area of CYLINDER
 000 SQUARE INCHES.
After entering data
     Press YES
```

FIRST TIME CONTROL SETUP

B5. IDENTIFYING TYPE OF WELDER

Identify your type of welder and follow the directions on the following pages to enter the proper number for AREA of CYLINDER.

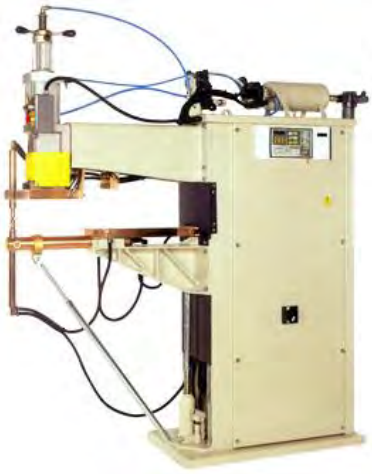
B5.1 PRESS and PROJECTION WELDERS, SINGLE PISTON CYLINDER

These welders use a **single-piston** air cylinder to directly push the electrodes closed.

TYPICAL PRESS WELDER WITH A STANDARD SINGLE-PISTON AIR CYLINDER ON TOP OF WELDER

TYPICAL PROJECTION WELDER WITH A STANDARD SINGLE-PISTON AIR CYLINDER ON TOP OF WELDER

TYPICAL PRESS WELDER WITH A STANDARD SINGLE-PISTON AIR CYLINDER ON TOP OF WELDER. THIS WELDER ALSO HAS A RETRACT FEATURE



TYPICAL PROJECTION WELDER WITH A STANDARD SINGLE-PISTON AIR CYLINDER ON TOP OF WELDER. THIS WELDER ALSO HAS A RETRACT FEATURE

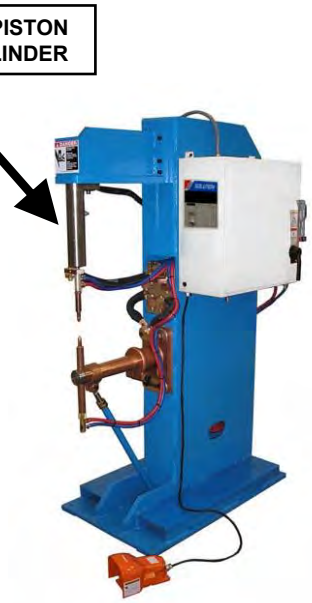
For these types of welders, enter the **AREA of CYLINDER** as listed in the **SINGLE PISTON** table in section B4.1 into PROGRAM 979.

TYPICAL SEAM PRESS WELDER WITH A STANDARD SINGLE-PISTON AIR CYLINDER ON TOP OF WELDER

B5.2 MULTI-PISTON AIR CYLINDER WELDER:

If your welder uses a cylinder that has two or three internal pistons (SavAir, ACP, Grossel, etc.), the effective cylinder area is usually part of the model number that is stamped on the cylinder body.

Enter this number as the **AREA of CYLINDER in PROGRAM 979.**



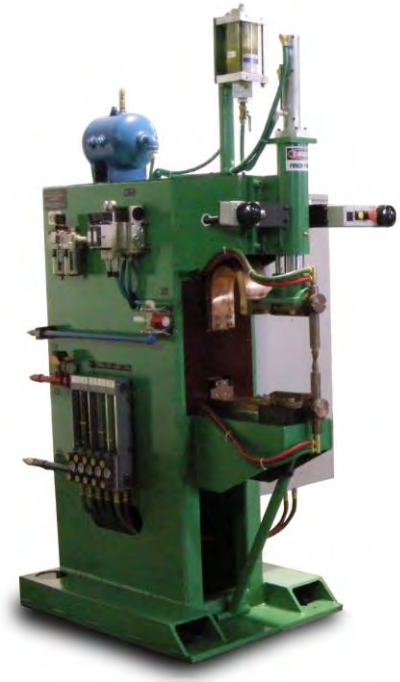
TYPICAL WELDER WITH A MULTI-PISTON AIR CYLINDER

BRAND	TYPICAL MODEL NUMBER	Effective AREA of CYLINDER (square inches)	ENTER THIS NUMBER IN PROGRAM 979
SAVAIR	C-G-584-6N	5.84	5.9
ACP	AC-C-G-937	9.37	9.4
GROSSEL	2-GA-1157-1.5	11.57	11.6
MILCO/TG	TG-CG-1143-8N	11.43	11.4

If your brand cylinder is **not** shown, consult the manufacturer or distributor to find the correct **effective area** of the cylinder.

B5.3 INTENSIFIER CYLINDER WELDERS:

The cylinders on this type of welder look similar to the **MULTI-PISTON** air cylinder welders, but include a separate oil reservoir to feed hydraulic fluid into the welder cylinder.



If your welder uses an OHMA brand intensifier-type cylinder, the effective area is the **third and fourth** digit:

TYPICAL OHMA MODEL NUMBER	Effective AREA of CYLINDER (square inches)	ENTER THIS NUMBER IN PROGRAM 979
8832-RH-.10-12A	32	32

Enter this number as the **AREA of CYLINDER in PROGRAM 979.**

If you have another brand of **intensifier** cylinder, consult the manufacturer or distributor to find the correct **effective** area of the cylinder.

B5.4 ROCKER ARM WELDERS:

Rocker Arm welders take the force from the air cylinder at the rear of the welder and multiply this force by the leverage of the welder's rocker arm system.

In the picture to the right, the calculation would be:

ELECTRODE FORCE = CYLINDER AREA X AIR PRESSURE X (A/B)

The **CYLINDER AREA** is the number as listed in the **SINGLE PISTON** table at section B4.1.

EXAMPLE: The electrode force of a rocker arm welder with a 6" single-piston air cylinder (28.3 in^2) where A=18", B = 24", and the air pressure is 65psi would be calculated as:

ELECTRODE FORCE = 28.3 X 65 X (18/24) = 1380 POUNDS

The SOLUTION*i* has a system to calculate the electrode force after the leverage of the welder is entered in section B9.

SKIP **Skip to B9.**

B5.5 TRANSGUNS AND HANGING PORTABLE GUNS:

Consult the specifications sheets or manufacturer of these types of welders to find the proper number that represents the “effective area” of the welder.

TYPICAL **TRANSGUN WELDERS**
WELDING TRANSFORMER IS BUILT INTO THE WELDING GUN.

TYPICAL **HANGING PORTABLE GUN**.
USES A HEAVY “KICKLESS” CABLE AND AN OVERHEAD WELDING TRANSFORMER.

If the specification shows the **TIP FORCE** at a particular **AIR PRESSURE**, then the effective AREA of CYLINDER that will be entered is calculated as:

Effective AREA of CYLINDER = TIP FORCE / AIR PRESSURE

EXAMPLE: The chart on the welding gun specification sheet shows:

688 pounds at 80psi.

The calculation will be: effective **AREA of CYLINDER = 688/80 = 8.6**

Enter this number as the **AREA of CYLINDER in PROGRAM 979.**

If the specification sheet for the welding gun has values in metric, convert the numbers first to inches and psi. Then do the calculation.

B6. ENTERING THE CYLINDER AREA:

After entering the air cylinder area into the display:

```
Area of CYLINDER is
 00.0 SQUARE INCHES
After entering data
     Press YES
```

Push YES The display will now show:

```
  For FORGE DELAY:
BACKUP PRES.= 00 PSI
After entering data
     Press YES
```

B7. FORGE DELAY: This is a fairly **uncommon** function on welders. But if your welder has an **extra solenoid valve** and **pressure regulator** for **BACKUP** (sometimes called **BUCKING) PRESSURE**, enter the air pressure that you will set on that pressure regulator. A typical value is 20psi.

But be sure that whatever you enter into this display for **BACK-UP PRES.** will match what you **set** on the BACK-UP pressure regulator on the welder. Otherwise all of the TIP FORCE calculations will be incorrect.

If you **do not** have this FORGE DELAY system installed on your welder, leave the value at 00.

Press YES and the display will show:

```
HEAD WEIGHT = 000LB

Want to change? PUSH
The YES or NO button
```

SKIP

If you disconnect the air coming into the welder and the electrodes do not close by gravity, press: NO and skip to B8.

B8. HEAD WEIGHT: **If you disconnect the air coming into the welder and the electrode closes by gravity with some force between them, that force, called HEAD WEIGHT, is entered here so that your calculations will be accurate.**

For example, if you need **500** pounds force for a weld and the HEAD WEIGHT is **150** pounds, you will only need **350** pounds of force out of the air cylinder to get the desired **500** pounds between the electrodes.

HEAD WEIGHT can be measured by using a digital hand-held electrode force measuring device. However if this is not available or your hand-held unit does not have any accuracy in the low range, you can use a digital UPS scale. **Put a 14 gage or thicker sheet of steel on top and bottom of the scale to prevent the electrodes from denting the soft steel panels of a typical scale.**

If the welder has a TIP DRESS valve that removes all air from the bottom of the air cylinder, turn on this valve.

If you are installing a control with SOFT TOUCH, you cannot use the SOFT TOUCH **TIP DRESS** switch to close the electrodes for this test. In this case you have to remove all of the air from the welder to measure the HEAD WEIGHT.

If the welder does NOT have a TIP DRESS valve, remove the incoming air pressure going to the welder to allow the electrode to close under gravity.

Enter the measured HEAD WEIGHT value (if any) and press: YES

FIRST TIME CONTROL SETUP

B9. SELECTING THE TYPE OF WELDER

The display will show one of the two displays:

```
This is a PRESS or
 PROJECTION WELDER
Want to change? PUSH
the YES or NO button
```

OR

```
      This is
A ROCKER ARM WELDER
Want to change? PUSH
the YES or NO button
```

Press YES or NO to select your welder type.

If your welder is a TRANSGUN or HANGING PORTABLE GUN (see pictures on page B8), select **PRESS or PROJECTION WELDER**.

B9.1 PRESS WELDER: If you told the SOLUTION*i* that your welder was a **PRESS or PROJECTION WELDER,** the display will show:

```
   TIP FORCE is
##.# times air psi
```

Where ##.# is the number you entered as the **AREA of CYLINDER.** This means that the TIP FORCE between electrodes will be calculated as the air pressure times this number. It will then exit out to the next setup program.

EXAMPLE: If the display showed:

```
   TIP FORCE is
12.6 times air psi
```

and the air pressure regulator is set for 60psi, then the force between electrodes would be:

TIP FORCE = 12.6 X 60 = 756 POUNDS

B9.2 ROCKER ARM WELDER SETUP: If you told the SOLUTION*i* that your welder was a **ROCKER ARM WELDER,** the display will show:

```
CYLINDER to PIVOT
 Distance  00.0in
After entering data
      press YES
```

TYPICAL
ROCKER ARM
WELDER

Enter **DIMENSION A** in the photo to the right. This is the dimension from the center of the pivot pin that connects the air cylinder rod to the back of the rocker arm to the center of the rocker arm pin.

Be sure that the number matches including the decimal.

Press YES and the display will show:

```
Distance from PIVOT
to ELECTRODE = 00.0
After entering data
      press YES
```

Enter **DIMENSION B** in the photo**.** This is the dimension from the center of the rocker arm pin to the centerline of the electrode holder.

Press YES and the display will show:

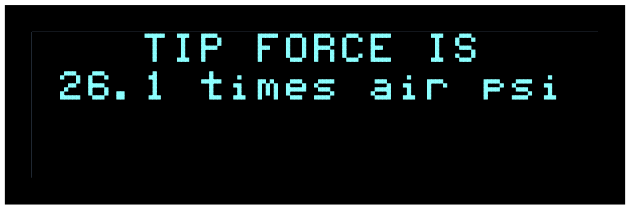
```
    TIP FORCE is
##.# times air psi
```

Where the SOLUTION*i* calculated: **##.# = AREA of CYLINDER X (A/B).**

FIRST TIME CONTROL SETUP

EXAMPLE: Dimension **A = 24”**, and dimension **B = 18**”, and the area of the air cylinder is **19.6in^2**. These numbers would be entered as:

Press YES and the SOLUTION*i* control will show:

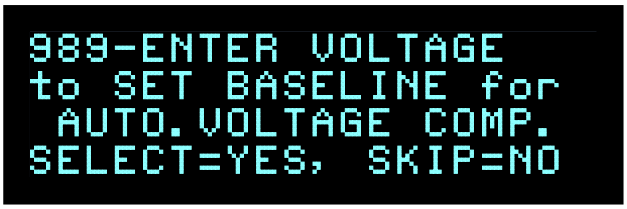


If the air pressure = 50psi, then: **TIP FORCE = 26.1 X 50 = 1,350 POUNDS.**

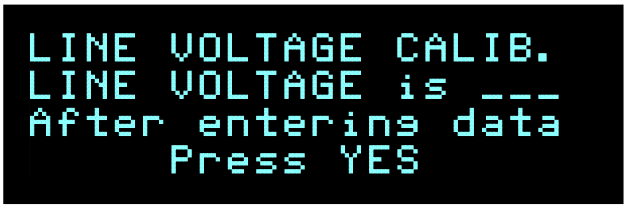
It will then exit out to the next setup program.

B10. SETTING UP Automatic Voltage Compensation (AVC). **This function will maintain the RMS voltage going into the welder transformer within a +/- 1% window for a line voltage variation of +/- 10%.**

Press NO 5 times. The display shows:



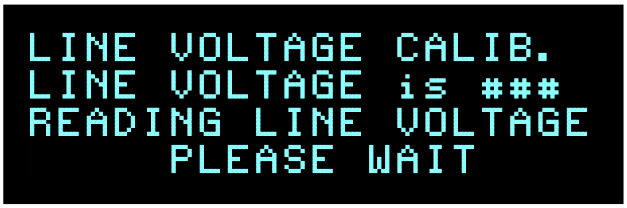
Press YES and the display shows:



FIRST TIME CONTROL SETUP

Read the line voltage with a voltmeter inside the welding control and **enter** the value on this line.

Then press YES The display will show:

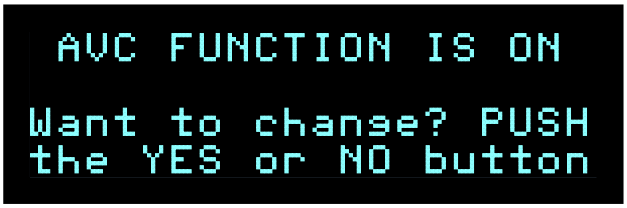


where ### is the value you just entered.
After a few seconds, the display will now show:

This confirms that the baseline for the Automatic Voltage Compensation system has been set.

B10.1 TURNING OFF AVC: If the control is not holding steady welding current, the **AVC** function can be turned **OFF** to see if this system is causing the problem. To do this, press:

The display will show:



Press YES and the **AVC** function will be turned **OFF.**

B11. INITIATION MODES: The display now shows:

```
990-CHOOSE MODE
    Of INITIATION:
MOMENTARY or HOLDING
SELECT=YES, SKIP=NO
```

Press YES and the display will show:

```
HOLDING INITIATION
Want to change? Push
The YES or NO button
```

Be sure that you set this INITIATION MODE properly as shown on the next page to prevent injury to the welder operator.

B11.1 HOLDING INITIATION: When the control is in this mode, if the foot or hand initiation switch is opened **before** the start of the first heat cycle, the electrodes will open and the sequence will stop.

This is the **safest** mode and should be used if you do **not** have the Unitrol **SOFT TOUCH** safety system installed on this welder, or if you have a light curtain properly installed to protect the operator from pinch point injury during a weld sequence.

Even if you have the Unitrol **SOFT TOUCH** system installed or have a properly installed light curtain system, leaving the control in the **HOLDING INITIATION** mode will allow the operator to open the electrodes before the start of the weld if the position of the electrode is not correct.

B11.2 MOMENTARY INITIATION: When the control is in this mode, once the foot or hand initiation switch has been pushed, the sequence will continue to completion even if the initiation switch has been opened.

This is the **LEAST SAFE** mode and should **only** be used if you have the Unitrol **SOFT TOUCH** safety system installed on this welder, or you have a light curtain properly installed to protect the operator from pinch point injury during a weld sequence.

Press 

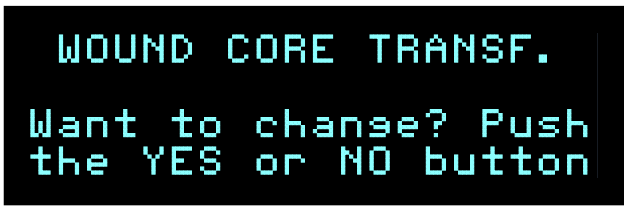
to exit out of this program.

B12. SETTING WELDER TRANSFORMER STYLE:

Your SOLUTION*i* control can operate two types of welding transformers.

Press: 

The display will show:



Most package transformers are **WOUND CORE** style. These are transformers with metal casings on the outside of the transformer.

Other transformers do not have metal casings on the outside and are usually **STACKED CORE** transformers.

Check with the welder manufacturer to identify your transformer style. If you cannot get this information, leave the control in **WOUND CORE.**

Press 

and the program will exit out.

If you have identified the welding transformer as a **STACKED CORE** style, press 

to make the change.

FIRST TIME CONTROL SETUP

SKIP

If this control does **not** have the letters **QC** in the model number, skip the rest of the FIRST TIME CONTROL SETUP.

SKIP

If your control has a primary Current Transformer (CT) installed inside the cabinet as in the photo to the right, skip to B14.

SKIP

If the KVA of your welder was known when the control was built at Unitrol, the CURRENT MONITORING settings were made to this control prior to shipment from Unitrol. This will be shown on the serial number page of at the front of this direction book. If the calibration and setting for SECONDARY CURRENT is shown on that page, skip to B14.

B13. SETTING SECONDARY CURRENT MONITORING SYSTEM

Press: PROGRAM | 9 | 8 | 7 | STEP / ENTER | 9 | 9

The display will show:

```
SECONDARY CUR SYSTEM

Want to change? Push
The YES or NO button
```

FIRST TIME CONTROL SETUP

Press NO if your control has a SECONDARY CURRENT COIL as shown in the photo to the right.

The display will show:

```
SECONDARY CUR SYSTEM
100KA MAX CURRENT =1
Want to change? Push
the YES or NO button
```

This program selects the maximum secondary current that will be read by this pickup coil. If you do not know the maximum secondary current for your welder, use the following chart to make this selection:

WELDER KVA	MAX. CURRENT	RANGE NUMBER
UP TO 20	10KA	4
25 TO 75	25KA	3
80 TO 150	50KA	2
OVER 150	100KA	1

If the maximum current number is shown on the display, press NO to exit out of this program.

If the maximum current number on the display is NOT correct, press YES

The display will show:

```
100KA MAX CURRENT =1
 50KA MAX CURRENT =2
 25KA MAX CURRENT =3
 10KA MAX CURRENT =4
```

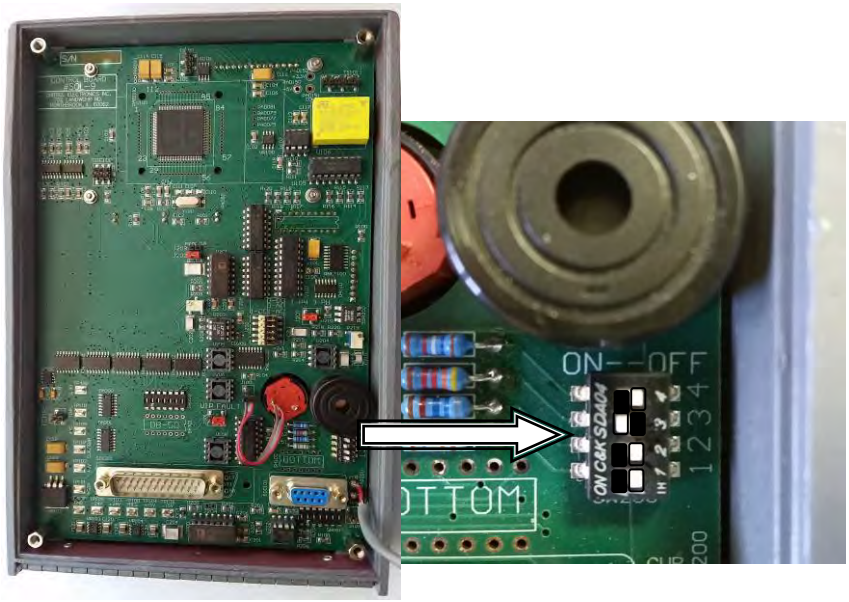
Press the numbered button on the keypad that matches the desired range.

The display will now briefly show the selected MAXIMUM CURRENT RANGE and then exit to:

```
PROGRAM NUMBER  ___
```

B13.1 SETTING CURRENT RANGE SWITCH

After setting the control's electronic system for current range, a DIPswitch has to be set mechanically to match this range.

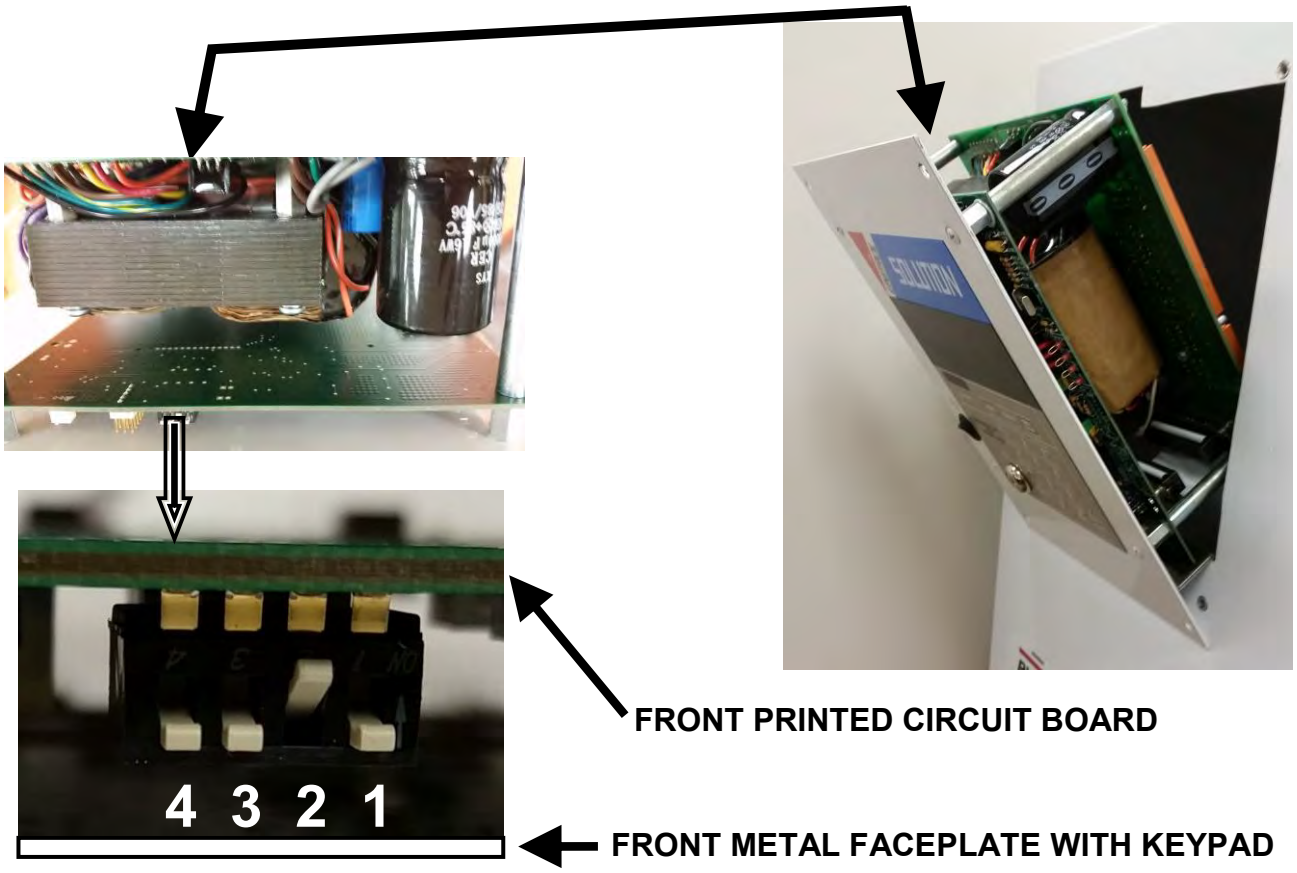


For model 9180iQC (REMOTE CONSOLE)

1. Remove the blue back plate on the remote console.
2. Locate the 4-position DIPswitch as shown in the photo.
3. Pull the switch finger that matches the desired MAXIMUM CURRENT RANGE (chart on page A16) to the left (ON) as shown in the photo. In this photo, the #3 (25KA) switch is selected.
4. Push the other three fingers to the **right (off).**
5. Install the back plate and mounting angles per the photo to the right.

FIRST TIME CONTROL SETUP

For models 9180iLQC- and 9180iDQC- (all in one cabinet)



1. Remove the outer four screws that hold the white faceplate of the control to the cabinet or door.
2. Lift the plate up slightly and rotate out a few inches at the top as shown in the photo above.
3. Look down between the two circuit boards and locate the 4-position DIPswitch at the top between the front of the circuit board and the inside of the white metal faceplate.
4. Push the switch finger that matches the desired MAXIMUM CURRENT RANGE (chart on page B18) away from the white metal faceplate. In the photo the #2 (50KA) switch is selected.
5. Pull the other three fingers towards the white metal faceplate.

B14. HEAT SETTING MODES:

Setting welding heat on your SOLUTION*i* control can be done in two different ways:

B14.1 UNDERSTANDING CONSTANT VOLTAGE MODE:

In this mode the welding heat will be set in **% of the maximum available power** for the welding transformer and welder. In this case, the first display for a welding schedule display will look like:

This **CONSTANT VOLTAGE** mode should be used for PROJECTION WELDING (weld nuts, parts with projections). It can also be used for all welding sequences.

SKIP

If you want to use only heat settings in percent (%) and not use the CONSTANT CURRENT feature of this control, exit out of this FIRST TIME CONTROL SETUP section. You can always come back at a later date to do this procedure.

B14.2 UNDERSTANDING CONSTANT CURRENT MODE:

In this mode, the welding heat will be set in AMPS. This is useful if you are going to use standard resistance welding charts, or are going to use the built-in RWMA welding schedules. The CONSTANT CURRENT welding schedule display will look like:

FIRST TIME CONTROL SETUP

You can switch back and forth between these two modes with just a few keystrokes.

Before using this control in the **CONSTANT CURRENT** mode, you need to follow a one-time set-up procedure to "teach" the SOLUTION*i* control the welding current created by different percentage heat settings on your particular welder.

B14.3 DOING THE LEARN CURVE:

1. Press:

The display will show:

```
Total  TRANSF.  TAPS=1

Want to change? Push
the YES or NO button
```

If your welder does **NOT** have a TAP SWITCH, PUSH 

If your welder **HAS** a TAP SWITCH, press 

and enter the total number of tap positions.

TYPICAL TAP SWITCH

If you have a HEAT STEPPER turned on at this time, the display will tell you to go to PROGRAM 988 and turn it off.

The display will now show:

```
LINE VOLTAGE CALIB.
LINE VOLTAGE is  ---
After entering data
     Press YES
```

FIRST TIME CONTROL SETUP

6. Measure the incoming line voltage inside the welding control cabinet and enter that number here. Then press YES

7. The display will now show:

```
Set TRANSF.TAP to #1
 Place metal between
ELECTRODES and then
close INITIATION SW.
```

8. As directed
   a. Place two pieces of metal that represent the **middle thickness** combination that you will be welding on this welder
   b. Put the metal **approximately ½ way into the throat of the welder**. This will "teach" the control results of the **average** welding conditions and get the control to the requested welding current quickly and accurately.

Since this LEARN CURVE will be used for a long time, try to use the correct metal combination and location as shown above. A little extra time now will pay off in the coming years!

9. Close the initiation foot switch or hand switches and KEEP THEM CLOSED. The electrodes will close on the metal and the display will show:

```
Set TRANSF.TAP to #1
Keep INIT. SW closed
Reading LINE VOLTAGE
```

```
  MEMORIZING DATA
S       W
```

The SOLUTION*i* control will make a series of pulses, open the electrodes, and then display.

```
 Open INIT. SWITCH
```

Open the footswitch or hand switches.

FIRST TIME CONTROL SETUP

If you told the control that there were more than 1 TRANSFORMER TAP SWITCHES, the display will show:

```
Set TRANSF.TAP to #2
Place metal between
ELECTRODES and then
Close INITIATION SW.
```

10. Move the metal to another spot a few inches away from the first location.

11. Close the initiation foot switch or hand switches and KEEP THEM CLOSED. The electrodes will close on the metal and the display will show:

```
Set TRANSF.TAP to #2
Keep INIT. SW closed
Reading LINE VOLTAGE
```

The SOLUTION*i* control will make a series of pulses and then display:

```
  MEMORIZING DATA
S       W
```

12. This sequence will continue until the control has done a LEARN CURVE for all TAP SWITCHES.

```
Open INIT. SWITCH
```

Welding in **CONSTANT CURRENT** mode is useful where metal will be put into and out of the throat of the welder. It will keep the welding current constant for all metal positions.

Welding in **CONSTANT VOLTAGE** mode is recommended for all projection welding (weld nuts, sheets with projections, etc.)

SECTION C

SOLUTION*i* PERSONALIZATION

FUNCTION	SECTION	DIRECT ACCESS NUMBER*	PAGE NUMBER
Setting **COUNTING SYSTEM**	C1	991	1
Setting **BATCH COUNTER**	C1.1	991	1
Using **BATCH COUNTER**	C1.2	991	2
SECURITY SYSTEM	C2	-	3
SECURITY LEVELS table	C2.1	-	3
Setting **SECURITY LEVEL**	C2.2	987/96	4
BYPASS KEYLOCK SECURITY CODE	C2.3	997/99	4
Viewing weld schedules with key in **LOCK** position	C2.4	997/99	5
Heat change **ON THE FLY**	C3	987/78	6
EHR/FAULT RELAY assignment	C4	-	7
EHR relay operation	C4.1	-	7
FAULT relay operation	C4.2	-	8
FAULT RESET mode	C5	982	8
KEYPAD & INITIATE fault reset mode	C5.1	-	9
KEYPAD & KEYLOCK fault reset mode	C5.2	-	9
FAULT RELAY mode	C6	985	9
CLOSE on **FAULT**	C6.1	985	10
CLOSE on **ACCEPTED WELD**	C6.2	985	10
EHR and Fault **RELAY CLOSING TIME**	C7	987/21	10
WATER SAVER	C-13	-	10
Setting **CURRENT BLANK** cycles	C8	983	11
Setting mode for **CURRENT MONITOR**	C9	984	11
DISPLAY CURRENT ONLY	C9.1	984	12
COMPARE CURRENT TO LIMITS	C9.2	984	12
Configure **SVO OUTPUT**	C10	987/80	13
FORGE DELAY	C10.1	987/80	13
INTENSIFIER DELAY	C10.2	987/80	14
CLAMP DELAY	C10.3	987/80	15
Turn on with **LEVEL 2**	C10.4	987/80	16
FULL or **HALF CYCLE** count	C11	993	16
Turn on **SOFT TOUCH** function	C10.5	987/80	17
Selecting weld time **0-99CY or 0-999CY**	C12	997	17
RT1 INPUT assignment	C14	987/93	20
LIGHT CURTAIN	C14.1	987/93	21
RETRACT SWITCH	C14.2	987/93	21
PART IN PLACE	C14.3	987/93	22
WATER FLOW SWITCH	C14.4	987/93	23
LIMIT SWITCH	C14.5	987/97	23

*If the number shown has a / (example: **987/96**), press:

PROGRAM	9	8	7	STEP ENTER	9	6

SOLUTION*i* PERSONALIZATION

Your SOLUTION*i* control can be personalized to use functions to best match your needs.

C1. SETTING COUNTING SYSTEM: The SOLUTION*i* control has several counting functions built into the system. They include WELD COUNTER, PARTS COUNTER, and BATCH COUNTER.

Press: PROGRAM | 9 | 9 | 1 | STEP / ENTER

The display will show:

```
The COUNTER is ON

Want to change? Push
the YES or NO button
```

Press NO and the display will show:

```
WELDS PER PART = 000

After entering data
   Press YES
```

If you are making more than 1 weld per part and want to count **FINISHED** parts, enter the number of **WELDS** on each **PART** and then press YES

If you want to only count **WELDS,** leave 000 and press YES

C1.1 SETTING BATCH COUNTER: The display will now show:

```
BATCH COUNTER is OFF
Want to change? Push
the YES or NO button
```

If you want to have the control stop operation when a predetermined number of finished parts has been completed, press YES

The display will now show:

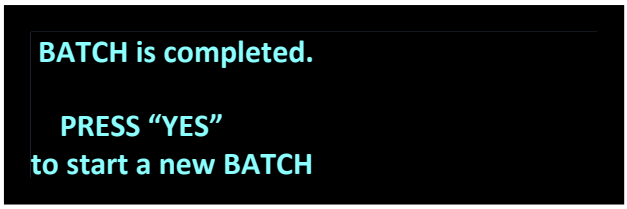
Enter the number of parts that will be in a BATCH and press YES. The display will exit out of this set up program.

C1.2 USING BATCH COUNTER:

If you entered a number for the **BATCH COUNTER** and start to weld, the welder will continue to operate and after each weld will display:

This indicated that there are 437 more parts to make before the control will stop.

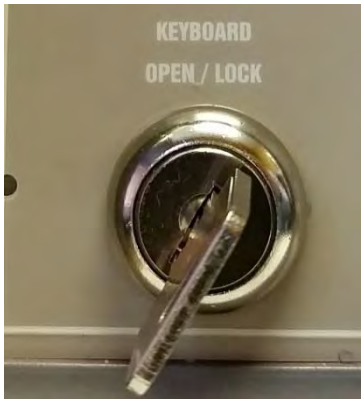
After the last weld is made for the last part in the batch, the display will show:

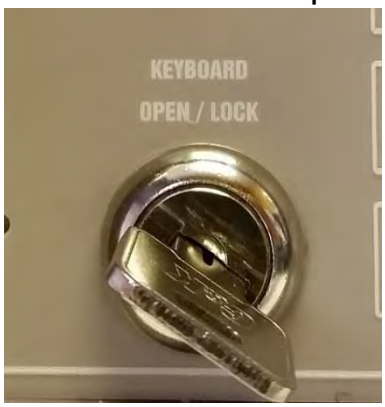


The welder will not operate until you push YES. This will now reset the **BATCH COUNTER.**

SOLUTION*i* PERSONALIZATION

C2. SETTING SECURITY SYSTEM: Your SOLUTION*i* control has a built-in security system to prevent unauthorized changes to welding or setup programs. The control will be either LOCKED or OPEN depending on the key position.





C2.1 SECURITY LEVELS: With the key in the LOCK position, the following operations will be allowed (YES) or blocked (NO):

FUNCTION	STANDARD	LOCK RESET	MANUAL	AUTO
Review **WELDING PROGRAM DATA**	YES	YES	NO	NO
Change **WELDING PROGRAM DATA**	NO	NO	NO	NO
Select **NEW WELDING PROGRAM**	YES	YES	NO	NO
Change welding mode **SINGLE, NO WELD,** or **REPEAT**	YES	YES	YES	NO
Link **PROGRAMS** TO **INITIATION-A** AND **INITIATION-B** in PROGRAM **995**	YES	YES	NO	NO
CHANGE **REPEAT OFF TIME** in WELDING PROGRAMS	YES	YES	YES	NO
Reset **PARTS COUNTER, BATCH COUNTER** or **HEAT STEPPER.**	YES	NO	NO	NO
Measure **TIP FORCE** in PROGRAM 996	YES	YES	NO	NO
Turn **TRANSDUCER ON/OFF** in PROGRAM 996	NO	NO	NO	NO
Set **WELD CYLINDER AREA** in PROGRAM 997	NO	NO	NO	NO
Select or change any of the **SETUP PROGRAMS**	NO	NO	NO	NO

SOLUTION*i* PERSONALIZATION

C2.2 SETTING SECURITY LEVEL: Turn the key to **OPEN** and press:

PROGRAM | 9 | 8 | 7 | STEP / ENTER | 9 | 6

The display will show:

```
KEYBOARD LOCK IS:
STANDARD KBRD LOCK=1
Want to change? Push
the YES or NO button
```

If you want to change the mode from that displayed, press YES.

The display will show:

```
STANDARD KBRD LOCK=1
KBRD LOCK RESET  = 2      MANUAL KBRD
LOCK = 3
AUTO KBRD LOCK   = 4
```

Push + 1, 2 or 3 - to match the desired mode.

C2.3 BYPASS KEYLOCK SECURITY CODE: You can enter a three-digit number that can be used in place of opening the keylock. To select a security code, press:

PROGRAM | 9 | 9 | 7 | STEP / ENTER | 9 | 9

The display will show:

```
Bypass keylock
Security code = 000
Want to change? Push
the YES or NO button
```

Press YES and the display will show:

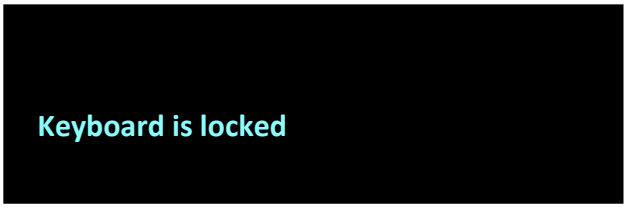
```
Bypass Keylock
Security code = 000
After entering data
Press  YES
```

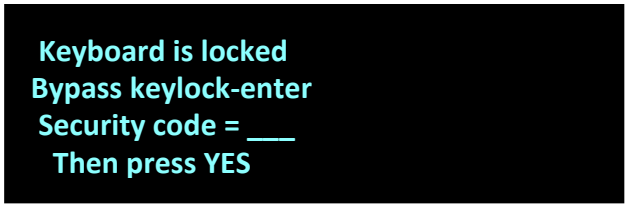
Enter a 3-digit number and then press YES

If the keylock is in the **LOCK** position and you try to make a change not permitted by the security level chosen, you can enter this code and then make changes. Once you push **SINGLE, NO WELD**, or **REPEAT** to exit out, you will have to go through the same procedure if you want to get back into a locked program.

C2.4 VIEWING WELDING SCHEDULES WITH KEY IN LOCK POSITION:

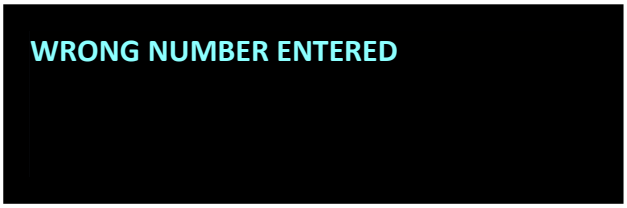
If the key is in the **LOCK** position, the control is the STANDARD KEYBOARD LOCK mode, and you try to enter a welding program, the display will show:



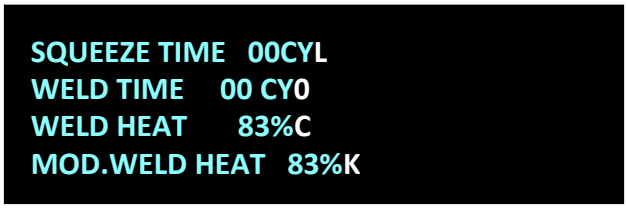


Enter the security code and press YES. You will be able to view and change anything in the **PROGRAM.**

If you do **not** know the security code, just press YES. The display will show:



and then go to the opening screen of the last **WELD PROGRAM.** If you try to change any line **other** than **REPEAT OFF TIME,** the control will show this display while flashing the word **LOCK** along the right edge and then exit out:



C3. HEAT CHANGE "ON THE FLY"

Your SOLUTION*i* control can be used to increase or decrease in **WELD HEAT%** using two buttons on the keypad without going into the welding program and even if the keypad is locked.

Each time you push [+ 1] the **WELD HEAT%** will **increase** by 1%.

Each time you push [- 3] the **WELD HEAT%** will **decrease** by 1%.

To use this feature and set + and - limits:

Press: [PROGRAM] [9] [8] [7] [STEP ENTER] [7] [8]

The display will show:

```
MODIFIED HEAT LIMITS
MAXIMUM "+CHANGE"=0%
Want to change? Push
the YES or NO button
```

Push [YES] and the display will show:

```
MODIFIED HEAT LIMITS
MAXIMUM "+CHANGE"=0
after entering data
   Press YES
```

SOLUTION*i* PERSONALIZATION

Enter the maximum **WELD HEAT% increase** that you want to allow from the keypad and press YES

The display will show:

```
MODIFIED HEAT LIMITS
MAXIMUM "-CHANGE"=0%
Want to change? Push
the YES or NO button
```

Push YES and the display will show:

```
MODIFIED HEAT LIMITS
MAXIMUM "-CHANGE"=0
after entering data
   Press YES
```

Enter the maximum **WELD HEAT% decrease** that you want to allow from the keypad and press YES

SKIP **If your control does NOT have the letters QC in the model number, skip to C7.**

C4. EHR/FAULT RELAY ASSIGNMENT.

The control has a relay that can be **jumper selected** to be used in one of two ways:

C4.1 EHR – End Of Hold OPERATION. When the **J3 jumper** is in the **EHR** position, the relay will close at the **end of every weld**.

If the NO WELD button is pushed, the **EHR** relay will **NOT** close.

EXCEPTION: If an external **NO WELD** switch is connected to terminal **NW1** and this switch is **OPEN,** the **EHR** relay will **still** close at the end of a sequence.

C4.2 FAULT RELAY OPERATION.

When the **J3 jumper** is in the **FAULT** position, the relay will close when any fault shown in **C5** occurs.

C5. FAULT RESET MODE:

The SOLUTION*i* control can respond to three types of faults:

1. **WELDING CURRENT** out of customer-set window
2. **ELECTRODE FORCE** out of customer-set variation window
3. **LINE VOLTAGE** out of +/-10% variation from baseline

Faults in any of these three categories can close a FAULT relay for a selectable time and can also stop the welding sequence if so desired. You can also set the SOLUTION*i* control to close on a successful weld.

The faults will also be shown on the display.
To set the desired **FAULT RESET MODE,** Press:

PROGRAM | 9 | 8 | 2 | STEP / ENTER

The display will show:

```
FAULT RESET MODE IS:
KEYPAD & INITIATE =1
Want to change? Push
the YES or NO button
```

Push YES and the display will show:

```
FAULT RESET MODE IS:
KEYPAD & INITIATE =1
KEYPAD & KEYLOCK  =2
   AUTOMATIC     =3
```

SOLUTION*i* PERSONALIZATION

C5.1 KEYPAD & INITIATE: If you push [+ 1] every time one of the three faults is detected, the **electrodes will stay closed.**

To release and reset the fault do **one** of the following even if the **KEYPAD** is **CLOSED**:

1. Release and then close the **FOOT SWITCH** or **HAND SWITCHES**.
2. Push any button on the keypad.

C5.2 KEYPAD & KEYLOCK: This mode is useful for critical parts welding when you want to require a supervisor to reset a fault.

If you push [2] every time one of the three faults is detected, the **electrodes will stay closed.**

To release and reset the fault do one of the following:

1. If the **KEYLOCK** is in the **OPEN** position, press (YES)
2. If the **KEYLOCK** is in the **LOCK** position, turn the **KEYLOCK** to **OPEN** and then press (YES)

C6 FAULT RELAY MODE: The **FAULT RELAY** can be used in two modes:

1. **CLOSE FOR REJECTED WELD.** In this mode, the relay will close after a weld with any of the faults in **C4.**
2. **CLOSE FOR ACCEPTED WELD.** In this mode, the relay will close after a weld has been completed with **NONE** of the faults in **C4.**

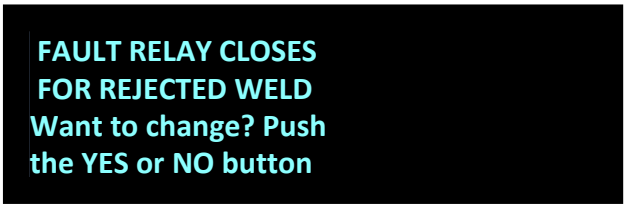
To select the desired mode, push:

[PROGRAM] [9] [8] [5] [STEP / ENTER]

SOLUTION*i* PERSONALIZATION

C6.1: CLOSE ON FAULT.

The relay will close when an out-of-range weld has just been completed.



Push NO to keep the control in this mode.

If you want to change the mode, press YES

C6.2: CLOSE ON ACCEPTED WELD.

The display will show: The relay will close when all values being monitored are within the proper range.

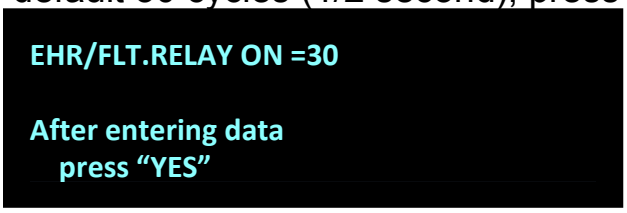
C7 EHR and FAULT RELAY CLOSING TIME:

The **EHR/FAULT** closing time can be adjusted to keep it closed long enough to allow a PLC or other control system to recognize the closure.

To adjust this time, press:

The display will show:

If you want to change the default 30 cycles (1/2 second), press YES and the display will show:



Enter the desired time (in cycles–1/60th second) for the relay to remain closed. Then push YES

NOTE: If the initiation is closed during this RELAY ON TIME, the relay will immediately open and the next weld will start.

SOLUTION*i* PERSONALIZATION

C8. SETTING CURRENT BLANK CYCLES: When measuring welding current it is usually helpful to not read the first few cycles in the weld. These first few cycles will be used to establish good contact at the weld zone, and not monitoring this initial time will help make the current readings more consistent. If you are using 5 cycles or less of **WELD TIME,** leave this number at 00. Otherwise:

Press: PROGRAM | 9 | 8 | 3 | STEP / ENTER

The display will show:

CUR.BLANK CYCLES =00

After entering data
press "YES"

If you are using more than 5 **WELD TIME** cycles, enter **1** or **2.** Then press YES

If you are checking the current monitoring system in this SOLUTION*i* control against another current monitoring instrument, be sure that you set the **BLANK CYCLES** for the other current monitoring instrument the same as set in this control.

If you put a number in **CUR. BLANK CYCLES** that is **equal or higher** than the **WELD TIME,** the control will show 00,000A for every weld.

C9. SETTING MODE FOR CURRENT MONITOR: The SOLUTION*i* control can use the **CURRENT MONITORING** system in three ways:

1. Just display the **WELDING CURRENT** at the end of each weld.
2. Display the **WELDING CURRENT** at the end of a weld and compare it to program limits.
3. Do not display **WELDING CURRENT** and do not compare it to program limits.

SOLUTION*i* PERSONALIZATION

To select the desired mode, press:

The display will show:

```
CURRENT READ MODE:
TURN READING OFF  =3
Want to change? Push
the YES or NO button
```

If you do not want to read welding current, press NO and the display will exit out.

If you do want to read the current, press YES and the display will show:

```
CURRENT READ MODE:
DISPLAY ONLY     =1
COMPARE TO LIMITS =2
TURN READING OFF  =3
```

C9.1: DISPLAY ONLY: If you push 1 the average RMS welding current will be displayed after each weld, but the control will not compare it to anything and will not indicate if an out-of-range weld has been made.

C9.2: COMPARE TO LIMITS: If you push 2, the average RMS welding current will be displayed after each weld, and the control will compare it to the **HIGH CURRENT LIMIT** and **LOW CURRENT LIMIT** in the welding program:

```
HI CUR LIM.00,000A←
LO CUR LIM.00,000A
```

If the measured average RMS welding current in a weld goes **above** the **HI CUR LIMIT,** the display will show:

```
PROGRAM 001 IN USE
CUR.ERROR=08,750 A      ▲
 CLOSE INITIATION
to OPEN ELECTRODES
```

HIGH CURRENT: The ▲ on the right indicates current read was **higher** than the **HI CUR LIM.** Line in the welding program.

If the control was set in **C5** for **AUTOMATIC** fault reset, the control will reset without any other action.

SOLUTION*i* PERSONALIZATION

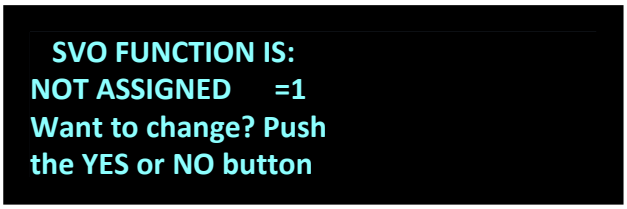
If the control was set in **C5** for **KEYPAD & INITIATION** or **KEYPAD & KEYLOCK**, the display will remain and the electrodes will stay closed until the system is reset per **C5.**

LOW CURRENT: If the measured average RMS welding current in a weld goes **below** the **LO CUR LIM.** the display will show ▼ at the end of the display line and follow the same reset procedure as shown above.

SKIP **If your control includes SOFT TOUCH, skip to C11.**

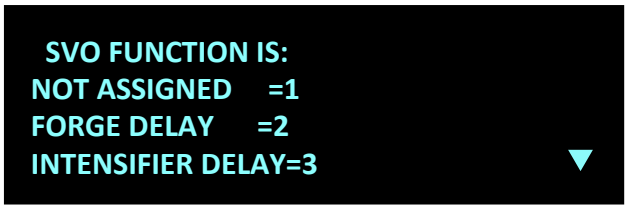
C10. CONFIGURE SV0 OUTPUT: The voltage output terminal **SV0** can be assigned to operate in several ways. To select how you want this output to operate, press:

The display will show:



Press 

and the display shows:



C10.1 FORGE DELAY: This function is useful when welding alloys that tend to crack when the nugget is cooled.

SKIP

Your welding machine has to have a **FORGE DELAY** valve system to use this function. This includes a 3-way **FORGE SOLENOID VALVE** to quickly exhaust air from the bottom (return) port of the air cylinder when the **FORGE VALVE** is turned on. If it does not have this valve, skip to **C10.2**.

To select **FORGE DELAY,** press 2 The display will show:

and then exit out.

```
SVO FUNCTION IS:
  FORGE DELAY
```

If you have selected **FORGE DELAY**, a new line will appear in all welding programs:

```
FORGE DELAY    00CY
```

In this mode, the **SV0 output** turns **ON** at a timing that starts at the beginning of **WELD TIME**. If there are using **PULSATION** in the welding program, the timing starts at the **start** of the last **IMPULSE**.

and exit out.

```
SVO FUNCTION IS:
FORGE DELAY    =2
```

If you are in this mode, a new line will appear in all welding programs:

```
FORGE DELAY   00CY←
```

FORGE DELAY time starts at the beginning of the **WELD TIME.** If your welding program uses **PULSATION,** this **FORGE DELAY TIME** starts at the **beginning** of the **last WELD IMPULSE.**

C10.2 INTENSIFIER DELAY: This function is used for welders that have **intensifier cylinders.** The most common brand of these is OHMA.

If your welder has the **SOFT TOUCH** option installed, this function will be handled by **SOFT TOUCH.** This mode should be left in **SOFT TOUCH = 6 mode.**

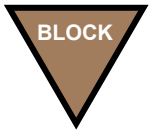
If you push 3 the display will show:

```
SVO FUNCTION IS:
INTENSIF. DELAY  =3
```

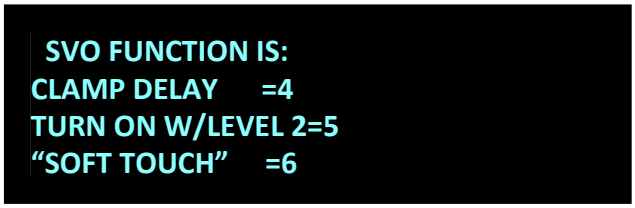
and exit out.

If you are in this mode, a new line will appear in all welding programs:

In this mode, the solenoid valve connected to **SV1** turns on first to bring the electrodes closed under low advance fluid force. After the **INTENSIF. DELAY** time, the solenoid valve connected to **SV0** turns on to put full welding force on the electrodes.

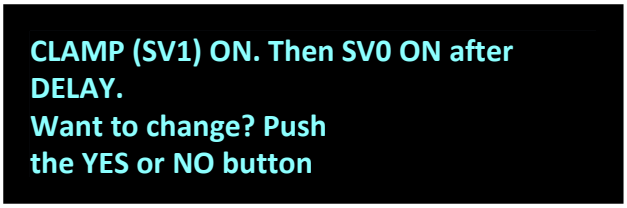
Push 

and the display will show the rest of the choices:



C10.3 CLAMP DELAY:

Press 4 and the display will show:

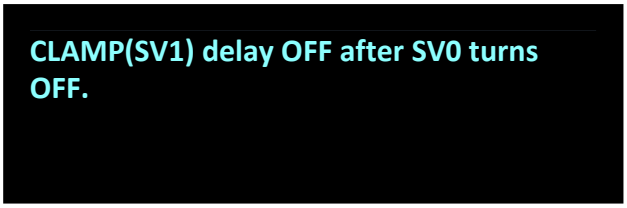


Push 

to use this mode. This is useful for operations that need to clamp a part first **before** bringing the welding electrode down.

Push 

and the display will show:



This clamp mode turns on at the same time the **WELD** solenoid **SV0** and the **CLAMP** solenoid valve. At the end of the sequence, **SV0** turns **OFF** to open the electrodes, and then after the **CLAMP DELAY** in the welding program, **SV1** turns off to release the **CLAMP** solenoid. This can be used to keep parts in place for cooling, or can be used to operate a water solenoid valve that floods the part during an operation and stays on for a selected time afterwards.

WIRING CHANGE: For either of the above clamp modes, wire the **CLAMP** solenoid valve to terminal **SV1** and the **WELD** solenoid valve to terminal SV0**.**

C10.4. TURN ON WITH LEVEL 2: Press **5** and the display will show:

In this mode, the SV0 output will turn ON only after the second level of the **FOOT SWITCH** is closed.

This can be used to clamp a part when the first level of the **FOOT SWITCH** is closed. Then if the part looks to be in the correct positon, closing of the second level of the **FOOT SWITCH** will close the welding electrode. This is often used for critical assemblies or for resistance brazing operations.

WIRING CHANGE: For this mode, wire the **CLAMP** solenoid valve to terminal **SV1** and the WELD solenoid valve to terminal **SV0.**

If you use **CLAMP DELAY** functions C10.3 or C10.4, the J2 jumper on the power supply **must** be set to the **ON** position as in this photo. **DO NOT OPERATE THE WELDER IF THIS JUMPER IS NOT IN THE "ON" POSITION** since you will have lost one level of redundant operation on the weld solenoid.

C10.5. SOFT TOUCH: If your welding control includes the SOFT TOUCH operator pinch point safety protection option, push 6. See the SOFT TOUCH direction book for this function.

C11. FULL or HALF CYCLE COUNT: Normal resistance welding uses full **line cycle** weld timing. But if you are welding very thin material and need to have ½ cycle of **WELD TIME**, or are doing a very sensitive weld that needs timing in ½ cycles, change the SOLUTION*i* control as follows:

Press PROGRAM 9 9 3 ENTER/STEP

The display will show:

```
FULL CY. HEAT COUNT

Want to change? Push
the YES or NO button
```

Push NO to keep the control in **FULL CYCLE HEAT COUNT** mode.

If you push YES the control will show:

```
1/2 CYCLE HEAT COUNT
```

and exit out.

C12. WELD TIME AND TEMPER TIME range: This control can operate for normal spot welding with up to 99 cycles of WELD TIME and TEMPER TIME. This is useful when doing **resistance brazing** or extended-time TEMPER sequences. To change from the factory default of 0-99 cycles:

Press: PROGRAM 9 7 7 STEP/ENTER

The display will show:

```
0-99 cycles WELD &
 TEMPER TIME range
Overwrite?  PUSH
the YES or NO button
```

If you want to change the range, push YES. The range will automatically change to 0-999 cycles.

If you do not want to change the range, push NO.

C12.1 BEAT or NON-BEAT MODE: This selection decides how the control will respond if the foot pedal or hand button initiation is released before the start of the first ½ cycle of weld heat.

NON-BEAT MODE: For normal operation, the control should be set to the default **NON-BEAT MODE.** In this case, you can stop the welding sequence by releasing the foot pedal or hand button initiation before the start of the first ½ cycle of weld. The time before the start of the first ½ cycle of weld includes **SQUEEZE TIME** and, waiting for a **PRESSURE SWITCH** to close, or if you have the **QC** version, when waiting for the **TIP FORCE** to be reached.

The **NON-BEAT MODE** allows the weld sequence to stop if the closed electrode location is not correct or the parts have shifted out of place.

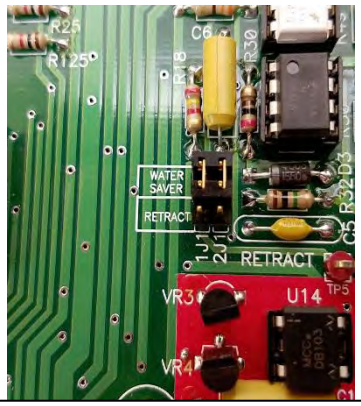
BEAT MODE: This allows placing parts to be welded into a nest, starting the welding sequence, and immediately letting go of the part before the start of the first ½ cycle of weld. This allows assembly of the next part to be welded while the previous one is being welded..

Never operate the welder in the **BEAT MODE** if the area between the electrodes is not fully guarded in a way that prevents any operator body part to go between the electrodes. The electrode force will not release until the full weld sequence has been completed even if you release the foot switch or hand switches.

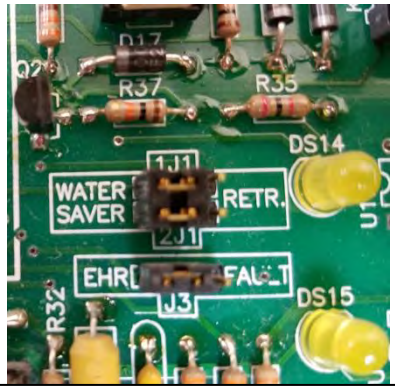
If your control includes **SOFT TOUCH,** the **BEAT MODE** can be used. This is useful when doing high-speed welding that requires assembly of the next parts while welding is being completed.

C13. WATER SAVER: Output terminal 39-40 marked **SVWS or RETR** can be used for many functions. If you set the plug jumper in the WATER SAVER position, this output will turn ON from the start of a welding sequence and will stay on about 1 minute after the end of the sequence.

To use this **WATER SAVER** function, set the jumper in the **WATER SAVER** position as shown below:

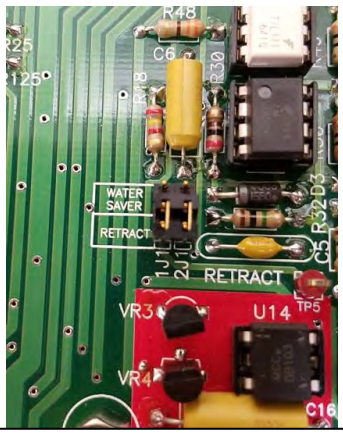


9180iL…, 9180iM…, and 9180iD… controls. Jumper in top position.



9180i… (remote console) controls. Jumper in left position.

The same RT1 output can be used for five other functions that are described starting on the next page. To set this output for use with one of these five functions, move the jumper to the **RETR.** Position as shown below.



9180iL…, 9180iM…, and 9180iD… controls. Jumper in bottom position.

9180i… (remote console) controls. Jumper in right position.

SOLUTION*i* PERSONALIZATION

C14. RT1 INPUT ASSIGNMENT: Terminal RT1 (13 – 14) can be setup to function in **only one** of many functions. To use any of the following five functions, be sure that the selection jumper shown on the previous page is on the **RETRACT** position. To select the desired function, press:

The display will show:

```
RT1 is ASSIGNED as:
NOT USED      = 1
Want to change? Push
The YES or NO button
```

If you do not want to use this input for any functions, press NO .

To see the other functions possible for this RT1 input, press YES and the display will show:

```
RT1 is ASSIGNED as:
NOT USED      = 1
LIGHT CURTAIN  = 2
RETRACT SWITCH  = 3
```

The ▽ triangle tells you that there are more choices on the next page. Just push the BLOCK button on the lower right corner of the keypad. The display will show:

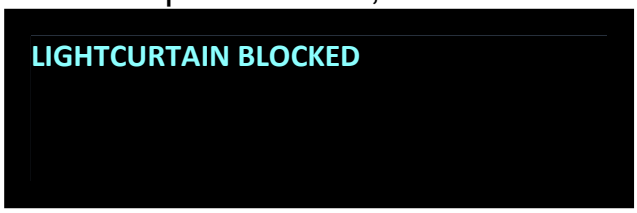
```
RT1 is ASSIGNED as:
PART in PLACE   =4
WATER FLOW SWITCH=5
LIMIT/PRES.SWITCH=6
```

To go back to the previous page, press the BACK button.

C14.1. LIGHT CURTAIN: If this mode is selected, the control will look at the RT1 input. This input will be connected to the output of a LIGHT CURTAIN that will have a **closed contact** when the area being guarded is **clear**.

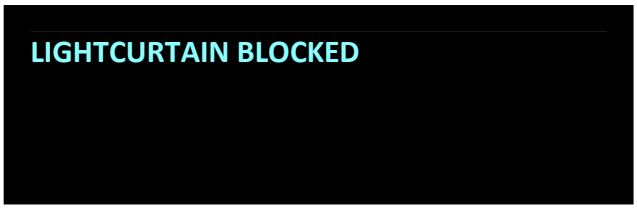
CONDITION #1: If when the weld initiation switch (foot switch or hand buttons) is closed to start a weld, and the RT1 input is **CLOSED,** the electrodes will close and the weld sequence will start.

CONDITION #2: If when the weld initiation switch (foot switch or hand buttons) is closed to start a weld and the RT1 input is **OPEN**, the electrodes will **not** close, and the display will show:



The system will reset in about 2 seconds and require the initiation switch be **released** before trying again.

CONDITION #3: If when the weld initiation switch (foot switch or hand buttons) is closed to start a weld, and the RT1 input is **CLOSED,** the electrodes will close and go through **SQUEEZE TIME, TIP FORCE satisfied (transducer option),** and pressure switch input closed (if in system). If before all of these are completed an object blocks the **LIGHT CURTAIN**, the electrodes will open, and the display will show:



The system will reset in about 3 seconds and require the initiation switch be **released** before trying again.

CONDITION #4: If **CONDITION #3** is repeated but the object blocking the **LIGHT CURTAIN** is pulled out before the end of the **SQUEEZE TIME, TIP FORCE satisfied,** or **PRESSURE SWITCH** input closed, the electrodes will **NOT** close again, and the weld initiation switch will have to be released and closed again to start another sequence.

To select this RT1 mode, press: 2

C14.2. RETRACT SWITCH: If the welder has a RETRACT function that opens the electrodes to clear large parts, press: 3

The display will now show:

```
RT1is ASSIGNED as RT1:RETRACT
MOMENT.
Want to change? Push
The YES or NO button
```

In this **RETRACT MOMENTARY** mode, closing the RETRACT switch will turn on the RETR valve output (terminals 39 & 40), and this output will stay on even when the RETRACT switch is opened. To release the RETRACT valve output, the RETRACT switch will have to be closed again.

To select this momentary operation, push YES.

If you have a **mechanically latching** RETRACT switch the stays closed until a mechanical lever is pushed to release the switch, push NO and the display will show:

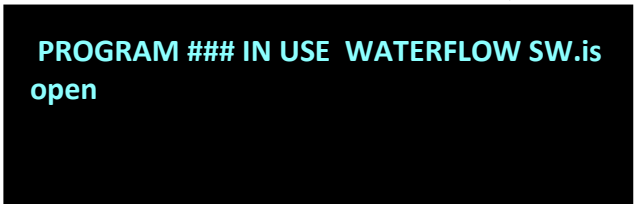
```
RT1is ASSIGNED as RT1:RETRACT
LATCHING
```

C14.3. PART IN PLACE: This mode looks for a switch closure to the RT1 input before the electrodes can close. If the initiation switch is closed and the input to RT1 is not closed, the display will show:

```
PART is not in NEST
```

and the electrodes will not close. To select this RT1 mode press 4.

C14.4. WATER FLOW SWITCH: This mode monitors the RT1 input. If the input is OPEN when the initiation switch is closed, electrodes will close and the display will show:



If the waterflow switch does not close in about 2 seconds the electrodes will open.

To select this mode, press 5

C14.5. LIMIT SWITCH: This mode monitors the RT1 input after the electrodes have closed. If this input to RT1 is not closed within about 2 seconds, the electrodes will open and require release and closing of initiation to start the next sequence. To choose this mode, press 6

SECTION D

SOLUTION*i* IN PRODUCTION

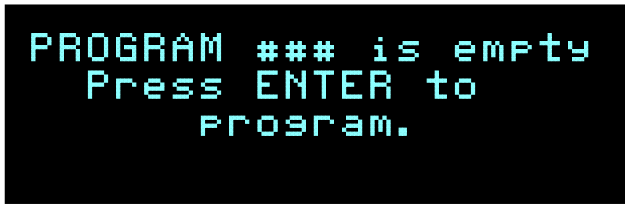
D1: ENTERING A WELDING PROGRAM:

D1.1 CREATE PROGRAM: To create a new **WELDING PROGRAM** or modify an existing one, turn the **KEYLOCK** to the **OPEN** position and press:

where ### is from 001 to 799.

When entering welding program numbers, you do NOT have to enter zeros (0) in front of numbers. Just enter a 1, 2, or 3 digit number.

The display will show:



OR

D1.2 VIEWING OR MODIFYING AN EXISTING WELDING PROGRAM:

If **PROGRAM ### IS READY** is shown, some data is already in this PROGRAM number. Press 

if you want to check this PROGRAM or make changes.

Press 

and another number if you want to find an EMPTY program.

D1.3 ENTERING A NEW WELDING PROGRAM:

If **PROGRAM ### is empty** is shown, there is no data in this program. Press

STEP / ENTER

and the display will show the first four lines of the welding program:

```
SQUEEZE TIME   00CY←
WELD TIME     00 CY
WELD HEAT       00%
MOD. WELD HEAT  00%
```

The ← on the right edge shows the line that can be changed.

On the display above, the arrow is pointing to the **SQUEEZE TIME**. To enter a value for **SQUEEZE TIME** in this program, just push the desired keypad numbers until the display shows the proper value.

You can move through a WELDING PROGRAM in many ways:

STEP / ENTER — Push this button **quickly** and the ← will move down to the next line even if it is 00.

STEP / ENTER — Push and **hold down** this button and the ← will go to the next line that has a number already entered and stop even if you have the button still held down.

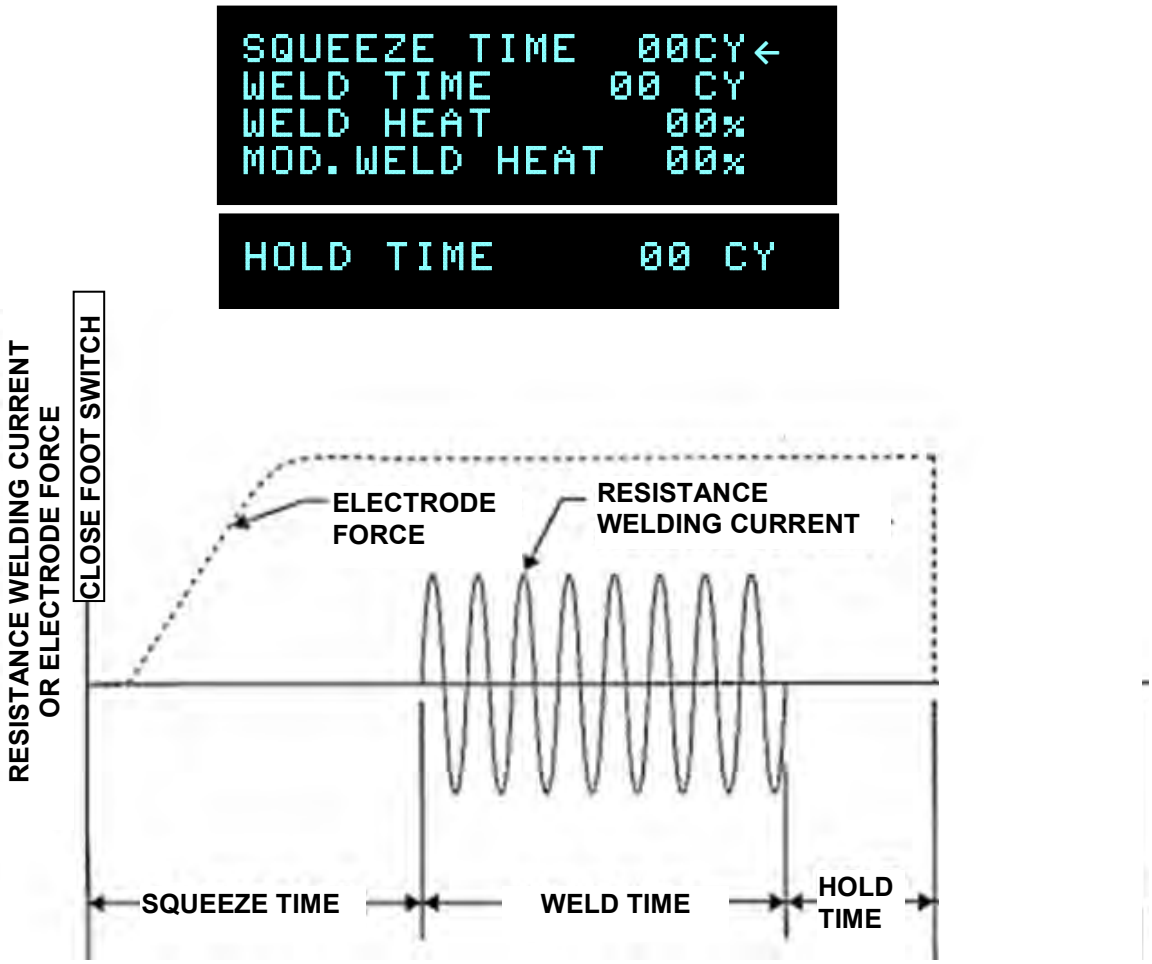
BLOCK — Push this button and the display will move to the **next page** of 4 lines.

BACK — Push this button and the ← will move **up** one line.

Try using these buttons and you will see how easy it is to move through a welding program.

D2. WELDING SEQUENCES

D2.1 BASIC WELDING SEQUENCE: The diagram below shows the welding sequence used for most applications. Lines in the welding schedules are RWMA welding functions. **MOD.WELD HEAT** will be explained later.



BASIC WELDING SEQUENCE

Enter desired values for each line and then push SINGLE, NO WELD or RUN REPEAT

A common error is to enter some value in every line of the **WELDING PROGRAM**. For the majority of welding, you only need the **BASIC WELDING SEQUENCE** above to make great welds.

D2.2 SINGLE, NO WELD, and RUN/REPEAT BUTTONS

Push SINGLE =

When the foot pedal is closed, the control will do **one** weld sequence and open the electrodes. It will not repeat another weld sequence even if the foot pedal remains closed.

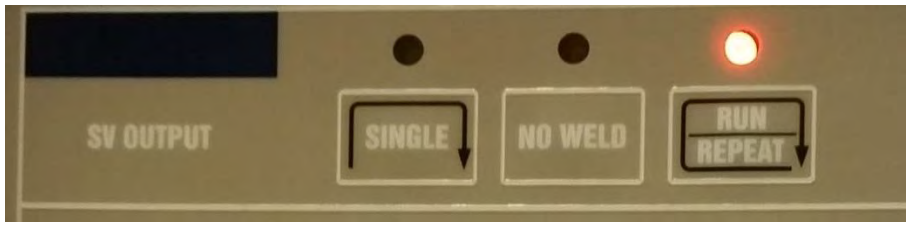
Push NO WELD =

When the foot pedal is closed, the control mechanically go through **one** sequence without passing any welding heat. It will not repeat another sequence even if the foot pedal remains closed.

Push NO WELD NO WELD =

When the foot pedal is closed, the control will mechanically go through **one** sequence without passing any welding heat. It will **repeat** this sequence if the foot pedal remains closed with **REPEAT OFF TIME** (as set in the welding program being used) between the opening of the electrodes and the next closing.

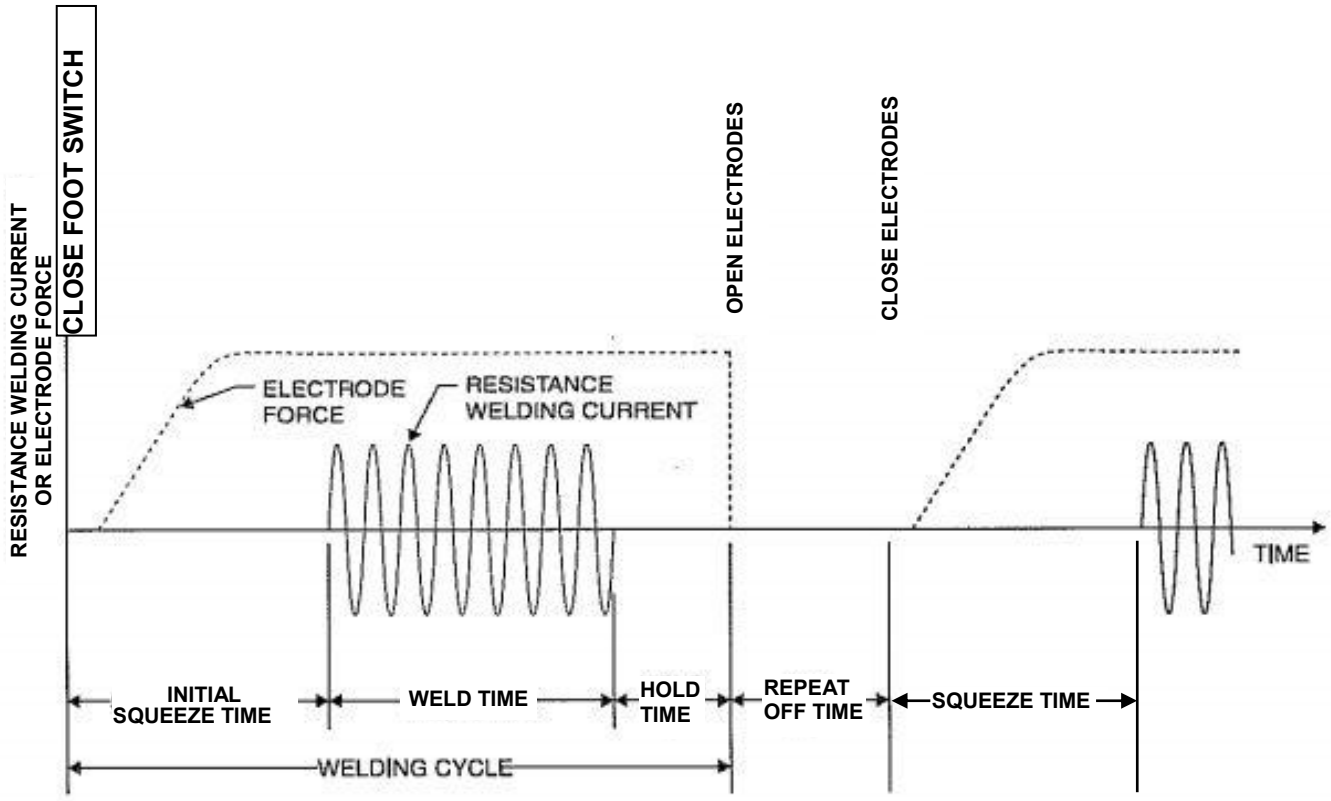
Push RUN REPEAT =



When the foot pedal is closed, the control will go through **one** weld sequence and open the electrodes. It will repeat this sequence if the foot pedal remains closed with **REPEAT OFF TIME** (as set in the welding program being used) between the opening of the electrodes and the next closing.

Before pushing the foot switch to start a weld, be sure that the colored lights are on to represent the way you want to operate the welder.

D2.3 WELD SEQUENCE WITH REPEAT:




```
SQUEEZE TIME   00CY←
WELD TIME     00 CY
WELD HEAT       00%
MOD.WELD HEAT   00%
```

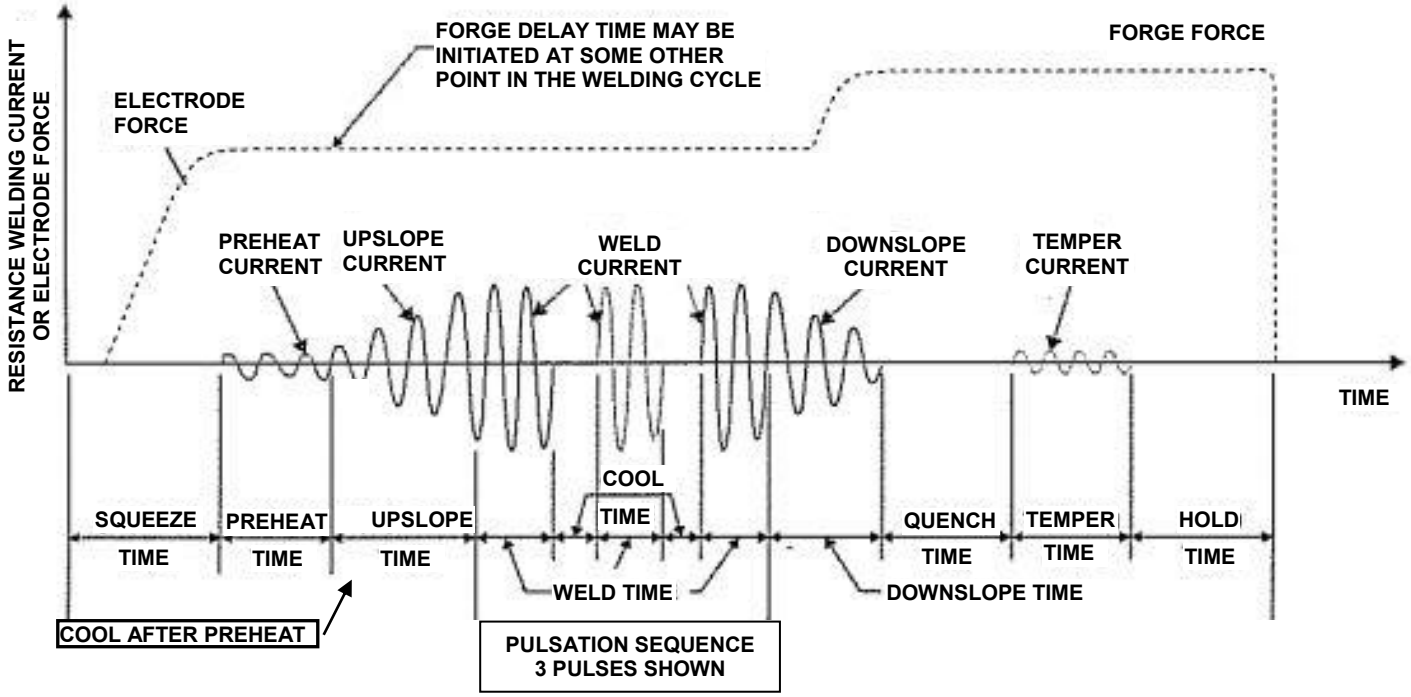
```
HOLD TIME        00CY
REPEAT OFF TIME   00
INITIAL SQUEEZE00CY
```

If you are using the **DIFFERENTIAL PRESSURE TRANSDUCER** in the **QC** control, and you use the transducer per the directions further down in these directions, putting anything in **SQUEEZE TIME** or **INITIAL SQUEEZE** will just increase the time it takes to make each weld and slow down production.

D2.4: If you are **NOT** using the **DIFFERENTIAL PRESSURE TRANSDUCER**, set **INITIAL SQUEEZE TIME** long enough to allow the electrodes to close and get to full weld pressure before starting heat. Then set the **SQUEEZE TIME** to the time it takes to close and get the electrodes to full force between the repeat sequences.

If you set **INITIAL SQUEEZE = 00,** the control will use **SQUEEZE TIME** for all delays.

D2.5: FULL RWMA WELD SEQUENCE



Enter the desired values in each line for the additional RWMA welding function using the sequence above as a guide.

First heat sequence.

Non-heat time after the end of PREHEAT

The sequence **PREHEAT, COOL AFTER PREHEAT, WELD** works amazingly well for welding **GALVANIZED STEEL.** See schedules in the back of this direction book for the **GALVANIZED STEEL** sequence.

```
NUMBER OF PULSES 00←
PULSATION COOL 00CY
```

Number of times the **WELD TIME** will repeat with **PULSATION COOL** cycles between the **WELD** pulses. The example in section D2.4 **3 PULSES** of **2 WELD CYCLES** each.

PULSATION is handy to use when welding thick metal (.120" or thicker). Divide the number of weld cycles found on a welding chart for this thickness by 5 and Set **PULSATION COOL = 3**.

PULSATION can also be useful for welding very near the edge of a sheet. If set properly it will minimize metal expulsion from the edge.

```
UPSLOPE TIME    00CY←
Start USLOPE at 00%
```

Increasing heat starting at the **Start UPSLOPE%** and finishing at the **WELD HEAT%** over the **UPSLOPE TIME.**

```
DOWNSLOPE TIME 00CY←
DOWNSLOPE at END00%
```

Decrease heat starting at the **WELD HEAT%** and finishing at the **DOWNSLOPE at END%** over the **DOWNSLOPE TIME.**

```
POSTHEAT TIME   00CY←
POSTHEAT         00%
```

Fixed heat of **POSTHEAT%** over **POSTHEAT TIME.**

```
QUENCH TIME     00CY
```

QUENCH = non-heat time before **TEMPER** sequence.

```
TEMPER TIME    00 CY←
TEMPER HEAT      00%
```

Fixed heat of **TEMPER HEAT%** over **TEMPER TIME.**

QUENCH & TEMPER sequence is useful for welding spring steel or other higher-carbon metals. The **QUENCH TIME** lets the nugget area cool down, and the **TEMPER TIME** reheats the nugget to a lower temperature to increase ductility of the weld nugget and area around the weld nugget.

```
TRANSFORMER TAP # 3←
```

TYPICAL TAP SWITCH

Enter the position of the welder transformer **TAP SWITCH**. If your welder does not have this switch, enter **1**.

This line will remind the setup person that the transformer **TAP SWITCH** should be set to this number to match conditions when this welding program was originally set up and approved.

If your control has **QC** in the model number, this line will also be used to select the proper **LEARN TABLE** when operating the control in **CONSTANT CURRENT** mode.

```
TIP FORCE    0000 LB←
```

Enter the desired force between electrodes. See **SETTING TIP FORCE CALCULATOR SYSTEM** in section B2 for information on this function.

If your control has **QC** in the model number, it will wait for this selected TIP FORCE to be reached before starting the first weld heat sequence.

D3: START WELDING:

After entering numbers on lines in this program, press: **STEP / ENTER** and the display will show:

```
PROGRAM 005 IS READY
Set TRANSF. TAP TO 3
Set PRES. REG. 35psi
```

Set the **TRANSFORMER TAP SWITCH** to the #3 position.

Set the **AIR PRESSURE REGULATOR** to 35psi.

D4: CHANGING HEAT% ON THE FLY: If you entered values for the **MODIFIED HEAT LIMITS** (see **C3**), you can **increase** or **decrease** the **WELDING HEAT% "on the fly"** without going into the welding program. This can be done even if the keypad is in the **LOCK** position.

Each time you press [+ 1] the **WELD HEAT%** will **increase 1%.** You can do this up until you have reached the limit set in section **C3 (**PROGRAM 978)**.**

Each time you press [- 3] the **WELD HEAT%** will **decrease 1%.** You can do this up until you have reached the limit set in section **C3 (**PROGRAM 978).

If you have pushed these buttons to trim the **WELD HEAT%**, the original **WELD HEAT%** that was set in this welding program will **not** be changed. But the next line will show the current value of **WELD HEAT%** being used:

```
SQUEEZE TIME   15CY
WELD TIME     12 CY
WELD HEAT       80%
MOD.WELD HEAT   87%←
```

This confirms that the WELD HEAT% you are now using (**MOD.WELD HEAT)** is 87%. But the original WELD HEAT% is still 80%. In this way you will not lose the original setting, but can trim it to match changes in material.

This **MOD.WELD HEAT%** will remain the value being used until either:

1. The **WELD HEAT%** value is changed. The **MOD.WELD HEAT%** will change to the new **WELD HEAT%.**
2. You press [STEP / ENTER] when the ← is on the **MOD.WELD HEAT** line. This will change the **MOD.WELD HEAT%** it to match the original **WELD HEAT %** value.

D5. USING THE DIFFERENTIAL PRESSURE TRANSDUCER:

The SOLUTION*i* control, when ordered with the **QC package,** will wait until the **ELECTRODE FORCE** has reached the program selected value before welding.

Use of this **DIFFERENTIAL PRESSURE TRANSDUCER** will eliminate the need for having any **SQUEEZE TIME** in a weld program. This will make the welding sequence as fast as possible while producing high quality welds.

The transducer, if used properly, will eliminate metal expulsion (flash), minimize surface indentation at the weld zone, and extend electrode life.

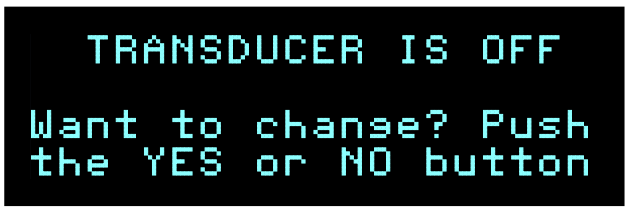
D5.1 SETTING EFFECTIVE CYLINDER AREA:

Before you turn the transducer on be sure that the effective air cylinder area was entered into PROGRAM 979 as directed in sections **B2 through B9.**

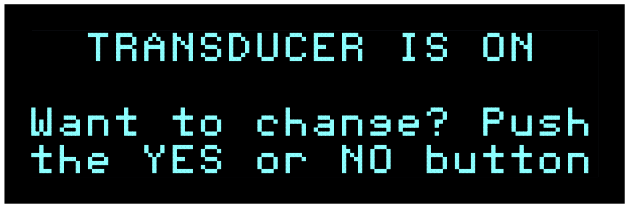
D5.2 TURNING THE TRANSDUCER ON:

Press:

The display will show:



OR



Press YES if the **TRANSDUCER is OFF** is shown.

Press NO if **TRANSDUCER is OFF** is shown.

D5.3 CHECKING TIP FORCE: The display will show:

```
  Check TIP FORCE?

        PRESS
the YES or NO button
```

Press YES and the display will show:

```
   Check TIP FORCE?

Push foot switch or
    Hand buttons
```

Close the foot switch or hand buttons and the electrodes will close. They will stay closed but will not pass any current.

The display will show:

```
  TIP FORCE = ###LB

    When finished
     press STEP
```

The number displayed represents the calculated TIP FORCE.

Remember, this TIP FORCE number is only accurate if you entered the correct information in section **B2 through B9**.

D5.4 CHECKING AIR PRESSURE: Press STEP/ENTER and the display will show:

```
Check AIR PRESSURE?

        PRESS
the YES or NO button
```

Press YES and the display will show:

```
Check AIR PRESSURE?

Push foot switch or
    Hand buttons
```

Close the foot switch or hand buttons and the electrodes will close. They will stay closed but will not pass any current.

The display will show:

```
AIR PRESSURE= ##PSI

   When finished
    Press STEP
```

The number displayed represents the differential air pressure as measured by the transducer.

Press STEP/ENTER and the SOLUTION*i* control will reset and be ready to weld.

SKIP

If your control does NOT have the letters QC in the model number, skip to the next section.

5.5 USING THE PRESSURE TRANSDUCER IN PRODUCTION:

1. Each weld program has a line: `TIP FORCE  0000 LB←`

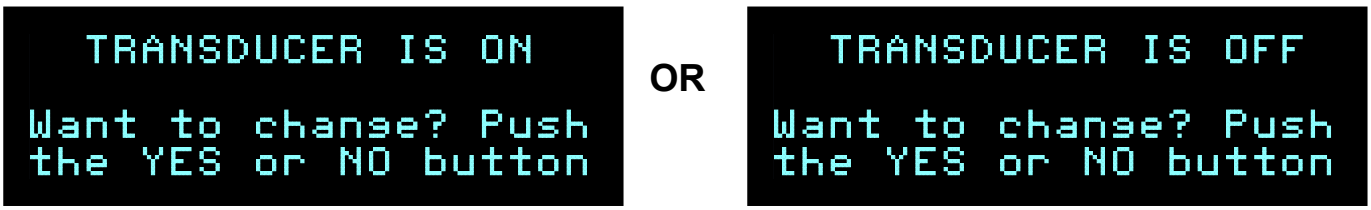
   Enter the desired TIP FORCE for the material being welded.

2. Press SINGLE

3. If you entered the correct information about cylinder area in section B of these directions, the SOLUTION*i* control will display:

4. Set the welding pressure regulator to the value displayed (35psi in this example). If you have the 9181-16 Electronic Pressure Regulator option, this pressure will be automatically set.
5. Before starting production, be sure that this transducer function is turned on. To do this, press:

The display will show:



If it shows **ON,** press 

If it shows **OFF,** press 

6. Press 

7. When you push the foot switch or hand buttons to make a weld, the SOLUTION*i* control will close the electrodes and wait for the air psi, as shown in step 3 above, to be reached. While this is happening, the display will scroll across the bottom: 

8. Once the air pressure has been reached, the control will go through the weld sequence. If the air pressure is NOT reached, this display will continue to be shown until you release the foot or hand switch.

D6. RWMA WELDING SCHEDULES:

Your SOLUTION*i* control is factory programmed with welding schedules for various alloys and metal thicknesses.

The **RWMA** welding schedules are **good starting points**. They assume that the proper electrode face shape is being used. These schedules should get you very close to the desired results.

As shown below, you can trim these schedules to get the optimized weld to match your particular test requirements.

D6.1 SELECTING AN RWMA SCHEDULE:

1. Press: MASTER SETUP PROGRAM MASTER SETUP PROGRAM

The display will show:

```
  900-Enter ALLOY
And GAUGE to select
 RWMA weld schedule
SELECT=YES, SKIP=NO
```

2. Press YES and the display will show:

```
   CHOOSE MATERIAL:
LOW CARBON STEEL =1
Want to change? Push
the YES or NO button
```

If you want to weld LOW CARBON STEEL (CRS), press NO

The display will show:

```
Thinnest metal =00GA

After entering data
    press "YES"
```

3. Enter the thinnest gauge of the parts being welded. Then press YES

4. For example, if you are welding 16 gauge CR to another sheet of CR that is the same or thicker, enter 16 gauge and the display will show:

```
LOW CARBON STEEL 16G
WELDING SCHEDULE=805
  Proceed? Push
the YES or NO button
```

Notice that this preset RWMA schedule is program 805. The next time you want to weld this same material you could just go to PROGRAM 805 directly. This number can also be put on a production sheet. This eliminates the need to go through the questions again.

5. If you want to weld this material, press YES

The display will show:

```
805:  CRS , 16GA-READY
```

D6.2. USING SELECTED SCHEDULE: Press SINGLE and the display will show:

```
PROGRAM 805 IS READY
Set TRANSF. TAP TO 1
Set PRES. REG. 57PSI
```

This Transformer TAP SWITCH position can be changed later if it is not correct for the range of current needed for this part.

Set the pressure regulator to the PSI shown on the display and make a sample weld.

D6.2. TRIMMING THE RWMA SCHEDULE.

If the results are not exactly what you need to pass your quality tests, you can trim the welding program by pushing **STEP / ENTER**

The display will show:

```
SQUEEZE TIME    30CY←
WELD TIME       14 CY
WELD CUR.    11,600A
MOD.WELDCUR  11,600A
```

Press **STEP / ENTER** to see the rest of the RWMA welding schedule.

It is recommended that you only adjust the welding current line. Leave the other values per the RWMA schedule. This should produce the best welds.

The trim changes in this RWMA welding program will stay in this program for future use.

IF YOUR SOLUTION*i* CONTROL DOES NOT HAVE QC IN THE MODEL NUMBER, YOU HAVE TO BE IN CONSTANT VOLTAGE MODE (PROGRAM 997, ENTER, 11). In this case the display will show 00% for the WELD HEAT. To make a starting weld, set WELD HEAT to 50%, make a test weld, and start increasing the WELD HEAT% until you reach the desired weld quality.

D6.3 TAP FAULT FUNCTION:

If the welding current in this program requires that the **WELD HEAT** be set **ABOVE 90%** or **BELOW 60%,** the display will show:

```
ATTN: WELD CURRENT
   too HIGH for
TRANSF. TAP POSITION
TURN TAP SW. HIGHER
```

OR

```
ATTN: WELD CURRENT
   Too LOW for
TRANSF. TAP POSITION
TURN TAP SW. LOWER
```

If you have a **TAP SWITCH** on your welding transformer, to up or down one number and try again. Repeat until the control does not show this phrase.

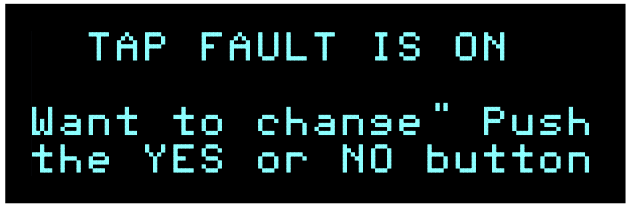
If you do **NOT** have a transformer **TAP SWITCH** on your welder, you can ignore this recommendation.

TYPICAL TAP SWITCH

D6.4 TURNING OFF TAP FAULT FUNCTION:

If you **do not** want this **TAP SWITCH** warning system, press:

The display will show:



To turn this function **OFF,** press 

7. ELECTRONIC PRESSURE REGULATOR **OPTION** 9181-16

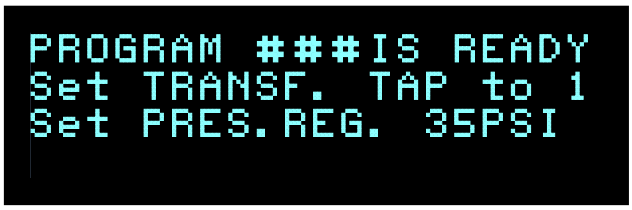
This **option** sets an electronic pressure regulator to provide the requested air pressure in response to the TIP FORCE line in a program. If this option was ordered with your control the system is factory set to operate.

7.1 EQUIPMENT: An electronic pressure regulator has been provided with your control. This unit is installed on your air system in full replacement of the existing mechanical **WELDING PRESSURE REGULATOR.** It should be located **AFTER** the filter and before the oiler.

7.2 OPERATION: Each welding program has a line:

When a value is entered on this line and the 

button is pushed, the display will show:



At this time the **ELECTRONIC PRESSURE REGULATOR** will change to this value and the display on the regulator will confirm the pressure.

Note that the pressure might be as much as 1psi higher than the requested value.

SOLUTION*i* DIRECT ACCESS CHART

DIRECT ACCESS NUMBER / = ENTER	SOLUTION*i* FUNCTION	SECTION	BOOK/PAGE
001-799	**ENTERING WELD PROGRAMS**	D1	D/5
900	**RWMA WELD SCHEDULES**	D6	D/18
901	Enter access number to **RESTORE RWMA SCHEDULES.**	-	-
976	Sets **UNIT NUMBER** for print / communication	-	-
977	Sets weld time **0-99 or 0-999 cy**.	C12	C17
	Select **BEAT** or **NON-BEAT** initiation mode	C12.1	C18
978	Changing **HEAT% ON THE FLY**	D4	D/9
979	Setting **TIP FORCE** system	B2	B/2
	Setting **PRESSURE VARIATION,** +/- window	B3	B/2
	Entering **CYLINDER AREA**	B6	B/9
	FORGE DELAY welders	B7	B/9
	Entering **HEAD WEIGHT**	B8	B/10
	Selecting **TYPE OF WELDER**	B9	B/11
	PRESS WELDER setup	B9.1	B/11
	ROCKER ARM welder setup	B9.2	B/12
980	Keep or reset **MOD HEAT%** after turn off and then turn on.	D4.3	D/9
981	**PRINT ALL WELDS/FAULT WELDS** selection	-	-
982	**FAULT RESET** modes	C5	C/8
983	Setting **CURRENT MONITOR BLANK** cycles	C8	C/11
984	Setting mode for **CURRENT MONITOR**	C9	C/11
	DISPLAY CURRENT only	C9.1	C/12
	COMPARE CURRENT TO LIMITS	C9.2	C/12
985	**FAULT RELAY** mode	C6	C/9
986	**SOFTWARE VERSION**	-	-
	Checking **TIP FORCE**	D5.3	D/11
987/21	**EHR** and Fault **RELAY CLOSING TIME**	C7	C/10
987/71	**60hz** or **50hz** line frequency. Line frequency auto sets. This program is for manual override.	-	-
987/79	**COPY SCHEDULES** from one program to others	D8	D/22
987/80	Configure **SVO OUTPUT**	C10	C/13
	FORGE DELAY	C10.1	C/13
	INTENSIFIER DELAY	C10.2	C/14
	CLAMP DELAY	C10.3	C/15
	Turn on with **LEVEL 2**	C10.4	C/16
	Set system to use **SOFT TOUCH**	C10.5	C/17
987/81	Setting **WELDING TRANSFORMER STYLE**	B12	B/16
987/86	**POWER FACTOR** set. Default 00 = auto P.F.	-	-

SOLUTION*i* DIRECT ACCESS CHART

DIRECT ACCESS NUMBER / = ENTER	SOLUTION*i* FUNCTION	SECTION	BOOK/PAGE
918/91	Setting system for **CYLINDERS OVER 99.9 in^2**	B4.2	B-4
-	**WATER SAVER** function	C-13	C/10
987/92	**CURRENT RANGE.** For factory setting when hardware supports 50KA to 200KA range	-	-
987/93	**RT1 INPUT** assignment:	C14	C/20
	LIGHT CURTAIN	C14.1	C/21
	RETRACT SWITCH	C14.2	C/21
	PART IN PLACE SWITCH	C14.3	C/22
	WATER FLOW SWITCH	C14.4	C/23
	LIMIT SWITCH	C14.5	C/23
987/96	Setting **SECURITY LEVEL** for keylock switch	C2.2	C/4
987/99	Setting **SECONDARY CURRENT MONITOR RANGE**	B.13	B/17
991	Setting **COUNTING SYSTEM**	C1	C/1
991	Setting **BATCH COUNTER**	C1.1	C/1
993	Selecting **FULL or HALF CYCLE** count	C11	C/16
996	Using the **DIFFERENTIAL PRESSURE TRANSDUCER**	D5	D/10
997/21	**LEARN CURVE** for **CONSTANT CURRENT**	B14.3	B/22
997/31	Checking **WELD CURRENT** results from last weld. Lists every ½ cycle value and corrections made.	-	-
997/62	Check **LEARN CURVE** values for 40% - 90% weld heat. Values should be progressively higher.	-	-
997/72	**TAP FAULT** function	D6.3	D/16
997/99	Setting **BYPASS KEYLOCK SECURITY CODE**	C2.3	C/4
-	**WELDING SCHEDULE** library	-	D/19

Unitrol Electronics, Inc.
702 Landwehr Road
Northbrook, IL. 60062
WEB: unitrol-electronics.com
Email: techsupport@unitrol-electronics.com