Your SOLUTION control has been factory calibrated to match a Unitrol standard. Unfortunately there is no practical U.S. standard for calibration of non-sinusoidal AC current produced by a resistance welding machine. This means that a measurement made by different models and brands of monitoring systems will be different for the same actual current.

Before going any further, check to be sure that the setting of the DIP switches inside the SOLUTION control, and the current range in PROGRAM 87/ENTER/99 are the same. If in doubt, check the direction book for this. If the DIP switch setting and the program settings do not match, the readings can be off as much as 10 times!

To change the factory calibration so that the SOLUTION will more closely match another standard, do the following steps:

1. Install a clean set of electrodes in the welder. If possible, use straight electrodes (not offsets of swivel types), and with one flat surface and one 2" radius electrode. Align electrodes and use a file and fine grit cloth to be sure that the electrodes are in full surface contact.

2. Set the air pressure to the maximum that can be handled by the welder without mechanically damaging the electrodes (80 psi if possible) and set the transformer tap switch to the lowest number.

3. Press: **PROGRAM, 83, ENTER**, and set BLANKING to 03

4. Press: **PROGRAM, 97, ENTER, 11** and be sure control is in **CONSTANT V MODE.**

5. Install the current pickup coil from the external current monitor being used as your standard next to the current pickup coil from the SOLUTION control. Be sure that the splice on both controls is hanging down towards the floor.

6. Set the monitor range to produce maximum accuracy and still handle the full current output of the welder. Set the BLANK cycles on the monitor to 03.

7. Press: **PROGRAM, 84, ENTER**, and set to: **I-READ ONLY = 1.**

8. Select a program number for testing the low current range. If you are not already using **PROGRAM 70,** use this program.

9. Step down into the program and set:
   a. **SQUEEZE TIME = 75**
   b. **WELD TIME = 06**
   c. **WELD HEAT = 40%**
   d. **HOLD TIME = 01**

   Be sure that no other welding settings (ie. PREHEAT, UPSLOPE, etc.) are in this program. The SOLUTION is designed to read only current produced during the WELD portion, while an external monitor reads and <u>averages</u> the entire heat envelope (from PREHEAT to TEMPER).

10. Select another program number for the low high current range. If you are not already using **PROGRAM 71,** use this program

11. Step down into the program and set:
   a. **SQUEEZE TIME = 75**

    b. **WELD TIME = 06**

    c. **WELD HEAT = 80%**

    d. **HOLD TIME = 01**

Be sure that no other welding settings (ie. PREHEAT, UPSLOPE, etc.) are in this program.

SETTING SPAN VALUE

12. With the control in **PROGRAM 71**, initiate the weld control (foot pedal or hand buttons). It is not necessary to have metal between the electrodes. Just be sure cooling water is turned ON.

13. Write the current measured by the SOLUTION and the monitor on the 80% line in the attached chart, trial #1.

14. Calculate the **DIFFERENCE AT 80%** between the monitor and SOLUTION on the first line:

DIFFERENCE at 80% = MONITOR READING – SOLUTION READING

   Write this number in the last column after the = sign.

15. Now press: **PROGRAM, 71, ENTER** to select the 40% heat setting.

16. Initiate the weld control again.

17. Calculate the **DIFFERENCE** at 80% between the monitor and SOLUTION on the second line:

DIFFERENCE at 40% = MONITOR READING – SOLUTION READING

MATH NOTE: Subtracting a negative (-) number actually means you will be *adding* that number. For example:

DIFFERENCE at 80% = -350A
DIFFERENCE at 40% = -460A
80% - 40% DIFFERENCE = -350 – (-460) = +110A

DIFFERENCE at 80% = +180A
DIFFERENCE at 40% = -90A
80% - 40% DIFFERENCE = 180 – (-90) = +270A

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18. Press: **PROGRAM, 97, ENTER, 91.** Press STEP once. The display will alternately show:

I SPAN 50

CHANGE1=YES,0=NO

where 50 is the typical factory set number. If calibration was made at another time, this number may be some other value. This **I-SPAN** number is actually a multiplier of the signal. Increasing **I-SPAN** will make the current readings *higher*.

Mark this **I SPAN** number in the SPAN box of TRIAL #1. Then press: 1 (to change).

If 80**% - 40% DIFFERENCE** is **positive (+)**, *decrease* **the I SPAN** ## by a small amount (3-5)

If **80% - 40% DIFFERENCE** is **negative (-)**, *increase* **the I SPAN##** by a small amount (3-5)

19. Repeat steps #12 through #18 until the actual **80% - 40% DIFFERENCE** is *as close to zero (0) as possible.*

SETTING ZERO VALUE

20. Set the welder in PROGRAM 70 and initiate the control again.

21. Calculate the **ZERO ERROR** as follows:

I ZERO ERROR = MONITOR READING - SOLUTION READING

Press: **PROGRAM, 97, ENTER, 91.** The display will alternately show:

I ZERO SUBTRACT	**OR**	I ZERO ADD

CHANGE1=YES,0=NO

22. If the **I ZERO ERROR** is negative (MONITOR READING is **lower** than SOLUTION READING), press 1 or 0 to select **I ZERO** SUBTRACT.

If the **I ZERO ERROR** is positive (MONITOR READING is **higher** than SOLUTION READING), press 1 or 0 to select **I ZERO ADD**.

23. The display will now show:

I ZERO SUBTRACT I ZERO = - ####A	**AND**	I ZERO ADD I ZERO = + ####A

CHANGE1=YES,0=NO

24. Enter the **ZERO ERROR** from step 21.

25. Check the settings by initiating the control (still in PROGRAM 70) and comparing the monitor to the SOLUTION values. Do the same for PROGRAM 71.

26. The values in each range should be within 1% of the range setting of PROGRAM 87, ENTER, 99:

<div align="center">

10K RANGE = +/- 100A
25K RANGE = +/- 250A
50K RANGE = +/- 500A
150K RANGE = +/- 1,500A

</div>

If there are any problems with this calibration, contact the Unitrol service department at 847-480-0115.

WORK SHEET #1

Adjust I SPAN until the **80% - 40% DIFFERENCE** is as close to 00 as possible.

TRIAL ##	I SPAN	WELD HEAT	MONITOR READING	SOLUTION READING	
1		80%	-	=	-
		40%	-	=	
			80% - 40% DIFFERENCE =		

TRIAL ##	I SPAN	WELD HEAT	MONITOR READING	SOLUTION READING	
2		80%	-	=	-
		40%	-	=	
			80% - 40% DIFFERENCE =		

TRIAL ##	I SPAN	WELD HEAT	MONITOR READING	SOLUTION READING	
3		80%	-	=	-
		40%	-	=	
			80% - 40% DIFFERENCE =		

TRIAL ##	I SPAN	WELD HEAT	MONITOR READING	SOLUTION READING	
4		80%	-	=	-
		40%	-	=	
			80% - 40% DIFFERENCE =		

TRIAL ##	I SPAN	WELD HEAT	MONITOR READING	SOLUTION READING	
5		80%	-	=	-
		40%	-	=	
			80% - 40% DIFFERENCE =		

TRIAL ##	I SPAN	WELD HEAT	MONITOR READING	SOLUTION READING	
6		80%	-	=	-
		40%	-	=	
			80% - 40% DIFFERENCE =		

WORK SHEET #2

Adjust I SPAN until the **80% - 40% DIFFERENCE** is as close to 00 as possible.

TRIAL ##	I SPAN	WELD HEAT	MONITOR READING	SOLUTION READING	
7		80%	-	=	-
		40%	-	=	
			80% - 40% DIFFERENCE =		

TRIAL ##	I SPAN	WELD HEAT	MONITOR READING	SOLUTION READING	DIFFERENCE
8		80%	-	=	-
		40%	-	=	
			80% - 40% DIFFERENCE =		

TRIAL ##	I SPAN	WELD HEAT	MONITOR READING	SOLUTION READING	
9		80%	-	=	-
		40%	-	=	
			80% - 40% DIFFERENCE =		

TRIAL ##	I SPAN	WELD HEAT	MONITOR READING	SOLUTION READING	
10		80%	-	=	-
		40%	-	=	
			80% - 40% DIFFERENCE =		

TRIAL ##	I SPAN	WELD HEAT	MONITOR READING	SOLUTION READING	
11		80%	-	=	-
		40%	-	=	
			80% - 40% DIFFERENCE =		

TRIAL ##	I SPAN	WELD HEAT	MONITOR READING	SOLUTION READING	
12		80%	-	=	-
		40%	-	=	
			80% - 40% DIFFERENCE =		