HOW SYSTEM OPERATES

This system uses two separate circuit board components that must work together to produce accurate results. The boards are mounted on top of the other and are located inside the SOLUTION enclosure.

PWM control: The Unitrol SOLUTION computer supplies the **upper** board of the two board set with a variable width pulse that is proportional to the desired air pressure:

```
0 psi. = 10ms
99 psi = 500 ms.
```

This pulse width signal is converted by the upper board to a voltage where:

```
0 psi. = 1.0 VDC
99 psi.= 5.0 VDC
```

PRESSURE SETTING: This "reference voltage" is sent from the upper board to the lower board through a ribbon cable. The lower board now uses this voltage as a reference against the output of its internal pressure transducer.

If the pressure read on the lower board's internal transducer is HIGHER than the reference voltage, a BLEED air valve is opened on this lower board to reduce the air pressure.

If the pressure read on the lower board's internal transducer is LOWER than the reference voltage, a FEED air valve is opened on this lower board to increase the air pressure.

By opening the BLEED or FEED air valves, the pressure sent out of the board (through the "R" port) should match the requested value.

This output pressure is sent by a 1/4' polyflow tube from this "R" port to the remote pressure regulator supplied with this option. This remote regulator sets the full flow air pressure going to the welder to this same value (1:1 ratio regulator).

CALIBRATE PRESSURE TRANSDUCER FIRST

Before attempting to adjust the electronic pressure regulator, **be sure** that the pressure transducer has been calibrated accurately. See technical bulletin: **Field Calibration of the 9181-05 pressure transducer**. It is important that the pressure transducer and the electronic pressure regulator systems are calibrated as a set. Note that the pressure transducer should have been calibrated to display 1psi above the reading of a calibrated accurate pressure gauge.

SETTING SOLUTION CONTROL

A1 Set **PROGRAM 96** for **PRESS. TRANSD. ON**.

A2. Press: **PROGRAM, 79, ENTER**, and write down the **HEAD WEIGHT** and **LB/PSI** values. Now for purposes of this calibration procedure, temporarily change these settings for: **HEAD WEIGHT** = **00**, and **LB/PSI** = **01**. You will be putting the original values back into this program after the calibration has been completed.

A3. In **PROGRAM 60**, set **TIP FORCE = 05**. If another value is already in this program, write it down for replacement after the calibration.

A4. Press **NOWELD** and the display should show: **SET AIR AT 05 PSI**.

A5. In **PROGRAM 61**, set **TIP FORCE = 80**. If there is another value in this program, write it down and put this value back after the calibration.

A6. Press **NOWELD**, and the display should show: **SET AIR AT 80 PSI**.

ADJUSTMENT OF ZERO SETTING ON UPPER BOARD:

PURPOSE: To set the low end of the electronic regulator to a value 1 psi **higher** than the reading of the pressure transducer.

B1. Press: **PROGRAM 60, ENTER, NOWELD**, and the display should show: **SET AIR AT 05 PSI**. The pressure regulator should now have changed the air pressure to a low value near 5 psi.

B2. Press: **PROGRAM 96, ENTER**. Step down until the line **CHECK INPUT**. Press **1**, and the display will show: **PLEASE INITIATE**.

B3. Initiate the control by closing the welder foot switch or hand switches. The electrodes. **The electrodes will now come together but no welding will occur.** Releasing the switch will still leave the electrodes closed.

B4. Read the psi value on the control display. Keep in mind that this calibration will not be meaningful if the pressure transducer system has not been previously calibrated to a known standard.

B5. If the reading is **lower or higher** than **6** psi, locate the **ZERO** adjustment multiturn potentiometer on the rear edge of the upper board. Adjust this slotted adjustment until the display shows 6 psi. Note that reading will typically move up and down 1 psi. Make your adjustment so that the reading is a **minimum** of 6 psi.

ADJUSTMENT OF SPAN ON UPPER BOARD:

C1. Now press: **PROGRAM 61, ENTER, NOWELD**. The display should show: **SET AIR AT 80 PSI**. The regulator should now change to a high pressure setting.

C2. Press: **PROGRAM 96, ENTER**. Step down until the line **CHECK INPUT**. Press **1**, and the display will show: **PLEASE INITIATE**.

C3. Initiate the control by closing the welder foot switch or hand switches. The electrodes should close. **The electrodes will now come together but no welding will occur.** Releasing the switch will still leave the electrodes closed.

C4. Read the psi value on the control display. Keep in mind that this calibration will **not** be meaningful if the pressure transducer system has not been previously calibrated to a known standard.

C5. If the reading is **lower or higher** than **81** psi, locate the **SPAN** adjustment multiturn potentiometer on the rear edge of the upper board. Adjust this slotted adjustment until the display shows 81 psi. Note that reading will typically move up and down 1 psi. Make your adjustment so that the reading is a minimum of 81 psi.

C6. Since changes on SPAN or ZERO can effect each other, **repeat steps B1 through C5 until pressure read at 6 psi and 81 psi both values remain correct.**

The pressure transducer and the electronic pressure regulator should now be calibrated. It is recommended that this procedure be repeated every 6 months.

INSTALLING ORIGINAL VALUES INTO THE SOLUTION CONTROL:

LOAD ORIGINAL HEAD WEIGHT AND LB/PSI VALUES BACK INTO PROGRAM 79.

If schedules were originally in PROGRAM 60 and 61, change the TIP FORCE values to the original ones as noted in steps A3 and A5.

POSSIBLE PROBLEMS DURING PRODUCTION USE OF THIS CONTROL:

ELECTRODES STAY CLOSED BUT WILL NOT CONTINUE THROUGH WELD SEQUENCE: When using the welder in production, if the electronic pressure regulator system is producing a pressure that is lower than that expected by the pressure transducer, the control will keep the electrodes closed and display: **WAIT: TIP FORCE** (or LOW TIP FORCE in older software). If this happens, go through the calibration sequence again.

ELECTRODES CLOSE, SYSTEM WAITS FOR AN UNUSUALLY LONG TIME, AND THEN GOES THROUGH WELD SEQUENCE: If the regulator sets pressure that is just barely at the set point, the control will wait for the "last drop" of air to enter the cylinder before satisfying the pressure transducer while displaying: **WAIT: TIP FORCE** (or TIP FORCE LOW on older software). In this case, adjust the SPAN potentiometer clockwise just slightly on the upper board and try to operate the welder again.

If you need assistance, call the Unitrol service department at 847-480-0115 or Email at www.unitrol-electronics.com.