



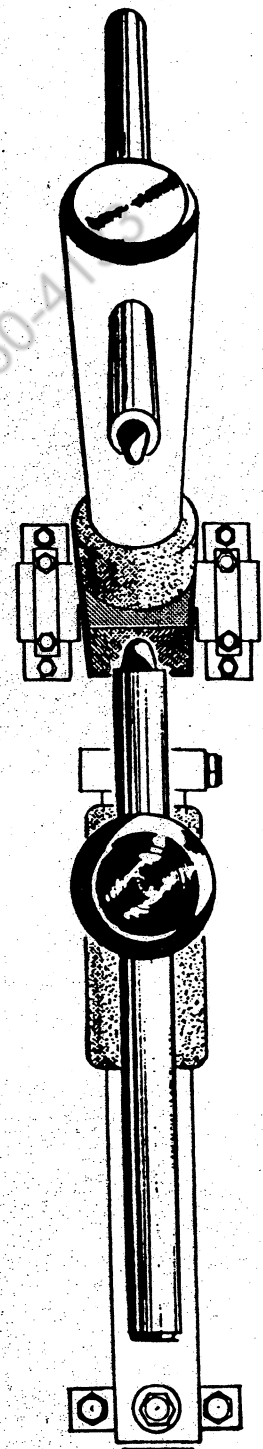
WESTERN ARCTRONICS

FULLY AUTOMATIC

SPOT WELDER

SERIES
165

**Operating
and
Service
Instructions**



1.0 Uncrate welder. Check to be sure the following parts are included with the welder:

- 1.1 Foot switch with cord and plug attached.
- 1.2 Set of arms.
- 1.3 Set of tip holders, tips and water hoses.

2.0 PRE-TEST FUNCTIONS

- 2.1 Install arms. (DO NOT install tip holders, tips and hoses at this time.)
- 2.2 Adjust vertical throat distance (arms center-to-center) as required.
- 2.3 Set OPERATE/OFF/TEST switch to OFF (center position.) Refer Photo 1.
- 2.4 Connect unit to power source.
- 2.5 Connect foot switch
- 2.6 Set Range switch in any position.
- 2.7 Set Sequence timers to approximately the following positions:

Squeeze,.....	60
Weld,.....	30
Cool,.....	60
Off,.....	60
- 2.8 Set REPEAT/NON REPEAT switch to NON REPEAT POSITION.
 - 2.8.1 Note: On some units a weld/no weld switch is incorporated in the sequencer. Place this switch in weld position.

PHOTO 1

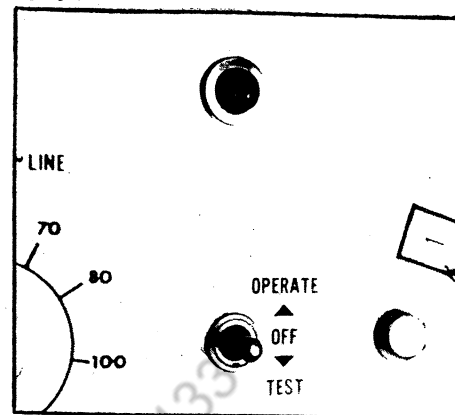


PHOTO 2

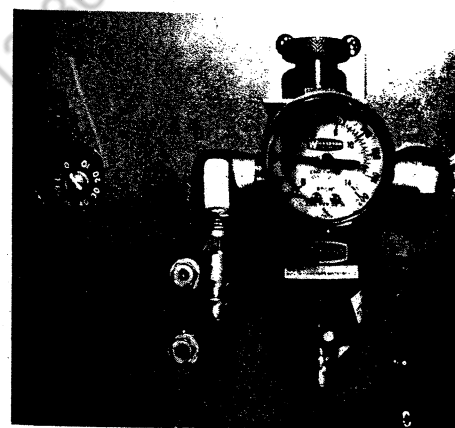
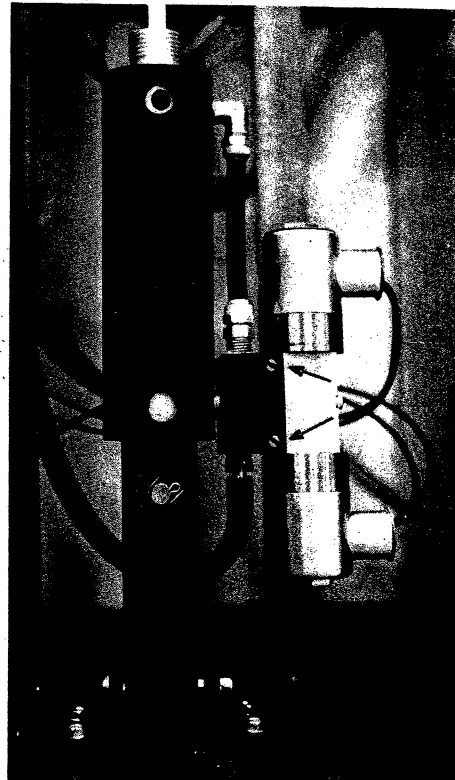


PHOTO 3



3.0 ADJUSTMENT

- 3.1 Connect air supply and adjust regulator to approximately 35-40 lbs. Refer Photo 2
- 3.2 Adjust pressure switch to approximately 50 lb. (Stops sequence on "SQUEEZE" cycle). Refer Photo 2
- 3.3 Set OPERATE/TEST switch to TEST. Refer Photo 1
- 3.4 Depress foot switch slowly to first position (approximately $\frac{1}{2}$ pedal travel) until arms close.
 - 3.4.1 Note: Two separate switches are incorporated in the foot switch assembly. The one which closes at the approximately mid-travel point actuates only the air cylinder to cause the arms to "squeeze"; when fully depressed, the second switch section closes allowing the sequencer to continue through its entire cycle.
- 3.5 Reduce pressure switch setting until arms open. Refer Photo 2.
- 3.6 Regulate arm travel speed.
 - 3.6.1 Depress foot switch to first (mid-travel) switching position to actuate arms. Adjust cylinder extend flow control until arm requires approximately one second to complete travel. Adjust cylinder retract flow control until arm requires approximately one second to complete reverse travel.
 - 3.6.1.1 Note: Turn flow control screw clockwise for slower movement, counter clockwise for faster movement. Lower adjust screw controls cylinder extend speed, upper adjust screw controls cylinder retract speed. Refer Photo 3.

- 3.7 Disconnect air supply.
- 3.8 With arms parallel, install tip holders, tips and hoses and adjust until tips make contact.
- 3.9 Connect air supply (which raises upper arm) and reduce tip spacing 1/4 (one-fourth) inch by adjusting tip holders.

4.0 FUNCTIONAL TEST

- 4.1 Connect water supply and adjust to approximately 20 lbs. pressure.
- 4.2 Set OPERATE/TEST switch to operate. Refer to Photo 1
- 4.3 Unit is now ready for operation.
 - 4.3.1 CAUTION: Do not operate unit without work between tips when in "WELD" condition or tips will be damaged.
 - 4.3.2 NOTES: This unit is equipped with an automatic re-cycle feature. When the foot switch is released completely, the automatic cycle stops and the arms immediately open. This feature allows re-positioning of the work after the foot switch has been depressed to the mid-travel position and the arms have "squeezed", and prior to initiation of the "weld" portion of the cycle.

5.0 OPERATIONAL ADJUSTMENTS

- 5.1 Once items 2.1 through 3.9 have initially been accomplished, individual adjustments in pressure, arm travel speed, etc. may be made with tip holders and tips installed.
- 5.2 Squeeze pressure at the tips can be controlled by varying air pressure at the regulator. (Increasing regulator pressure increases tip pressure.) If regulator pressure is changed, this directly affects cylinder extend and retract speeds and also the pressure switch adjustment. Consequently, any change in regulator pressure will require readjustment of pressure switch and air cylinder flow controls.
- 5.3 A direct relationship exists between air cylinder operating speed and the "OFF" timer of the sequencer. If the operating speed of the air cylinder is less than the "OFF" time set on the OFF timer of the sequencer, the arms will not fully open but will start to close before full open position is reached.
- 6.0 The HEAT CONTROL SWITCH has numbers from 1 to 5 on welders below the 40 KVA size and from 1 to 7 on the 40 KVA size. The knob with the pointer is used to set the desired heat for welding. Be sure the pointer is pointing directly to a number and not between the numbers. The best rule to follow for setting this switch is to test-weld by starting at the lowest heat you think is needed to get the desired weld. If weld is not good enough, the pointer should be turned to the next higher number and increased as necessary to secure the best weld. If the metal burns badly and leaves a depression with rough surface and sparks fly from the weld, it is an indication that the heat is too high-- therefore, the pointer should be turned back to a lower number until this does not occur.
- 7.0 Set squeeze timer to somewhere between a minimum of 6 cycles and a maximum of 30 cycles, depending on the amount of time you determine it will take to completely compress the pieces together. Any longer period would be a waste of time.

- 8.0 The Weld Time Timer should always be set the lowest number of cycles possible to secure a good weld. To increase the cycles on this timer is to prolong the time the heat is being applied. If the heat is not hot enough to liquify the metals enough to fuse the pieces together, you only get a hot spot with no weld. The prolonged weld time is hard on the tips and will cause them to burn which will necessitate dressing frequently. Always remember to use the highest heat number possible on the Heat Switch and the lowest possible number of cycles on the Weld Timer to get the desired weld.
- 9.0 Set COOL TIMER to minimum of 6 cycles for the thinnest metals, increasing the cycles as the thickness of the metal increases. This holds the metals together until the weld solidifies. Too short of a period might allow the metal to pull apart or cause a weak weld.
- 10.0 Set OFF TIMER to any desired cycle which will allow for re-position of metal for the next weld. If a very short time is required, the cycles should be low and higher if the materials are difficult to position. This is true only on automatic repeat operation.
- 11.0 Select the material you intend to weld and set the heat switch and the four timer dials according to the above instructions--and with the switch on the "NON REPEAT" position, place the material between the tips with the metal resting on the lower tip and press the foot switch. The welder should complete one weld and stop with upper arm raised. This same action can be repeated by simply raising your toe on the foot switch and then depressing it again. If the weld is satisfactory, you are ready to try the repeat operation. Flip the toggle switch to the "REPEAT" position--then with the material in position and ready to be moved as soon as the first weld is completed, press the foot switch and hold it down until you want the operation to stop, repositioning the metal after each stroke of the upper arm.

NOTE: If the weld is not good enough and the indications are that the metal has not fused together, set the HEAT SWITCH TO THE NEXT HIGHEST NUMBER ON THE DIAL.

Remember that the best welds are obtained at the lower cycle periods of the weld timer rather than increasing the cycles until the metal has been heated at the low heat setting of the HEAT SWITCH. Of course, the thicker the metal, the longer it takes to heat through the metal sufficiently to make the metal fuse together. If the spot appears to be indented too much and the cooled spot appears to be thin, it is evidence of too much air pressure--and the pressure should be reduced by backing the gauge down by use of the regulator. This, in turn, will require resetting of the air pressure switch as defined in Section 5. If the action of the REPEAT setting is too rapid to give time for repositioning of the metal, just increase the OFF TIME cycles to allow necessary time for positioning of metal. If this time is not sufficient, simply set the machine to NON REPEAT and make welds as fast as you are able to get the material in position for welding by pressing the foot switch as soon as you are ready for the next weld.

OPERATIONAL SEQUENCE

Bulletin 601

Circuit Function Description (Ref. Schematic # 11005)

- S 1 - DPDT, Switches control power and contactor coil.
- S 1 A- Controls 230V input power to step-down control transformer (115V sec).
Transformer is energized in either "Operate" or "Test" position.
- S 1 B- In series with contactor coil. In operate position, allows contractor S 5 to function and weld to be made. In test position, prevents contactor S 5 from energizing main transformer. All functions are normal and cycle is completed without actual weld being made.
- S 2 - Foot Switch
This unit contains two SPDT micro switches which are adjusted to operate at different pedal positions.
- S 2 A- SPDT
When foot switch is released, N.C. contacts enable relay K 6 which enables air off solenoid, opening arms. When foot switch is depressed to approximately mid-travel position, N.O. contacts close, disabling K 6 which disables air off solenoid and enables air on solenoid, causing arms to close.
- S 2 B- N.O. contacts in series with output of squeeze timer. Holds cycle in squeeze condition until foot pedal is fully depressed. Then automatic sequence continues.
- S 3 - On early models only. S 3 B performs same function as S 1 B. S 3 A controls illumination of weld indicator lamp in sequencer only.
- S 4 - SPST
Open to Repeat. (on sequencer panel) When closed, maintains holding voltage on all sequence timers to prevent return to reset condition. This holds sequencer in arms retracted position until foot switch (S 1) is fully released and then depressed. (Semi-automatic operation).

When open, holding voltage is removed from all sequencer timers when cycle is complete allowing a reset and allowing "air on" solenoid to be energized, starting new cycle.

S 5 - Main Contactor

Switches 230 volt power to welding transformer. Functions only in "operate" position of S 1. (On older models, S 3 must also be in "weld" position).

S 6 - Pressure Switch

A diaphragm operated micro switch senses pressure in the extend position of the air cylinder. When the desired preset tip squeeze pressure is reached, this switch closes, applies power to the squeeze timer and starts the automatic sequence timing.

V 1 - Air on (cylinder extend) solenoid valve.

Allows air to enter the lower end of the air cylinder, causing the piston to operate the upper arm and start the tip squeeze cycle.

V 2 - Air off (cylinder retract) solenoid valve.

Allows air to enter the upper end of the air cylinder, causing the piston to retract and open the arms.

V 3 - Water Solenoid Valve.

Controls flow of cooling water to tip holders and tips. Opens at start of weld cycle and closes at sequencer reset.

T 1, T 2, T 3, T 4

Identical timing circuits, adjustable from approximately 1 cycle to 60 cycles. Allow individual preferred timing of each of the four sequence functions.

K 1 - Energizes when cool timer relay K 4 closes. Opens control circuit to V 1 and keeps entire sequencer circuit energized until OFF timer relay K 5 energizes which then resets entire sequencer and allows cycle to repeat. (If foot switch S 2 is kept fully depressed).

K 2 - Squeeze timer relay. After V 1 has been energized and S 6 closes, power is applied to T 1. When T 1 times out K 2 closes and disables air solenoid V 1; also applies control power to S 6 B which, when closed, starts the weld cycle timer and weld operation.

K 3 - Weld timer relay. Until T 2 times out, the N. C. position of this relay allows power to be applied to the main contactor S 5. This energizes the main transformer and the weld operation is performed. When T 2 times out, K 3 energizes, latches in and de-energizes S 5, stopping the weld function; enables T 3.

K 4 - Cool timer relay. When timing circuit T 3 times out, K 4 is energized. This applies control power to timing circuit T 4 (off timer), energizes K 1, (refer to description of K 1) and energizes V 2 (air off solenoid).

K 5 - Off timer relay. When timing circuit T 4 times out, K 5 energizes, disables V 2 and removes power from the hold-in circuit thru K 1 to T 1, allowing the entire timing sequence to reset to a ready-to-repeat condition.

K 6 - Manual stop & release relay. This relay is controlled by a N. C. set of contacts in S 2 A. When the foot switch (S 2) is depressed, this relay is de-energized which allows normal fully automatic operation of the welder. When the foot switch (S 2) is completely released, K 6 is energized which immediately stops the cycle and returns the welder to a reset or ready-to-repeat condition. (refer to description of operation given for S 2 A).

INDICATOR LAMPS

L 1 - With switch in S 1 in Test Position, contactor is inoperable and lamp indicates power ON.
With switch in Operate position, contactor is operable and lamp indicates power ON and ready for weld.

L 2 - Indicator lamp indicates squeeze timer ON. The time of illumination is controlled by time adjustment. Light will stay on till weld and cool cycle is completed.

L 3 and L 4 - Indicator lamps indicates duration of weld and cooling cycle. The time of illumination is controlled by time adjustment.

L 5 - Indicator lamp signals end of entire performance cycle. The time of illumination is controlled by time adjustment. A somewhat longer time duration for this function is advised so that work piece can be properly reset for next welding cycle.

CINCINNATI PRECISION MACHINERY 513-860-4133

TRUBLE SHOOTING THE FULLY AUTOMATIC SPOTWELDER

Bulletin 602

CORRECTIVE ACTION

SYMPTOM

PROBABLE CAUSE

Welder operates normally for short period of time - then blows fuse or trips circuit breaker.

Fuse or breaker size insufficient.

Consult manual for correct power source requirements.

Foot switch depressed to Mid-travel position - arms do not close.

Main fuses or breaker open.

Replace fuses or reset breaker.

Control transformer defective.

Replace.

Insufficient or no air pressure.

Re-adjust regulator to increase pressure. Consult set-up and operating instructions.

Fuse F 1 blown.

Replace.

TEST /OPERATE switch in OFF Position.

Switch to OPERATE position.

Switch S2A defective.

Replace.

Contacts of relay K1 (in sequencer) not making contact.

Replace Relay.

K6 contacts not making contact.

Replace Relay.

Cool timer defective.

Replace timer (See emergency procedure. Note 2)

"AIR ON" solenoid coil defective.

Replace coil.

Air cylinder valving block dirty - valve sticking.

Disassemble, clean and reassemble.

Squeeze timer defective.

Replace timer

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
With foot switch fully depressed, arms close out weld cycle does not function.	TEST/OPERATE switch in TEST position. Air pressure switch (S6) set too high or defective. Weld timer defective.	Switch to OPERATE position Reduce pressure setting or replace switch. Consult set-up & operating instructions. Replace timer.
Switch S2B defective or not closing when foot pedal is fully depressed.	Main contactor (S5) not operating.	Adjust or replace switch S2B. Repair or replace.
On older models, S3 (Weld/no Weld) switch in NO weld position.	Squeeze timer defective.	Replace timer
Heat selector switch detent not functioning properly. Switch contacts not positioned properly.	Water supply not turned on.	Switch to WELD position. Verify selector switch properly positioned.
No cooling water flow during weld & cool cycles.	Water solenoid V3 not functioning.	Verify water supply on. Repair or replace solenoid valve.
Continuous water flow	Water lines clogged or corroded.	Disconnect lines at various points and verify water flow point-to-point thru system.
Dirt particles in valve seat.	Water solenoid V3 not closing.	Switch S2B shorted. Replace. Disassemble & clean valve.

SYMPTOM

PROBABLE CAUSE

CORRECTIVE ACTION

Sequence is normal, weld indicator L 1 illuminates but no weld is made.

TEST/OPERATE switch in TEST position.

Switch to OPERATE position.

Contactors defective.

Replace contactors. (See Note 1)

Switch S 1 defective.

Replace

Cool timer defective.

Replace

Weld cycle completed-arms will not retract.

OFF timer defective.

Replace

AIR OFF solenoid defective.

Replace

Air cylinder valving block dirty-valve sticking.

Disassemble & clean valving block.

Relay K 6 contacts not making contact.

Clean contacts or replace relay.

Weld cycle will not terminate without releasing foot switch.

Weld timer defective.

Replace

Arms close immediately upon re-turning to open position. "OFF" delay time not adjustable.

OFF timer defective.

Replace

Sequence will not repeat automatically.

OPEN to REPEAT switch (S4) on sequencer in incorrect position.

Switch to REPEAT position.

Foot switch not fully depressed. (S2B not closing)

Depress fully-verify closure of switch S2B.

Pressure switch (S6) not opening.

Repair or replace. Verify correct setting. Consult set-up & operating instructions.