



## UEC-8 UNIONMELT® ELECTRONIC WELDING CONTROL

Part No. 677190

### ! CAUTION

These INSTRUCTIONS are for experienced operators. If you are not fully familiar with the principles of operation and safe practices for electrical welding equipment, we urge you to read our booklet, "Precautions and Safe Practices for Arc Welding, Cutting and Gouging", Form 52-529. Do NOT permit untrained persons to install, operate, or maintain this equipment. Do NOT attempt to install or operate this equipment until you have read and fully understand these instructions. If you do not fully understand these instructions, contact your supplier for further information. Be sure to read the Safety Precautions on page 2 before installing or operating this equipment.

Before applying electrical power, refer to Section IV for an important checklist on the proper interconnection of the UEC-8 Control.

### FEATURES/BENEFITS

- **Solid State Control** ... To assure economical welding, precise control of welding conditions and arc stability is maintained with UEC-8 solid state accuracy.
- **Compact Size** ... For easy installation and capability to fit into simple fixtures, OM-48 carriages, or the most complex automated production lines.
- **Low Maintenance** ... Two basic solid state plug-in printed circuit boards simplify troubleshooting and minimize maintenance time.
- **Operating Versatility** ... The UEC-8 is adapted to a wide range of Sub Arc operations.
- **Rugged Construction** ... Minimize downtime and maintenance costs, and provides for worry-free operation.
- **Variable INCH/STRIKE Wire Feed Speed** ... Smooth starts can be obtained even under the most demanding conditions with the UEC-8's front panel variable INCH/STRIKE wire feed speed adjustment.
- **Positive Starts** ... Result from the UEC-8 voltage/current detection circuit. This circuit will only allow transfers from INCH/STRIKE to Welding Wire Feed speed after an "ARC" has been established. Most competitive controls do not offer this feature.
- **Adjustable Anti-Stick** ... This feature allows adjust-

### SPECIFICATIONS

Dimensions and weight of the UEC-8 are as follows:

Height ..... (152 mm) 6-in.  
Width ..... (305 mm) 12-in.  
Depth ..... (209 mm) 8-1/3

Input requirements: 120 Volt 50/60 Hz. 1 phase power @ 5 amps A.C.

ment of the wire retract time to prevent the electrode from sticking in the puddle after completion of a weld.

- **OM-48 Compatibility**.... The UEC-8 has a plug-in connection for direct interface with the J Governor/OM-48 Carriage.
- **UEC-8 and EH-10 or EH-11 Motor** .... With large 2-in. diameter feed rolls offers the reserve power needed to assure consistent wire feeding under the most demanding conditions.
- **Optional Digital Meters** .... Provide excellent means of observing and controlling welding voltage, wire feed speed - I.P.M., and amperage.

Be sure this information reaches the operator.  
You can get extra copies through your supplier.



ESAB Welding & Cutting Products

## SAFETY PRECAUTIONS



**WARNING:** These Safety Precautions are for your protection. They summarize precautionary information from the references listed in Additional Safety Information section. Before performing any installation or operating procedures, be sure to read and follow the safety precautions listed below as well as all other manuals, material safety data sheets, labels, etc. Failure to observe Safety Precautions can result in injury or death.



**PROTECT YOURSELF AND OTHERS --** Some welding, cutting, and gouging processes are noisy and require ear protection. The arc, like the sun, emits ultraviolet (UV) and other radiation and can injure skin and eyes. Hot metal can cause burns. Training in the proper use of the processes and equipment is essential to prevent accidents. Therefore:

1. Always wear safety glasses with side shields in any work area, even if welding helmets, face shields, and goggles are also required.
2. Use a face shield fitted with the correct filter and cover plates to protect your eyes, face, neck, and ears from sparks and rays of the arc when operating or observing operations. Warn bystanders not to watch the arc and not to expose themselves to the rays of the electric-arc or hot metal.
3. Wear flameproof gauntlet type gloves, heavy long-sleeve shirt, cuffless trousers, high-topped shoes, and a welding helmet or cap for hair protection, to protect against arc rays and hot sparks or hot metal. A flameproof apron may also be desirable as protection against radiated heat and sparks.
4. Hot sparks or metal can lodge in rolled up sleeves, trouser cuffs, or pockets. Sleeves and collars should be kept buttoned, and open pockets eliminated from the front of clothing
5. Protect other personnel from arc rays and hot sparks with a suitable non-flammable partition or curtains.
6. Use goggles over safety glasses when chipping slag or grinding. Chipped slag may be hot and can fly far. Bystanders should also wear goggles over safety glasses.



**FIRES AND EXPLOSIONS --** Heat from flames and arcs can start fires. Hot slag or sparks can also cause fires and explosions. Therefore:

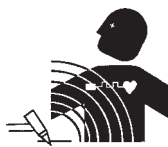
1. Remove all combustible materials well away from the work area or cover the materials with a protective non-flammable covering. Combustible materials include wood, cloth, sawdust, liquid and gas fuels, solvents, paints and coatings, paper, etc.
2. Hot sparks or hot metal can fall through cracks or crevices in floors or wall openings and cause a hidden smoldering fire or fires on the floor below. Make certain that such openings are protected from hot sparks and metal."
3. Do not weld, cut or perform other hot work until the workpiece has been completely cleaned so that there are no substances on the workpiece which might produce flammable or toxic vapors. Do not do hot work on closed containers. They may explode.
4. Have fire extinguishing equipment handy for instant use, such as a garden hose, water pail, sand bucket, or portable fire extinguisher. Be sure you are trained in its use.

5. Do not use equipment beyond its ratings. For example, overloaded welding cable can overheat and create a fire hazard.
6. After completing operations, inspect the work area to make certain there are no hot sparks or hot metal which could cause a later fire. Use fire watchers when necessary.
7. For additional information, refer to NFPA Standard 51B, "Fire Prevention in Use of Cutting and Welding Processes", available from the National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.



**ELECTRICAL SHOCK --** Contact with live electrical parts and ground can cause severe injury or death. **DO NOT** use AC welding current in damp areas, if movement is confined, or if there is danger of falling.

1. Be sure the power source frame (chassis) is connected to the ground system of the input power.
2. Connect the workpiece to a good electrical ground.
3. Connect the work cable to the workpiece. A poor or missing connection can expose you or others to a fatal shock.
4. Use well-maintained equipment. Replace worn or damaged cables.
5. Keep everything dry, including clothing, work area, cables, torch/electrode holder, and power source.
6. Make sure that all parts of your body are insulated from work and from ground.
7. Do not stand directly on metal or the earth while working in tight quarters or a damp area; stand on dry boards or an insulating platform and wear rubber-soled shoes.
8. Put on dry, hole-free gloves before turning on the power.
9. Turn off the power before removing your gloves.
10. Refer to ANSI/ASC Standard Z49.1 (listed on next page) for specific grounding recommendations. Do not mistake the work lead for a ground cable.



**ELECTRIC AND MAGNETIC FIELDS —** May be dangerous. Electric current flowing through any conductor causes localized Electric and Magnetic Fields (EMF). Welding and cutting current creates EMF around welding cables and welding machines. Therefore:

1. Welders having pacemakers should consult their physician before welding. EMF may interfere with some pacemakers.
2. Exposure to EMF may have other health effects which are unknown.
3. Welders should use the following procedures to minimize exposure to EMF:
  - A. Route the electrode and work cables together. Secure them with tape when possible.
  - B. Never coil the torch or work cable around your body.
  - C. Do not place your body between the torch and work cables. Route cables on the same side of your body.
  - D. Connect the work cable to the workpiece as close as possible to the area being welded.
  - E. Keep welding power source and cables as far away from your body as possible.



**FUMES AND GASES -- Fumes and gases, can cause discomfort or harm, particularly in confined spaces. Do not breathe fumes and gases. Shielding gases can cause asphyxiation. Therefore:**

1. Always provide adequate ventilation in the work area by natural or mechanical means. Do not weld, cut, or gouge on materials such as galvanized steel, stainless steel, copper, zinc, lead, beryllium, or cadmium unless positive mechanical ventilation is provided. Do not breathe fumes from these materials.
2. Do not operate near degreasing and spraying operations. The heat or arc rays can react with chlorinated hydrocarbon vapors to form phosgene, a highly toxic gas, and other irritant gases.
3. If you develop momentary eye, nose, or throat irritation while operating, this is an indication that ventilation is not adequate. Stop work and take necessary steps to improve ventilation in the work area. Do not continue to operate if physical discomfort persists.
4. Refer to ANSI/ASC Standard Z49.1 (see listing below) for specific ventilation recommendations.



**CYLINDER HANDLING -- Cylinders, if mishandled, can rupture and violently release gas. Sudden rupture of cylinder, valve, or relief device can injure or kill. Therefore:**

1. Use the proper gas for the process and use the proper pressure reducing regulator designed to operate from the compressed gas cylinder. Do not use adaptors. Maintain hoses and fittings in good condition. Follow manufacturer's operating instructions for mounting regulator to a compressed gas cylinder.
2. Always secure cylinders in an upright position by chain or strap to suitable hand trucks, undercarriages, benches, walls, post, or racks. Never secure cylinders to work tables or fixtures where they may become part of an electrical circuit.
3. When not in use, keep cylinder valves closed. Have valve protection cap in place if regulator is not connected. Secure and move cylinders by using suitable hand trucks. Avoid rough handling of cylinders.
4. Locate cylinders away from heat, sparks, and flames. Never strike an arc on a cylinder.
5. For additional information, refer to CGA Standard P-1, "Precautions for Safe Handling of Compressed Gases in Cylinders", which is available from Compressed Gas Association, 1235 Jefferson Davis Highway, Arlington, VA 22202.



**EQUIPMENT MAINTENANCE -- Faulty or improperly maintained equipment can cause injury or death. Therefore:**

1. Always have qualified personnel perform the installation, troubleshooting, and maintenance work. Do not

perform any electrical work unless you are qualified to perform such work.

2. Before performing any maintenance work inside a power source, disconnect the power source from the incoming electrical power.
3. Maintain cables, grounding wire, connections, power cord, and power supply in safe working order. Do not operate any equipment in faulty condition.
4. Do not abuse any equipment or accessories. Keep equipment away from heat sources such as furnaces, wet conditions such as water puddles, oil or grease, corrosive atmospheres and inclement weather.
5. Keep all safety devices and cabinet covers in position and in good repair.
6. Use equipment only for its intended purpose. Do not modify it in any manner.



**ADDITIONAL SAFETY INFORMATION -- For more information on safe practices for electric arc welding and cutting equipment, ask your supplier for a copy of "Precautions and Safe Practices for Arc Welding, Cutting and Gouging", Form 52-529.**

The following publications, which are available from the American Welding Society, 550 N.W. LeJuene Road, Miami, FL 33126, are recommended to you:

1. ANSI/ASC Z49.1 - "Safety in Welding and Cutting"
2. AWS C5.1 - "Recommended Practices for Plasma Arc Welding"
3. AWS C5.2 - "Recommended Practices for Plasma Arc Cutting"
4. AWS C5.3 - "Recommended Practices for Air Carbon Arc Gouging and Cutting"
5. AWS C5.5 - "Recommended Practices for Gas Tungsten Arc Welding"
6. AWS C5.6 - "Recommended Practices for Gas Metal Arc Welding"
7. AWS SP - "Safe Practices" - Reprint, Welding Handbook.
8. ANSI/AWS F4.1, "Recommended Safe Practices for Welding and Cutting of Containers That Have Held Hazardous Substances."



This symbol appearing throughout this manual means **Attention! Be Alert! Your safety is involved.**

The following definitions apply to DANGER, WARNING, CAUTION found throughout this manual:



Used to call attention to immediate hazards which, if not avoided, will result in immediate, serious personal injury or loss of life.



Used to call attention to potential hazards which could result in personal injury or loss of life.



Used to call attention to hazards which could result in minor personal injury.

## I. INTRODUCTION

1. The UEC-8 electronic welding control P/N 677190 is designed for a wide range of Subarc† welding applications, and can be used with either a constant-voltage or a constant-current power supply as follows:

650 cvcc, 60 hz.\*.....P/N36006  
653 cvcc, 60 hz.\*.....P/N36234

\* If higher welding currents are desired, a kit is available from ESAB that allows you to parallel two 650 cvcc units to provide up to 1300 amperes output.

† If the UEC-8 is to be used with power sources no longer manufactured (or recommended), please contact your ESAB Welding Supplier or the Factory and request a copy of edition F-12-747-"E". The "E" edition contains historical information and requirements previously provided for low-range Subarc and Mig welding applications.

The UEC-8 is recommended for use with the following welding heads: EH-11 (for either constant-voltage or constant-current operation) or the EH-10 or 10A (for constant-voltage operation only). The control utilizes two solid-state printed circuit boards (described in Sec. II-C) to obtain excellent wire feed speed regulation. The control is designed to be used for "Touch Work" (with optional D.C. touch work kit) and "scratch" starts (for AC or DC). In scratch starting the carriage is moving before the wire has contacted the work; in touch-work starting, the wire inches down to the work and the carriage does not move until the welding arc has been initiated.

## II. DESCRIPTION

### A. FRONT PANEL CONTROLS

1. **Main Line Switch** -- double pole single throw; breaks both sides of 120 VAC power to control. Pilot light built in 5 ampere Slo-Blo fuse in hot side of AC lines.
2. **Voltage Control Potentiometer**--allows remote adjustment of output voltage.
3. **Wire Feed Speed Potentiometer** -- controls rate of wire feed speed during welding. This potentiometer dial contains a 10 turn vernier calibrated from 0 to 100, and a computer which indicates the number of turns (0 to 9) giving a total of 1000 increment settings for accurate repeatable wire speed conditions.
4. **Inch Speed Potentiometer** -- screwdriver adjustment controls rate of wire feed speed during inching.
5. **Inch Up-Down Switch**--spring loaded to center off position - provides signal to allow motor to inch wire up or down.
6. **Carriage Auto-Manual-Off Switch**---when a compatible carriage governor is connected to the UEC-8,

allows automatic starting and stopping of carriage in "Auto" position. In "Manual" position, carriage drive is energized continuously. In center "Off" position, there is no carriage operation.

7. **Weld Start-Stop Switch**--double pole double throw, no center off position - in "Start" position is initiates welding action. In "Stop" position, weld sequence is terminated.
8. **Touch Work Light** -- included in optional Touch Work Kit-lights when wire touches work prior to arc initiation.
9. **Anti-Stick Potentiometer** -- located on the left side panel of the UEC-8. control. The potentiometer controls the length of time the wire is retracted at the end of the weld cycle, thus allowing the welding wire to retract a controlled amount. With a clockwise adjustment, the anti-stick time will increase, with a counter-clockwise adjustment, the anti-stick time will increase, with a counter-clock wise adjustment, the anti-stick time will decrease.

### B. INTERNAL CONTROLS

1. **Sensitivity Potentiometer (See Figure 3)** -- an arc voltage sensitivity potentiometer is located on the inside back panel of the UEC-8 control. The adjustment of this "pot" controls the amount of arc voltage signal with respect to motor back e.m.f. (electro-motive force) used; thus controlling motor response to arc voltage changes.
2. **Weld Power Selector Switch (See Figure 5)** -- located on the Reversible Governor PC Board - allows the control to be used with either a constant-current or a constant-potential power supply. **Switch must be placed in the proper position with respect to the type of power supply selected.**

### C. PRINTED CIRCUIT BOARDS (See Figures 5 and 6)

1. **Logical Board (P/N 675330)** -- provides basic sequencing of wire feed motor, weld contactor and anti-stick. A 1/2- amp standard fuse to protect the current detector circuit is located on the right side of the board. Also the PC board contains two LED\* indicator lights. These lights help in troubleshooting the unit by indicating the state of the voltage and current detector at all times.
2. **Reversible Governor Board (P/N 675332)** -- solid state motor speed control. Automatic reversing feature for retract starts. During welding, if wire stubs to the plate or the arc is lost the wire will retract (at inch speed ) and inch down automatically until the arc is reestablished. A weld power selector switch (see II-B-2 above) is located on the right side of the PC board. Also the board contains an LED indicator light to check proper electrical installation of the wire feed motor.

\* Light emitting diode



### III. INSTALLATION

#### A. EQUIPMENT REQUIRED

1. A 25-ft., 12-conductor cable with 14-pin (@ UEC-8) extension cables with 19-pin (@ power source) amphenols at each end to connect the UEC-8 to the 650 cvcc power source, P/N 34135.

Also available are extension cables with 19-pin amphenols at each as follows:

- 30-ft., 19-conductor cable ..... P/N 34378
  - 60-ft., 19-conductor cable ..... P/N 34377
2. Two-single conductor voltage pickup cables; 6-ft. long, P/N 996806; or 25-ft. long, P/N 996805.
  3. D. C. Analog meters as follows: Voltmeter, 0-80 volts, P/N 2062416; Ammeter, 0-800 amps, P/N 2062422, and Trimpot assembly P/N 997507. The trimpot adjusts the ammeter to match the power source ammeter for precise current readings.
  4. **Flux Manual/Auto Switch Kit, P/N 996369.** This switch can be used to operate an (optional) automatic flux gate P/N 01E62 (ordered separately).

To install the switch, refer to the schematic and wiring diagrams in this booklet, and to instructions packed with the kit.

#### B. OPTIONAL ACCESSORIES

1. Motor Extension Cable P/N 996808. Provides an extra 25-ft. of cable between the welding head and the UEC-8.
2. Touch Work Kit, P/N 997868: (**Recommended** for sub-arc welding; for use only in D.C. applications.) The touch work kit senses contact between the welding wire and workpiece, automatically stopping the wire when contact is established and lighting the touch work light. For installation, refer to Figs. 7 and 8 and the instruction literature packed with the kit.
3. Voltage Raise/Lower Switch Kit, P/N 953559: (For use only with power supplies with motorized control. The remote voltage control consists of a switch and silkscreened mounting plate. The switch is installed in the UEC-8 to control the voltage when the power supply is not located near the control. For installation, refer to instructions packed with kit.

#### C. MOUNTING THE CONTROL

Since the operating controls are in the control front panel the box should be mounted so that the meters and controls are within easy reach and view of the operator. The control can be mounted on a sidebeam carriage or other vertical surface by means of the two holes provided on back of the control.

#### D. INSTALLATION OF METERS



**Before performing any installation inside the control, disconnect the electrical power cable at the receptacle (P6) on the control.**

1. With the UEC-8 cover removed, install the two analog meters using screws supplied with the meters. (Voltmeter on left, ammeter at right, as viewed from the front.) Connect meter leads in UEC-8 control as follows:

Ammeter leads: Violet (-) to in-line connector P10  
Blue (+) to in-line connector P11

Voltmeter leads: Positive (+) terminal to Yellow lead from TB1-5, Negative (-) terminal to Violet lead from TB1-6



**Be careful when making the following adjustment so as not to touch other components. Touching other components could result in damage to the unit or personal injury.**

2. The trimpot calibrates the ammeter for applications where the control is more than 25-ft. from the power supply. On the rear of the ammeter, mount trimpot assembly so that the adjusting screw is at the top of the meter, as you are looking at the chassis. Connect trimpot leads to terminal points for ammeter as shown in D-1 above. Under actual welding conditions, remove the UEC-8 cover and adjust the trimpot adjusting screw to bring the control ammeter reading in line with the power supply ammeter reading.

#### E. CONNECTIONS FOR SINGLE WIRE OPERATION

Make the required cable connections in accordance with the interconnection diagram, Fig. 1, and the following:

1. Connect the 14-pin Amphenol of the 12-conductor cable to the receptacle (P6) on the side of the control. Connect the 19-pin Amphenol to the power supply as shown in Fig. 1.

*NOTE: When using DC power and making ammeter connections from power supply to two leads of 12-cond. cable connected to control via the 14-pin receptacle, the polarity MUST be proper or the weld current detector will not operate and the control will not properly sequence.*

2. Connect the motor cable to receptacle (P7) on the side of the control. See Note 1 on Fig. 1.
3. Connect the plug end of the voltage pickup cable to

UEC-8 CONTROL

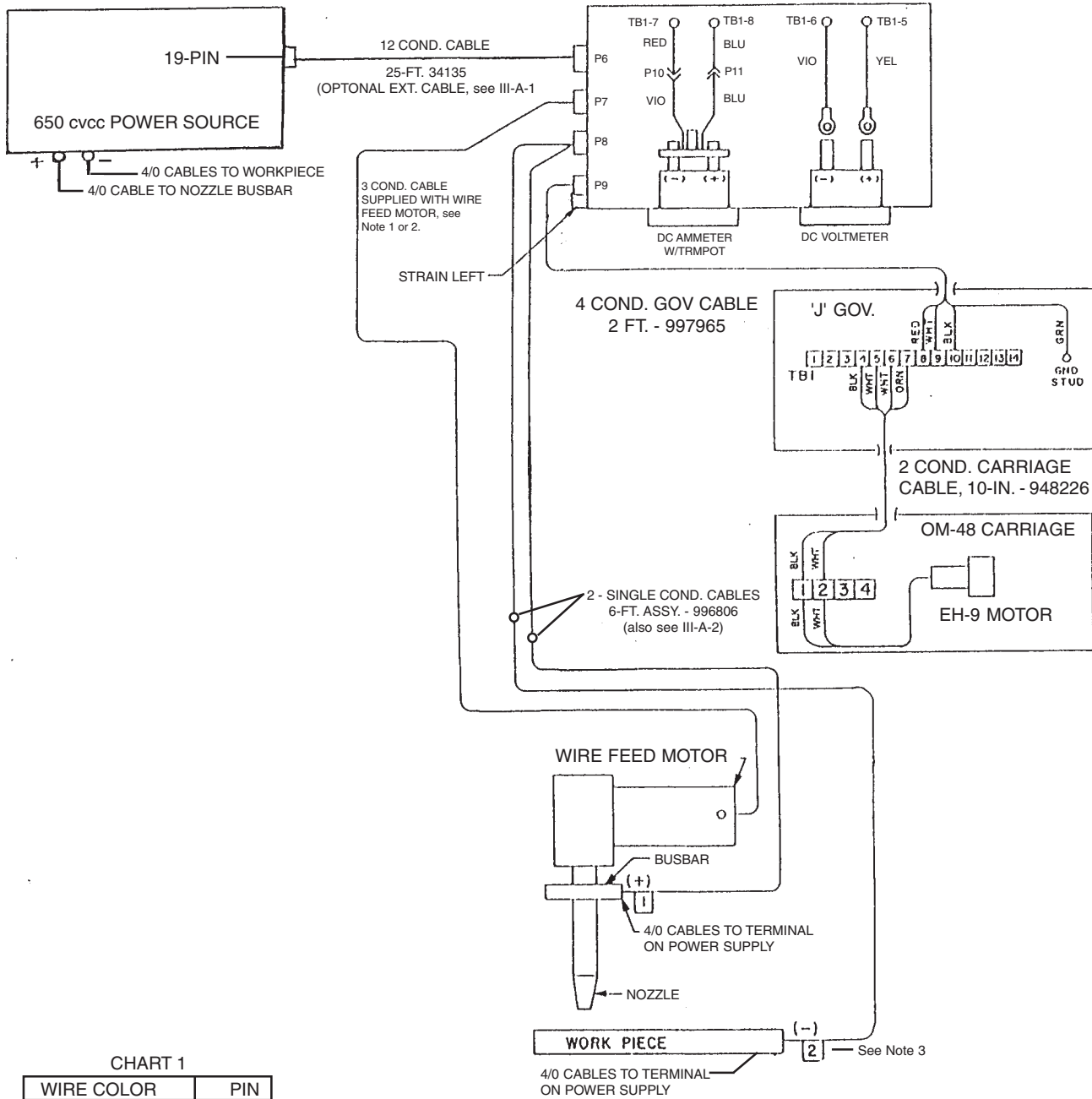


CHART 1

WIRE COLOR	PIN
FIELD (-), BLK	A
FIELD (+), RED	B
ARM (-), GRN	C
ARM (+), WHT	D

CHART 2

WIRE COLOR	PIN
ARM (-), GRN	C
ARM (+), WHT	D
GND, GRN	E

NOTES

1. If shunt wound motor does NOT have mating plug for UEC-8 motor receptacle (P7) use connector plug 996513 & cable clamp 525564 and wire per chart-1.
2. If permanent magnet motor does NOT have mating plug for UEC-8 motor receptacle (P7) use above plug and cable clamp and wire per chart-2.
3. The work voltage pick-up lead must be corrected as shown from the workpiece. This function is also provided from the power supply thru P6-1 to TB1-6 in the UEC-8 (via a faston connection). This connection must be disconnected and taped.

Fig. 1 - Interconnection Diagram

receptacle (P8) on the side of the control. Connect the lead tagged No. 1 to busbar and lead No. 2 to the workpiece or fixture (see Note 3 on Fig. 1).

4. Connect the plug end of the carriage governor cable to receptacle (P9) on the control.

*NOTE: When using "J" Gov. P/N 953534 cable 997965 is required (see Section III-B-5). Insert the lugged end through the strain relief on the back of the "J" Governor and connect to TB1 in governor as follows: Red to TB1-8; White to TB1-9; Black to TB1-10; Green to ground stud.*

#### F. CONNECTIONS FOR DUAL WIRE OPERATION

1. DC/AC Connection (see Fig. 1). With the numerous power supplies available for use with the UEC-8, it is suggested in dual-wire applications that the operator use a DC unit as the lead power supply source to provide weld penetration. An AC unit should be used as the trail power supply to give the weld a cosmetic finish.

#### G. IMPORTANT WIRING/OPERATING MODIFICATION USING EH-10A MOTOR

As noted in this booklet, one of the welding heads the UEC-8 is recommended for use with is the new EH-10A motor that can accommodate wire speeds from 0-1000 ipm. As a result, the Wire Feed Speed potentiometer may not have the fine adjustment (or resolution) range settings that you may prefer, and would normally be afforded the other motors with lower wire speed (ipm) ranges.

If finer resolution in the "speed" potentiometer is desired, and you do not plan to operate the control at wire feed speeds above 500 ipm, you can modify the circuitry to spread the operating range of this "speed control". To do this, add a resistor (100K ohm, 1/4 watt) to the Wire Speed potentiometer as shown in the schematic diagram. **Remember, if this modification is made, that the effective operating range of the potentiometer will be changed from 0-1000 ipm to 0-500 ipm.**

## IV. IMPORTANT CHECKLIST

To confirm that the various components (control, head, carriage, and power supply) have been properly interconnected, it is imperative that the following tests be performed BEFORE operation starts.

*Note: Failure to perform these tests may result in damage to the printed circuit boards in the control.*

### A. PREPARATORY INSTRUCTIONS



**Precautionary measures should be taken to provide maximum protection against electrical shock. Be sure that all power is off by opening the line (wall) disconnect switch. To be doubly safe, check your input leads with a voltmeter to make sure that all power is OFF.**

1. Remove the cover (5 screws) from the UEC-8 Control.
2. Remove the two printed circuit boards (P/N's 677330 & 675332) from inside the UEC-8.
3. The following readings should be taken after all equipment has been installed and interconnected, BEFORE POWER IS APPLIED to the system, and WITH PRINTED CIRCUIT BOARDS REMOVED.

### B. TEST FOR INPUT POWER CONNECTION

1. Place "MLS" switch in the ON position.
2. Place ohmmeter to the highest resistance scale.
3. Check for continuity between TB1-3 and ground stud; then check for continuity between TB1-1 and ground stud. There should be a small deflection when the meter leads are first connected to these points; then both readings should be infinity.

### C. TEST FOR CONTACTOR, CARRIAGE AND FLUX GATE CONNECTION

1. Place carriage travel and flux gate switches in the "OFF" position, ("MLS" switch ON).
2. Place ohmmeter on Rx-1 scale. Check for continuity between TB1-3 and the center terminal of CTS switch. Reading should be approx. 1000 ohms (for "J" Gov.).
3. Check for continuity between TB1-3 and the red wire on WSSS switch. Reading should be approx. 40 ohms. If flux gate is used, check for continuity between TB 1-3 and the center terminal of the Flux switch. Readings should be approx. 40 ohms.

### D. TEST FOR VOLTMETER AND AMMETER CONNECTIONS

1. If hookup is made to a DC power supply:
  - a. Place the positive meter lead on TB1-5 and negative meter lead on TB1-6. Reading should be approx. 500 ohms, but this reading will vary considerably from power supply to power supply.

- b. Reverse meter leads and reading should be 50 ohms or less. To test for ammeter harnessing, place meter across terminals TB1-7 and TB1-8, reading should be approx. 1 ohm.

#### E. TEST FOR MOTOR CONNECTION

1. For permanent-magnet motors such as EH-10, EH-11, check for continuity between TB1-13 and TB1-14. Reading should be approx. 5 ohms.
2. For shunt-wound motors such as EH-2, EH-3, check for continuity between P7-A and P7-B. Reading should be approx. 500 ohms.
3. Check for shorts between TB1-13 and ground stud; check for continuity between P7-B and ground stud. Both readings should be infinity.

#### F. RESULTS

If any of the readings do NOT correspond with the readings above, DO NOT APPLY POWER. Instead, check all connections between components until the problem is found and corrected.

If all readings correspond with the readings above, place "MLS" switch in the OFF position and re-install the printed circuit boards inside the control. UEC-8 is now ready for operation.

#### G. LED INDICATOR LIGHTS

There are three LED indicator lights mounted on the PC boards that will help in setting up the equipment and in troubleshooting. Two of the lights are located on the Logic Board (675330) and one on the Reversible Governor Board (675332).

In setting up the equipment, the indicating light (REV-LED) on the Reversible Gov. Board (675332) is of main concern. (Refer to Fig. 5)

1. The control and wire feeder should be set up such that when the inch switch is depressed in the down position the motor should be feeding forward. If the motor feeds in the reverse direction, reverse the yellow and gray armature leads at TB1-13 and TB1-14.
2. To double check motor setup, perform this final test: Depress inch up switch and see if indicating light on the Reversible Gov. Board is dimly lit. The unit **should not** be operated if the indicating light is not on.

The other two lights are located on the logic board (Fig. 6) and marked C-DET and V-DET. These lights will be illuminated only when welding currents and welding voltages are detected.

#### H. IMPORTANT INFORMATION AND REQUIREMENTS FOR LOW-RANGE SUBARC AND/OR MIG WELDING

In order of magnitude, the welding current required for mig is much lower than that used for Sub Arc; therefore it is vitally important that the shunt signal needed to operate the Logic board's current detector circuit **never drops below 12 mv.** (min.) from the power supply's 100 mv. shunt taps. Since this can only occur if you are welding in a low-load welding current range (e.g. 70 to 120 amperes), a minimum shunt pickup signal (12 mv.) must be maintained in order to transfer speed control from the UEC-8's **Inch Potentiometer to the Weld Potentiometer.** Please note that if the existing shunt (in your power supply) is 50 mv; it must either be replaced by a 100 mv. shunt, or the existing shunt pickup leads must be separated sufficiently to provide the minimum 12 mv. signal to the control. If this transfer does not take place, check the following:

1. Polarity of shunt pickup leads (see schematic diagram) are properly connected.
2. Make sure shunt pickup leads are connected to the 100 mv. output taps.
3. If 1. and 2. are correct, and transfer still does not take place, **increase wire feed speed (amperage)** and see if the unit works properly (transfers).
  - a. If it does, the problem was that of insufficient signal strength -- or your original welding range was too low. If you still need to stay with your original lower current, the existing 100 mv. distance between the shunt lead connections will have to be widened or separated in order to increase the signal strength.
  - b. When the unit is setup for mig operation, the voltage pickup leads are only required if a voltmeter is used on the UEC-8 Control; otherwise, the unit will operate properly without the arc voltage input.
  - c. As shipped from the factory, all Logic p.c. boards are setup for Sub Arc welding operations. To adapt the UEC-8 for mig welding operation, the Logic p.c. boards must be modified as shown in Figure 8. Please note that the earlier board P/N 997115 only contained a transistor (Q2) which had to be jumpered (as shown) to provide mig capability (conversely, this jumper must be removed to do Sub Arc again). The present boards P/N 675330 now contain a jumper plug (J1) which provides the mig capability as shown.



## V. OPERATION

In each of the starting methods to be considered, it will be assumed that the unit has been properly installed, wire placed on reel and fed through sub-arc nozzle, and checked to insure proper operation and that fuses are of the proper values. In no case should fuses of larger capacity be substituted. If sub-arc welding, fill the hopper with welding composition.

The following is a description of the procedures to be followed in making starts.

*IMPORTANT NOTE: When using any of the procedures, make sure that the Weld Start-Stop Switch is in the "Stop" position before the Main Line Switch is moved to "ON" position to energize the control.*

### A. SUB-ARC SCRATCH STARTING SEQUENCE

1. Provide flux cover of weld zone.
2. Place Carriage Auto-Manual switch in "Manual", Carriage will move in direction of weld.
3. Place Weld Start-Stop switch in "Start" position. Welding wire will begin slow inch down through flux burden; when the wire touches the plate and an arc is established, wire speed is transferred to the main control potentiometer and the weld is in progress.
4. Place Carriage Auto-Manual switch in "Auto" position if automatic stoppage of the carriage is required.
5. To stop weld, place Weld Start-Stop switch into the "Stop" position.

### B. POSITIONED STARTING SEQUENCE (without touch-work kit installed)

1. Wedge a tightly rolled ball of steel wool about 3/8-in. in diameter between the welding wire and the workpiece, and cover the weld zone with flux. Place the Carriage Auto-Manual switch in "Auto" position.
2. Place Weld Start-Stop switch in "Start" position. The power supply contactor comes in immediately, initiating the welding action and carriage travel.
3. To stop the welding action, place Weld Start-Stop switch in "Stop" position.

### C. TOUCH WORK STARTING SEQUENCE (optional accessory)

1. Place Carriage Auto-Manual in "Auto" Carriage will start and stop with welding action.
2. Place Inch Up-Down in "Down" position. Wire will inch toward work and automatically stop when contact is made, at which time the touch work light will be energized.
3. Place flux over weld zone, leaving Weld Start-Stop switch in "Stop" position.

4. Place Weld Start-Stop switch in "Start" position. Power supply contactor is automatically energized and weld commences.
5. With start of welding current, carriage starts, and wire retracts at inch speed creating an arc.
6. After arc is established, the wire is fed in the forward direction at weld speed required to properly maintain the selected arc voltage.
7. To end the weld, the Weld Start-Stop switch is placed in the "Stop" position. Wire feed will cease, and the contractor and carriage travel will continue for the desired anti-stick time. (To adjust the length of time for the anti-stick, refer to Section II-A-9).

### D. SUB-ARC RETRACT START - C. C. MODE

In this mode the wire is in contact with the workpiece before the Start key is operational. After the wire is energized, and the current detector detects short circuit current, the motor will reserve and the wire will retract at inch speed. As soon as the wire separates from the workpiece, and arc voltage and current are detected, the motor will change direction to forward and feed wire at preset weld speed.

## VI. TROUBLESHOOTING INFORMATION

If this equipment does not operate properly, stop work immediately and investigate the cause of the malfunction. Troubleshooting and maintenance work must be performed by an experienced person, and electrical work by a trained electrician. Do not permit untrained persons to inspect, clean or repair this equipment. Use only recommended replacement parts.



Precautionary measures should be taken to provide maximum protection against electrical shock. Be sure that all power is off by operating the line (wall) disconnect switch, before attempting any work inside the control.

**A. SYMPTOM: F1 fuse blows whenever main line switch is turned "ON".**

1. Check wiring for shorts.
2. If no short, replace governor PC board.

**B. SYMPTOM: F1 fuses blows when Inch Switch is operated.**

1. Check for jammed or defective wire feed motor/drive unit.
2. Replace governor PC board.

**C. SYMPTOM: Motor inoperative.**

1. Check setting of Inch Speed pot.
2. Check main line fuse F1.
3. Check motor plug.
4. Check motor brushes.
5. Replace logic PC board.
6. Replace Governor PC board.

**D. SYMPTOM: Wire feed motor operates by inching but does not operate for welding.**

1. Check setting of WFSP.
2. Check touch work indicator light for operation when wire torches work.
3. Observe that both LED lights on logic PC board are lit after arc initiating.
4. Replace logic PC board.

**E. SYMPTOM: If wire feed motor continues to run when wire touches plate and work light not on.**

1. Check fuse (1/2 amp) located on logic board.
2. Check for fused flux at tip of welding wire.
3. Check power supply ground cable for connection to workpiece.
4. Replace logic PC board.

**F. SYMPTOM: No control over motor speed at wire feed potentiometer.**

1. Check wire speed potentiometer with ohmmeter. Resistance should range from 0 through 100 K ohms. Resistance should range from 0 through 100 K ohms. Replace if defective.
2. Replace governor PC board.
3. Replace logic PC board.

**G. SYMPTOM: Contactor in power supply does not energize. Motor operates.**

1. Check power supply control cable.
2. Check fuse (power supply).
3. Replace logic PC board.

**H. SYMPTOM: Erratic or pulsing wire feed rate.**

1. Replace logic PC board.

## VII. REPLACEMENT PART DATA

1. All replacement parts are keyed on the illustrations which follow. Order replacement parts by part number and part name, as shown on illustrations. DO NOT ORDER BY PART NUMBER ONLY.
2. Many of the parts on the illustrations, particularly electronic parts, are 'vendor items.' This means that they are standard commercial parts made by and purchased from other manufacturers. If you order from these outside sources, use the manufacturer's part number or designated as shown in the Electrical Parts List.
3. Always state the series or serial number of the machine on which the parts are used. The serial number is stamped on the unit nameplate.

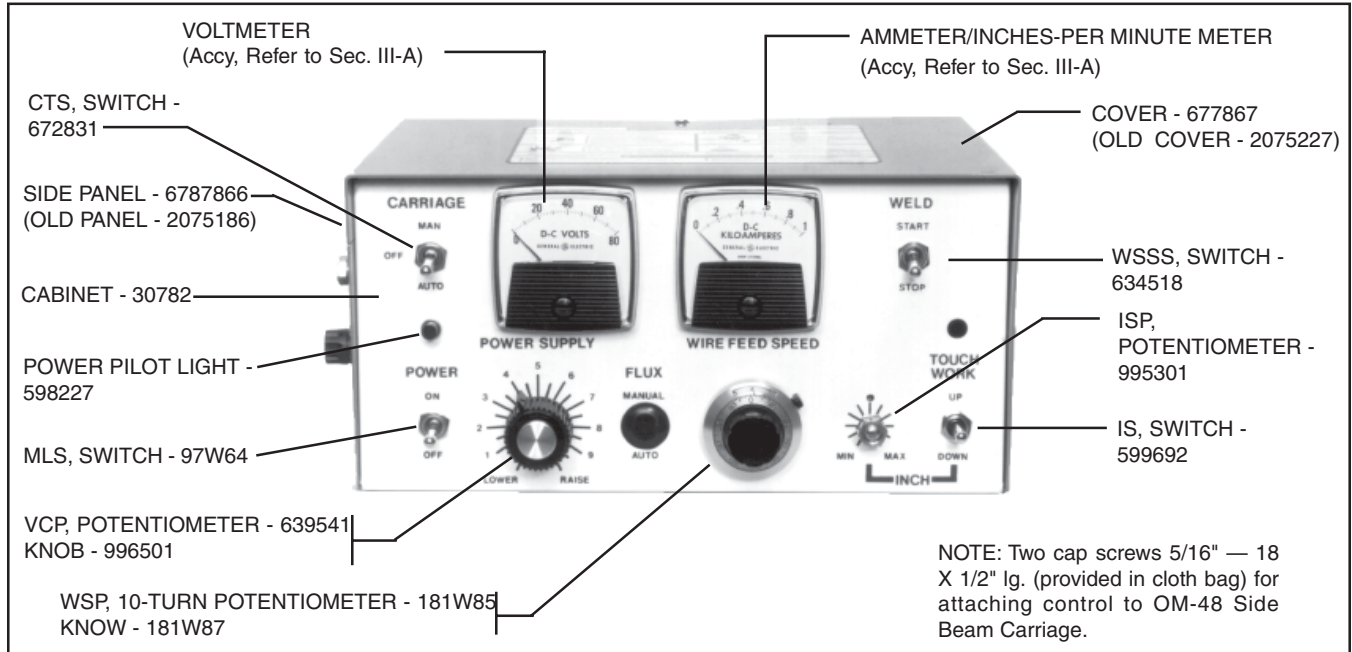


Fig. 2 - UEC-8 Control, P/N 677190

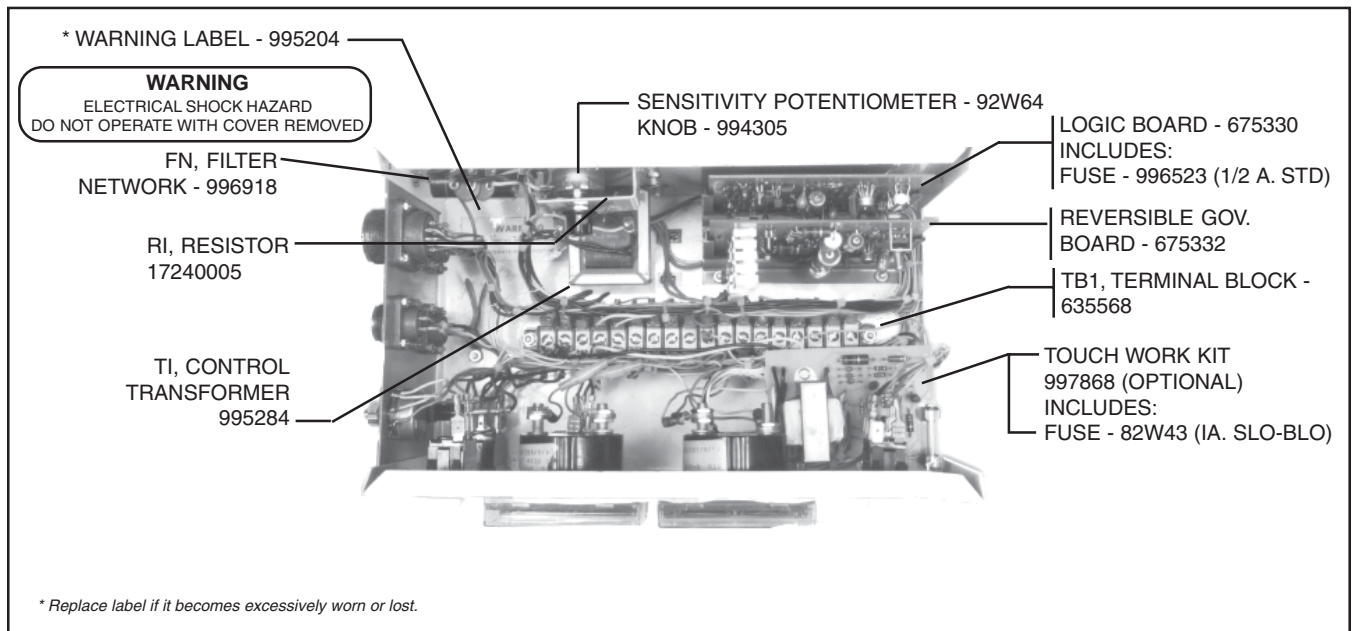


Fig. 3 - UEC-8 Control (Inside View)

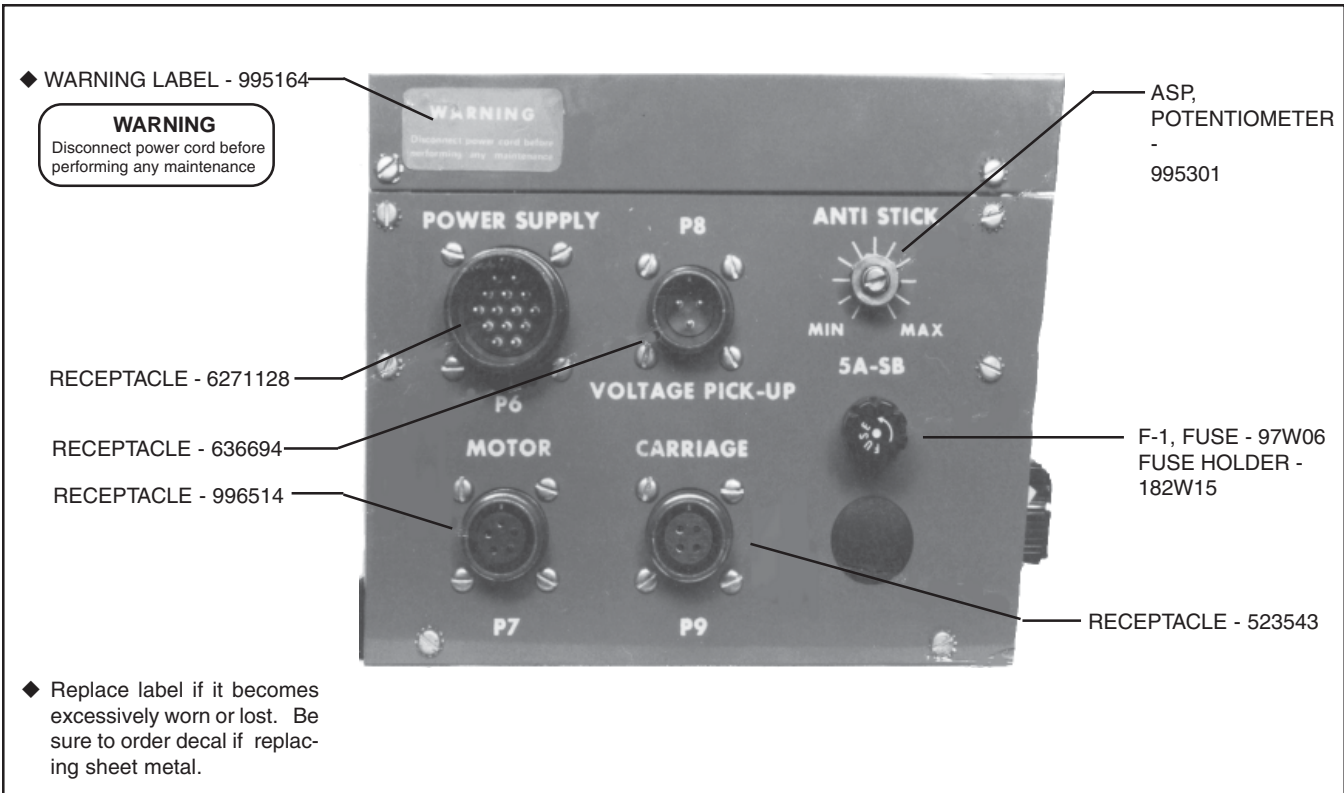


Fig. 4 - UEC-8 Control (Left Side View)

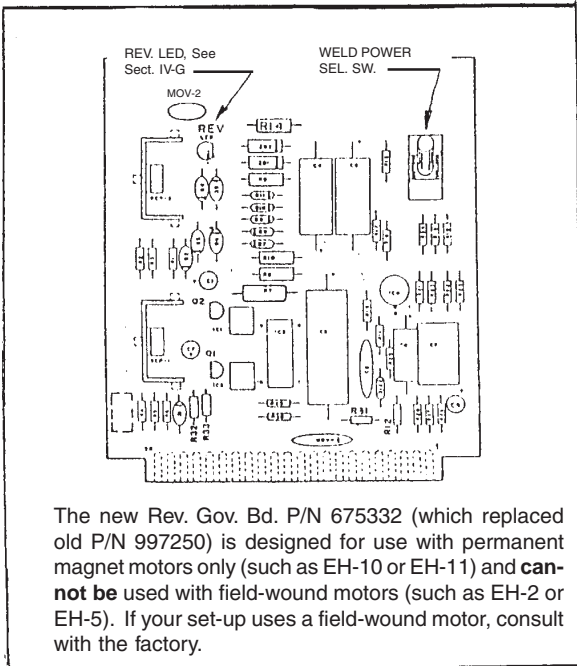


Fig. 5 - Reversible Governor PC Board, P/N 675332

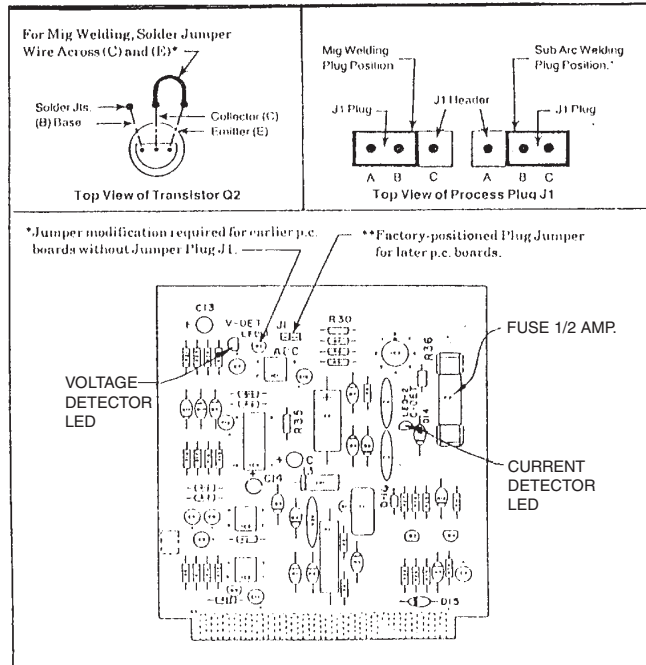


Fig. 6 - Logic P.C. Board, P/N 997115 (Earlier Units - obsolete)  
Logic P.C. Board, P/N 675330 (Later Units - after March 1984)



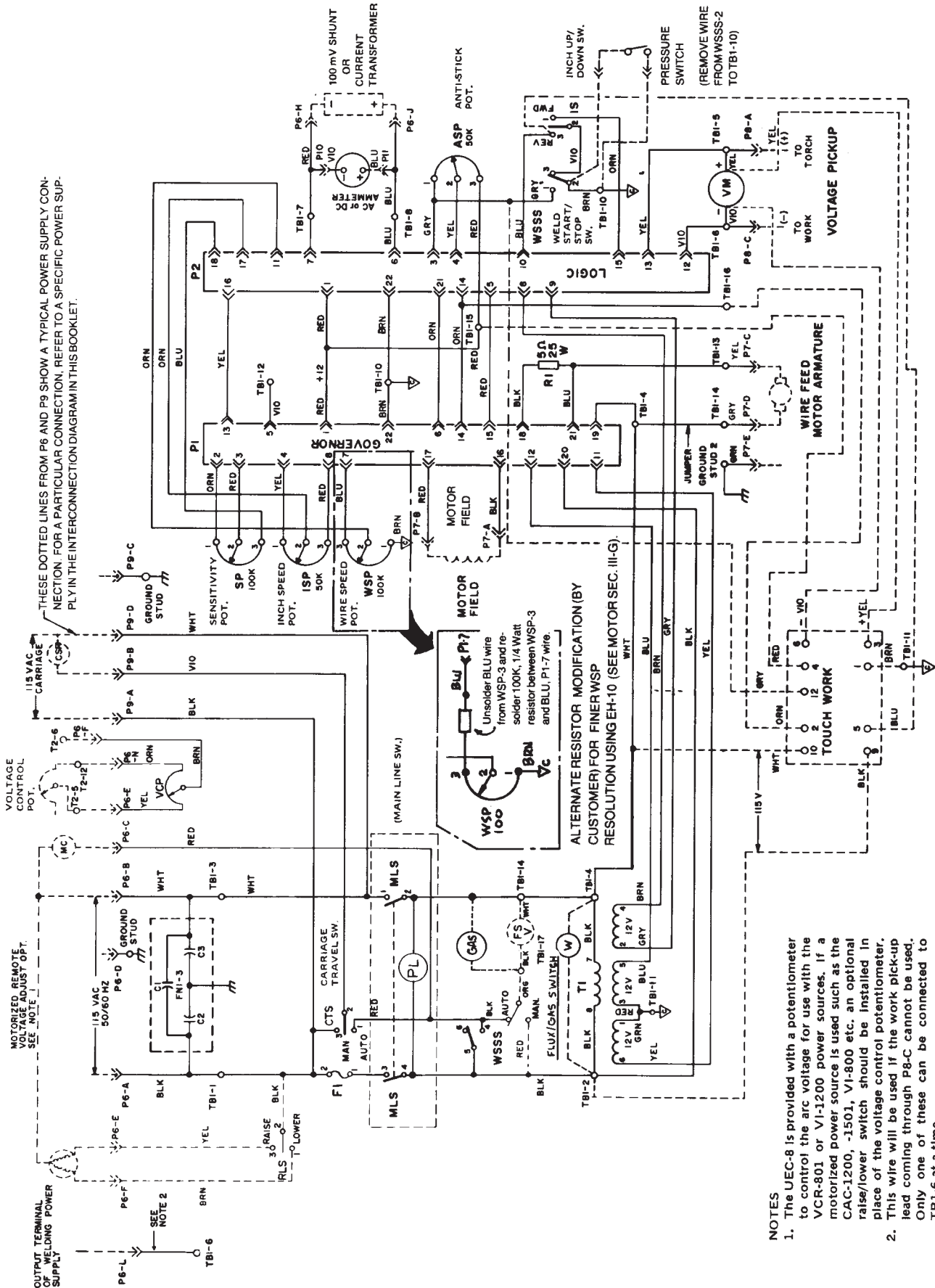
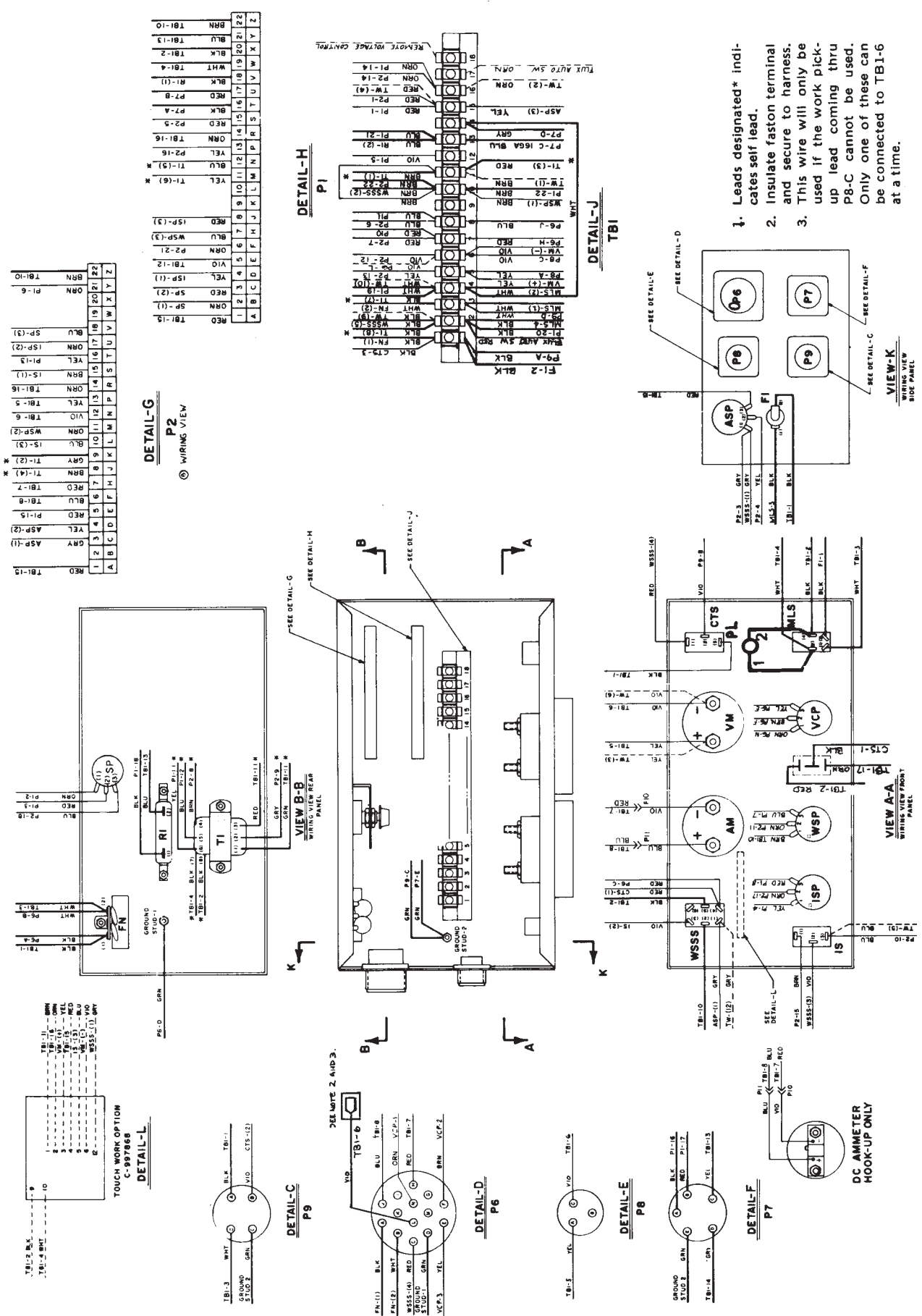


Fig. 7 - Schematic Diagram, UEC-8 Control

- NOTES
1. The UEC-8 is provided with a potentiometer to control the arc voltage for use with the VCR-801 or V1-1200 power sources. If a motorized power source is used such as the CAC-1200, -1501, V1-800 etc. an optional raise/lower switch should be installed in place of the voltage control potentiometer. This wire will be used if the work pick-up lead coming through P8-C cannot be used. Only one of these can be connected to TBI-6 at a time.
  - 2.



**DETAIL-G**  
P2  
WIRING VIEW

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
BRN	ORN	ORN	ORN	ORN	ORN	ORN	ORN	ORN	ORN	ORN	ORN	ORN	ORN	ORN	ORN	ORN	ORN	ORN	ORN	ORN	ORN

**DETAIL-H**  
P1

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
BRN	BLU	WHT	WHT	WHT	WHT	WHT	WHT	WHT	WHT	WHT	WHT	WHT	WHT	WHT	WHT	WHT	WHT	WHT	WHT	WHT	WHT

**DETAIL-I**  
P6

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
BLK	BLK	BLK	BLK	BLK	BLK	BLK	BLK	BLK	BLK	BLK	BLK	BLK	BLK	BLK	BLK	BLK	BLK	BLK	BLK	BLK	BLK

**DETAIL-J**  
TBI

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
BLK	BLK	BLK	BLK	BLK	BLK	BLK	BLK	BLK	BLK	BLK	BLK	BLK	BLK	BLK	BLK	BLK	BLK	BLK	BLK	BLK	BLK

1. Leads designated\* indicates self lead.
2. Insulate faston terminal and secure to harness.
3. This wire will only be used if the work pickup lead coming thru P8-C cannot be used. Only one of these can be connected to TBI-6 at a time.

Fig. 8 - Wiring Diagram, UEC-8 Control



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