201241-001 Rev. C

PowCon®

! IMPORTANT !
-FOR YOUR SAFETY-
READ THIS MANUAL BEFORE
INSTALLING OR USING EQUIPMENT

OPERATION MANUAL

Power Drive I/M

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THANK YOU!!!

. . . for purchasing **PowCon Incorporated** products. Our commitment to you is to provide an ever expanding family of quality welding and welding/cutting power sources, arc positioning equipment and accessories. Please take a moment to read the following pages as they contain important information regarding proper welding/cutting safety and procedures.

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! IMPORTANT !

THIS MANUAL HAS BEEN DESIGNED FOR EXPERIENCED WELDING AND CUTTING EQUIPMENT OPERATORS AND MUST BE READ COMPLETELY BEFORE USING THIS EQUIPMENT. IF YOU LACK EXPERIENCE OR ARE UNFAMILIAR WITH THE PRACTICES AND SAFE OPERATION OF WELDING AND CUTTING EQUIPMENT, PLEASE CONSULT YOUR FOREMAN. DO NOT ATTEMPT TO INSTALL, OPERATE, OR PERFORM MAINTENANCE ON THIS EQUIPMENT UNLESS YOU ARE QUALIFIED AND HAVE READ AND UNDERSTOOD THIS MANUAL. IF IN DOUBT ABOUT INSTALLING OR OPERATING THIS EQUIPMENT, CONTACT YOUR DISTRIBUTOR OR THE CUSTOMER SERVICE DEPARTMENT OF PowCon.

DEFINITIONS

Throughout this manual, NOTE, CAUTION, WARNING and DANGER are inserted to call attention to particular information. The methods used to identify these highlights and the purpose for which each is used, are as follows:

NOTE

Operational, procedural, and background information which aids the operator in the use of the machine, helps the service personnel in the performance of maintenance, and prevents damage to the equipment.

CAUTION

An operational procedure which, if not followed, may cause minor injury to the operator, service personnel and/or bystanders.

WARNING

An operational procedure which, if not followed, may cause severe injury to the operator, service personnel, or others in the operating area.

DANGER

An operational procedure which, if not followed, will cause severe injury or even death to the operator, service personnel or bystanders.

SAFETY INFORMATION

Safety is a combination of good judgement and proper training. Operation and maintenance of any arc welding and cutting equipment involves potential hazards. Individuals who are unfamiliar with cutting and welding equipment, use faulty judgement or lack proper training, may cause injury to themselves and others. Personnel should be alerted to the following potential hazards and the safeguards necessary to avoid possible injury. In addition, before operating this equipment, you should be aware of your employer's safety regulations.

BE SURE TO READ AND FOLLOW ALL AVAILABLE SAFETY REGULATIONS BEFORE USING THIS EQUIPMENT.

ELECTRIC SHOCK

THE VOLTAGES PRESENT IN THE WELDING AND CUTTING ENVIRONMENT CAN CAUSE SEVERE BURNS TO THE BODY OR FATAL SHOCK. THE SEVERITY OF ELECTRICAL SHOCK IS DETERMINED BY THE PATH AND THE AMOUNT OF CURRENT THROUGH THE BODY.

A) Install and continue to maintain equipment according to USA Standard C1, National Electric Code.

B) Never allow live metal parts to touch bare skin or any wet clothing. Use only dry gloves.

C) When welding or cutting in a damp area, or when standing on metal, make sure you are well insulated by wearing dry gloves, rubber soled shoes, and by standing on a dry board or platform.

D) Do not use worn or damaged welding or torch cables. Do not overload the cables. Use well maintained equipment.

E) When not welding/cutting, turn equipment OFF. Accidental grounding can cause overheating and create a

fire hazard. Do not coil or loop the cable around parts of the body.

F) The ground cable should be connected to the workpiece as close to the work area as possible. Grounds connected to building framework or other locations remote to the work area reduce efficiency and increase the potential hazard of electric shock. Avoid the possibility of the cutting current passing through lifting chains, crane cables or other electrical paths.

G) Keep everything dry you might touch, including clothing, the work area, welding gun, torch and welding or cutting machines. Fix water leaks immediately. Do not operate equipment standing in water.

H) Never use a cutting torch or welding gun which is damaged or contains cracks in its housing.

I) Refer to AWS-Z49.1 for grounding recommendations.

PERSONAL PROTECTION

SKIN AND EYE BURNS RESULTING FROM BODY EXPOSURE TO ELECTRIC-ARC WELDING AND CUTTING RAYS OR HOT METAL CAN BE MORE SEVERE THAN SUNBURN.

A) Use a proper face shield fitted with the correct filter (#10 or greater) and cover plates to protect your eyes, face, neck and ears from the sparks and rays of the cutting/welding arc when cutting/welding or observing cutting/welding. Warn bystanders not to watch the arc and not to expose themselves to the cutting/welding arc rays or to hot metal.

B) Wear flameproof gauntlet-type gloves, a heavy long-sleeve shirt, cuffless trousers, high-topped shoes, and a welding helmet or cap (for hair protection) to protect the skin from arc rays and hot sparks or hot metal.

C) Protect other nearby personnel from arc rays and hot sparks with a suitable non-flammable partition.

D) Always wear safety glasses or goggles when in a cutting or welding area. Use safety glasses with side shields or goggles when chipping slag or grinding. Chipped slag is hot and may travel a considerable distance. Bystanders should also wear safety glasses or goggles.

E) Compressed gas cylinders are potentially dangerous, refer to the suppliers for proper handling procedures.

F) Wear ear plugs or other ear protection devices when operating cutting or welding equipment.

FIRE SAFETY

HOT SLAG OR SPARKS CAN CAUSE A SERIOUS FIRE WHEN IN CONTACT WITH COMBUSTIBLE SOLIDS, LIQUIDS OR GASES.

A) Move all combustible materials well away from the cutting area or completely cover materials with a non-flammable covering. Combustible materials include but are not limited to wood, clothing, sawdust, gasoline, kerosene, paints, solvents, natural gases, acetylene, propane, and similar articles.

B) Do not weld, cut or perform other hot work on used barrels, drums, tanks or other containers until they have been completely cleaned. There must be no substances in the container which might produce flammable or toxic vapors.

C) For fire protection, have suitable extinguishing equipment handy for instant use.

VENTILATION

WELDING AND CUTTING FUMES AND GASES, PARTICULARLY IN CONFINED SPACES, CAN CAUSE DISCOMFORT AND PHYSICAL HARM IF INHALED OVER AN EXTENDED PERIOD OF TIME.

A) At all times, provide adequate ventilation in the welding and cutting area by either natural or mechanical means. Do not weld or cut on galvanized, zinc, lead, beryllium or cadmium materials unless positive mechanical ventilation is provided to prevent inhaling fumes and gases from these materials.

B) Do not weld or cut in locations close to chlorinated hydrocarbon vapors coming from degreasing or spraying operations. The heat of arc rays can react with solvent vapors to form phosgene, a highly toxic gas, and other irritant gases.

C) If you develop momentary eye, nose or throat irritation during welding or cutting, it is an indication that the ventilation is not adequate. Stop work and take the necessary steps to improve ventilation in the welding or cutting area. Do not continue to weld or cut if physical discomfort persists.

D) Use an air supplied respirator if ventilation is not adequate to remove all fumes and gases.

E) Beware of gas leaks. Welding or cutting gases containing argon are more dense than air and will replace air when used in confined spaces. Do not locate gas cylinders in confined spaces. When not in use, shut OFF the gas supply at its source.

F) Refer to AWS Standard Z49.1 for specific ventilation recommendations.

SAFETY REFERENCES

The following publications provide additional information on important welding safeguards.

A) ANSI/ASC Z49.1-1988, American National Standard "Safety in Welding and Cutting".

B) Bulletin No. F4-1, "Recommended Safe Practices for the Preparation for Welding and Cutting Containers and Piping that have held Hazardous Substances".

C) OSHA Safety and Health Standards, 29CFR 1910, available from the United States Department of Labor, Washington, DC 20210.

D) NFPA Standard 51B, "Fire Prevention in Use of Cutting and Welding Processes", available from the National Fire Protection Association, 470 Atlantic Avenue, Boston, MA 00210.

E) NEMA Standards Publication/No. EW1-1989, Electric Arc-Welding Apparatus, approved as ANSI C87.1-1989. Available from National Electrical Manufacturers Association, 155 E. 44th Street, New York, NY 10017.

Description of Equipment

The **PowCon** PDI/M wirefeeder is a member of the evolving family of welding accessories available from your **PowCon** dealer. The Power Drive I wirefeeder is designed for use with any **PowCon** 275SM, 400SM, 500SM *, or 630SMP.

The PDI/M features continuously variable wire feed speed from 20 to 750 inches (508 - 19,050 mm) per minute. It is supplied with 2/0 welding cable for high current applications. Its dynamic braking circuit and improved control board mean higher welding performance and longer life.

The PDI/M continues the **PowCon** tradition of utilizing high quality engineered plastics for its packaging materials. Durability, long-life, electrical safety, and preservation of finish are all benefits of this design philosophy.

Accessories & Systems

PowCon supplies several accessories which will help customize your wirefeeder for optimum operation.

The WP1 SPOT/STITCH/BURNBACK option, P/N 105127-002, is a field installed printed circuit assembly which allows you to use the wirefeeder in three modes: normal, spot, and stitch. A continuously variable burnback control is also provided.

DRIVE ROLLS are available for welding with different sizes of wire. The PDI/M comes with a standard .030 - .035 / .045 inch DIA (.8 - .9 / 1.2mm) roll for use with steel wires, which is **PowCon** P/N 600060-001. You may also purchase alternate rollers. The part numbers and applications of these rollers are listed in Table 3.

A REMOTE WIREFEED SPEED CONTROL KIT, P/N 250053-002, is a field installed option that enables the user to remotely control wirefeed speed.

EUROTORCH ADAPTER KIT, P/N 969010-001 is available to allow the use of a torch with a EURO-QUICK disconnect.

The PDI/M may also be purchased as part of a complete welding system. Consult your **PowCon** distributor for part numbers and prices.

Theory of Operation

The PDI/M utilizes a transistorized solid state control circuit. This circuit converts the 30VAC signal from the **PowCon** power source into DC to drive the 24VDC motor. It also provides gas solenoid, trigger, and inch/purge control for the wirefeeder.

The 24VDC signal passes through a series of timing and wave-shaping circuitry which drives the motor at different speeds. The wire feed speed potentiometer (front panel) provides the standard **PowCon** 0-15V control signal to the circuit. The higher the voltage, the higher the speed. The speed range is between 20 to 750 inches (508 - 19,050 mm) per minute.

The printed circuit accessories are interfaced to the control circuit through the jumper plug located on the control board. These options are extensions of the same control theory, and provide additional timing functions such as spot, stitch, and burnback control to the wirefeeder.

Schematics for both the motor driver PCB and the printed circuit accessories are located in the Drawing and Parts Lists Section.

INSTALLATION

Unpacking New Equipment

(Receiving and Handling)

Remove the unit from its shipping carton and inspect for any possible damage that might have occurred during shipping. Make sure all items on the packing list are accounted for and identified. One copy of the Operation Manual is included with each unit.

Any claims for loss or damage that may have occurred in transit must be filed by the PURCHASER with the CARRIER. Copies of the bill of lading and freight will be furnished by the carrier on request if the need to file a claim arises. When requesting information concerning this equipment, it is essential that model description, serial number and/or part number of the equipment be supplied.

Location Of Equipment

Care should be exercised in properly locating your equipment for maximum productivity and safety. Please refer to the Safety Section at the beginning of this manual for suggestions on equipment location.

The PDI/M may also be used as a stand alone unit. If not mounted to the power source, it must be positioned in accordance with the INSTALLATION, ACCESS and SECURITY portions of this section.

INSTALLATION

Install the equipment in accordance with OSHA and National Electrical Code Standars, or other applicable standards.

ACCESS

Locate the **PowCon** equipment where there is room for the operator to manipulate the controls or change the connections on either the front or the rear. Avoid placing the unit in a hallway or other area where foot traffic might be impeded.

SECURITY

Locate the unit where it can be secured to a platform, deck or other structure which is capable of safely supporting the unit and any other potential load.

Wirefeeder Mounting

The PDI/M is designed to mount on top of the **PowCon** 275 and 400 series Power Sources by attaching directly to the black handles. This makes an attractive, compact, functional and portable assembly.

To mount the wirefeeder, first pick it up by the molded handles at each end of the base. Then, align the spring loaded mounting bracket on the bottom of the wirefeeder (this is the one toward the front of the unit) with the handle on the front of the Power Source. Once these are aligned and the bracket is slipped over the handle, compress the spring by pushing the wirefeeder forward on the handle. Then, lower the rear of the unit, and align the rear wirefeeder bracket with the rear Power Source handle. Gradually release the compression on the spring by moving the rear bracket toward the rear handle until they are seated on one another. Make sure that the bracket and handle are completely engaged.

The mechanical mounting of the PDI/M is now complete. See Figure 1 for a pictorial representation of the installation.

Mounting kits are available for other **PowCon** Power Sources. Consult your **PowCon** distributor for part numbers and prices.

WARNING

THE WIREFEEDER ATTACHMENT TO THE POWER SOURCE WAS NOT DESIGNED TO SUPPORT THE WEIGHT OF THE POWER SOURCE. LIFTING THE POWER SOURCE BY THE WIREFEEDER CAN CAUSE THE POWER SOURCE TO BREAK AWAY AND CAUSE PERSONAL INJURY BY FALLING. ALWAYS DISASSEMBLE THE WIREFEEDER FROM THE POWER SOURCE BEFORE LIFTING.

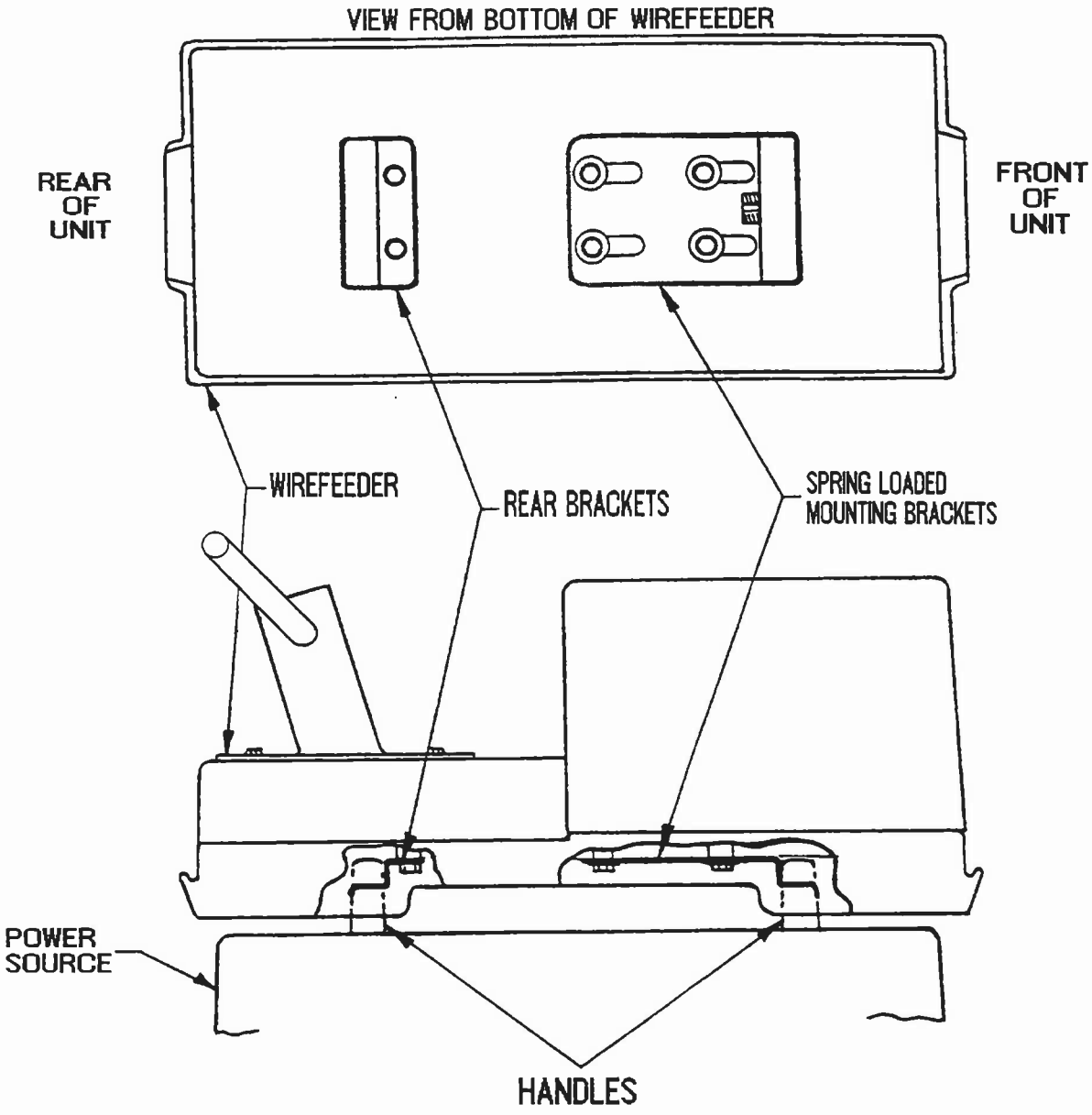

Figure 1, Wirefeeder Mounting to Power Source

Electrical Connections

Three electrical connections must be made to complete the electrical installation of your PDI/M. Two will be covered in this section, and one will be covered in the next section. Figure 2 provides further details.

Two cables are located on the rear of the unit: one capped with a Tweco or Dinse male connector, and the other with a circular remote connector. Plug the Tweco or Dinse connector into the output terminal on the Power Source marked "+", and the circular connector into the remote plug, making sure that all keyways are properly aligned. This represents a reverse polarity connection, which is characteristic of GMAW operation. If you mount the wirefeeder away from the power source, you may order additional lengths of remote cable as indicated in the following table.

TABLE 1

OPTIONAL REMOTE CABLE ASSEMBLIES

Part Number	Length (Ft)
603086-005	5
603086-012	12
603086-025	25
603086-050	50
603086-075	75
603086-100	100
603086-150	150

To prevent damage from occurring as a result of improper or faulty electrical connections, a fuse is provided on the rear of the unit. If a fault condition occurs, the fuse will blow to protect the control circuits. If this happens, you can replace the fuse with a 2.5 amp slow blow (Bussman MDA 2.5 or equivalent).

Before restoring power, isolate and correct the fault condition. If the fuse blows a second time, call the PowCon Technical Service department for assistance. Do Not, under any circumstances, continue applying power to a unit which repeatedly blows fuses. Seek help before proceeding.

CAUTION

A BLOWN FUSE OR BREAKER IS AN INDICATION OF A CIRCUIT FAULT. DO NOT REPEATEDLY REPLACE FUSES AND APPLY POWER TO A UNIT WHICH CONSISTENTLY BLOWS FUSES. SEEK TECHNICAL HELP AND SOLVE YOUR PROBLEM BEFORE PROCEEDING.

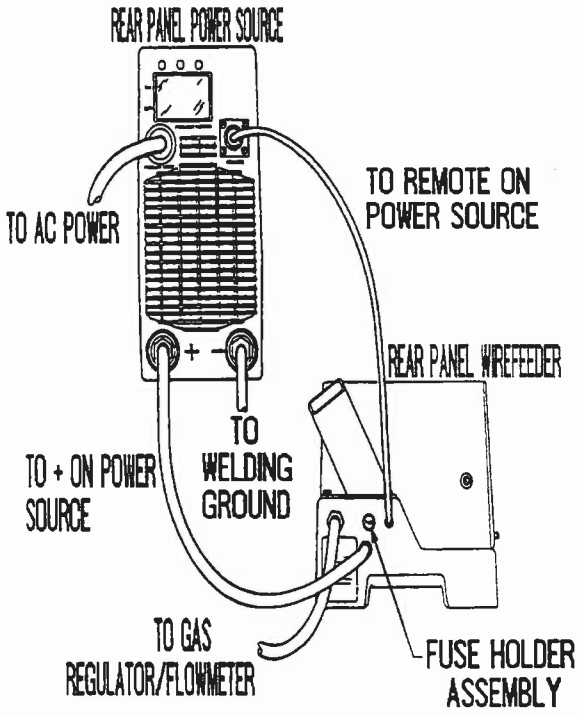

Figure 2, Reverse Polarity Electrical Connections

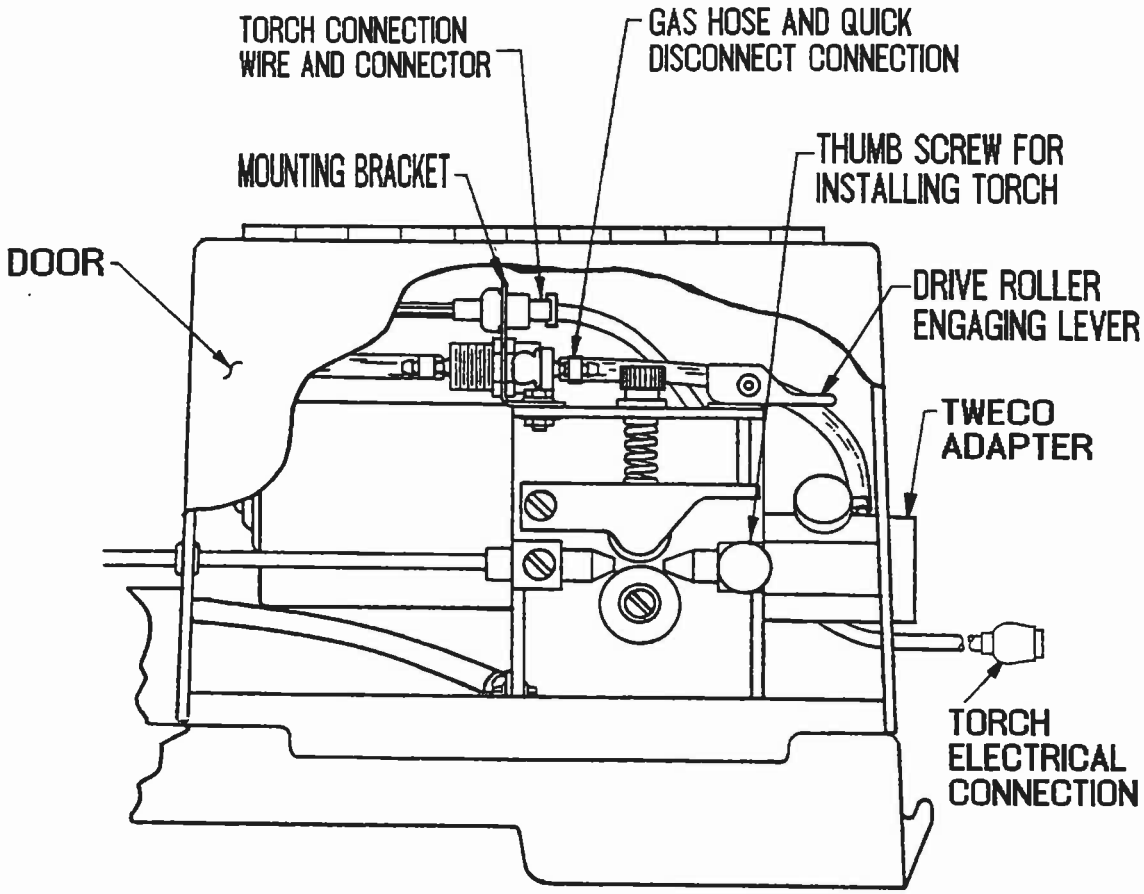

Figure 3, Welding Torch Connections

Welding Torch Connections

The PDI/M may be equipped with a TT350 MIG gun. Both gas and electricity must be supplied to the torch for proper operation. To install the torch using the Tweco adapter, perform the following steps.

First, open the PDI/M door by unfastening the two clips on each side. The door is hinged and is designed to lay back on the cover, out of the way. Next, identify the torch and gas hose mounting bracket which is mounted on the motor housing, above the drive assembly and to the rear. It contains a connector for the trigger wires and a quick disconnect fitting for the gas hose.

Unpack your Tweco MIG gun from its package. The torch installation is simply a matter of inserting the torch end into the adapter and tightening the thumb screw on the adapter body. Then, plug the electrical connector into the torch. The installation is now complete. Review all connections once again to ensure they are all tight.

CAUTION

DO NOT APPLY POWER TO UNIT UNTIL ASSEMBLY HAS BEEN COMPLETED.

To install a Eurotorch Adapter, see the instuctions included with the kit.

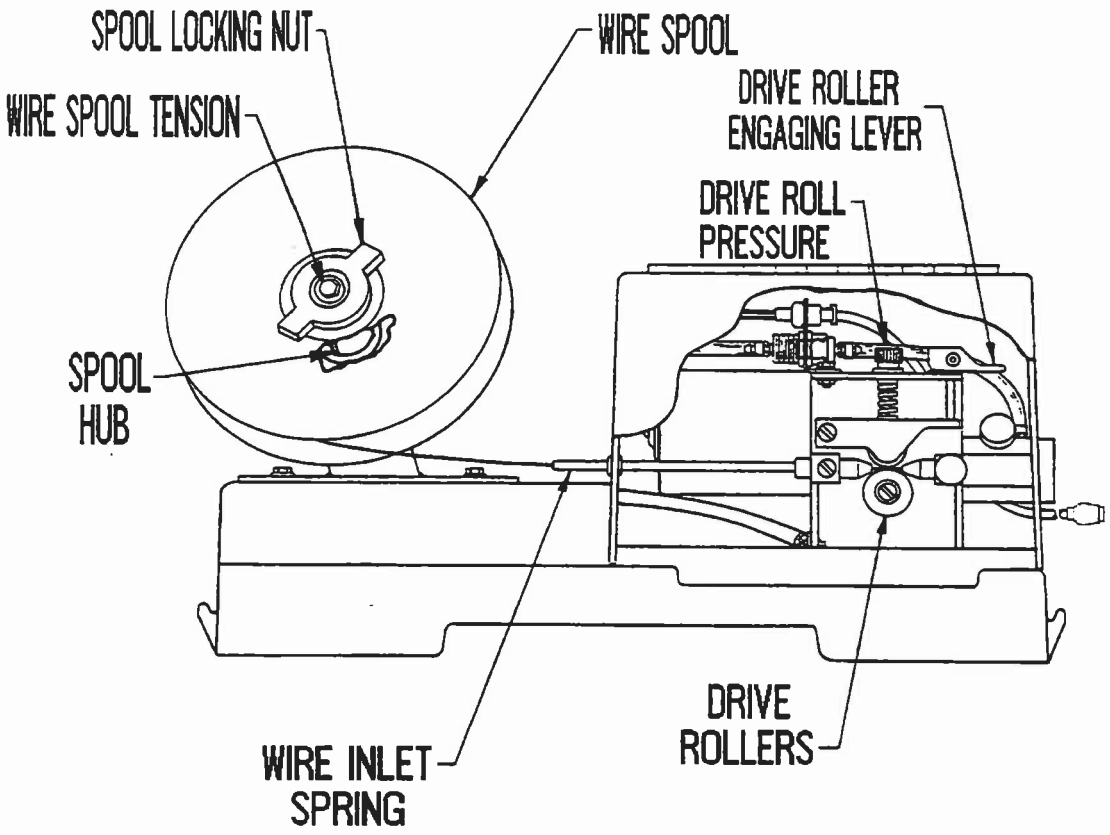

Figure 4, Wire Spool Mounting, Wire Threading & Mechanical Adjustments

Welding Cable

To ensure maximum safety and operating efficiency, use a ground cable of the appropriate size. To avoid excessive heat losses during welding, all output connections, lugs and cables should be secure and well insulated. Failure to use proper cable sizes contributes to lost efficiency of the power source and excessive consumption of electrical power.

The ground lead has to be assembled using customer supplied welding cable and cable connectors. After the cable is assembled, the ground lead is connected to the negative (-) jack on your power source. This represents a reverse polarity connection, which is characteristic of GMAW operation. If the wirefeeder or ground lead must be extended for any reason, follow the recommendations in Table 2.

TABLE 2

RECOMMENDED COPPER WELDING CABLE SIZES BASED ON A 300A 60% DUTY CYCLE AND COMBINED LENGTH OF ELECTRODE GROUND CABLE*

0' to 150' (45.7m)	150' to 200' (61m)	200' to 250' (76m)
1/0	2/0	3/0

*Use of aluminum cable requires increase by two AWG sizes over recommended copper cable size. Recommended cable sizes for other duty cycles and output currents can be found in Volume 2, WELDING HANDBOOK, 7th Edition, published by the American Welding Society.

Gas Connections

After making the torch connection as described on page 8, a source of shielding gas must be supplied to the wirefeeder.

On the back of the wirefeeder, in the lower left corner, is the gas solenoid connector. Remove the protective plastic insert and tighten your gas hose snugly at this location. Check the setup for leaks. This connection requires a 5/8 - 18 UNF RH male nozzle.

It is important to keep gas cylinders chained in an upright position to a stationary object. Always turn OFF the gas supply at the source when not in use. Make sure that pressure regulators, flowmeters, hoses and fittings are in good condition BEFORE using. For safety, a gas flowmeter or regulator should always be used.

WARNING

BEWARE OF GAS LEAKS. SHIELDING GASES SUCH AS ARGON ARE MORE DENSE THAN AIR AND WILL REPLACE AIR WHEN USED IN CONFINED SPACES. DO NOT LOCATE GAS CYLINDERS IN CONFINED SPACES. WHEN NOT IN USE, SHUT OFF GAS SUPPLY AT THE SOURCE. PROVIDE ADEQUATE VENTILATION AT ALL TIMES.

The PDI/M has a maximum operating pressure of 30 psi. Ensure that your pressure regulator/flowmeter is adjusted properly before use.

Wire Spool Mounting/Wire Threading

The wire spool is mounted to the black reel bracket on the rear of the PDI/M. To mount the spool, remove the spool locking nut on the spool hub. Next, place the wire spool on the spool hub and slide it down until it rests against the flange provided. Make sure the small locating pin is engaged with its counterpart on the wire spool and that the spool is laying flat against the flange. Replace the spool locking nut and tighten.

To thread the wire into the motor drive assembly, start by placing the wire into the wire inlet spring. Push the wire into the motor housing. Make sure the drive rollers are separated by lifting the black lever at the top right of the motor housing. Once the wire is through the rollers, place it into the sleeving in the torch, and lower the drive roller lever to engage the rollers.

The wire may be fed to the end of the gun by using the INCH control. To do this, place the WIRE FEED SPEED control midway between 0 and 10 and hold down the INCH switch until wire appears at the end of the gun. Release the INCH switch, and trim the wire to the desired length if necessary. See Figure 4 for reference.

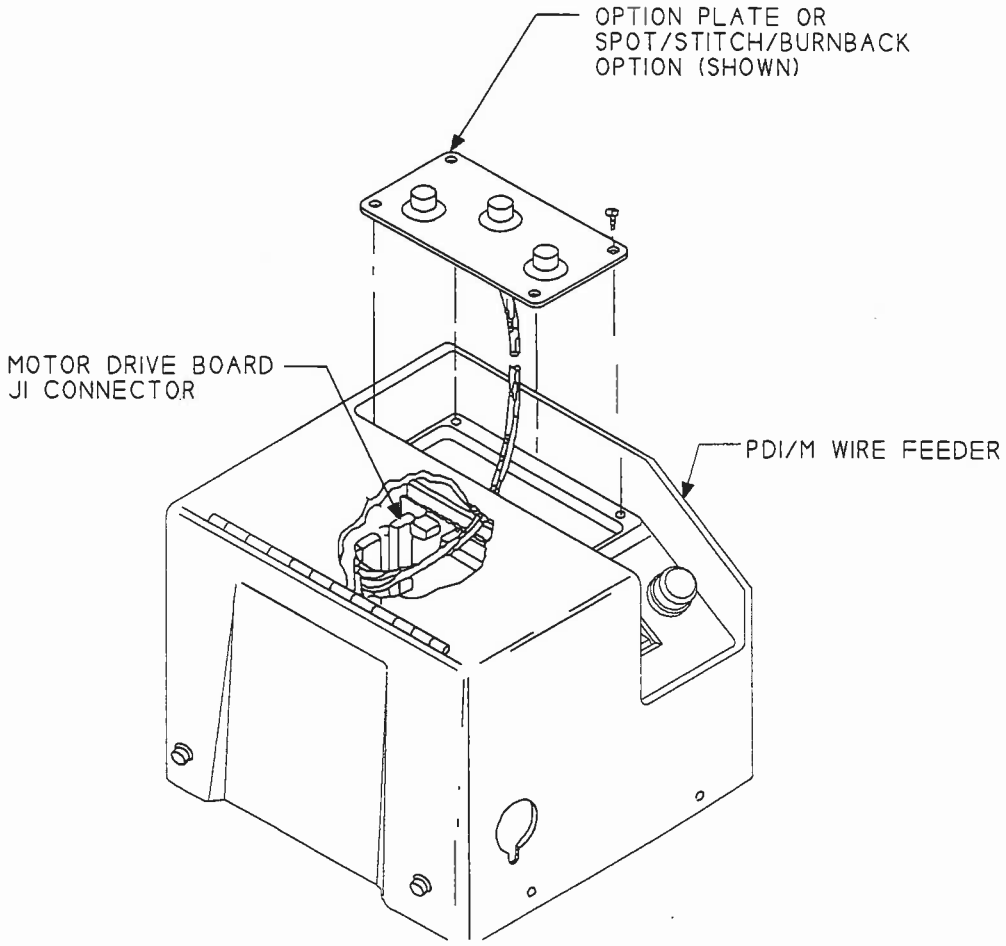

Figure 5, Option Installation

CAUTION

TO AVOID PINCHING INJURY, MAKE SURE FINGERS ARE CLEAR OF DRIVE ROLLERS BEFORE ENGAGING. TO AVOID ELECTRIC SHOCK, ALWAYS KEEP THE DOOR CLOSED WHILE OPERATING THE WIREFEEDER.

Accessories

Your PDI/M may be equipped with several accessories allowing you to customize your wirefeeder in the most effective configuration for your application. Following are installation instructions for each type of accessory.

WP1 Spot/Stitch/Burnback Option

The SPOT/STITCH/BURNBACK option is installed by removing the blank option plate from the wirefeeder cover and plugging the option board into the motor driver board. See Figure 5.

To loosen the option plate, remove and save the four screws holding the plate to the cover. Remove the plate, leaving an opening which exposes the motor driver board. The plate will no longer be needed once the option is installed.

Remove the jumper plug from the motor driver board. This plug is located as shown in Figure 5. If you have trouble removing the plug with the cover on the unit, you may remove the cover to gain better access.

Insert the plug from your SPOT/STITCH/BURNBACK option into the receptacle you just removed the jumper plug from. Make sure the locking tabs on the plug are secured to their counterparts on the receptacle. This helps ensure a reliable connection and prevents loss of operation due to vibration.

Place the SPOT/STITCH/BURNBACK option plate into the opening, making sure not to pinch the harness between the plate and the cover. Secure the plate with the four screws used with the original option plate.

The installation of your SPOT/STITCH/BURNBACK option is now complete. Please refer to page 14 for a discussion of the operation of the SPOT/STITCH/BURNBACK option.

Drive Rolls

The PDI/M comes equipped with steel drive rollers to run .030-.035/.045" DIA wire. Optional rollers are also available. See Table 3 for Part Numbers and descriptions of these alternate rolls.To install or replace a roller, remove the drive roller setscrew located in the middle of the drive wheel. Then disengage the drive rollers by lifting the lever on the motor bracket. Remove the roller and replace it with the desired size. Retighten the setscrew. The installation is now complete.

NOTE

ALWAYS MAKE SURE THAT THE SETSCREW HOLDING THE DRIVE ROLLER IS TIGHT BEFORE OPERATING THIS UNIT. THIS WILL PREVENT ROLLER MISALIGNMENT, WIRE CRIMPING, AND BINDING.

TABLE 3
DRIVE ROLLER ALTERNATES

Part Number	Wire Diameter (")	Wire Diameter (mm)	Wire Material
600060-001	.030 - .035 / .045	.8 - .9 / 1.2	Steel *
600060-002	.025 / .030 - .035	.6 / .8	Steel
600060-003	.035 - .045	1.0 - 1.2	Aluminum
600060-004	.045 - .062	1.2 - 1.6	Knurled, Flux Core

*This is the standard roller supplied with the PDI/M and may be ordered as a replacement under this number.

Function and Location of Standard Controls

Inch/Purge Switch

This switch is located on the left side of the front panel. It is a 3 position, center OFF, momentary rocker switch. Holding this switch down in the PURGE position allows the gas solenoid to operate without the motor running. Holding the switch down in the INCH position allows the motor to run without any solenoid action. Releasing the switch in either position returns it to the OFF position automatically. When in the INCH position, the motor turns at a rate dependent on the position of WIRE FEED SPEED control. See Figure 6.

Wire Feed Speed Control

This is the potentiometer located to the right of the INCH/PURGE switch on the front panel. The wirefeed speed control dial is scaled in inches per minute with an accuracy of 10% of the total scale. Turning the control CLOCKWISE increases the speed. Turning it COUNTERCLOCKWISE decreases the speed. See Figure 6 for a layout of the front panel.

Drive Roller Engaging Lever

This is located inside the wirefeeder cover on top of the motor housing on the right hand side. Lift this lever up and down to engage or disengage the drive rollers. Lifting the lever up disengages the drive rollers. Lowering the lever re-engages the drive rollers. See Figure 4.

Wire Spool Tension

The tension on the wire spool is adjustable. To make this adjustment, tighten or loosen the bolt (located at the center of the spool locking nut) as necessary to increase or decrease rolling resistance. See Figure 4.

CAUTION

EXCESSIVE TIGHTENING OF THE WIRE SPOOL TENSION BOLT MAY CAUSE MOTOR OVERLOAD. ERRATIC OPERATION OR FAILURE MAY RESULT. DO NOT OVERTIGHTEN THIS BOLT.

Drive Roll Pressure

Drive roll pressure is adjustable by twisting the adjustment screw/spring combination just above the drive rollers in the motor housing. See Figure 4.

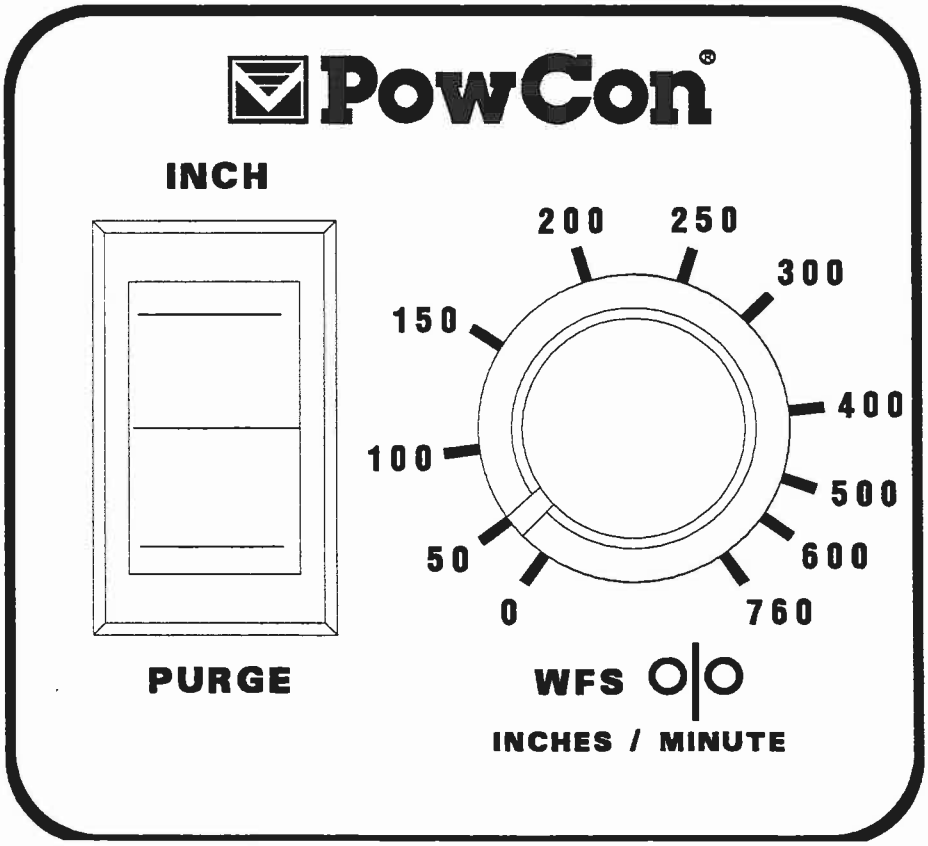

Figure 6, PDI Front Panel

Function and Location of Optional Controls

WP1 Spot/Stitch/Burnback Option

Following is a description of controls on the WP1 SPOT/STITCH/BURNBACK option. See Figure 7.

SPOT WELD - STITCH WELD - NORMAL WELD: This switch allows you to choose between three modes. SPOT mode is for performing single spot welds, with one pull on the trigger. STITCH mode is for performing a series of spot welds at timed intervals, while holding the trigger down. NORMAL mode disables both the SPOT and STITCH modes and allows the PDI/M to operate as if no option were installed.

SPOT/ON TIME: This potentiometer controls the SPOT, or "ON," time of the arc, and is variable between 1 and 5 seconds. Turning the potentiometer in a clockwise (CW) direction increases the time, and turning it in a counterclockwise (CCW) direction decreases the time.

STITCH/OFF TIME: This potentiometer controls the STITCH, or "OFF," time of the arc. This is the time period between spots, and is continuously variable between 1 and 5 seconds. CW motion of the potentiometer increases time, and CCW motion of the potentiometer decreases time, just as with the SPOT potentiometer.

BURNBACK TIME: This potentiometer controls the amount of time the power supply remains on after the trigger has been released. The burnback available is continuously variable between 0 and .25 seconds. With the potentiometer in the fully CW position, maximum time will result. With the potentiometer in the fully CCW position, minimum time will result, and the burnback will be essentially disabled.

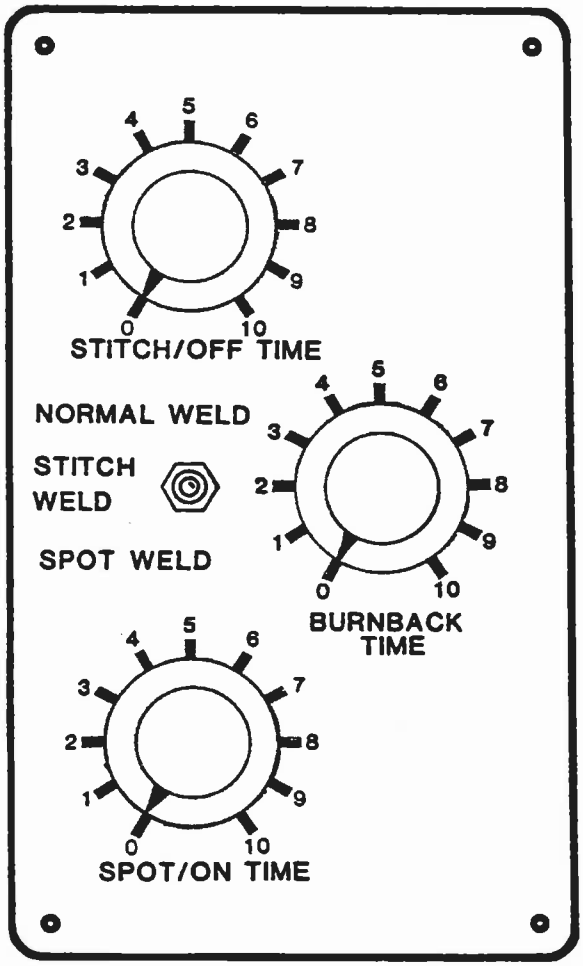

Figure 7, WP1 Spot/Stitch/Burnback Option Panel Controls

Sequence of Operation

Standard PDI/M

The sequence of operation of the PDI/M is very straightforward. When the **PowCon** Power Source is turned ON and the wirefeeder is connected to the power source, the wirefeeder is energized. To commence operation, select the wire feed speed setting and press trigger switch. The contactor is then engaged, and the unit will operate. The contactor will remain engaged until the trigger is released.

The contactor on the PDI/M is designed as a contact closure system. The unit will not operate on a 115VAC return system.

PDI/M with WP1 Spot/Stitch/Burnback Option

When the WP1 SPOT/STITCH/BURNBACK Option is installed, the sequence of operation is slightly different than on the standard PDI/M.

Three modes of operation are available with the SPOT/STITCH/BURNBACK Option: NORMAL WELD , SPOT WELD and STITCH WELD. These modes of operation are graphically illustrated in Figure 8.

When the mode switch is in the NORMAL WELD position, the sequence of operation is identical to the standard PDI/M. As long as the trigger on the gun is engaged, the contactor is engaged, and normal uninterrupted welding will continue. After each cycle, the burnback time is engaged and burnback will occur according to the BURNBACK TIME potentiometer setting.

When the switch is in the SPOT WELD position, depressing the trigger will cause one spot weld with burnback to occur. Again, the duration is set by the SPOT/ON and BURNBACK time potentiometer. The trigger must be depressed every time you want a spot weld to occur. This is not an automatically repeated sequence like the STITCH mode. In fact, the stitch timer is disabled during spot welding.

When the switch is in the STITCH WELD position, and the trigger is being held down, the weld sequence has two distinct parts, as illustrated in Figure 8. The ON Time, or Spot time, is controlled by the SPOT/ON TIME potentiometer. The OFF Time, or STITCH TIME, is controlled by the STITCH/OFF TIME potentiometer. In both cases, rotating the potentiometer clockwise will increase the time of each function. As long as the trigger is depressed, the weld will alternately spot and stitch according to the times set by the potentiometers. When the trigger is released, the welding will stop. After each spot time the burnback timer is engaged and burnback will occur corresponding to the BURNBACK TIME potentiometer setting. If the BURNBACK TIME potentiometer is set to zero, no burnback will occur.

By practicing with the WP1 SPOT/STITCH/BURNBACK Option, you will soon find acceptable settings for your particular application.

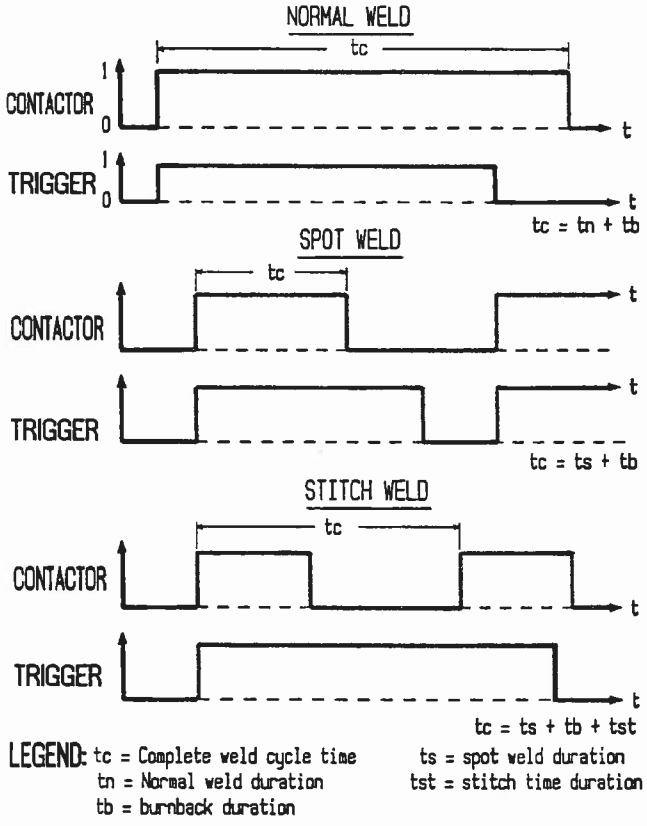

Figure 8, Graphs of Spot/Stitch/Burnback Modes

Service

Unauthorized service to this unit by anyone other than a **PowCon** trained and authorized technician will void the limited warranty. If technical problems arise with your unit, please call the Technical Service Department at **PowCon.**

Troubleshooting

The PDI/M Wirefeeder has been designed with both simplicity and reliability in mind. As a result of this design philosophy, there are no parts, with the exception of consumables, which require regular user service or calibration. Nonetheless, there are several things you need to be aware of in case difficulties arise.

Some electrical transients and fault conditions may blow the 2.5 AMP slow blow fuse located at the back of the unit. Sometimes a fuse may be damaged during shipment as well. If your wirefeeder fails to energize when the power source is on with the gun engaged, check the fuse. If it is blown, replace it and try again. If the fuse blows again, contact a **PowCon** Technical Service Representative for assistance. DO NOT, under any circumstances, continue to replace fuse when this device repeatedly indicates a fault. To do so will only cause further damage to the equipment.

CAUTION

A POPPED BREAKER OR BLOWN FUSE IS AN INDICATION OF A CIRCUIT FAULT. DO NOT REPEATEDLY RESET THE BREAKER OR REPLACE THE FUSE AND APPLY POWER TO A UNIT WHICH CONSISTENTLY POPS THE BREAKER OR BLOWS FUSES. SEEK TECHNICAL HELP AND SOLVE YOUR PROBLEM BEFORE PROCEEDING.

Another reason for a non-energized wirefeeder may be in the cable connecting it to the power source. Power is supplied to the wirefeeder via Pins S and J on the remote connector on the Power Source. Check to make sure the pins in this connector have not been damaged or the wires broken, and that the connectors are firmly engaged.

Aside from these two simple checks, there are no user serviceable parts on the PDI/M. If you have further difficulty, please contact our Technical Service Representative or an authorized service center.

Table 4

Parts List for PDI/M Final Assembly, 123100-001

Item	Qty.	Part No.	Description
6	1	601107-002	Hub, Spool
7	1	601107-009	Nut, Spool
8	1	601107-004	Spring, Comp.
9	1	601107-008	Spacer, Friction
10	1	105169-001	Washer, Friction
11	1	601107-006	Spacer
12	1	601107-007	Screw, 3/8 - 16 X 1 HHC SZ
13	1	123102-001	Label Wirefeeder PDI/M
16	1	982004-001	Caps, Square Tubing
17	6	970011-506	Screw, #10 - 32 X .50 CR1AF SZ NL
18	2	970025-304	Screw, 6 - 10 X .38 TFA CR1AP SZ
20	1	100108-001	Warning Label, High Voltage
21	1	105097-001	Label, Data Tag
24	1	930003-001	Connector, Weld Cable, Tweco
Opt	1	930008-001	Connector, Weld Cable, Dinse *

* Available on 123100-002 as a standard feature.
Items 6 thru 12 & Base Weldment are available as Kit P/N 105172-002.

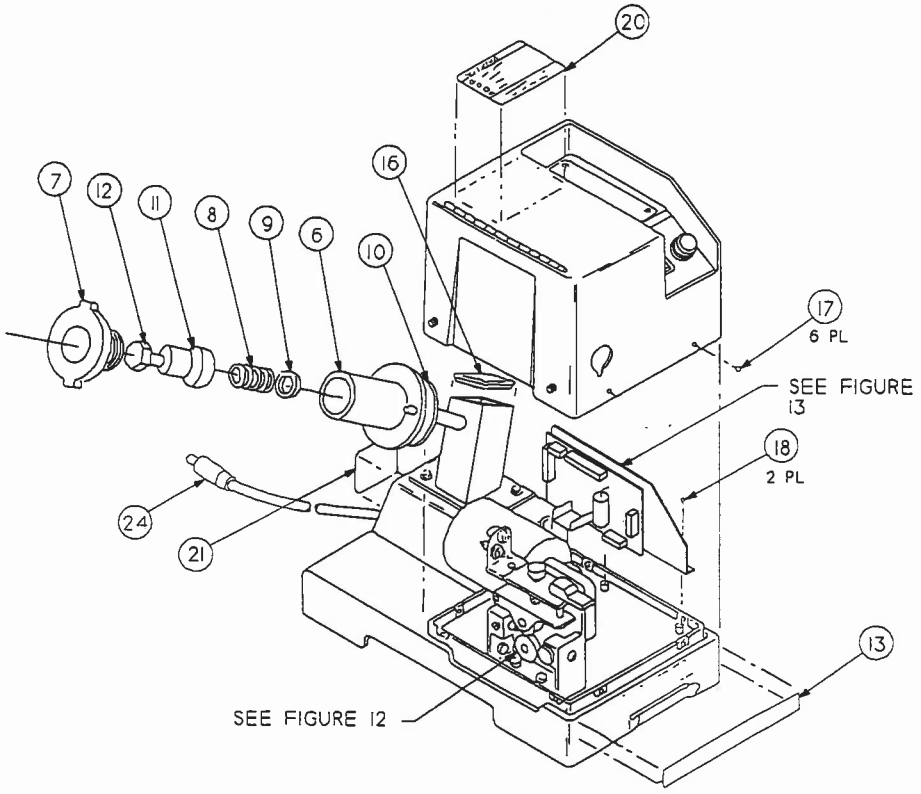

Figure 9, Final Assembly PDI/M Exploded View

Table 5

Parts List for PDI/M Cover Assembly, 123112-001

Item	Qty.	Part No.	Description
1	1	105056-001	Cover, Molded
2	1	105053-001	Door, Sub Assembly *
3	1	903000-005	Potentiometer
5	1	105058-003	Option Plate, Blank
6	1	123115-001	Overlay, Front Panel
10	1	920005-001	Switch, Rocker
12	1	940024-101	Knob
15	4	970025-304	Screw, 6 - 10 X .38 TFA CR1AP SZ
16	5	970002-303	Screw, #6 - 32 X .31 CR1AP SZ NL
18	5	974010-003	Washer, Lock #6
19	1	976000-001	Grommet, Rubber, 0.281 ID

* Door latches may be ordered separately as 979008-001

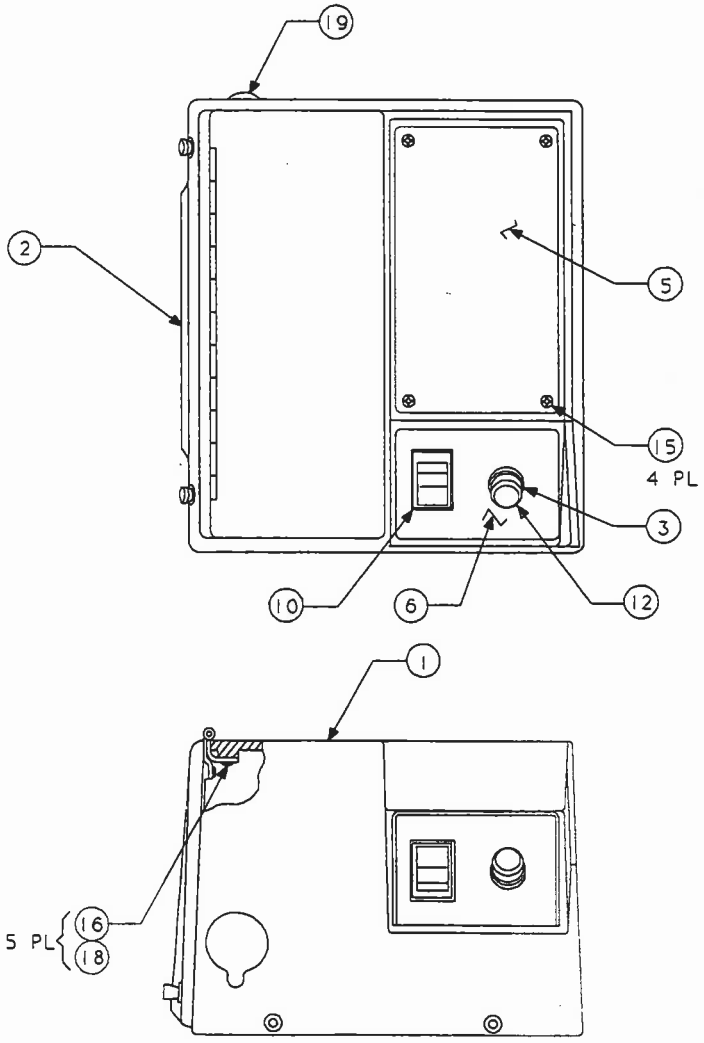

Figure 10, Cover Assembly, PDI/M

Table 6

Parts List for PDI/M Base Assembly, 123111-001

Item	Qty.	Part No.	Description
1	1	105055-001	Base, Molded PDI
3	1	105066-003	Assy, Gas Solenoid PDI
4	1	105086-001	Assy, Fuse Holder *
5	1	123113-001	Assy, Cable, PS to PDI
6	1	123114-001	Assy, Ftg/Tube
10	1	105173-002	Reel Bracket
11	1	105072-001	Bracket, Front Handle
12	1	105073-001	Bracket, Rear Handle
13	1	105077-001	Spacer, Handle Bracket
20	1	963000-002	Fitting, 1/8 NPT - 5/8 - 18 **
21	2	964000-001	Spring, Handle Bracket
24	1	970025-306	Screw, 6-10 X .50 TFA, CR1AP SZ
25	2	970025-406	Screw, 8 - 10 X .50 TFA, CR1AP SZ
26	5	970006-608	Screw 1/4 - 20 X .62 FH SZG5 SL
27	6	970006-610	Screw, 1/4 - 20 X .75 FH SZG5 SL
28	1	970006-623	Screw, Hex Head, 1/4 - 20 X 2 - 1/4
32	1	974005-003	Washer, F #16 .267 X .143 X .032 SZ
33	4	974001-006	Washer, Flat, #1/4 (Brass)
36	1	989009-001	Clamp, Cable 3/8 I.D.
38	1	963018-008	Clamp, Hose 2-ear 5/16
42	1	963004-001	Plug, Tapered
43	REF	979001-001	Tie, Cable
46	1	930007-013	Plug Housing, 3 Pin
47	1	930007-015	Housing
52	1	963007-003	Gas Fitting, Quick Disconnect
53	1	963007-004	Gas Fitting, Quick Disconnect
54	1	105098-002	Mounting Bracket, Torch Connections
55	1	970006-504	Screw, Flanged, Hex Head 10 - 32 X 3/8
56	1	974005-005	Washer, Flat Reduced Diameter
57	1	972000-005	Nut, Hex, Steel, 10 - 32
58	1	930007-022	Connector, Female***

* Plastic fuse holder may be ordered separately as **PowCon** part number 921005-001. Fuse may be ordered as PowCon part number 921004-003. Fuse holder is Bussman series HKP or equivalent (to house 1/4" X 1 1/4" fuse.)

** Western Enterprises part number AW-152A or equivalent.

*** Female Pin may be ordered as PowCon part number 930007-041. The Male Connector may be ordered as PowCon part number 930007-012. The Male Pin can be ordered as 93007-52.

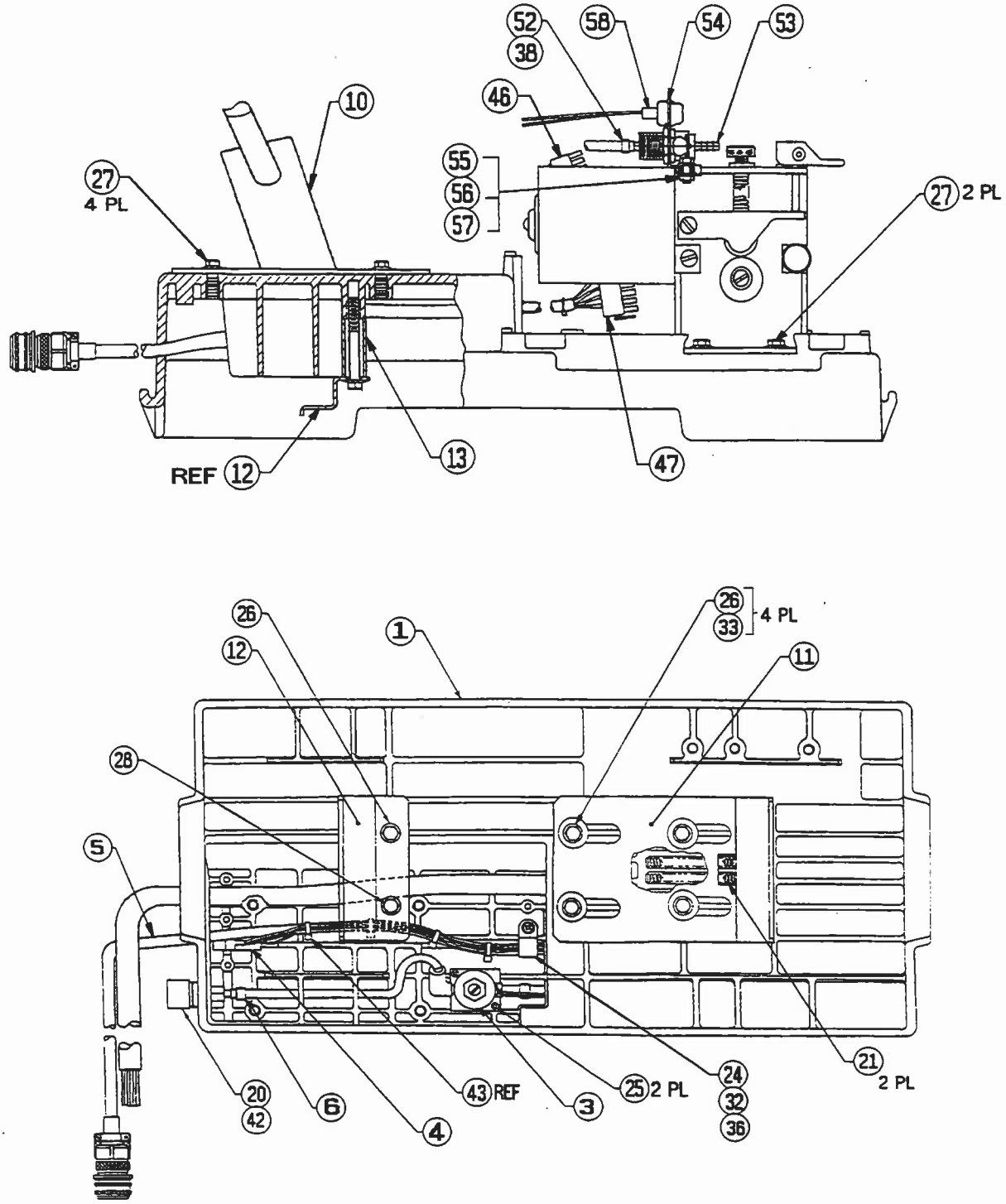

Figure 11, Base Assembly PDI/M

Table 7

Parts List for PDI/M Motor & Drive Assembly, 105070-002

Item	Qty.	Part No.	Description
1	1	922006-001	Drive Motor & Casting Assembly **
2	1	930007-014	Housing
3	2	930007-041	Socket, 18 - 24 AWG
4	1	105133-001	Assy, Cable Weld PDI
5	1	970006-608	Screw, Hex, 1/4 - 20 X 5/8
6	1	972001-006	Nut, Flanged, Hex Serrated Locking, 1/4 - 20
7	1	105092-001	Wire Inlet Assembly *

NOTES:

* This part consists of a Brass Wire Inlet (105087-001) and an Input Guide Spring (1097-0032). These may be ordered as individual replacement parts.

** This part consists of a number of individual items, which may be ordered as follows:

A.	922006-020	Wire Tension Adjustment Screw
B.	922006-030	Wire Tension Adjustment Spring
C.	922006-040	Wire Tension Arm Assembly
D.	922006-050	Wire Inlet Guide Screw
E.	922006-060	Drive Roll Set Screw
F.	922006-070	Drive Roller Engaging Lever Assembly
G.	922006-090	Tension Arm Shoulder Screw
H.	922006-100	Spring Plate
I.	922006-110	Feed Plate (Casting)
J.	922006-120	Motor
K.	922006-025	Thumb Screw
L.	600060-100	Key Shaft

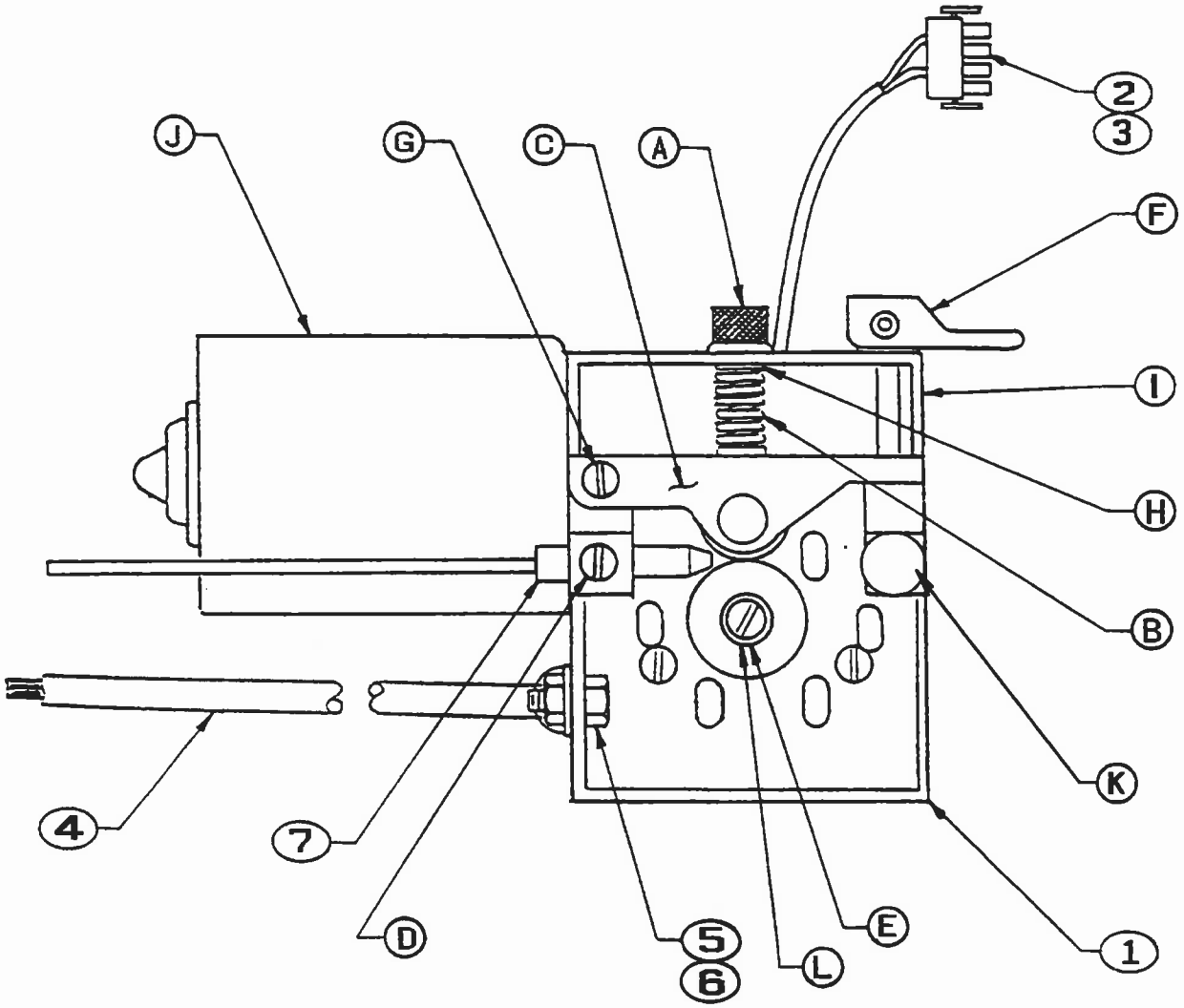

Figure 12, Motor and Drive Assembly, PDI/M

Table 8

Parts List for PDI/M PCB Bracket Assembly, 105140-002

Item	Qty.	Part No.	Description
1	1	105137-002	Assy, Motor Drive PCB PDI/M *
2	4	2040-0200	Spacer, #6 X 1/4 Lg Round Nylon
3	4	970000-308	Screw, Pan Head 6 - 32 X 5/8
4	4	974010-003	Washer, Lock #6
5	4	974005-003	Washer, Flat #6
6	4	972003-003	Nut, Hex Light Duty #6-32
7	1	105118-001	Bracket, Vertical Mount, PDI
8	1	105099-001	Jumper Plug Assembly

* See separate parts list for individual component breakdown and schematic, Figure 14 and 15.

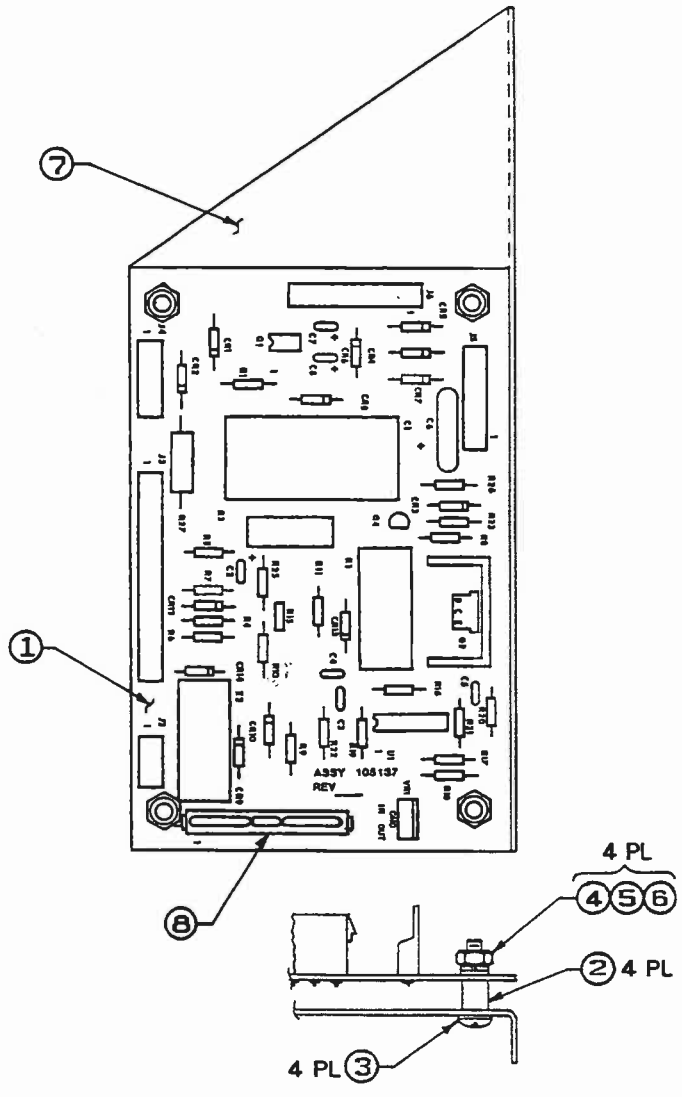

Figure 13, PCB Bracket Assembly, PDI/M

Table 9

Parts List for PDI/M Motor Drive PCB Assembly, 105137-002

Item	Qty.	Part No.	Description	Ref. Des.
1	1	105139-001	Drill Motor Drive PCB PDI	
2	1	902001-093	Resistor 5.1K 1/2 Watt	R27
3	1	902018-055	Resistor 150 Ohm	R4,
4	1	902000-071	Resistor 680 Ohm	R5
5	2	902000-142	Resistor 470K	R6, R16
6	3	902000-076	Resistor 1K	R8,R23,R25
7	5	902000-101	Resistor 10K	R9,R10,R17,R19,R21
8	1	902000-151	Resistor 1Meg	R11
9	1	902000-146	Resistor 680K	R15
10	2	902000-096	Resistor 6.8K	R18,R22
11	1	902000-117	Resistor 47K	R20
12	1	902000-084	Resistor 2.2K	R28
13	1	902001-088	Resistor 3.3K 1/2 Watt	R1
14	2	923005-001	Relay	K1,K2
15	1	902004-010	Resistor, 1 Ohm, 5W, WW	R3
16	1	902001-067	Resistor 470 Ohm	R7
17	6	913001-001	Diode, 1 Amp	CR1,CR2,CR9,CR12-14
18	1	913004-024	Zener Diode, 1N4751A	CR10
19	1	913006-001	Diode, 2 Amp	CR3
20	5	913008-001	Diode Rectifier, 3 Amp	CR4,CR5,CR6,CR7,CR8
21	1	900004-006	Capacitor, 2200 UF, 50V	C1
22	2	900005-006	Cap 1 UF 50V Tant	C2, C7
23	1	900002-208	Capacitor, .47 UF	C3
24	2	900002-205	Cap .01 UF (2500-0218)	C4, C5
25	1	910003-002	IC, LM324N	U1
26	1	914000-001	Transistor 2N4401	Q4
27	1	100086-006	Assy, XSTR, Tip 125, PNP	Q2
29	1	915001-001	Opto-Isolator (4N 25A)	Q1
30	1	910010-003	Regulator 7815	VR1
31	1	930007-032	Connector 2 Pin	J2
32	1	930007-033	Connector 3 Pin	J4
33	1	930007-034	Connector 4 Pin	J5
34	1	930007-035	Connector 5 Pin	J6
35	1	930007-036	Connector 6 Pin	J1
36	1	930007-038	Connector 8 Pin	J3
40	1	2500-0676	Cap, Cer. .05 UF 500V	C6
41	1	902001-042	Resistor, 47 Ohm CF 1/2 W	R26
43	1	900005-002	Capacitor, 2.2 UF / 35V	C8
44	1	900002-301	Capacitor, .1 UF	C9

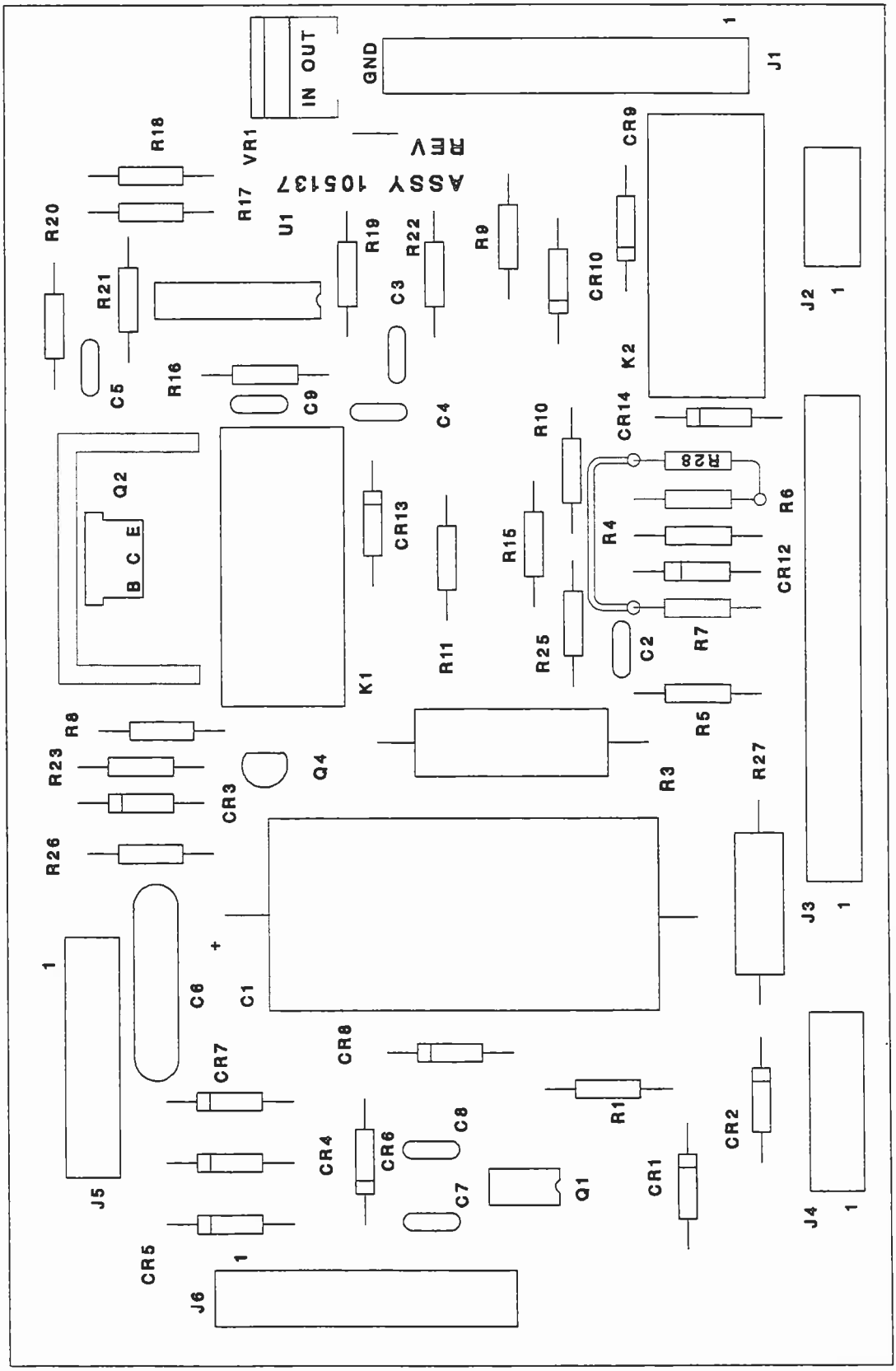

Figure 14, Motor Drive PCB Assembly, PDI/M

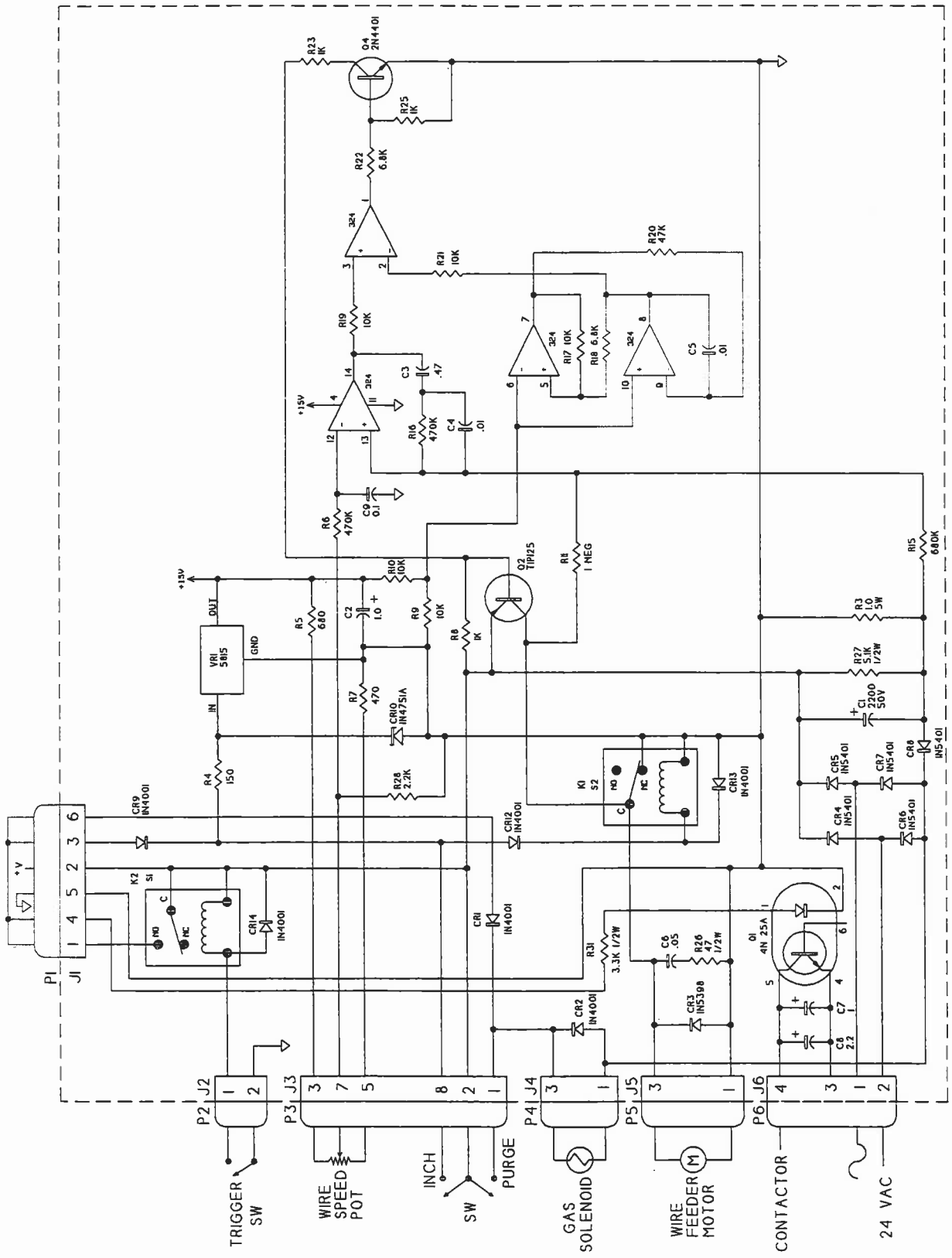

Figure 15, Schematic, Motor Drive PCB

Table 10

Parts List for WP1 Spot/Stitch/Burnback Control, 105127-002

Item	Qty.	Part No.	Description
1	1	105145-001	Option Plate SP/ST/BB WP1
2	1	105141-001	Assy, PCB SP/ST/BB WP1
3	1	105146-002	Overlay, SP/ST/BB WP1
4	3	940000-004	Knob, Control, Miniature
5	3	974006-006	Washer, Flat, Brass, 1/4

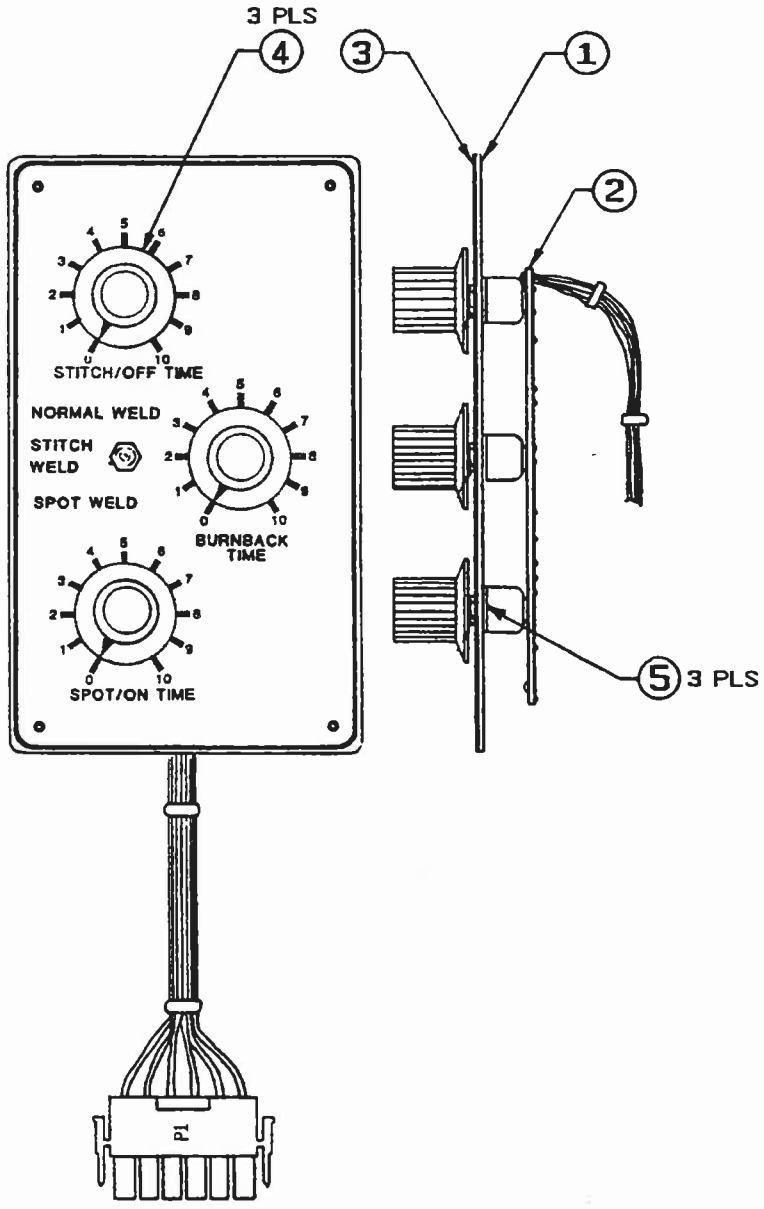

Figure 16, WP1 Spot/Stitch/Burnback Control

Table 11

Parts List for WP1 Spot/Stitch/Burnback PCB Assy, 105141-001

Item	Qty.	Part No.	Description	Ref. Des.
1	1	105143-001	Drill SP/ST/BB PCB PDI	
2	2	902000-108	Resistor 20K	R2
3	8	902000-101	Resistor 10K	R3,R5,R10,R11,R13,R17,R18,R20
4	6	902000-076	Resistor 1K	R6,R14,R15,R22,R25,R28
5	1	902000-055	Resistor 150 Ohm	R7
6	2	902000-126	Resistor 100K	R8,R21
7	1	902000-074	Resistor,910 Ohm 1/4W,5%	R24
9	4	902000-085	Resistor, 2.4K, 1/4W, 5%	R4,R9,R30,R33
10	2	902000-082	Resistor 1.8K, 1/4 Watt	R23,R26
11	1	902004-003	Resistor,300 Ohm,5W, WW	R1
12	3	903005-001	Pot,100K,PC Panel Mounting	R16,R19,R27
13	1	913004-015	Diode IN4742 12V 1 Watt	CR3
14	4	913001-001	Diode, 1 Amp	CR2,CR4-CR6
15	1	900005-008	Capacitor 22UF, 35V Tant	C1
17	3	914000-002	Transistor 2N4403	Q3,Q4
18	3	914000-001	Transistor 2N4401	Q1,Q2,Q6
19	1	910003-002	IC, LM324N	U1
20	1	920006-001	PC Panel Mounted,3 Pos Switch	S1
21	1	105103-001	Assy,Harness,Spot Stitch Opt.	
23	3	979001-001	Tie,Cable (Alt. 2040-0706)	
24	2	913000-001	Diode 1N4148	CR1, 7
25	1	910001-005	IC 4538 (Alt. 2800-0928)	U2
26	1	902000-094	Resistor 5.6K	R31
27	1	900005-002	Capacitor 2.2UF/35V	C2
28	1	902000-090	Resistor 3.9K	R37
29	1	902000-042	Resistor 47 Ohm	R36
30	1	913004-013	Diode, Zener 10V	CR8
31	1	914006-011	Transistor Tip 125 PNP	Q5
32	1	902002-076	Resistor, 1K 2W	R29
33	1	900007-001	Capacitor .01UF 1KV	C3

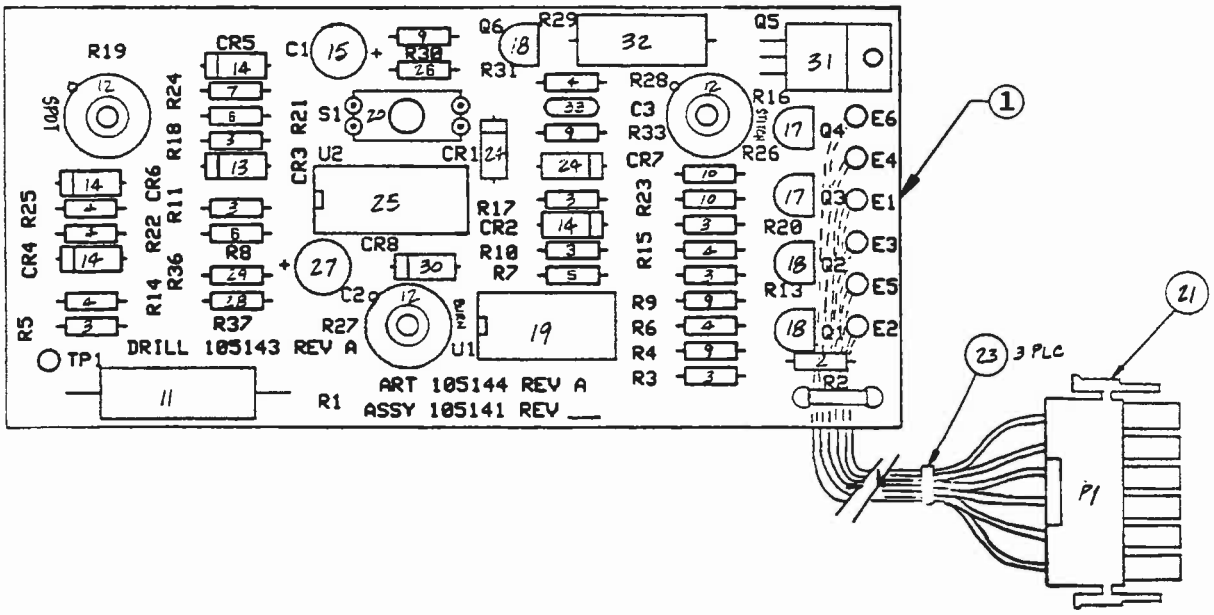

Figure 17, PCB, WP1 SP/ST/BB Assembly, PDI/M

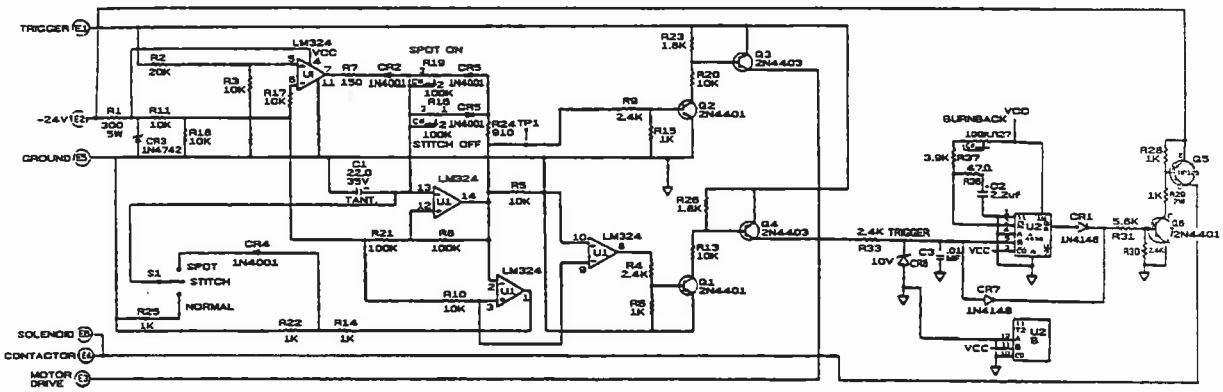

Figure 18, Schematic, WP1 Spot/Stitch/Burnback PCB

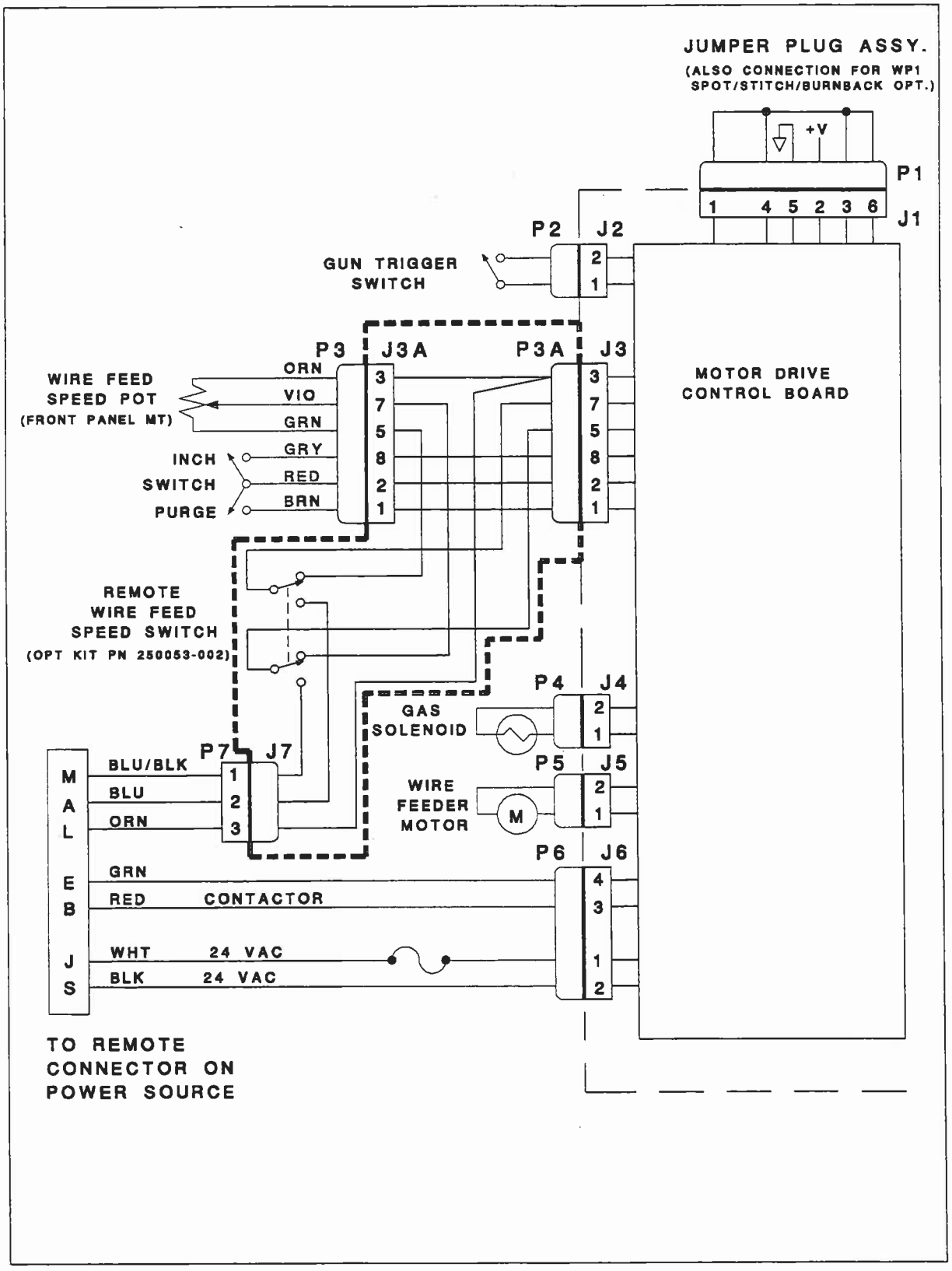

Figure 19, PDI/M System Wiring Diagram

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