INSTRUCTIONS for

PCM-50A
PLASMA ARC CUTTING OUTFITS

I. FEATURES/BENEFITS

- high speed manual or mechanized cutting of any metal from gauge thickness to 1/2-in. thick plate; pierces up to 1/4-in. thick plate — greater productivity
- universal input, 208/230 volt single-phase or 230/460 volt three-phase — greater versatility
- power factor corrected — lower operating cost due to lower input line draw
- fixed output — simplifies setup and operation, requires less operator skill
- uses PT-31XL, PT-17A or PT-121 torch
- cuts with nitrogen (PT-121) or air (PT-31XL and PT-17A); choice of CO2, air, or nitrogen for torch cooling (PT-121)
- patented torch designs provide perfect electrode centering — provides longer tip life by minimizing the possibility of double-arcing
- torch spare parts kit supplied with each outfit — ample supply of spare parts at no additional cost to minimize downtime
- pressure and flow switches — prevent torch damage when gas supply is insufficient providing lower maintenance cost
- thermal overload switch — prevents damage if unit overheats due to insufficient air flow or erratic line voltage
- easy intermittent ("grate") cutting — additional capability permits continuous cutting of grates, expanded metal, heavy screen material, etc.
- wheels and built-in tool storage — all provided standard at no additional cost for portability and greater utilization

Fig. 1 - Typical PCM-50A/PT-121 Plasma Arc Cutting Outfit
(See Tables 1, 2, and 3 for available outfits)
Gas Cylinder not included

NOTE: For listing of changes covered in the reprint of this booklet, see page 19.

These INSTRUCTIONS are for experienced operators. If you are not fully familiar with the principles of operation and safe practices for electric welding equipment, we urge you to read our booklet, "Precautions and Safe Practices for Electric Welding and Cutting," 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.

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

WARNING: These Safety Precautions are for your protection. They summarize precautionary information contained in the references in item 7 and as noted herein. 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 personal injury or death.

1. PROTECT YOURSELF AND OTHERS -- Some welding, cutting, and gouging processes are noisy and require ear protection. Skin and eye burns from arc rays can be more severe than sunburn. Hot metal can cause skin burns and heat rays may injure eyes. Training in the proper use of the processes and equipment is essential to prevent accidents. Also:
   a. Always wear safety glasses with side shields in any work area, even if welder helmets, face shields, and goggles are also required.
   b. 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.
   c. Wear flameproof gauntlet type gloves, heavy long-sleeve shirt, cuffless trousers, high-temperature 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 radiant heat and sparks.
   d. 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.
   e. Protect other personnel from arc rays and hot sparks with a suitable non-flammable protective clothing or curative plastic.
   f. Use goggles over safety glasses when chipping slag or grinding. Chipped slag may be hot and can travel considerable distances. Bystanders should also wear goggles over safety glasses.

2. FIRES AND EXPLOSIONS -- Heat from flames and arcs as well as their radiation can act as ignition sources. Hot slag or sparks can also cause fires and explosions. Therefore:
   a. Remove all combustible materials well away from the work area or completely cover the materials with a protective non-flammable covering. Combustible materials include woods, cloth, sawdust, liquid and gas fuels, solvents, paints and coatings, paper, etc.
   b. Hot sparks or 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 or metal.
   c. 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.
   d. 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.
   e. 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 watchmen when necessary.
   f. For additional information, refer to NFPA Standard 51B, "Fire Prevention in Use of Cutting and Welding Processes", which is available from the National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

3. ELECTRICAL SHOCK -- Contact with live electrical parts can cause severe burns to the body or fatal shock. Severity of electrical shock is determined by the path and amount of current through the body. Therefore:
   a. Never allow live metal parts to touch bare skin or any wet clothing. Be sure gloves are dry.
   b. When standing on metal or operating in a damp area, make certain that you are well insulated. Wear dry gloves and rubber-soled shoes and stand on a dry board or platform.
   c. Always ground the power supply by connecting a ground wire between the power supply and the ground system of the input power.
   d. Always make sure that the workpiece is connected to a good electrical ground.
   e. It is especially important, particularly with plasma cutting equipment, to be sure the work cable is connected to the workpiece. A poor or missing connection could expose the operator or others in the area to a fatal shock.
   f. Do not use worn or damaged cables. Do not overload the cable. Use well maintained equipment.
   g. When not operating, turn off the equipment. Accidental overcharging can cause overheating and create a fire hazard. Do not coil or loop cable around parts of the body.
   h. Be sure the proper size ground cable is connected to the workpiece as close to the work area as possible. Grounds connected to building framework or other remote locations from the work area increase the possibility of output current passing through lifting chains, crane cables, or various electrical parts.
   i. Keep everything dry, including clothing, work area, cables, electrode holders, and power supply. Fix water leaks immediately.
   j. Refer to ANSI/ASC Standard Z49.1 in item 7 below for specific grounding recommendations. Do not mistake the work lead for a ground cable.

4. FUMES AND GASES -- Fumes and gases, particularly in confined spaces, can cause discomfort and physical harm. Do not breathe fumes and gases. Shielding gases can cause asphyxiation. Therefore:
   a. 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 and gases from these materials.
   b. Do not operate in locations close to chlorinated hydrocarbon vapors coming from degreasing and spraying operations. The heat or 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 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.
   d. Refer to ANSI/ASC Standard Z49.1 in item 7 below for specific ventilation recommendations.

5. EQUIPMENT MAINTENANCE -- Faulty or improperly maintained equipment can result in poor work, but most importantly it can cause physical injury or death through fires or electrical shock. Therefore:
   a. Always have qualified personnel perform the installation, troubleshooting, and maintenance. Do not perform any electrical work unless you are qualified to perform such work.
   b. Before performing any maintenance work inside a power supply, disconnect the power supply from the electrical power source.
   c. Maintain cables, grounding wire, connections, power cord, and power supply in safe working order. Do not operate any equipment in faulty condition.
   d. 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.
   e. Keep all safety devices and cabinet covers in position and in good repair.
   f. Use equipment for its intended purpose. Do not modify it in any manner.

6. CYLINDER HANDLING -- Cylinders, if mishandled, can rupture and violently release gas. Sudden rupture of cylinder, valve, or relief device can injure or kill. Therefore:
   a. 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.
   b. 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.
   c. When not in use, keep cylinder valves closed. Have valve protection cap in place if not connected for use. Secure and move cylinders by using suitable lifting tools, never by pulling by hand. Do not move cylinders in contact with a fire hazard or an electric circuit.
   d. Locate cylinders away from heat, sparks, or flame of a welding, cutting, or gouging operation. Never strike an arc on a cylinder.
   e. 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.

7. ADDITIONAL SAFETY INFORMATION -- For more information on safe practices for setting up and operating electric welding and cutting equipment and on good working habits, ask your L-TEC welding equipment supplier for a copy of "Precautions and Safe Practices for Electric Welding and Cutting", Form 52-529.

The following publications, which are available from the American Welding Society, 550 N.W. LeJeune Road, Miami, FL 33126, are recommended to you:
   a. ANSI/ASC Z49.1-1 "Safety in Welding and Cutting"
   b. AWS C5.1- "Recommended Practices for Plasma Arc Welding"
   c. AWS C5.2- "Recommended Practices for Plasma Arc Cutting"
   d. AWS C5.3- "Recommended Practices for Air Carbon Arc Gouging and Cutting"
   e. AWS C5.5- "Recommended Practices for Gas Tungsten Arc Welding"
   f. AWS C5.6- "Recommended Practices for Gas Metal Arc Welding"
II. SPECIFICATIONS

PCC-50A Console

230/460 V, 60 Hz, 3 Phase
208/230 V, 60 Hz, 1 Phase

Input Voltage ........................................... 230/460 V, 60 Hz, 3 Phase
30 A @ 230 V (3 ph.); 15 A @ 460 V (3 ph.)
50 A @ 208 V (1 ph.); 50 A @ 230 V (1 ph.)

Input Current @ rated load .................................. 55 A; 100 V DCSP

Output Rating (100% duty cycle) .......................... 390 V DC @ 208/230 V (1 ph.)
310 V DC @ 230/460 V (3 ph.)

Open Circuit Voltage (Nom.) ............................. 26" high x 16" wide x 30" long

Dimensions .................................................. 250 lbs.

WARNING

Note the high open circuit voltage. Use only torches designed for this equipment. Do NOT attempt to use this equipment with any process other than plasma arc cutting.

PT-121 Torch

Max. Current Capacity (100% duty cycle) .................. 120 A DCSP
Plasma (Cutting) Gas ..................................... Nitrogen @ 25 psi (20 cfm)
Secondary (Cooling) Gas .................................. Nitrogen, Air, or CO₂ @ 25 psi (120 cfm)

Dimensions:

Length of Service Lines .................................... 25 or 50-ft.

Instruction Booklet ........................................ Form F-12-794

PT-17A Torch

Max. Current Capacity (100% duty cycle) .................. 100A DC
Cutting/Cooling Gas ...................................... Air @ 75 psi (225 cfm)

Dimensions:

Length of Service Lines .................................... 25-ft. or 50-ft.

Instructions Booklet ....................................... Form F-14-332

III. EQUIPMENT SUPPLIED & ACCESSORIES

A. OUTFITS AVAILABLE

Available outfits are listed in Tables 1 and 2.

B. REQUIRED EQUIPMENT

1. Using PT-121 Torch

   a. Nitrogen Gas Supply - Nitrogen is always used for plasma gas (20 cfm @ 25 psig) on the PT-121 torch. A single cylinder can be used for both plasma and cooling by use of the "Y" connector on outlet of regulator. A large "T"-size (300 cfm) cylinder will provide over 2 hours of operating time. However, if using nitrogen for plasma gas only, then the cylinder will provide about 15 hours of operating time. Nitrogen may also be supplied through a pipeline.

   b. Cooling Gas - If not using nitrogen for cooling, then either a cylinder of CO₂ or a suitable supply of air (150 psig max.) will be required. (See Table 1A and 1B.) Generally, CO₂ is the preferred cooling gas for....
### Table 1 - Available PCM-50A/PT-121 Outfits

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>25-ft. lines</td>
<td>50-ft. lines</td>
<td>25-ft. lines</td>
</tr>
<tr>
<td>600426</td>
<td>600427</td>
<td>600428</td>
<td>600797</td>
</tr>
</tbody>
</table>

**Includes:**
- PT-121 or -121M Torch
- Work Cable, 25 or 50-ft.
- Hand Control Switch, 25-ft. cable
- PCC-50A Power Supply
- TR-12 Truck
- Torch Spare Parts Kit
- R-77-30-580 N₂ Regulator
- (2) Gas Hose, 12-1/2-ft.
- "Y" Connector

**CO₂ Cool Outlet, P/N**

| 600368 | 600370 | 600419 | 600798 | 600421 | 600423 |

**Includes:**
- PT-121 or -121M Torch
- Work Cable, 25 or 50-ft.
- Hand Control Switch, 25-ft. cable
- PCC-50A Power Supply
- TR-12 Truck
- Torch Spare Parts Kit
- R-77-30-580 N₂ Regulator
- R-76-150-320 CO₂ Regulator
- (2) Gas Hose, 12-1-1/2-ft.

**Air Cool Outlet, P/N**

| 600369 | 600371 | 600420 | 600799 | 600422 | 600424 |

**Includes:**
- PT-121 or -121M Torch
- Work Cable, 25 or 50-ft.
- Hand Control Switch, 25-ft. cable
- PCC-50A Power Supply
- TR-12 Truck
- Torch Spare Parts Kit
- R-77-30-580 N₂ Regulator
- Air Filter-Regulator w/Mgt Bracket
- Gas Hose, 12-1-1/2-ft.
- Air Hose, 30-in.

*Torch Spare Parts Kit (P/N 999276) contains the following PT-121 torch parts:
- 2 — Heat Shield (Drig Type), P/N 999620
- 1 — Front Body Insert, P/N 999260
- 2 — O-ring, P/N 06W79
- 1 — Heat Sink, P/N 999265
- 2 — O-ring, P/N N85W50
- 1 — Spacer, P/N 999586
- 1 — Center-Adjust Tool, P/N 999266
- 1 — Tip Wrench, P/N 99568
- 1 — Tip Wrench, Substitute, P/N 99568
- 2 — Gasket, P/N 999262
- 1 — O-ring Lubricant (1 oz.), P/N 17672

### Table 1A - PCM-50A/PT-121 Cutting Data

<table>
<thead>
<tr>
<th>Thickness</th>
<th>Carbon Steel CO₂ Cool (in./min.)</th>
<th>Carbon Steel Air Cool</th>
<th>Stainless Steel CO₂ Cool (in./min.)</th>
<th>Stainless Steel Air Cool</th>
<th>Aluminum CO₂ Cool (in./min.)</th>
<th>Aluminum Air Cool</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/32</td>
<td>200 - 350</td>
<td>200 - 300</td>
<td>200 - 350</td>
<td>200 - 360</td>
<td>250 - 380</td>
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<tr>
<td>1/16</td>
<td>80 - 160</td>
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<td>80 - 210</td>
<td>135 - 280</td>
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<td>1/8</td>
<td>25 - 55</td>
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<td>3/16</td>
<td>25 - 35</td>
<td>25 - 30</td>
<td>25 - 35</td>
<td>30 - 55</td>
<td>40 - 70</td>
<td>40 - 70</td>
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<tr>
<td>1/2</td>
<td>5 - 9</td>
<td>6 - 8</td>
<td>5 - 9</td>
<td>6 - 9</td>
<td>8 - 10</td>
<td>5 - 8</td>
</tr>
</tbody>
</table>

**NOTES:**
1. Cutting speeds given above are based on using 230 V, single-phase input. If using 208 V or 230/460 V, three-phase input, cutting speeds may be 5 to 10% less.
2. The speeds ranges given are typical for good quality cuts. Results will vary depending on material composition, surface conditions, operator technique, etc. Also see Gas Selection Chart (Table 1A) for additional reference. If cutting speed is too fast, you may lose the cut. On slow speeds, dross may accumulate. If speed is too slow (4 - 10 in./min. depending on material and thickness), cutting arc may go out.
### Table 1B - Cooling Gas Selection Chart

<table>
<thead>
<tr>
<th>Material</th>
<th>Thickness</th>
<th>CO₂</th>
<th>Air</th>
<th>N₂</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon</td>
<td>1/32&quot;</td>
<td>E 1</td>
<td>G 3</td>
<td>G 2</td>
</tr>
<tr>
<td></td>
<td>1/16&quot;</td>
<td>G 2</td>
<td>F 3</td>
<td>G 1</td>
</tr>
<tr>
<td></td>
<td>1/8&quot;</td>
<td>G 1</td>
<td>G 2</td>
<td>F 3</td>
</tr>
<tr>
<td></td>
<td>1/4&quot;</td>
<td>F 1</td>
<td>F 2</td>
<td>F 3</td>
</tr>
<tr>
<td></td>
<td>1/2&quot;</td>
<td>S 2</td>
<td>F 1</td>
<td>S 3</td>
</tr>
<tr>
<td>Stainless Steel</td>
<td>1/32&quot;</td>
<td>G 2</td>
<td>G 1</td>
<td>G 3</td>
</tr>
<tr>
<td></td>
<td>1/16&quot;</td>
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<td>F 3</td>
<td>G 2</td>
<td>G 1</td>
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<td>S 2</td>
<td>S 3</td>
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<td>1/2&quot;</td>
<td>S 2</td>
<td>S 1</td>
<td>S 3</td>
</tr>
<tr>
<td>Aluminum</td>
<td>1/32&quot;</td>
<td>E 1</td>
<td>G 2</td>
<td>G 2</td>
</tr>
<tr>
<td></td>
<td>1/16&quot;</td>
<td>G 2</td>
<td>G 3</td>
<td>G 1</td>
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<td>1/8&quot;</td>
<td>G 2</td>
<td>G 3</td>
<td>E 1</td>
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<td>G 1</td>
<td>S 3</td>
<td>G 2</td>
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<tr>
<td></td>
<td>1/2&quot;</td>
<td>S 3</td>
<td>S 2</td>
<td>S 1</td>
</tr>
</tbody>
</table>

### Table 2 - Available PCM-50A/PT-17A Outfits

<table>
<thead>
<tr>
<th>PCM-50A/PT-17A Outfit</th>
<th>PT-17A Torch, 75° Hd. with</th>
<th>PT-17AM Torch Mech. (in-line) with</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>25-ft. lines</td>
<td>50-ft. lines</td>
</tr>
<tr>
<td>Outfit P/N</td>
<td>600908</td>
<td>600912</td>
</tr>
</tbody>
</table>

includes:
- PT-17A or 17AM Torch 19999 20000 20001 20002
- Work Cable, 25 or 50-ft. 678006 678007 678006 678007
- Hand Control Switch — — 680982 680982
- PCC-50A Power Supply 680050
- TR-12 Truck 600541
- Torch Spare Parts Kit 20062
- Air-Filter-Regulator with Mounting Bracket 30338
- Air Hose, 30-in. 678152

♦ Torch Parts Kit (P/N 20062) contains the following PT-17A torch parts:
- 3 — Heat Shield, P/N 19124
- 2 — Shield Guard (Drag Type), P/N 19989
- 1 — Shield Guard (Std Type), P/N 19990
- 5 — Tip (0.046), P/N 19915
- 5 — Electrode, P/N 19918
- 1 — Electrode Adaptor, P/N 20053
- 1 — Baffle tube, P/N 19114
- 1 — Shroud, P/N 19499
- 1 — Shroud Cap, P/N 19498
- 1 — Adaptor, Pilot Arc, P/N 19497
- 1 — Wrench, P/N 19129
- 1 — Tool Box, P/N 950272

### Table 3 - Available PCM-50A/PT-31XL Outfits

<table>
<thead>
<tr>
<th>PCM-50A/PT-31XL Outfit</th>
<th>PT-31XL Torch, 75° Hd. with</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>25-ft. lines</td>
</tr>
<tr>
<td>Outfit P/N</td>
<td>604426</td>
</tr>
</tbody>
</table>

includes:
- PT-31XL Torch, 75°, 25 or 50-ft 20060 20062
- Work Cable, 25 or 50-ft. 678006 678007
- PCC-50A Power Supply 680050 680050
- TR-11 Truck w/o Cyl. Rack 680542 680542
- Torch Spare Parts Kit (50A) 20464 20464
- Air Filter-Regulator Assembly 30338 30338
- Air Hose, 30-in. 678152 678152
- "C" to "B" Adaptor 18228 18228

♦ 50A Torch Spare Parts Kit (P/N 20464) contains the following PT-31XL torch parts:
- 3 — Heat Shield, P/N 20282
- 5 — Tip (50A), P/N 20079
- 5 — Electrode, P/N 19683
- 5 — O-Ring, P/N 950790
- 3 — Swirl Baffle, P/N 20463
- 1 — Seat, P/N 19679
- 1 — O-Ring Lubricant (1 oz.), P/N 17672
- 1 — Case, P/N 20467
Table 2A - Recommended PCM-50A/PT-17A Cutting Conditions
Cutting Tip: 0.046" (P/N 19915)
Air Pressure: 75 psig (260 cfm)
Standoff: 3/16"

<table>
<thead>
<tr>
<th>Material</th>
<th>Thickness, in.</th>
<th>Cutting Speed in/min</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminum</td>
<td>1/16</td>
<td>260</td>
</tr>
<tr>
<td></td>
<td>1/8</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>1/4</td>
<td>45</td>
</tr>
<tr>
<td></td>
<td>3/8</td>
<td>20</td>
</tr>
<tr>
<td>Stainless Steel</td>
<td>1/16</td>
<td>175</td>
</tr>
<tr>
<td></td>
<td>1/8</td>
<td>70</td>
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<td></td>
<td>1/4</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>3/8</td>
<td>15</td>
</tr>
<tr>
<td>Carbon Steel</td>
<td>1/16</td>
<td>225</td>
</tr>
<tr>
<td></td>
<td>1/8</td>
<td>95</td>
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<td>1/4</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>3/8</td>
<td>20</td>
</tr>
</tbody>
</table>

NOTES:
1. Lower standoff produces superior cuts on thin materials.
2. Speed ranges given are typical for best quality cuts. Results will vary depending on material, surface conditions, operator technique, etc. If cutting speed is too fast, you may lose the cut. On slow speeds, dross may accumulate. If speed is too slow, cutting arc may go out.

(cont. from pg. 3)

cutting thick carbon steel and aluminum; air for cutting thick stainless steel. In cutting thin stock of any material, there is no significant difference in cutting speed or quality regardless of the cooling gas used. 120 cfm at 25 psig of cooling gas is required for proper torch cooling.

ev. Mechanized Torch Mounting and Travel Carriage - A Torch Rigging Assembly, P/N 995984 (see Fig. 13), is available for mounting the PT-121M or PT-17AM torch on a CM-79 or CM-37 travel carriage. If using a CM-79, an adaptor assembly (490769) is also required.

If using the PT-121M or PT-17AM with the CM-86 Shape Cutting Machine, an adaptor kit (P/N 600435) will be required. This adaptor kit permits the torch head to be in line with the rotor head of the cutting machine.

The PT-121M or PT-17AM can also fit any standard L-TEC torch holder designed for torches with 1-3/8-in. diam. barrel and 32- pitch rack on riggins of larger cutting machines such as CM-50, CM-100, and others. See your L-TEC representative for more details.

2. Using PT-17A or PT-31XL Torch
a. Air Supply - Approximately 225 cfm of air is required for the cutting/cooling gas. Clean, dry air at a pressure between 80 and 150 psi should be supplied to the inlet of the air filler-regulator supplied with each PCM-50A/PT-17A and PT-31XL outfit.

C. OPTIONAL ACCESSORIES
1. Drag Type Heat Shield, P/N 999620 (PT-121); P/N 19122 (PT-17) - slightly longer than a standard heat shield and slotted permitting the operator to drag a manual PT-121 along the plate during a cut. This maintains a fixed standoff (tip-to-work distance) throughout the cut providing a uniform appearance of the cut plate edge.

2. Circle Cutting Attachment, P/N 999696 (PT-121); P/N 19897 (PT-17A or PT-31XL) - Permits cutting accurate circles from 4-1/2 in. to 22-in. in diameter with a PT-121, PT-17A, or PT-31XL manual torch. The attachment includes a head and radius bar assembly, center-point/adapter, and dual swivel castor assembly. Cuts can be made inside or outside the circle. The torch head is always held vertical during the cutting operation. An accessory extension bar (P/N 163223) is also available for cutting larger circles up to 44-in. in diameter. The attachment is also handy for maintaining a constant standoff in other types of cutting.

IV. INSTALLATION

Proper installation can contribute materially to satisfactory and trouble-free operation of the cutting outfit. It is suggested that each step in this section be studied carefully and followed as closely as possible.

A. INSPECTION AND PLACEMENT
1. Having removed the shipping container, and before removing the skid, inspect for evidence of concealed damage which may not have been apparent upon receipt of the unit. Notify the carrier of any defects or damage at once.
2. Check the container for any loose parts. Check air passages on rear panel of cabinet for any packing materials that may obstruct air flow through the power supply.
3. Mount the components of the TR-12 truck kit to the unit as covered in Form F-12-888 packed with the truck kit. Move the unit in a location relatively close to a properly fused source of electrical power.
4. The machine components are maintained at proper operating temperatures by forced air which is drawn through the front panel louvers and holes in the base and out the rear panel by a heavy-duty fan. Locate the machine in an open area where air can circulate freely through the openings. Leave at least two feet of clear-
ance between the unit and wall or other obstruction. The area around the unit should be relatively free of dust, fumes and excessive heat.

B. PRIMARY INPUT ELECTRICAL CONNECTION

**WARNING**

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 and unplug the power cord to the unit when primary electrical connections are made to the power supply.

1. A line (wall) disconnect switch, with fuse or circuit breakers, should be provided at the main power panel. The primary power leads should be insulated copper conductors, and include three power leads (two if using single-phase) and one ground wire. The wires may be heavy rubber covered cable, or may be run in a solid or flexible conduit. Refer to Table 3 for recommended input conductors and line fuse sizes.

<table>
<thead>
<tr>
<th>Table 3 - Recommended Sizes For Input Conductors and Line Fuses</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Volts</strong></td>
</tr>
<tr>
<td>208</td>
</tr>
<tr>
<td>230</td>
</tr>
<tr>
<td>230</td>
</tr>
<tr>
<td>460</td>
</tr>
</tbody>
</table>

2. As shipped, the PCC-50A is set up for 460 volt, 60 hertz, 3-phase input. If using 230 volt (1 or 3-phase) or 208 volt (1-phase) input, the links on the terminals of the terminal board (TB1) inside the unit must be repositioned (see Fig. 2). For 208 volt, use the 230 V, 1-phase hook up. To gain access to the terminal board, remove the front top cover and the left side panel.

3. Thread the input conductor cable from the wall disconnect switch through the (strain relief) hole in the rear panel to the input terminal board. Connect the primary power leads to terminals TB-L1, L2, and L3 (if using 3-phase; if single phase, connect leads to L1 and L2) using UL listed pressure wire connectors. Also connect the ground wire to the stud provided on the chassis base inside the left-rear of the cabinet. Secure the input cable by tightening the strain relief coupling.

**CAUTION:** It is of the utmost importance that the chassis be connected to an approved electrical ground to prevent accidental shocking. Take care not to connect the ground wire to any of the primary leads.

4. Recheck all connections to make sure that they are tight, well insulated, and that the proper connection has been made.

C. SECONDARY (OUTPUT) CONNECTIONS

**WARNING**

Before making any connections to the power supply output terminals, make sure that all primary input power to the machine is deenergized (off) at the main disconnect switch.

1. Using PT-121 Torch (Refer to Fig. 3)
   a. Thread the terminal lug end of the work cable assembly through the bushing on the front panel and connect it to the work terminal (top right between front panel and storage box).
   b. Thread the three service lines (gas, power, and switch lead) of the PT-121 torch through the same bushing as the work cable and connect them to the matching fittings adjacent to the work terminal. Hose connections should be wrench-tight. Make sure plug of the switch lead is firmly locked in place.
   c. Connect the gas supplies. The nitrogen cylinder may be placed and secured on the cylinder rack of the truck. Before connecting the regulator(s), be sure to
Fig. 3 - PCM-50A/PT-121 Interconnection Diagram

* Supplied with Nitrogen Cooling Outfits.
* Supplied with CO₂ Cooling Outfits.
* Supplied with Air Cooling Outfits.

NOTE: PT-121M MECHANIZED TYPHUS uses a separate remote hand controlled torch switch (2079600 - supplied with each mechanized outfit). See Sect. II-B-1C for mounting equipment required.

Fig. 4 - PCM-50A/PT-17A and PT-31XL Interconnection Diagram

NOTE: PT-17AM MECHANIZED TYPHUS uses a separate remote hand controlled torch switch (680682 - supplied with each mechanized outfit). See Sect. II-B-1C for mounting equipment required.
read, understand, and follow all instructions packed with each regulator.

d. Connect the gas hoses to the regulator(s) and to the proper fittings on the rear panel of the PCC-50A (Nitrogen to PLASMA GAS fitting; nitrogen, air, or CO₂ to COOL-GAS fitting). Connections should be wrench tight.

e. Reinstall the left side panel and the top onto the unit. Tighten all screws firmly.

f. Clamp the work cable to the workpiece. Be sure the workpiece is connected to the approved earth ground with a properly sized ground cable (see Table 3).

2. Using PT-17A or PT-31XL Torch (Refer to Fig. 4)

a. For operator safety, the torch and work cable connections are located on the output terminal board inside the unit about five inches behind the front panel in the top-right side corner (see Fig. 4). Remove top cover and left-side panel.

b. Thread the terminal lug end of the work cable assembly through the bushing on the front panel and connect it to the WORK terminal on the output terminal board. Nut should be wrench-tight.

c. If using PT-17A, connect pilot arc adapter P/N 19497 (supplied with torch spare parts kit P/N 20662) to the POS output fitting (note that threads are left-handed) and tighten firmly with a wrench. Loosely place screw, washer, and lockwasher in the most convenient tapped hole in the adaptor.

If using PT-31XL, connect “C” to “B” adapter P/N 18228 (supplied with each PT-31XL outfit) to the “NEG” output fitting and tighten firmly with a wrench.

d. If using PT-17A, thread the three torch service lines through the bushing in the upper right corner of the front panel and proceed as follows: (1) Connect the power cable (large male nut with left hand threads) to the NEG output fitting and tighten firmly with a wrench. (2) Connect pilot arc cable to the adapter assembled on POS fitting at the most convenient tapped hole position of adapter. With washer and lockwasher in place, tighten screw firmly with a screwdriver. (3) Connect the 2-prong switch lead to the mating receptacle. Make sure plug is firmly locked in place.

If using the PT-31XL, connect power cable to adapter assembled on NEG fitting and tighten firmly with a wrench. Connect the 2-prong switch lead to the mating receptacle and make sure plug is firmly locked in place.

e. Reinstall the side panels and the top cover to the unit. Tighten all screws firmly.

f. Assemble the filter-regulator and mounting bracket (30338) to the center of the upper cylinder rack of the TR-12 or TR-11 truck as illustrated. Hardware is supplied with the assembly.

g. Connect the air hose assembly (678152) to filter-regulator outlet fitting and to the “Plasma Gas” fitting on the rear panel of the PCC-50A unit. Note that the air hose has left-hand threaded nut on one end (regulator) and right-hand on the other.

h. Connect your air supply to the inlet connection (1/4-in. NPT female - customer to supply suitable end fitting) of the filter-regulator.

i. Clamp the work cable (678006) to the workpiece. Be sure the workpiece is connected to an approved earth ground with a properly sized ground cable (See Table 3.)

V. ADJUSTMENTS & OPERATIONS

CAUTION: Never, under any circumstances, operate the power supply with the cover removed. In addition to the safety hazard, improper cooling may cause damage to internal components. Keep side panels closed when unit is energized. Also make sure you are adequately protected before you start cutting – protective helmet and gloves should always be worn. Refer to page 2 for additional operating precautions.

A. TORCH ADJUSTMENTS

[WARNING]

Before making any adjustments or performing any maintenance on the torch, make sure the power to the torch is shut off.

For torch adjustments, see booklet F-12-794 (PT-121), F-14-441 (PT-17A), or F-14-246 (PT-31XL) packed with the torch.

B. PCC-50A ADJUSTMENTS

1. Slowly open the nitrogen and CO₂ or air cylinders valves.

2. Place the PCC-50A OPERATE/SET-UP and READY/OFF switches in the SET-UP and OFF positions.

3. Place the primary (wall) switch in the ON position.

4. Place READY/OFF to READY position. Small pilot light should light up. Fan should be running.

5. With OPERATE/SET-UP switch in SET-UP position gas solenoid valves should be open. Adjust the gas regulator(s) to deliver 25 psi (PT-121), 75 psi (PT-17A), or 55 psi for (PT-31XL).

6. Allow the gases to flow for a few minutes. This should remove any condensation that may have accumulated during shut down.

7. Place the OPERATE/SET-UP switch in the OPERATE position. This will shut off the gas flows.

8. Large pilot light when lit indicates torch is energized.

C. OPERATION

[WARNING]

Wear the usual protective gloves, clothing, and helmet. Helmet with filter lens shade No. 6 or 7 should provide adequate protection for your eyes.

Never touch any parts forward of the torch handle (tip, heat shield, electrode, etc.) unless the Ready-Off switch is in the OFF position.

1. Position the torch on the workpiece by resting the heatshield on the edge of the workpiece where you intend to start the cut.
2. Lower your protective helmet and then lift the torch about 1/8-in. above the workpiece. The PT-31XL may be dragged on the workpiece.

3. Push down on the torch switch button mounted on the torch handle. Pilot arc contactor and high frequency will energize, and gas will start flowing. Two seconds later, the main contactor will come on. The pilot arc should then transfer to the cutting arc. (PT-31XL does not have pilot arc.)

   NOTE: If cutting arc does not start within 6 seconds, the pilot arc will shut off. Release torch switch. Check to be sure gas pressures are adequate, work cable is firmly connected to workpiece, torch was about 1/8 to 1/4-in. above workpiece, etc. Then start from step 1 again.

4. For manual cutting, maintain a standoff (torch-to-work distance) of about 3/16-in. to 1/4-in. (PT-121) or 1/16 to 3/16-in. (PT-17A). Keep the torch head vertical, and move it at a rate that produces the desired cut quality. The cuttings should produce a straight, fine spray of molten metal emitting from beneath the workpiece as illustrated in Fig. 5. For mechanized cutting, see Table 1A or 2A for recommended cutting speed range.

5. If cutting arc is lost during cut, the pilot arc immediately reignites as long as the torch switch is depressed. You then have about 6 seconds to move the torch close enough to work to reestablish the cutting arc.

6. The cutting arc will extinguish at the end of the cut; however, the torch switch should be released to keep the pilot arc from reigniting.

7. When cutting operation is completed, wait a few minutes before placing the READY-OFF to the OFF position so that the cooling fan has time to remove the heat from the unit. Then shut off the primary power at the main disconnect switch.

---

**D. COMMON CUTTING FAULTS**

Listed below are common cutting problems followed by probable causes of each. If problems are determined to be caused by the PCC-50A, refer to the troubleshooting section (Sect. VII).

1. **Insufficient Penetration.**
   a. Cutting speed too fast.
   b. Damaged cutting tip.
   c. Improper gas pressure.

2. **Main Arc Extinguishes.**
   a. Cutting speed too slow.

3. **Dross Formation.** (In some materials and thicknesses, it may be impossible to get dross-free cuts.)
   a. Cutting speed too fast or too slow.
   b. Improper gas pressure.
   c. Faulty tip or electrode.

4. **Double Arcing.** (Damaged Tip Orifice.)
   a. Low gas pressure.
   b. Damaged cutting tip.
   c. Loose cutting tip.
   d. Incorrect electrode "set-back" (PT-121).
   e. Contact with work
   f. Heavy spatter.
   g. Very low speed on thin plate

5. **Uneven Arc.**
   a. Incorrect electrode "set-back" (PT-121).
   b. Damaged cutting tip.
   c. Electrode not straight or centered.
   d. Partially plugged holes on front end insert of torch.
   (See PT-121 torch booklet, L12-794.)

6. **Unstable Cutting Conditions.**
   a. Incorrect cutting speed.
   b. Loose cable or hose connections.
   c. Electrode and/or cutting tip in poor condition.
   d. Incorrect electrode set-back (PT-121).

7. **Main Arc Does Not Strike.**
   a. Loose connections.
   b. Improper "Stand-off" between torch and work
   c. Torch not over the work
   d. Torch not properly adjusted

8. **Poor Consumable Life.**
   a. Improper gas pressure.
   b. Improper electrode "set-back".
   c. Check O-ring on the front end insert of torch (see PT-121 torch booklet, L12-794).

---

**VI. MAINTENANCE**

If this equipment does not operate properly, stop work immediately and investigate the cause of the malfunction. 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.
A. INSPECTION AND CLEANING

Frequent inspection and cleaning of the PCM-50A cutting machine is recommended. Some suggestions for inspecting and cleaning are as follows:

**WARNING**

Make sure the power is shut off.

1. Check heat shield on torch. It should be replaced if damaged.
2. Check the torch electrode and cutting tip for wear on a daily basis. Remove spatter, resharpen point or replace if necessary.
3. Make sure cable and hoses are not damaged or kinked.
4. Make sure all plugs, fittings, and ground connections are tight.
5. With all input power disconnected, and wearing proper eye and face protection, blow out the inside of the cutting power supply using low-pressure dry compressed air.

**CAUTION:** Water occasionally accumulates in compressed air lines. Be sure to direct the first blast of air away from the equipment to avoid damage.

6. Occasionally bleed water from the filter beneath the air regulator.

B. SPARK GAP ADJUSTMENT

The spark gap, which is part of the high frequency generator, is factory set at 0.025-in. After extended operation or if erratic operation is noted, it may be necessary to readjust or replace the electrodes (634098). Use a feeler gauge when readjusting the gap. (See Form 11-831, “Recommended Installation and Test Procedures for High-Frequency Stabilized Arc Welding Machines”, packed with the unit.) Cleaning or dressing of the spark gap electrodes is not recommended since the tungsten electrodes are impossible to file. When replacement is necessary, both electrodes should be replaced.

C. TESTING AND REPLACING DIODES

If trouble has been diagnosed to be a faulty diode(s) in the bridge rectifier, the following procedure is suggested for testing and replacement:

1. Disconnect all diode leads to the main transformer. It is necessary to electrically isolate the bridge from the transformer for proper testing.
2. Using an ohmmeter set on a low range, place one test probe against the diode’s pigtail’s lead and the other against the pigtail’s stud. Note the ohmmeter reading.
3. Reverse the test probes and again note the ohmmeter reading.

4. A diode is good if reading shows low resistance (3 to 15 ohms) in one direction and high resistance (200 to 2000 ohms) in the other direction. A diode should be replaced if resistance is low (shorted) or high (opened) in both directions.
5. Make sure all wires are not touching the NEG output connection as well as other metal fittings associated with this connection. High voltage applied to this connection can break down the insulation of a wire.

**IMPORTANT:** When replacing diodes make sure that mounting surfaces are clean. Silicone grease, such as Dow-Corning No. 340 silicone heat sink compound (P/N 7358-5976 or equivalent, should be used to coat mounting surfaces. Tighten the diodes to 20 - 30 in.-lbs. with a torque wrench. If a torque wrench is not available, carefully tighten the diodes until firm.

VII. TROUBLESHOOTING

**WARNING**

Be sure that all primary power to the machine has been externally disconnected. Open wall disconnect switch or circuit breaker before attempting inspection or work inside of the power supply.

Check the problem against the symptoms in the following troubleshooting guide. The remedy may be quite simple. If the cause cannot be quickly located, shut off the input power, open up the unit, and perform a simple visual inspection of all the components and wiring. Check for secure terminal connections, loose or burned wiring or components, bulged or leaking capacitors, or any other sign of damage or discoloration.

The cause of control malfunctions can also be found by referring to the sequence of operations and electrical schematic diagram (Fig. 7) and checking out the various components. A volt-ohmmeter will be necessary for some of these checks.

**NOTE:** Before checking voltages in the circuit, disconnect the power from the high frequency generator to avoid damaging your voltmeter.

**WARNING**

Voltages in plasma cutting equipment are high enough to cause serious injury or possibly death. Be particularly careful around equipment when the covers are removed.
Be sure unit is set up properly for voltage being used and that the gas supplies are adequate.

A. TROUBLESHOOTING GUIDE

1. Unit Inoperative; fan does not run.
   a. Check for blown fuse F1.
   b. Check primary disconnect switch to make sure input power is being supplied.
   c. Check links on the input terminal board TB1 to make sure all are connected to the proper input voltage being used.
   d. Check for defective ready-off switch ROS.

2. No output but fan runs.
   a. Check to make sure the links on terminal board TB1 are properly connected for power being used.
   b. Main contactor MC may not be closing, check for following:
      (1) If gases flow when torch switch is depressed, pressure or flow switch may not be closing due to insufficient pressure or flow. Check gas pressure.
      (2) If gases flow continuously, Operate-Set-Up Switch OSS may be in "Set-Up" position. Switch must be in "Operate" position for cutting operations.
      (3) If gases are not flowing, torch switch and/or wiring may be defective. Replace where necessary.
      (4) Main Contactor (MC) may be defective. Replace.
      (5) Control PC Board (675369) may be defective. Replace.

3. No pilot arc.
   a. Improper torch electrode position (PT-121). Readjust electrode as described in F-12-794.
   b. Gas pressure(s) too high which may be flowing out the pilot arc. Check to make sure the gas regulators are set to deliver 25 psi (PT-121) or 75 psi (PT-17A).
   c. Pilot arc contactor PAC not closing. PAC or control board (675369) may be defective.
   d. High frequency may be lacking intensity. Open spark gap to 0.025-in. (see Sect. VI-B).
   e. Electrode may have been resharpened improperly (PT-121).
   f. Low open circuit voltage. Check diodes (see Sect. VI-C), main transformer voltage, and C11 capacitor (240 uf, 450 volts).

4. Weak pilot arc; difficult to transfer.
   a. Check to make sure links on terminal board TB1 are properly connected for input power being used.
   b. Torch electrode may not be properly positioned. Readjust electrode as described in Sect. V-A.
   c. Improper gas pressure(s). Check to make sure regulators are set to deliver 25 psi (PT-121) or 75 psi (PT-17A).
   d. If operating from single-phase power input, check for defective starting relay (SR) or loose wiring connections to it.

5. Difficult starting.
   a. Improper nozzle position on work.
   b. Gas pressure too high which may be blowing out the high frequency HF. Check to make sure the gas regulator is set to deliver 25 psi (PT-121) or 75 psi (PT-17).
   c. High frequency may be lacking intensity. Open spark gap to 0.025-in. (see Sect. VI-B).
   d. Contactor PAC not closing. PAC or control board (675369) may be defective.

6. Low cutting output.
   a. Links on terminal board TB1 may be improperly connected. Check to be sure they are properly connected to the input voltage being used.
   b. Input voltage may be low. Check power source.
   c. Input power cable may be too long or wire guage size too small. Check and replace if necessary.
   d. Diode(s) in bridge rectifier may have failed. Check (see Sect. VI-C) and replace if defective.
   e. If operating from single-phase power input, check for defective starting relay (SR) or loose wiring connections to it.
   f. Check for proper electrode and cutting tip setting.

7. No preflow or postflow.
   a. Check gas solenoid valves. Replace if defective.
   b. Replace control board (675369).

8. Main arc pulsing on and off continuously (PT-121).
   a. Cooling gas pressure switch CGPS may not be closing due to insufficient gas pressure (at least 20 psig required).

B. SEQUENCE OF OPERATION

1. Close primary disconnect switch.
2. Place Ready-Off Switch (ROS) to "Ready" position.
   a. Fan motor (FM) energizes.
   b. Pilot light (PL) on.
   c. Control circuit energizes.
3. Place Operate-Set-Up Switch (OSS) to "Set-Up" position.
   a. Gas solenoid valves (PGSV and CGSV) energize. Gases flow to permit setting of pressures and to purge system.
4. Place OSS to "Operate" position.
   a. Gas valves (PGSV and CGSV) deenergize to stop gas flows.
5. Depress torch switch.
   a. PGSV and CGSV open to allow gases to start flowing.
   b. Pilot Arc Contactor (PAC) closes.
   c. High frequency (HF) energizes.
   d. If using PT-121, Pressure Switches (PGPS & CGPS) close (provided gas pressures are set above 20 psig). If using PT-17, Flow Switch (FS) closes (provided gas flow is above approximately 150 cfm).
   e. Two seconds later, Main Contactor (MC) closes to establish pilot arc.
f. Pilot arc will transfer to cutting arc within 6 seconds as long as torch electrode is close enough (1/8–1/3-in.) to work, and FS will open when main arc is established.

g. HF and PAC deenergize immediately when cutting arc is established, or after 6 seconds of continuous pilot arc. If cutting arc is not established after six seconds, MC will open but the HF will remain energized. MC and pilot arc will then cycle on and off every 3 seconds until torch switch is released. **WARNING:** Dangerous high voltage (over 300 volts) exists at the torch front end whenever MC is closed; therefore, release torch switch when cutting arc is not established and repeat step 5.

   a. MC opens and the cutting arc shuts off.
   b. Gases continue to flow (postflow) for approximately another 10-12 seconds at which time the PGSV and CGSV will close to open PGPS, CGPS, and FS.

**NOTE:** A new cutting cycle can be started anytime during the postflow. As soon as the torch switch is depressed, the remaining postflow time will cancel and the normal preflow time will start.

7. Control circuit will not energize or can deenergize during a cutting cycle when:
   a. PGS or CGPS is open due to insufficient gas pressure (at least 20 psi required) or FS is open due to insufficient flow. (Note that FS will open when main arc is established with a PT-121 torch.)
   b. Thermal Switch (TS) is open due to overheating of unit. TS should open at 180°C (356°F).

8. Place ROS to “OFF” position.
   a. Control circuit deenergizes.
   b. Fan motor (FM) deenergizes.
   c. Pilot light (PL) goes out.

9. Open primary disconnect switch.
   a. Input power to unit shut off.

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**Fig. 6 - Torch Operation Sequence Diagram**
### Table 4 - Electrical Parts List (Vendor Items)

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Part No.</th>
<th>Description and Vendor</th>
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</thead>
<tbody>
<tr>
<td>AMC</td>
<td>950760</td>
<td>Relay, 24 VAC, Struthers-Dunn A-283XBC1</td>
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<td>C1-C9</td>
<td>950255</td>
<td>Capacitor, 60uf, 370 VAC, Sprague P/N325P606X8370F46N4X</td>
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<td>950283</td>
<td>Capacitor, 0.2uf, 1000 VDC, Stad. Motor Products P/N FD-77X</td>
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<td>C11</td>
<td>950257</td>
<td>Capacitor, 24uf, 460 VWDc, Mallory P/N CG-24T45D1</td>
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<td>Capacitor, 0.22uf, 600 V, Mallory PVC 6022</td>
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<td>950256</td>
<td>Capacitor, 0.002uf, 6000 VWDc, Acushnet P/N 1550-221</td>
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<td>Capacitor, 0.02uf, 1000 VAC, Sprague P/N 5GA-S20</td>
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<td>C19</td>
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<td>Flow Switch, Flow Switch, 0.25 gpm Gems Sensors P N 70821</td>
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<td>HFR</td>
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<td>Transformer, 120V Prim., 3000V sec., Jefferson Electric P/N 969-002-202</td>
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<td>J2</td>
<td>182W64</td>
<td>Receptacle, 2-Pole, Hubbell Inc. P/N 7468</td>
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<td>MC, PAC</td>
<td>950247</td>
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<td>634518</td>
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<td>P1</td>
<td>951504</td>
<td>Plug, Amp Inc. P/N 1-480710-0</td>
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<td>PL</td>
<td>598227</td>
<td>Pilot Light, Sorensen Lighted Controls (SOLICO) 3LF5LRN-1</td>
</tr>
<tr>
<td>R1-R9, R17</td>
<td>17120433</td>
<td>Resistor, 330 K ohms, 1/2 W</td>
</tr>
<tr>
<td>R11</td>
<td>17250005</td>
<td>Resistor, 5 ohms, 50 W</td>
</tr>
<tr>
<td>R12</td>
<td>17135410</td>
<td>Resistor, 100 K ohms, 1 W</td>
</tr>
<tr>
<td>R13</td>
<td>17300008</td>
<td>Resistor, 8 ohms, 300 W</td>
</tr>
<tr>
<td>R14</td>
<td>17280110</td>
<td>Resistor, 100 ohms, 100 W</td>
</tr>
<tr>
<td>R15</td>
<td>17250230</td>
<td>Resistor, 3 K ohms, 50 W</td>
</tr>
<tr>
<td>R16</td>
<td>17135510</td>
<td>Resistor, 1 Mohms, 1 W</td>
</tr>
<tr>
<td>R18, 19, 20</td>
<td>17140147</td>
<td>Resistor, 470 ohms, 2W</td>
</tr>
<tr>
<td>R21, 22</td>
<td>17120368</td>
<td>Resistor, 68 K ohms, 1/2W</td>
</tr>
<tr>
<td>R23</td>
<td>17145410</td>
<td>Resistor, 100K ohms, 2W</td>
</tr>
<tr>
<td>ROS</td>
<td>672506</td>
<td>Toggle Switch, 3 PST, 250V/15A, Cutler-Hammer P/N 8946K260</td>
</tr>
<tr>
<td>SR</td>
<td>97W48</td>
<td>Relay, 120 VAC, 85 mA, DPDT, Potter &amp; Brumfield P/N PDR11AY0</td>
</tr>
<tr>
<td>T1</td>
<td>673168</td>
<td>Terminal Block, 13 terms., Kukla Elec. P/N 699-13-KT47-KT48</td>
</tr>
<tr>
<td>TS</td>
<td>2062211</td>
<td>Thermostat, 115 VAC/2amps, 180° C, Franklin Dales Co. P/N DA8M-180° C</td>
</tr>
</tbody>
</table>

### VIII. REPLACEMENT PARTS

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 ALONE.

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 designation as shown in the Electrical Parts List.

3. Always state the series or serial number of the machine on which the parts are to be used. The serial number is stamped on the unit nameplate.

**NOTE:** The PCC-50A Power Supply, P/N 680050, replaced the PCC-50, P/N 677978, which was formerly covered in booklet Form L12-861. With the exception of additional components for PT-17A torch use (torch switch receptacle, J2, Flow Switch, FS, and relay, AMC) the units are identical. The following are changes that have occurred on the PCC-50 units prior to May, 1985 and incorporated into the PCC-50A:

1. Control Board Assembly P/N 675369 replaced P/N 675317 for greater operating reliability. (This change was covered by Insert dated 2/84 for PCC-50A booklet, Form L12-861-B.)
2. Resistors R18, 19, and 20 were added to eliminate chattering contacts.
3. Resistor R16 was relocated to connect in parallel with capacitor C12 and varistor MOV2 was removed.
Fig. 9 - PCC-50A Power Supply, P/N 680050 (Front View)

*Replace label if excessively worn or lost.
**When replacing panel or cover, order appropriate label(s).

Fig. 10 - PCC-50A Power Supply (Left Side View)
Fig. 11 - PCC-50A Power Supply (Right Side View)

Fig. 12 - PCC-50A Power Supply (Top Front View)
Fig. 13 - Torch Rigging Assembly, P/N 995984