INSTALLATION & OPERATING INSTRUCTIONS for

F-14-376-B
March, 1989

PCM-70

PLASMA ARC CUTTING PACKAGES

I. FEATURES

- cuts up to 3/4" thick material for greater versatility
- power factor corrected version standard for low input draw
- variable output provides greater versatility
- use of either a PT-17A torch for air operation or a PT-121 torch with choice of dual gases
- perfect electrode centering gives longer torch and consumables life
- hinged top cover for easy maintenance
- pilot arc starting delivers sure starts even on paint
- automatic intermittent cutting for grates and expanded metal
- single and three phase models are available
- five tips available for PT-17A for superior cutting performance
- standard and drag type heat shield guards available for operator convenience
- two year warranty

NOTE: For detailed maintenance, troubleshooting, and parts information on the PCM-70 Console, see Form 14-390.

F-14-376-B

NOTE: For listing of changes covered in the reprint of this booklet, see page 12.

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.

L-TEC
WELDING & CUTTING SYSTEMS

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 welding 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-topped shoes, and a welding helmet or cap for hair protection, to protect against arc rays and hot sparks or hot metal. A flameproof apron may also be desirable as protection against radiated heat and sparks.
   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 partition or curtains.
   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 hot metal can fall through cracks or crevices in floors or wall openings and cause a hidden smoldering fire or fires on the floor below. Make certain that such openings are protected from hot sparks and metal.
   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 watchers 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 overloading 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 holder, 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 ventilation 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 work. 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 hand trucks. Avoid rough handling of cylinders.
   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. LeJuene Road, Miami, FL 33126, are recommended to you:
   a. ANSI/ASC Z49.1 - "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"
   g. AWS SP - "Safe Practices" - Reprint, Welding Handbook, Vol. 1, 8th Edition.

SPECIFICATIONS

PCC-70 Console

Input Voltage 3-Phase Model ..... 230/460 V, 60 Hz
1-Phase Model ..... 208/230/460 V, 60 Hz
Input Current @ rated load 3-Phase Model ..... 38 A @ 230 V; 19 A @ 460 V
1-Phase ..... 54 A @ 208 V; 48 A @ 230 V; 24 A @ 460 V
Output Rating (65% duty cycle) ..... 70 A; 100 V DCSP
Open Circuit Voltage (Nom.) ..... 325 V DC (3-Ph.); 350 V DC (1-Ph.)
Power Factor 76% (3-Ph.); 88% (1-Ph.)
Dimensions ..... 35" high x 26" wide x 16" deep
Weight ..... 375 lbs. (3-Ph.); 345 lbs. (1-Ph.)

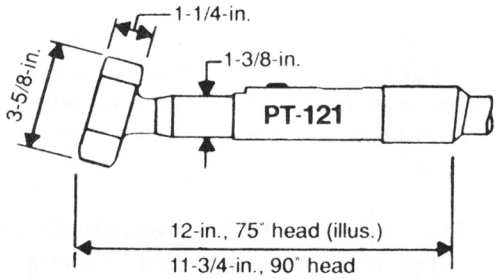
WARNING

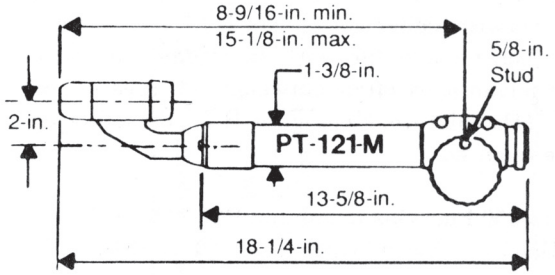
Note the high open circuit voltage. Use only torches designed for this equipment. Do NOT attempt to use this equipment with any process other than plasma arc cutting.

PT-121 Torch

Plasma (Cutting) Gas ..... Nitrogen @ 25 psi (30 cfh) or H-35 @ 65 psi (100 cfh)
Secondary (Cooling) Gas ..... Nitrogen or Air @ 25 psi (200 cfh)
or CO_2 @ 25 psi (160 cfh)

Dimensions:

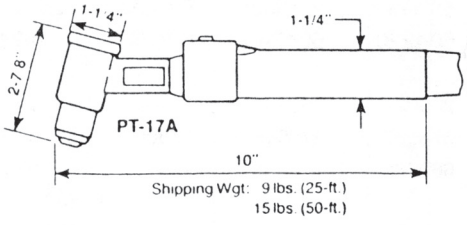


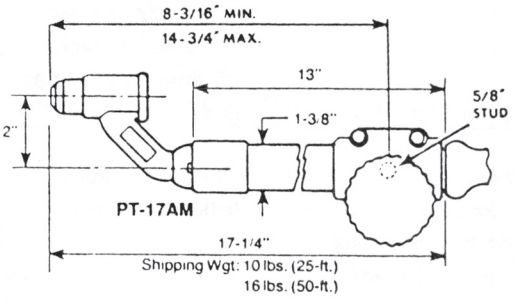


Length of Service Lines ..... 25 or 50-ft.
Instruction Booklet ..... Form F-12-794

PT-17A Torch

Cutting/Cooling Gas ..... Air @ 75 psi (290 cfh min)
Dimensions:





Length of Service Lines ..... 25 or 50-ft.
Instruction Booklet ..... Form F-14-441

III. EQUIPMENT SUPPLIED & ACCESSORIES

A. OUTFITS AVAILABLE

Available outfits are listed in Tables 1 and 2.

B. REQUIRED EQUIPMENT

1. **Using PT-17A Torch**
   a. **Air Supply** — A minimum of 290 cfh of air is required for the cutting/cooling gas. Clean, dry air at a pressure between 90 and 150 psi should be supplied to the inlet of the air filter-regulator supplied with each PCM-70/PT-17A Packages.
2. **Using PT-121 Torch**
   a. **Nitrogen or H-35 Gas Supply** — Nitrogen is most commonly used for plasma gas 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.

      H-35 (35% Hydrogen; 65 Argon) gas mixture is an excellent plasma gas for cutting aluminum or thick steel. It is usually considered over nitrogen in mechanized or production cutting due to its ability to cut thicker materials as well as cutting thick materials with higher speeds. The H-35 also provides longer consumable life with less fume emission. These advantages often outweigh the greater expense of the mixture. If using the H-35, the following will be required:

      R-77-75-350 Fuel Gas Regulator, P/N 998341
      Fuel Gas Hose Assembly (12-1/2-ft.), P/N 19414

   b. **Cooling Gas** — If not using nitrogen for cooling, then either a cylinder of CO_2 or a suitable supply of air (150 psig max.) will be required. (See Tables 4 and 5.)

      Generally, CO_2 is the preferred cooling gas for 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. 170-230 cfh of Air or Nitrogen or 13-190 cfh of CO_2 at 25 psig of cooling gas is required for proper torch cooling.

      NOTE: When using CO_2 as a cooling gas, at least 4 cylinders should be manifolded or a high capacity CO_2 heater may be employed to prevent "freeze-ups" or dry-ice formation at the regulator.

      If using H-35 for plasma gas, air and CO_2 produce the least dross and are recommended for low carbon and stainless steels. Nitrogen produces the smoothest face on aluminum but air or CO_2 can also be used.

   c. **Mechanized Torch (PT-17AM or PT-121M) Mounting and Travel Carriage** — A Torch Rigging Assembly, P/N 995984 (see Form 14-390), is available for mounting the PT-17AM or PT-121M 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-17AM or PT-121M 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-17AM or PT-121M can also fit any standard L-TEC torch holder designed for torches with 1-3/8-in. diam. barrel and 32-pitch rack on riggings of larger cutting machines such as CM-50, CM-100, and others. See your L-TEC representative for more details.

Table 1 - Available PCM-70/PT-17 Shop Air Packages

	PCM-70 Shop Air Package with							
	3-Phase Console				1-Phase Console			
	PT-17A, 75° Hd. Manual Torch		PT-17AM Mechanized Torch		PT-17A, 75° Hd. Manual Torch		PT-17AM Mechanized Torch	
	25' lines	50' lines	25' lines	50' lines	25' lines	50' lines	25' lines	50' lines
PCM-70 Shop Air Pkg., P/N	604217	604218	604219	604220	604246	604247	604248	604249
includes:								
PT-17A or -17AM Torch	19999	20000	20001	20002	19999	20000	20001	20002
Work Cable, 25 or 50-ft.	678006	678007	578006	678007	678006	678007	678006	678007
Hand Control Switch, 25-ft. cable	—	—	680982	680982	—	—	680982	680982
PCC-70 Console (3 or 1 Phase)	680700				680830			
Torch Spare Parts Kit ♦	680784				680784			
Air-Filter Regulator w/Mtg. Brkt	30338				30338			
Air Hose Assy., 30-in.	678152				678152			

♦ Torch Spare Parts Kit (P/N 20063) includes following PT-17 torch parts:

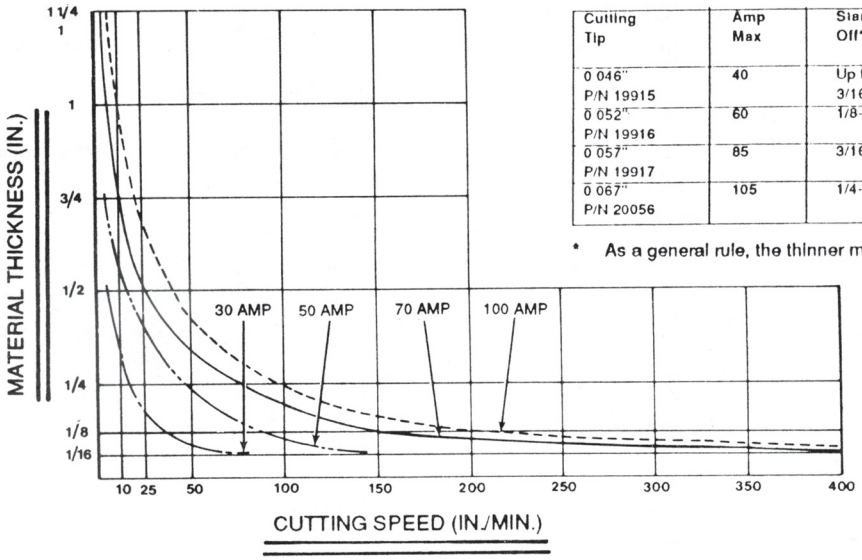
- 1 — Cutting Tip (0.052"), P/N 19916 (Pkg. of 5)
- 1 — Cutting Tip (0.046"), P/N 19915 (Pkg. of 5)
- 1 — Cutting Tip (0.057"), P/N 19917 (Pkg. of 5)
- 5 — Electrode, P/N 19918 (Pkg. of 5)
- 1 — Electrode Adaptor, P/N 20053
- 1 — Baffle Tube, P/N 19114
- 3 — Heat Shield, (Guard), P/N 19124
- 2 — Shield (Drag Type), P/N 19122
- 1 — Shield Guard (Std.), P/N 19990
- 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 2 - Available PCM-70/PT-121 Dual Gas Packages

	PCM-70/3-Phase Package with:						PCM-70/1-Phase Package with:					
	75° Hd. Manual PT-121 Torch with		90° Hd. Manual PT-121 Torch with		Mechanized PT-121M Torch with		75° Hd. Manual PT-121 Torch with		90° Hd. Manual PT-121 Torch with		Mechanized PT-121M Torch with	
	25-ft. lines	50-ft. lines	25-ft. lines	50-ft. lines	25-ft. lines	50-ft. lines	25-ft. lines	50-ft. lines	25-ft. lines	50-ft. lines	25-ft. lines	50-ft. lines
N_2 Cool Package P/N →	**604225**	**604226**	**604227**	**604228**	**604229**	**604230**	**604250**	**604251**	**604252**	**604253**	**604254**	**604255**
includes:												
PT-121 or -121M Torch	999242	999243	999246	999247	999244	999245	999242	999243	999246	999247	999244	999245
Work Cable, 25 or 50-ft.	678006	678007	678006	678007	678006	678007	678006	678007	678006	678007	678006	678007
Hand Control Switch, 25-ft. cable	—	—	—	—	2075600	2075600	—	—	—	—	2075600	2075600
PCC-70 Power Supply (3 or 1 Phase)	680700						680830					
TR-21SP Truck & Cyl. Kit	680793						680793					
Torch Spare Parts Kit ♦	999276						999276					
R-77-30-580 N_2 Regulator	19590						19590					
(2) Gas Hose, 12-1/2-ft.	40V77						40V77					
"Y" Connector	950356						950356					
CO_2 Cool Package P/N →	**604231**	**604232**	**604233**	**604234**	**604235**	**604236**	**604256**	**604257**	**604258**	**604259**	**604260**	**604261**
Includes:												
PT-121 or -121M Torch	999242	999243	999246	999247	999244	999245	999242	999243	999246	999247	999244	999245
Work Cable, 25 or 50-ft.	678006	678007	678006	678007	678006	678007	678006	678007	678006	678007	678006	678007
Hand Control Switch, 25-ft. cable	—	—	—	—	2075600	2075600	—	—	—	—	2075600	2075600
PCC-70 Power Supply (3 or 1 Phase)	680700						680830					
TR-21SP Truck & Cyl. Kit	680793						680793					
Torch Spare Parts Kit ♦	999276						999276					
R-27-75-580 N_2 Regulator	19590						19590					
R-27-75-320 CO_2 Regulator	19629						19629					
(2) Gas Hose, 12-1/2-ft.	40V77						40V77					
Air Cool Package P/N →	**604237**	**604238**	**604239**	**604240**	**604241**	**604242**	**604262**	**604263**	**604264**	**604265**	**604266**	**604267**
includes:												
PT-121 or -121M Torch	999242	999243	999246	999247	999244	999245	999242	999243	999246	999247	999244	999245
Work Cable, 25 or 50-ft.	678006	678007	678006	678007	678006	678007	678006	678007	678006	678007	678006	678007
Hand Control Switch, 25-ft. cable	—	—	—	—	2075600	2075600	—	—	—	—	2075600	2075600
PCC-70 Power Supply (3 or 1 Phase)	680700						680830					
TR-21SP Truck & Cyl. Kit	680793						680793					
Torch Spare Parts Kit ♦	999276						999276					
R-77-30-580 N_2 Regulator	19590						19590					
Air Filter-Regulator w/Mtg. Brkt.	30338						30338					
Gas Hose, 12-1/2-ft.	40V77						40V77					
Air Hose, 30-in.	678152						678152					

♦ Torch Spare Parts Kit (P/N 999276) contains the following PT-121 torch parts:
- 2 — Cutting Tip (0.047"), P/N 17119 (Pkg. of 5)
- 2 — Electrode, P/N 2075328
- 1 — Collet, P/N 999259
- 3 — Heat Shield (Standard), P/N 999261
- 2 — Heat Shield (Drag Type), P/N 999620
- 1 — Front Body Insert, P/N 999260
- 1 — Baffle, P/N 19540
- 1 — Spacer, P/N 999586
- 1 — Torch Cap, P/N 999257
- 5 — O-ring, P/N 994092
- 2 — O-ring, P/N 96W97
- 2 — O-ring, P/N 85W50
- 1 — Center-Adjust Tool, P/N 999266
- 1 — Tip Wrench, P/N 996568
- 1 — O-ring Lubricant (1 oz.), P/N 17672
- 1 — Tool Box, P/N 950252

Table 3 - PT-17A/AM Cutting Data for Carbon Steel



Cutting Tip	Amp Max	Stand-Off*	Air Pressure, psig
0.046" P/N 19915	40	Up to 3/16"	55
0.052" P/N 19916	60	1/8-1/4"	75
0.057" P/N 19917	85	3/16-5/16	75
0.067" P/N 20056	105	1/4-3/8"	85

* As a general rule, the thinner material requires the least stand-off.

NOTES: 1. Lower standoffs produce superior cuts on thin materials. Do not initiate arc with cutting tip touching the work.
2. The 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. Air cutting typically produces a rough face on stainless steel and aluminum.

Table 4 - PCM-70/PT-121 Cutting Data

Cutting Tip	Pressure Settings	Current Settings	Standoff	Material Thickness	Cutting speed (in./min.) for Mech. Cutting Low Carbon Steel	Stainless Steel	Aluminum
0.032" Dia. P/N 17184	Plasma (N_2)-35 psig Cooling Gas-25 psig	30 Amps	1/8-in.	1/32"	200	200	250
				1/16"	100	100	150
				1/8"	40	40	75
0.046" Dia.* P/N 17119	Plasma (N_2)-25 psig Cooling Gas-25 psig	70 Amps	1/4-in.	1/16"	140	200	250
				1/8"	50	80	100
				3/16"	30	50	70
				1/4"	25	40	60
				1/2"	10	10	10
0.055" Dia. P/N 999263	Plasma (N_2)-25 psig Cooling Gas-25 psig	70 Amps	1/4-in.	1/16"	175	220	240
				1/8"	55	85	100
				1/4"	20	25	50
				1/2"	8	8	8
0.032" Dia. P/N 17184	Plasma (H35)-65 psig Cooling Gas-25 psig	35 Amps	Conditions not developed.				
0.046" Dia. P/N 17119	Plasma (H35)-65 psig Cooling Gas-25 psig	70 Amps	Conditions not developed.				
0.055" Dia. P/N 999263	Plasma (H35)-65 psig Cooling Gas(Air)-25 psig	70 Amps	1/4-in.	1/4"	35	40	80
				1/2"	10	15	18
				3/4"	5	3	10

* 0.046" cutting tip is supplied with Torch Spare Parts Kit (999276). 0.055" cutting tip may be used in place of 0.047 tip for longer consumable life at 70 amps but with lower cutting speed.

NOTE: The speed ranges given are typical for best quality cuts. Results will vary depending on material composition, surface conditions, operator technique, etc. Also see Gas Selection Chart (Table 5) for additional reference. If cutting speed is too fast, you may lose the cut. On slow speeds, dross may accumulate.

Table 5 - Cooling Gas Selection Chart PCM-70/PT-121

Cutting Tip	Current Setting	Mat. Thick.	Low Carbon Steel Cooling Gas (N2 Plasma) N2	CO_2	Air	H-35 Pla. Air	Stainless Steel Cooling Gas (N2 Plasma) N2	CO_2	Air	H-35 Pla. Air	Aluminum Cooling Gas (N2 Plasma) N2	CO_2	Air	H-35 Pla. Air
0.032" Dia. P/N 17184	30 Amps	1/32"	3S	2F	1F	—	1G	3G	2G	—	1E	2E	3E	3E
		1/16"	3F	1G	2G	—	3G	1G	2G	—	2E	1E	3G	—
		1/8"	3F	1G	2G	—	2G	1G	3F	—	1E	2G	3S	—
0.047" Dia. P/N 999279	70 Amps	1/32"	2G	1E	3G	—	3G	2G	1G	—	2G	3G	1E	—
		1/16"	1G	2G	3F	—	1G	2F	3F	—	1G	2G	3G	—
		1/8"	3F	1G	2G	—	1G	3F	2G	—	1E	2G	3G	—
		3/16"	3F	2G	1G	—	3S	2F	1F	—	3G	1E	2E	—
		1/4"	3F	1G	2G	4F	3S	1F	2F	4F	2F	1G	3S	1E
		1/2"	3S	1F	2F	1F	3S	1F	2S	1F	2S	1F	3S	1E
		3/4"'	—	—	—	1F	—	—	—	1F	—	—	—	1E

E (Excellent) — Essentially no bottom dross; excellent cut face.
G (Good) — Moderate to no bottom dross; good cut face.
F (Fair) — Heavier but removable bottom dross or fair cut face.
S (Sever) — Heavy tenacious dross or poor face.
Numbers indicate order of cooling gas preferred for a particular material and thickness.

C. OPTIONAL ACCESSORIES

1. **Drag Type Shield Guard, P/N 19989 (PT-17A) —** Protects the heat shield and permits the operator to drag a manual torch on the plate while cutting. Thus maintaining a fixed stand-off (tip-to-work distance) throughout the cut resulting in a uniform appearance of the cut edge. Two drag type guards are supplied with each spare parts kit.
2. **Standard Shield Guard, P/N 19990 (non drag type) (PT-17A)** — Protects the shield against accidental breakage on both manual and mechanized torches. One standard guard is supplied with each spare parts kit.
3. **Drag Type Heat Shield, P/N 999620 (PT-121) —** Slightly longer than a standard heat shield and slotted permitting the operator to drag a manual torch 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.
4. **Circle Cutting Attachment, P/N 19897 (PT-17A); P/N 999696 (PT-121)** — Permits cutting accurate circles from 4-1/2-in. to 22-in. in diameter with a manual torch. The attachment includes a head and radius bar assembly, center-point/adaptor, 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 163Z23) 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.
5. **Plasma Gas Flow Measuring Kit, P/N 19765** — This kit is used for checking gas flows through torch. See Section VI-B.

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. On PCM-70/PT-121 packages, mount the components of the TR-21SP truck and cylinder kit (680793) as directed by F-14-414 packed with the kit.
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 clearance 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 6 for recommended input conductors and line fuse sizes.

Table 6 - Recommended Sizes for Input Conductors and Line Fuses

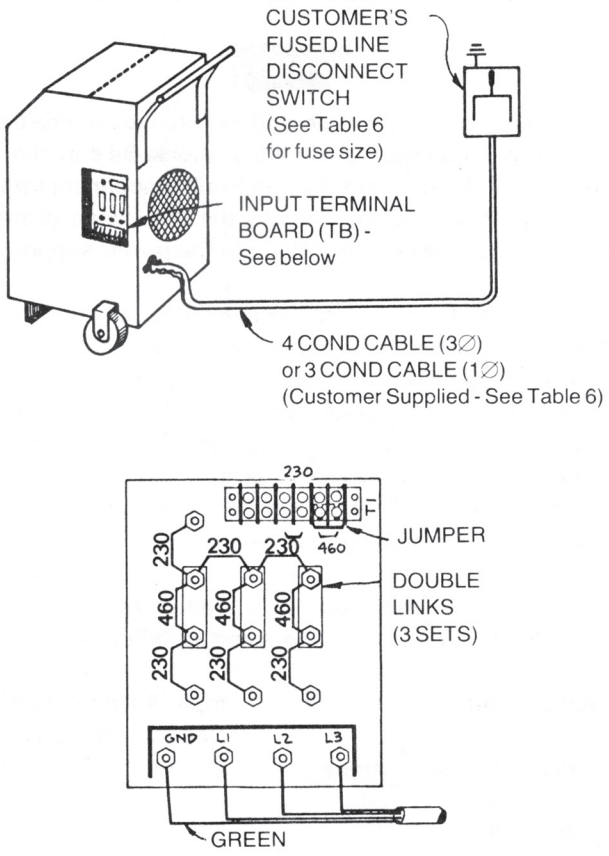
Rated Input			Input & Gnd. Conductors CU/AWG	Fuse Size Amps
Volts	Phase	Amps		
230	3	38	8	60
460	3	19	12	30
208	1	54	6	80
230	1	48	6	70
460	1	24	10	40

* Sized per National Electric Code for 75° C rated conductors @ 30° C ambient. Not more than three conductors in raceway or cable. Local codes should be followed if they specify sizes other than those listed above.

2. As shipped, the PCC-70 is set up for 460 volt, 60 hertz input. If using 230 or 208 volt input, the links on the terminal board (TB) and jumper on terminal block (T1) inside the unit must be repositioned (see Fig. 2). To gain access to the terminal board, remove access door on right 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 L1, L2, and L3 (if using 3-phase; if single phase, connect leads to L1 and L2) and the green ground wire to GND terminal on the terminal board using UL listed pressure wire connectors. 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. Then reinstall the access door to right side panel.



TB (3-Phase Unit)

Fig. 2 - Input Power Cable Connection and Terminal Board (TB)

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-17A Torch (Refer to Fig. 3)

a. Connect the terminal lug end of the work cable assembly to the WORK terminal in lower left corner of front panel. Nut should be wrench-tight.

b. Lift front top cover to gain access to the torch connections.

c. Connect pilot arc adaptor P/N 19497 (supplied with torch spare parts kit P/N 680784) 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.

d. Thread the three torch service lines through the bushing in the upper left 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 adaptor assembled on POS fitting at the most convenient tapped hole position of adaptor. 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.

e. Close the top cover.

f. Assemble the filter-regulator (30338) to the upper left corner on the rear panel (view from rear) as illustrated. Mounting holes are provided. Hardware is supplied with the mounting bracket.

g. Connect the air hose assembly (678152) to filter-regulator outlet fitting and to the "Plasma Gas-Air" fitting on the rear panel of the PCC-70 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. Electrically connect work cable to work piece. The connection must be made to a clean, exposed metal surface free of paint, rust, mill scale, etc.

WARNING

A poor connection or failure to connect work cable to work piace can result in fatal shock.

j. Make sure workpiece is connected to an approved earth ground. Use copper ground cable equal to or larger than the power supply chassis ground listed in Table 6.

2. Using PT-121 Torch (Refer to Fig. 4)

a. Connect the terminal lug end of the work cable assembly to the work terminal at the lower left corner of front panel.

b. Lift front top cover to gain access to torch connections.

c. Thread the three service lines (gas, power, and switch lead) of the PT-121 torch through bushing in upper left corner of front panel 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. Then close the top cover.

d. Connect the gas supplies. The cylinders may be placed and secured on the cylinder rack of the truck. Before connecting the regulator(s), be sure to read, understand, and follow all instructions packed with each regulator.

e. Connect the gas hoses to the regulator(s) and to the proper fittings on the rear panel of the PCC-70

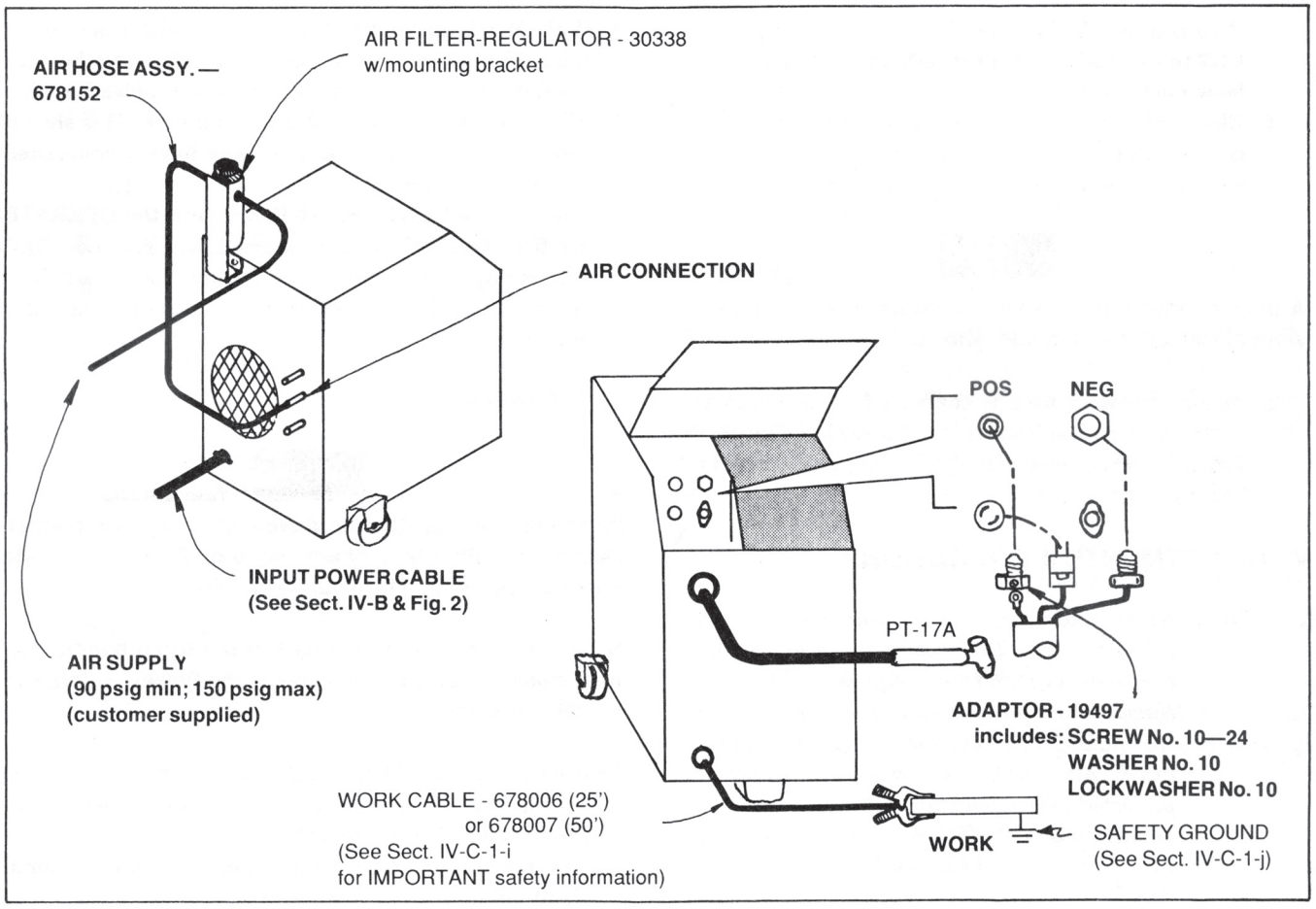


Fig. 3 - Interconnection Diagram - PCM-70/PT-17A

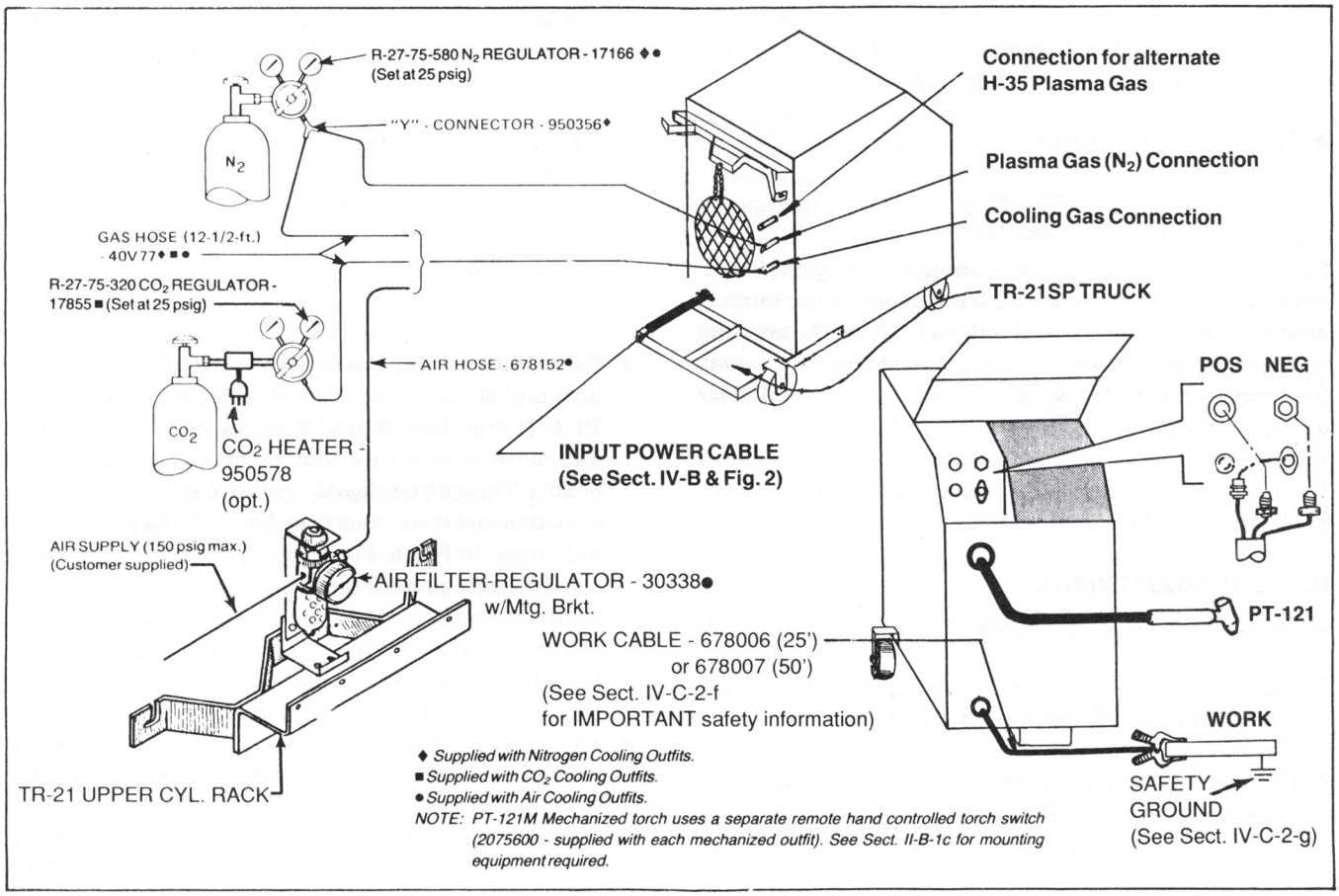


Fig. 4 - Interconnection Diagram - PCM-70/PT-121

(Nitrogen to PLASMA GAS fitting; nitrogen, air, or CO2 to COOLING-GAS fitting). Connections should be wrench tight.

f. Electrically connect work cable to work piece. The connection must be made to a clean, exposed metal surface free of paint, rust, mill scale, etc.

WARNING

A poor connection or failure to connect work cable to work piece can result in fatal shock.

g. Make sure workpiece is connected to an approved earth ground. Use copper ground cable equal to or larger than the power supply chassis ground listed in Table 6.

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 and top 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.

CAUTION: Voltage is available at the POWER On-Off switch on the hinged top cover when voltage is applied to the input terminal board even when the POWER switch is OFF.

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 and the "Torch On" light is off. Do NOT make any adjustments underneath the hinged top of the unit unless the primary power to the unit is OFF even if the Power on-off switch is off.

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

B. PCC-70 ADJUSTMENTS

1. Slowly open the nitrogen and CO2 or air cylinders valves.
2. Place the PCC-70 OPERATE/SET-UP and POWER switches in the SET-UP and OFF positions.
3. Place the primary (wall) switch in the ON position.
4. Place POWER SWITCH to ON POSITION. "Low Gas" light should light up. (This light is indicating that power is applied to the control circuit.) 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 proper pressure (Tables 3 & 4).
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. (The "Low Gas" will remain on. It will go off when torch switch is depressed and it will then function as a low gas indicator light.)

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 Power switch is in the OFF position.

1. Position the PT-17A or PT-121 torch on the workpiece by resting the heat-shield 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.
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.

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 1/8 to 3/8-in. (3/16 to 1/4-in. with the PT-121). (See Table 3 or 4.) Keep the torch head vertical, and move it at a rate that produces the desired cut quality. The cutting should produce a straight fine spray of molten metal emitting from beneath the workpiece as illustrated in Fig. 5. For mechanized cutting, see Table 3 or 4 for recommended cutting speed range.
5. If cutting arc is lost during cut, the pilot arc immediately reignite 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 POWER switch to the OFF

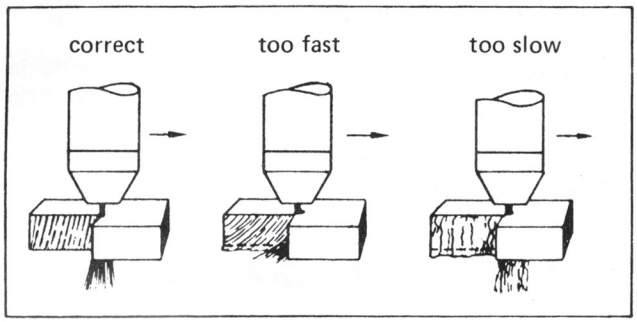


Fig. 5 - Effect of Cutting Speed

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 PCM-70 Console, refer to the troubleshooting section in booklet Form 14-390.

1. **Insufficient Penetration.**
   a. Cutting speed too fast.
   b. Damaged cutting tip.
   c. Improper gas pressure.
   d. Standoff too low.
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.
   d. Standoff too low.
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, F-12-794.)
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, F-12-794).

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.

NOTE: For detailed maintenance, troubleshooting, and parts information on the PCM-70 Console, see Form 14-390.

A. INSPECTION AND CLEANING

Frequent inspection and cleaning of the PCM-70 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 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. FLOW TESTING

WARNING

Avoid fatal shock. Follow the steps below to assure safe flow measurement.

1. Shut off input power at the main disconnect switch.
2. Lift the top lid of the PCM-70 and unplug the torch switch cord.
3. Close the lid.

4. Turn on the power at the main disconnect switch.
5. Place gas mode selector switch (OSS) in SET-UP position.
6. Place power ON-OFF switch (ROS) to ON.
7. Check flow measurements with P/N 19765 flow measuring kit.
8. Place ROS switch to OFF.
9. Turn off power at main disconnect switch.
10. Reconnect torch switch plug inside console.

PT-121 Plasma Gas Flow (No Arc):

Nitrogen @ 25 psig: . . . . . .30 cfh
H-35 @ 65 psig: . . . . . .75 cfh

PT-121 Cooling Gas Flow:

Nitrogen or Air @ 25 psig: . . . . . .200 cfh
CO2 @ 25 psig: . . . . . .160 cfh

PT-17 Total Air Flow @ 75 psig: 290 cfh minimum.

LITERATURE CHANGES

The "A" edition (6/87) of this booklet was printed to cover part number change on the hand control switch (2075600 to 680982) in the PCM-70/PT-17M Mechanized packages and change in PT-17 cutting tips and electrode for greater operating life. Old tips and electrode are interchangeable with the new parts.

The "B" edition (3/89) of this booklet was printed to cover change from PT-17 to an upgraded PT-17A which provides higher cutting speed, and as a result, cutting data was revised.

F-14-376-B 89-0813 3/89 2M Printed in U.S.A.

L-TEC Welding & Cutting Systems
Box F-6000 Florence, SC 29501