

# SIP ULTRA-LINE PORTABLE CUTTING MACHINE

OPERATION  
MAINTENANCE  
PARTS LIST



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



ESAB /L/TEC  
Steel Industry Products

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# SAFETY NOTICES

This equipment moves in various directions and at various speeds. All personnel, materials and equipment not involved in the cutting process must be kept clear of the entire system area. Only personnel that are qualified must be allowed to operate or service the equipment.

Read entirely through a procedure to become familiar with the task before operating or performing maintenance on any part of the system. Special attention must be given to all NOTES, CAUTIONS AND WARNINGS that provide essential information regarding personal safety and/or possible damage to the equipment.

All safety precautions relevant to electrical equipment and the process operations must be strictly observed by all who have responsibility or access to the system. DO NOT operate any part of the system with any protective covers removed. Adhere to all safety standards set by your company. Obtain additional publications in reference to proper process procedures.

Guard the entire work cell to prevent personnel from passing through the area or standing near operating equipment. Post appropriate CAUTION signs around the work cell area.

## Electrical Ground

Electrical grounding is imperative for proper machine operation as well as for SAFETY. All cutting machines must have a good electrical connection earth ground.

## Operating Precautions

1. Periodically check all fittings for leaks, wear, corrosion or deterioration of cables and hoses. Protect supply lines and cables from damage. Do not drive heavy equipment over them. Know your required pressures and corresponding tool requirements for each application.
2. Wear goggles to protect your eyes from burns and flying debris generated during operation.
3. Wear ear protection as required for the cutting of various materials.
4. Observe the clearance requirements around the machine for proper operation and personnel safety. Keep the working area clean and unobstructed.

Keep the track and path of the machine clear of debris or obstructions such as tools or clothing.

5. Do not operate oxy/fuel-gas torches without check valves in the preheat gas lines at the torch.
6. Open gas source supply valves slowly, shut them off when machine is not in operation for any length of time. Bleed the line pressure when shut down for an extended period.
7. Use only the correct type and size of wrench for changing or tightening the oxy/fuel-gas torch nozzles. Be sure the nozzles are tight. Do not hand tighten only.

## Special Information

In presenting information for the operator or serviceman, a system of advisories are used to call particular attention to specific information. The method used to identify this information is as follows:

### NOTE

An operational procedure or information that aids the operator in efficient use of the machine, the serviceman in performing maintenance, or information that requires additional emphasis.



**An operational procedure that, if not properly followed, may cause damage to the machine.**



**An operational procedure that, if not properly followed, may cause injury to the operator or others in the operating area.**

## Gas Control Safety Precautions

Follow these safety rules when using any type oxy/fuel-gas cutting system:

Keep all equipment clean and in good working condition. Keep the entire work area free from oil, grease and other combustible material.

Before using the machine, check for leaks at the gas connections on regulators, valves and torches. Always open the gas valves slowly.

Bleed the regulators completely when changing the oxygen cylinders.

Purge the oxygen and fuel-gas lines individually to discharge combustible mixtures before lighting each torch.



**Do not purge the lines close to a source of ignition (i.e., flame or cigarette), toward a person or near clothing.**

Make sure all valves are operating properly.

Secure all cylinders to prevent them from falling or being knocked over.

Avoid or otherwise ventilate any work area that might accumulate leaking gas.

Depressurize the system before performing any maintenance or disassembly.



**Never disconnect any part of the system that is under pressure. Clean all parts used to repair or replace oxygen systems. They must be free of oil.**

Wear appropriate clothing and eye protection.

Isolate the cutting area to protect yourself and others from heat, flame, sparks, and hot slag.

Never attempt to cut any container that is pressurized or that has contained flammable materials.

Do not cut near combustible materials.

Do not have on your person any combustibles such as a butane lighter or matches.

Keep the cutting area well ventilated. DO NOT breath the fumes.

Do not cut containers with toxic materials or containers that have held toxic materials. Clean such containers thoroughly before cutting.



**Do not cut metal or painted metals containing zinc, lead, cadmium or beryllium unless proper and adequate fume removal equipment is installed and properly operating.**

#### **Skin Protection**

To protect skin against burns caused by sparks and hot metal:

Wear protective clothing.

Wear gauntlet gloves, safety shoes and hat.

Wear flame retardant clothing that covers all exposed areas.

Wear cuffless trousers to prevent entry of sparks and slag.

Do not touch the torch while cutting, after cutting allow time for the torch to cool.



**Figure 1. SIP ULTRA-LINE Carriage Assembly**

## INTRODUCTION

The SIP ULTRA-LINE is a "Steel Mill Version" of the Standard Ultra-Line lightweight portable carriage designed for controlled gas cutting applications. It is designed for Steel Mill and Heavy Metal Working Applications.

With various attachments, the SIP ULTRA-LINE can be used for straight-line (with or without track) or circle (2 to 54 inch diameter) cutting applications and for plate-edge preparation. The carriage can be rigged for one or two torch operation.

By using a PM-100 machine cutting torch, the ULTRA-LINE can be used to cut steel up to 28" thick.

The SIP ULTRA-LINE has a factory calibrated speed range of 0 to 45 inches-per-minute (0 - 1143 mm/m). The carriage is driven by a reversible DC motor with built-in solid state speed regulation. With the solid state circuitry no warm-up time is required for starting carriage travel.



**Figure 2. Single Torch Rigging**

## DESCRIPTION

The SIP ULTRA-LINE is approximately 16 inches long, 7-1/4 inches wide, 5-3/4 inches high (including the mounting stud). The housing is a one-piece aluminum casting weighing about 24 pounds. With rigging and single torch included weight is about 38 pounds.

Carriage travel is implemented by the conveniently located controls that include:

**Main Power Switch** - a JOG/OFF/ON switch that controls 120 volt AC power to the control circuitry.

**Forward/Reverse Switch** - selects the direction of travel when drive is engaged. The neutral position will place the carriage in an idle state.

**Speed Control Dial** - Sets the travel speed of the carriage. The scale is for reference speed control over the range of operating speeds.

**Clutch Lever** - Located on top of the carriage the clutch lever is used to engage or disengage the drive mechanism. When disengaged the carriage can be free-wheeled for positioning.

A 3 conductor heavy duty electrical pigtail allows the customer to connect his own plug/cable assembly.

The pair of larger diameter drive wheels are knurled for positive traction to the riding surface. The two caster wheels can be locked into position in-line with the drive wheels for straight line cutting without the track by tightening the thumbscrews.

A wide variety of accessories are available that make the ULTRA-LINE more versatile.

### Hook-Up Hose Assemblies

These hose assemblies with captive fittings are used to connect the oxygen & fuel gas regulation supply to the machine carriage. The customer should select the shortest length and largest diameter assembly to suit his needs.

Part No.	Size	Service	Length
2060396	"B" - 3/8	Oxygen	50 Ft.
2228057	"B" - 3/8	Oxygen	75 Ft.
2228058	"B" - 3/8	Oxygen	100 Ft.
2060397	"B" - 3/8	Fuel Gas	50 Ft.
2228060	"B" - 3/8	Fuel Gas	75 Ft.
2228061	"B" - 3/8	Fuel Gas	100 Ft.
2120399	"C" - 1/2	Oxygen	50 Ft.
2228062	"C" - 1/2	Oxygen	75 Ft.
2228063	"C" - 1/2	Oxygen	100 Ft.
2228124	"D" - 3/4	Oxygen	100 Ft.

**HI-FLOW Manifold Block: Aluminum (2223796), Brass (2225427), Mounting Bracket (2223797)** - The customer can use either the aluminum or brass block together with the mounting bracket and his own valves/fittings/hardware for oxygen/fuel gas hose connection.

**HI-FLOW Manifold Kit: Aluminum (2226713), Brass (2226712)** - Same as above but includes all valves/fittings and hardware for oxygen/fuel gas hose connection.

### Jumper Hose Assemblies (2228140, 2228141, 2228142)

These SS/Teflon hose assemblies with captive fittings are used to connect the Hi-Flow valve block to the torch:

2228140 - "B" Size Oxygen, 40" Long

2228141 - "B" Size Fuel Gas, 40" Long

2228142 - "C" Size Oxygen, 40" Long

**Track - 6 Foot Length (16V82); 7 1/2 Foot Length (20086), 9 Foot Length (2223156)** - The heavy duty track has a v-groove on the side that is accurately aligned with the track edge. The groove guides one set of wheels of the carriage. The ULTRA-LINE can be set up quickly and easily for straight line cutting by placing the track edge parallel to the line of cut. The track can be laid on the workpiece or mounted to a structure adjacent to the area. Each track has a male and female end providing ease of joining sections to increase cutting length.

**Circle Cutting Attachment (16V84)** - Consists of an 18 inch radius bar and sliding pivot pin for cutting circles from 2 - 54 inches in diameter.

**Standard Counterweight (995587)** - The counterweight can be mounted to either side of the carriage as required to maintain balance of the carriage when the equipment is mounted on one side creating an unbalance. Three tapped holes are provided on each side of the carriage for the purpose of mounting the counterweight. Three 5/16-18 x 1-3/4 inch screws and three spacers are provided. The spacers are placed between the counterweight and the carriage. Two tapped holes are provided in the counterweight corresponding to the manifold mounting.

### Hi-Temp Heat Shield Kit (2228130) For Use With PM Torch

This kit consists of the following parts which may be ordered individually if desired:

One (1)

One (1)

One (1)

Five (5)

Three (3)

Hardware For Assembly

See Form F-15-630 for Assembly Instructions.

**Standard Double Heat Shield Kit (995586)** - The heat shields may be mounted on either side of the carriage. The kit includes one fixed and one plate-riding shield, screws, spacers and mounting instructions. Use this kit for low temperature (non PM torch) applications.

**Bottom Cover Insulation Set (2228128)**

This insulation board mounts between the bottom cover and the aluminum carriage. It isolates the carriage from the cover which may become hot, especially when using the PM torch or if the product is "warm". Although new machines will be equipped with this insulation, it is available for replacement, or on machines built before it's implementation.

**Torch Rigging Assembly (16V90)** - This unit is mounted to the threaded stud located on top of the carriage. The rigging includes a 24 inch rack for horizontal positioning of the torch and a torch holder for mounting a machine cutting torch equipped with a 32 pitch rack that allows vertical adjustment of the torch.

**Extended Rack For Torch Rigging (2228133) and Rack Counterweight (2228129)**

This rack assembly is 44" long and allows for spacing the torch further from the machine carriage (for improved heat protection) especially when using the PM style torch. The special counterweight will be required when using the extended rack.

**Two Torch Operation** - The SIP ULTRA-LINE can be set up to simultaneously cut with two torches in a variety of positions by using either of the following adaptors:

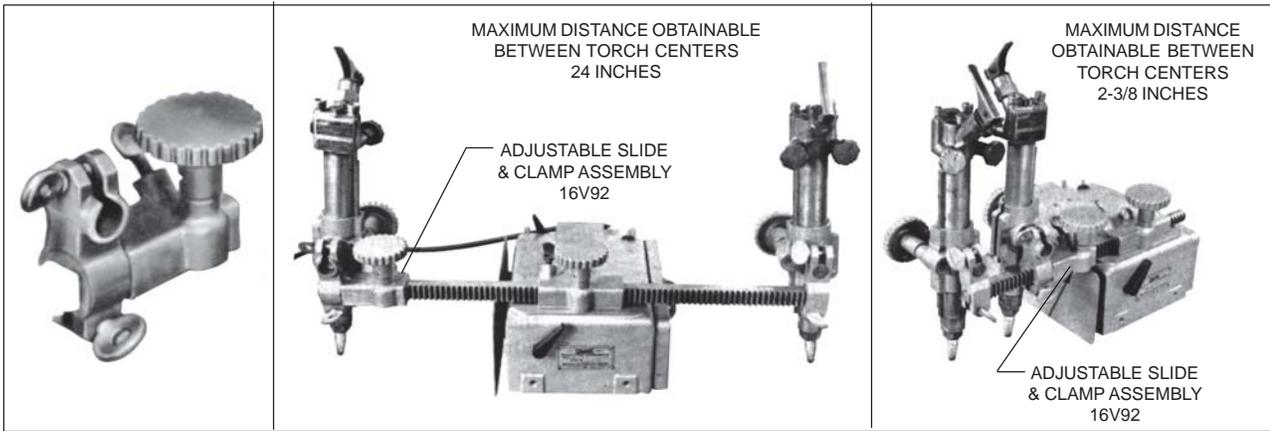
1. Adjustable Slide and Clamp (16V92) - This is a slotted fixture that will fit on either end of the rack supplied with the "torch rigging assembly". A pinion gear engages the rack and by turning a knob, the second torch can be positioned at any location on the rack. An additional torch holder (16V83) is required and is clamped to this assembly. A thumb screw is provided to lock this assembly in place.
2. Adaptor Plate (16V89) - This unit is installed onto the mounting stud and has two studs for mounting two torch rigging assemblies (16V90).

**Vertical Post (491620)** - Provided for applications where vertical adjustment of the Torch Rigging Assembly is desired. A post adaptor kit (490769) is also required that includes an adaptor rod, bushing, capscrew and a mounting bracket (491571). The post slips over the mounting stud on the carriage. The adaptor rod fits inside the post and screws onto the stud. The bushing inserts into the top of the post and the capscrew passes through the bushing and screws into the top of the adaptor rod. The mounting bracket slips over the post and is locked in any position by a thumbscrew.

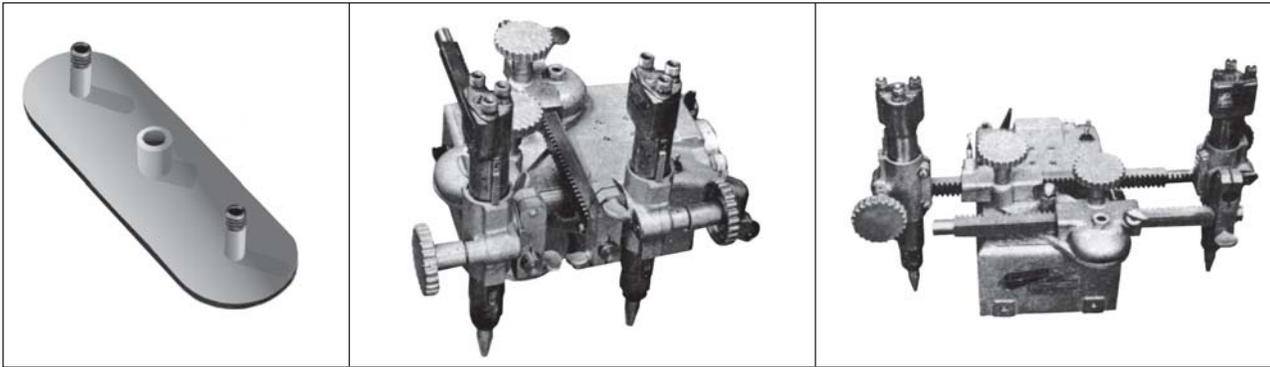
The slide on the torch rigging is then attached to the mounting bracket using a locknut supplied with the bracket.

There is a variety of accessories available for OXWELD oxy/fuel-gas machine cutting torches:

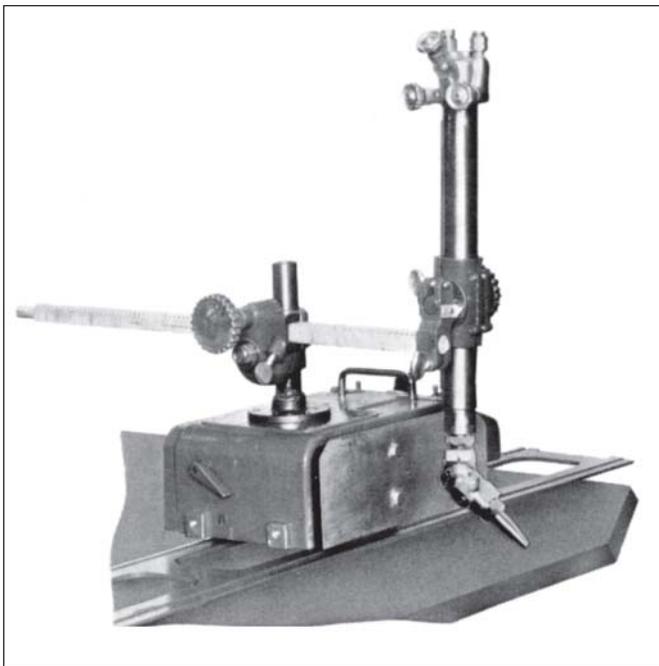
1. Quick Acting Cutting Valve Assembly (32Y08) - Can be used to substitute for cutting oxygen throttle valve on torch for quick on/off cutting oxygen control. Note the valve on torches shown in Figure 3.
2. Adjustable Bevel Cutting Adaptor (18845) - For use with OXWELD 1500 series nozzles and connects to the torch in the same way as a cutting nozzle. The adaptor can be adjusted from 0 to 90 degrees either side of the torch center line. The bevel adaptor is shown in Figure 5.
3. Auxiliary Preheat Kits (Acetylene - 61Y99, Other Fuel-Gases - 63Y13) - Allows preheating the plate ahead of the torch. Also, available for the bevel cutting adaptor.
4. Scissor-Type Slitting Adaptor (22X42) - Mounts two OXWELD 1500 series nozzles into the torch for making parallel cuts ranging from 1-1/2 to 12 inches wide such as a coupon or slot cutting. Shown in figure 6.
5. Two-way Oxygen Inlet Adaptor.



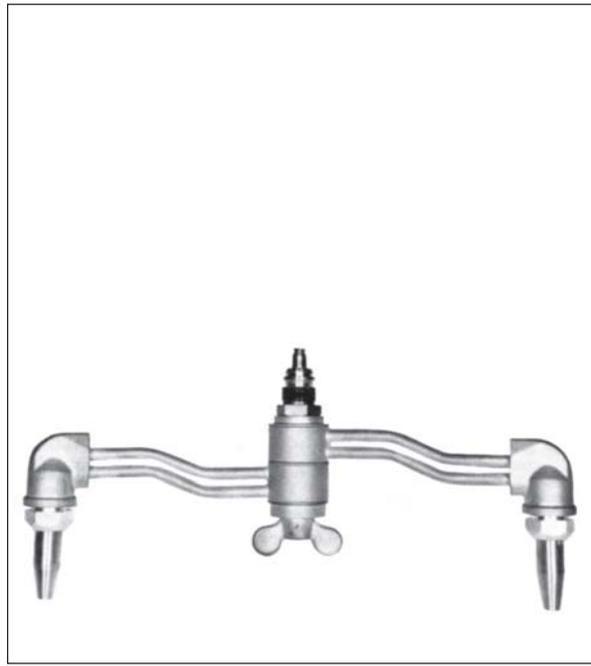
**Figure 3 - Two-Torch Setup Using Adjustable Slide and Clamp Assembly**



**Figure 4 - Two-Torch Setup Using Adaptor Plate**



**Figure 5 - Torch Rigging, Vertical Post & Bevel Adaptor**



**Figure 6 - Scissor - Type Slitting Adaptor**

## INSTALLATION

The SIP Ultra-Line carriage is shipped completely assembled. Simply remove it from the carton and place it on a flat, clean plate or bench. Never roll the carriage by hand unless the gears are first disengaged.

## POWER LINE

Customer connects to 3 conductor heavy duty pigtail on the machine.

## TRACK INSTALLATION

For many applications a single 6, 7 1/2 or 9 foot section of track is sufficient. Whenever greater length is needed, two or more loose sections of track may be joined along the line of travel, refer to Figure 7.

1. Set up two or more loose sections of track and start carriage operation on the first section.
2. When the carriage has passed from the first section of track to the second section, take up the first section of track and move it to a point beyond the section on which the carriage is traveling.
3. Rejoin the track sections along the line of travel. Note that track sections have male and female ends for quick match up.

A continuous track assembly may be constructed by fastening any number of track sections end-to-end. The assembly may be rested directly on the surface of the workpiece or by placing it upon a support along the side of the working area. The installation can be made permanent by fastening it to a rigid supporting structure at the desired location. Supporting structures should be checked to ensure they provide a firm and level base for track sections. They must be strong enough and rigid enough to maintain position against vibration and operating load.

## ASSEMBLING TORCH RIGGING (16V90)

Referring to Figure 8, the Torch Rigging Assembly consist of four units.

1. SLIDE - a slotted fixture with a geared traversing knob to move the rack in and out. It may be swiveled horizontally to locate the rack at any angle from the side or the front of the carriage.
2. RACK - an adjustable bar that is inserted through the slide. The range of the rack movement in and out is 17 inches. The rack can be locked in position by a locking thumbscrew on the side.
3. CLAMP - is the connecting fixture between the rack and the torch holder. The clamp slides onto either end of the rack. The clamp angle to the rack can be adjusted to control the angle of the torch along the line of travel. The thumbscrew can be used to lock the clamp at the desired angle. If the level of work is below the level of carriage travel, the clamp position can be shifted 180 degrees from that shown in Figure 9 to extend the lower range of the torch. The clamp thumbscrew can be shifted to the other side to suit the inverted position.
4. TORCH/HOLDER - holds the torch in the operating position. Vertical movement of the torch is controlled by turning the geared knob that engages the rack on the torch. The torch holder stud rotates in the clamp to allow adjustment of the torch angle across the line of travel. A scale included with the torch holder indicates approximate torch angle settings for bevel cutting. It can be locked into position at the desired angle. The thumbscrew can be inserted from either side for best clearance.

### Torch Rigging Assembly Procedures:

1. Disengage gears by releasing the shift lever. Tighten the caster thumbscrew to prevent side movement during assembly.

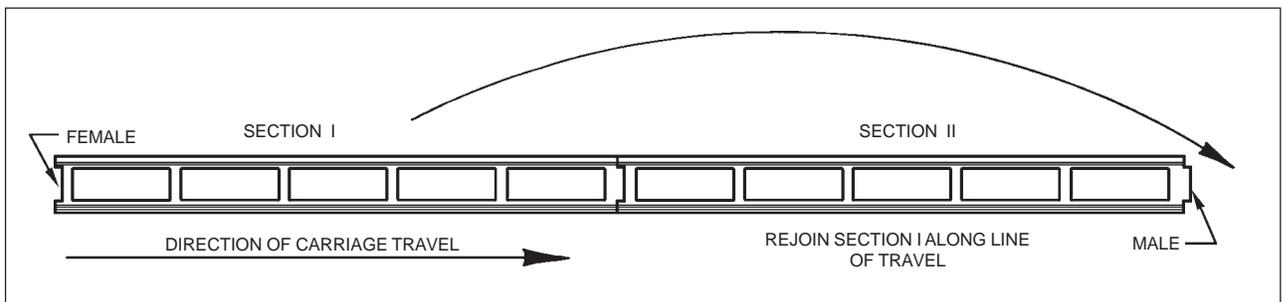
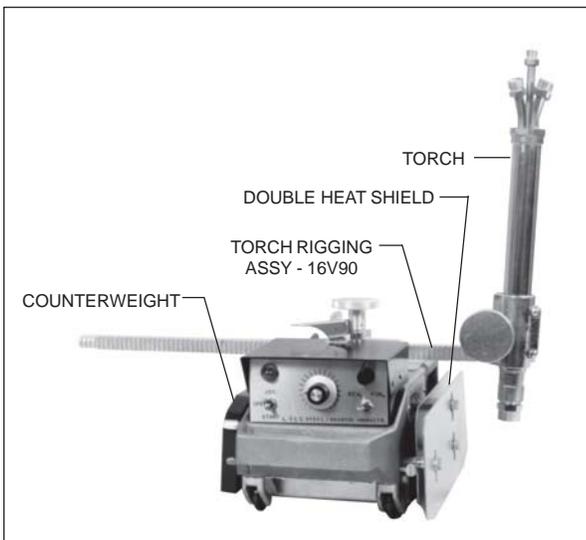


Figure 7 - Multiple Track Sections

2. Install the slide onto the mounting stud. The traversing knob should be toward the front of the carriage. Secure the slide in place by installing the cap nuts supplied with the rigging.
3. Be sure that the fiber plug under the locking thumb screw on the side does not project into the space to be occupied by the rack. If it does force it all the way out with the thumbscrew. Then remove the thumb screw, reinstall the plug in the proper position, replace the thumbscrew. NOTE: Care should always be taken to ensure the fiber plug is not damaged or lost when assembling and disassembling the rigging.
4. Insert the end of the rack into the slot of the slide, with the toothed edge facing toward the front of the carriage. Turn the slide knob to move the rack in and out. Use the slide locking thumbscrew to lock the rack in position. NOTE: The thumbscrew will only lock the rack against the square section, not against the rounded end portion.
5. Slide the clamp onto the end of the rack. Tighten the clamp thumbscrew.



**Figure 8 - Mounted Torch Rigging Assembly**

6. Insert protruding stud of torch holder into the clamp with knob facing toward rear of the machine. Tighten the top clamp screw. The rigging is now ready for the torch to be mounted.

### Torch Installation

1. Loosen the two screws on the torch holder and insert the torch.
2. Slide the torch into the holder until the pinion of the holder adjusting knob engages the teeth on the torch rack.

3. Retighten the screws on the torch holder so the torch will remain at any desired height by friction, but can still adjust smoothly up and down by the torch adjusting knob. The torch angle is adjusted by using the two thumbscrews on the clamp.
4. Set up the oxygen and fuel-gas supplies and connect the hoses to the torch and appropriate regulators. Hoses can be interconnected with the optional manifold using twin hose supplied with the manifold kit or they may be suspended above the carriage from the ceiling or other overhead support. Be sure the hoses and power cable are clear of the hot work material. Also, cable and hoses should not interfere with the operator or movement of the carriage.

## OPERATION

### Preparation for Operation

1. Brush the track or workpiece clean. Dirt or slag under the wheels may cause irregular carriage movement resulting in poor quality cuts and wasted material. Be sure that the workpiece is level, and has open space under it for slag to fall free of the material.
2. Place the track, if being used, on the plate and line it up along planned cut path. Be sure the track installation is long enough for the cut to be made. If using multiple track sections, be sure to mark a line of travel to keep the tracks aligned for the right path. When properly connected, the machine should travel smoothly from one section to another.
3. Place the carriage on the track aligning the casters in the track groove. Disengage the drive mechanism with the clutch lever. Roll the carriage along the track to ensure freedom of movement.

### Straight Line Cutting

1. Connect the power cord to the power source outlet. Be sure power cord and hoses are free to travel with the machine and are long enough to make the planned cut.
2. Select the desired direction of travel.
3. Rotate the Speed Dial to the travel speed required.
4. Engage the drive mechanism.
5. Place the JOG/OFF switch in the JOG position. When the carriage reaches the start point stop travel. (The carriage may be moved manually to the start point by disengaging the drive with the clutch lever and power off.)

6. To begin travel for cutting operation, select direction, set speed, engage drive position JOG/OFF/ON switch to ON.
7. To stop travel switch JOG/OFF/ON to OFF position.

After some experience is gained, the operator will be able to calibrate the speed dial for specific applications. When performing similar work the same setting can be used.

### Bevel Cutting

Either the bevel cutting adaptor (22X24) can be used, or by tilting the torch holder to the desired angle. The torch holder is equipped with a protractor scale so the torch can be angled in either direction. Loosen the thumbscrew on the clamp to move torch to the desired angle, then lock in position by tightening the thumbscrews. Scale is marked in 5 degree increments from 0 to 90 degrees on each side of the vertical centerline.

When cutting bottom bevels with the torch angled toward the carriage, it is advantageous to rotate the torch holder 180 degrees to extend the lower range of the torch. Shift the clamp screws to the other side to suit the inverted position of the clamp. It is also desirable to extend the rack as far as possible to avoid overheating the carriage.

*NOTE: When bevel cutting it is necessary to consider the length of the bevel as the cut depth, not the plate thickness, when selecting the proper nozzle, gas pressures and cutting speed.*

### Cutting Circles

When using the circle cutting attachment, 16V84, circles of 2 to 54 inches in diameter can be cut. The diameter of a circle determines whether the carriage should be operated outside the circumference.

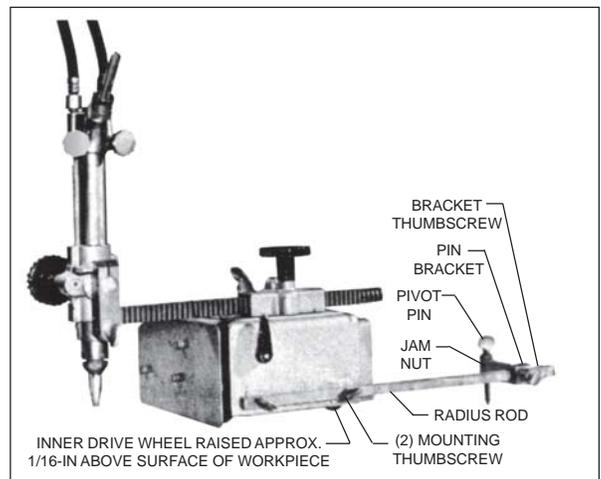
#### Circles 2 to 19 Inch Diameter

1. Locate the center of the circle to be cut and mark it with a deep punch mark. A punch with a 60 degree angle point is recommended for this purpose.
2. Loosen the caster locking screws so casters rotate freely.
3. There are two holes in the front end of the carriage for the attachment of the long radius rod. Fasten the rod to extend outward on the torch side of the carriage. Tighten the thumbscrews.

*NOTE: In attaching or removing the radius rod, care should be taken to hold the side of the rod back against the thumbscrew heads while turning each screw alternately, a little at a time.*

4. Place the carriage on the workpiece with the torch directly over the intended line of cut.
5. Slide the pivot pin bracket over the end of the radius rod so that the pivot pin and the torch are on the same side of the rod.
6. Move the pivot pin bracket along the radius rod until the point of the pivot pin rests in the punch mark made at the center of the circle.
7. Loosen the pivot pin jam nut. Screw in the pivot pin until the near drive wheel has been raised approximately 1/16th inch above the surface of the work piece. Tighten the jam nut.

There are now three points of contact; the pivot pin, the far drive wheel, and the far caster. Since the position of the torch is closer to the center of the circle than the position of the drive wheel, the torch nozzle will



**Figure 9. Installed Circle Cutting Attachment**

travel at a speed that is actually slower than that set on the Speed Dial. The approximate Speed Dial setting for the desired nozzle speed may be determined as follows:

1. Measure distance (A) from the far drive wheel to pivot pin.
2. Measure distance (B) from the torch nozzle to pivot pin.
3. Divide distance (A) by distance (B). multiply the result by the desired nozzle speed. The answer gives the approximate Speed Dial setting for the carriage.

Example: If distance (A) is 20 inches, distance (B) is 5 inches, 20 divided by 5 = 4. If the desired nozzle speed is 6 inches-per-minute, 4 X 6 = 24. Therefore, the Speed Dial should be set at 24 inches-per-minute. The Speed Dial is not labeled for speed indication.

### Cutting 19 to 54 Inch Diameter Circles

Proceed in the same way as before, except the radius rod is extended outward on the opposite side of the carriage from the torch.

Since the torch is further from the center than the drive wheel the torch nozzle will travel at a faster speed than the carriage. The Speed Dial setting is determined in the same way as the smaller circle.

With the proper cutting speed set, start the cut in the waste part of the workpiece. The starting point is outside the circle for a disk, inside for a hole. Rack the torch to the line of cut after the material has been pierced.

## 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.**

### General

Little maintenance is required to keep the ULTRA-LINE in top operating shape. The motor-gear reduction unit, drive gears, electrical and other components are well protected from dust and dirt by the bottom cover plate. However, it is recommended that the drive gears be lubricated at least once per month. Disconnect power cord from source, set the carriage on the side, and remove the bottom cover plate. Wipe off excess grease from the side of gears and coat the gear teeth with a small amount of Molykote M-77.

With the bottom cover removed, check the electrical system for possible loose connections, broken wires, worn or broken insulation, burned resistor or other components, etc.

Warranty: The printed circuit board/harness assembly is warranted for 90 days against defects in material or workmanship. DO NOT attempt any type of repair. If a malfunction of the entire assembly is traced to this part

after eliminating the possibility of failure or defect in other components, it should be returned. Replacement will be made at no charge if found to be defective and there is no evidence of abuse or misuse.

### Calibrating Speed Dial

If it becomes necessary to re-calibrate the Carriage speed, use the following procedure:

1. With the bottom cover removed and the carriage on its side, scribe a distinct mark on either drive wheel.
2. Plug in power cord, turn on the power switch, engage the drive system, select either travel direction, set the Speed Dial to "zero".
3. The drive wheels should not move. If wheels are rotating, adjust the "MIN" trim potentiometer on the circuit board with a screwdriver, clockwise or counterclockwise, until the wheels stop turning.
4. Set the Speed Dial to "MAX." Using a stop watch, time the rotation of the marked drive wheel. The carriage is calibrated for 45 inches-per-minute when the wheel makes one revolution in 8.1 second. If adjustment is necessary, rotate the MAX., trim potentiometer on the circuit board until the speed is correct.

### Checking or Replacing Motor Brushed

Dismount the motor-gear reduction unit from the carriage. Unscrew each brush plug and remove brush assembly. Mark each brush so it can be returned to the original holder in the same position. If a brush is broken or worn down 1/2 inch or less, it must be replaced.

## TROUBLESHOOTING

SYMPTOM: Motor does not run. Power ON, Direction selected, Speed Dial above minimum.

1. Check fuse.
2. Check cable for defects.
3. Check power source.
4. Check Power Switch
5. Check Direction Switch

SYMPTOM: Motor runs erratically with power On, Direction selected, Speed Dial above Minimum.

1. Check motor brushes.
2. Check motor commutator.

SYMPTOM: Rated speeds cannot be obtained.

1. Check for low voltage source.
2. Check alignment of pinion and drive gear.
3. Check drive wheel bushing.

4. Check motor brushes.
5. Check motor commutator
6. Adjust trim potentiometers on circuit board.

SYMPTOM: Carriage moves with Speed Dial set at zero.

1. Adjust trim potentiometers of circuit board until motor, pinion gear or drive wheels stop.

SYMPTOM: Carriage speed is irregular.

1. Check for dirty or uneven track.
2. Check alignment of pinion and drive gear.
3. Check drive wheel bushing and rear caster bushings.
4. Check for defective Speed Control.
5. Replace circuit board/harness assembly.

SYMPTOM: Motor runs at one constant speed.

1. Check adjustment of trim potentiometers on the circuit board.
2. Replace circuit board/harness assembly.

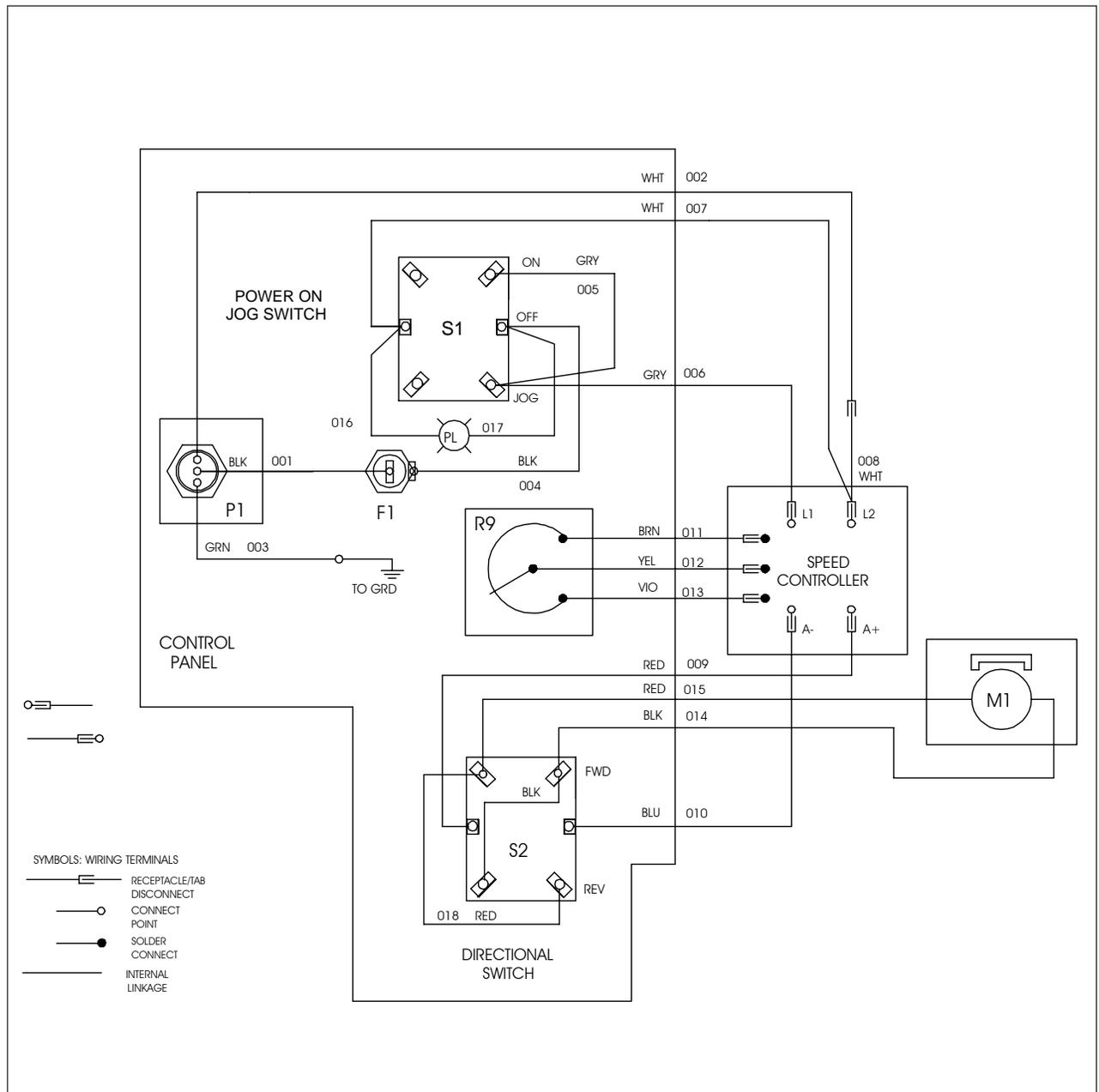


Figure 10 - SIP Ultra-Line Wiring Diagram

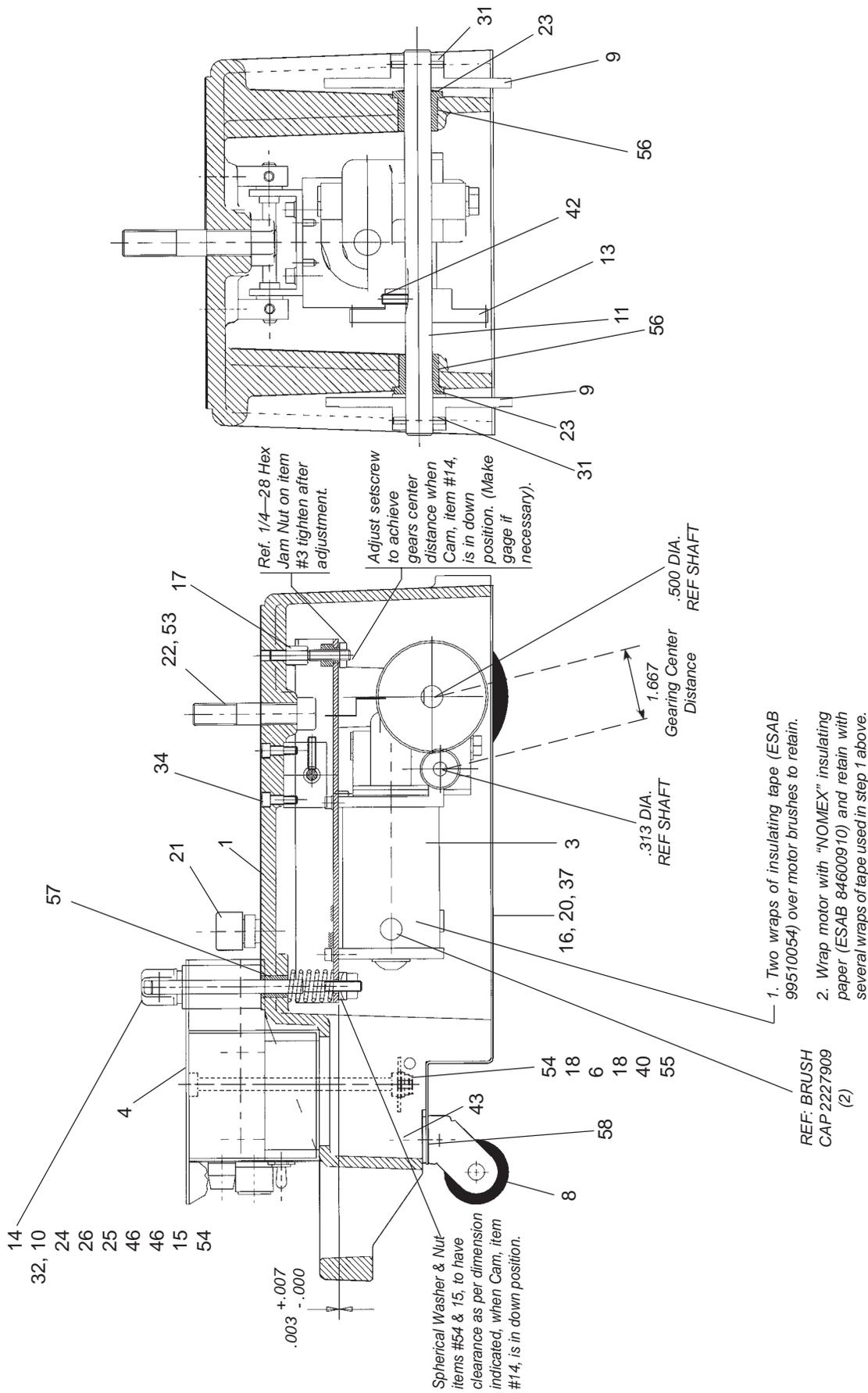


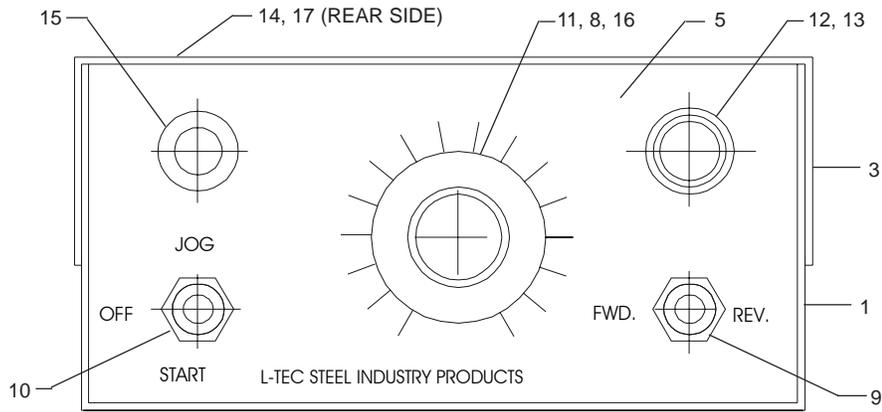
FIG. 11 - SIP Ultra-Line Carriage Assembly, PN 2225235

## REPLACEMENT PARTS

Order replacement parts through your authorized local ESAB Distributor. Order replacement parts by part number and description. Do not order by part number alone or description alone. Indicate any special shipping instructions.

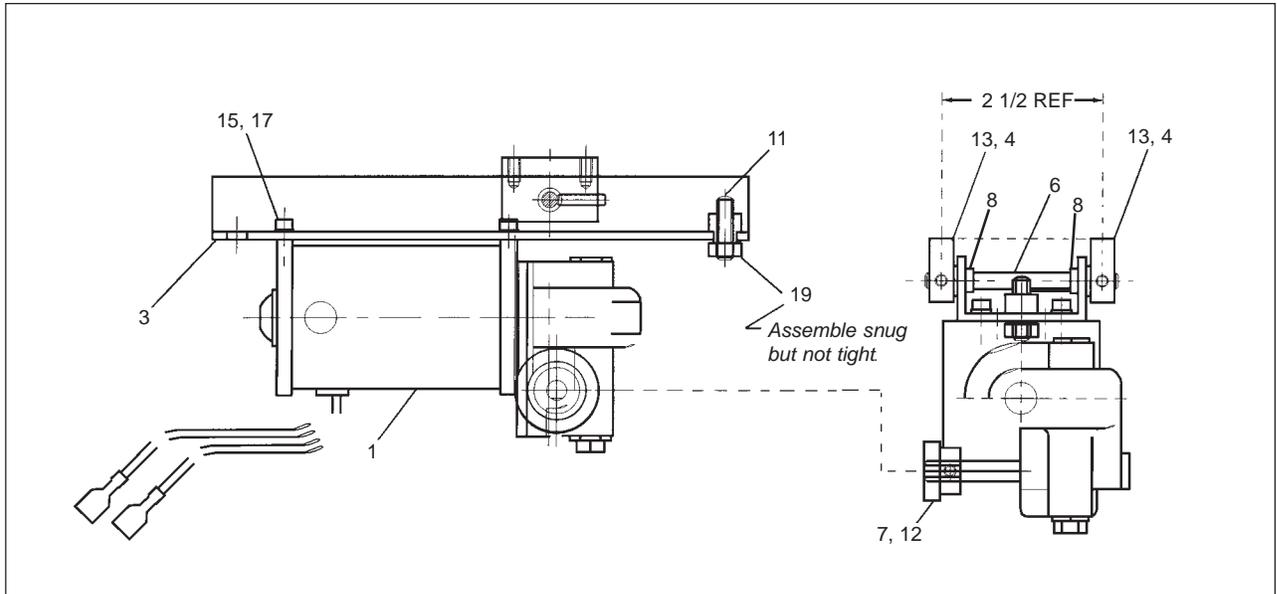
### PORTABLE CUTTING CARRIAGE, 115V, 45 IPM (2225235)

PART NO.	DESCRIPTION	QTY
1	2225210 CARRIAGE, MACHINED	1
3	2223429 ASSY., MOTOR & PIVOT (see Fig. 13)	1
4	2225211 ASSY., PANEL, SPEED CONTROL (see Fig. 12)	1
6	2238010 CIRCUIT BOARD/HARNESS ASSY.	1
8	997687 ASSY., CASTER	2
9	31W04 WHEEL, DRIVE	2
10	2225212 ROD, LIFT, MOTOR PIVOT MECHANISM	1
11	2223278 SHAFT, DRIVE	1
13	2223277 GEAR, 24 DP X 14-1/2 PA X 48 T	1
14	2223415 CAM MOTOR DISENGAGE	1
15	2223281 WASHER, SPHERICAL 1	1
16	2228128 INSULATION SET, BOTTOM COVER	1
17	2223283 STOP, HEX HEAD, SCREW TYPE	1
18	2223249 WASHER, THRUST, MOLDED NYLON, 1/4 ID X 5/8 OD X 3/32 THK	2
20	2223421 COVER, BOTTOM	1
21	2226710 VENT, BREATHER	2
22	45N19 STUD, TURRET MOUNT	1
23	995574 WASHER, SPRING, WAVY, 1/2	2
24	2225215 WASHER, THRUST CAMACTUATOR	1
25	29Z02 SPRING, COMPRESSION, .81 OD X 1.38 FL, SSSL	1
26	2225217 SPACER, ROD, LIFT	1
31	62350027 PIN, ROLL, 1/8 DIA., STL, CAD/ZN PLT, L1" LG	2
32	62350032 PIN, ROLL, 1/8 CO/ZN PLT, STL, 1/2 LG	1
34	61340903 SCREW, CAP, HEX SOCK, #10-24, STL., ZN PLT, 5/8 LG	4
37	61307876 SCREW, MACH, PAN HD, SLOT, #8-32, STL, ZN PLT, 1/4 LG	8
40	61344089 SCREW, CAP, FLAT HD, HEX SOCK, 1/4-20, STL, PLT 3/4 LG	1
42	61330900 SCREW, SET, CUP PT, HEX SOCK,L #10-32, STL, PLT 3/8 LG,NYLON INSERT	2
43	61351087 SCREW, THUMB, 1/4-20, 1/2 LG	2
46	64309431 WASHER,L PLAIN, 1/4 X 1" X 1/16, TYPE B, STL, ZN PLT	3
53	63300183 NUT, HEX, 1/2-13, STL, ZN PLT	2
54	63300100 NUT, HEX, 1/4-20, STL, ZN PLT	1
55	NUT, HEX,NYLON INSERT STOP,THIN, 1/4 - 20, PLT, STL	1
56	91W42 BUSHING, FLANGE, BRONZE, DRIVE AXLE	2
57	2223248 BUSHING, CYLINDRICAL, PLAIN, BRONZE	1
58	2228281 BUSHING, FLANGE, STEEL, CASTER	2



ITEM NO.	PART NO.	DESCRIPTION	QTY.
1	2225219	ENCLOSURE, PANEL, CONTROL	1
3	2225220	COVER, PANEL, CONTROL	1
5	2225221	NAMEPLATE, PANEL, CONTROL	1
8	23608212	POTENTIOMETER, LINEAR, 50K, 2 WATT (R9)	1
9	2225222	SWITCH, TOGGLE (S2)	1
10	2225223	SWITCH, TOGGLE, (MOMENTARY "ON") (S1)	1
11	996506	KNOB, POTENTIOMETER	1
12	634709	HOLDER, FUSE, 15A	1
13	92W45	FUSE, LAMP, SLOW BLOW, 2 AMP (F1)	1
14	2225224	CONNECTOR, STRAIN RELIEF	1
15	2225225	LIGHT, PILOT (P1)	1
16	2225226	LOCK, POTENTIOMETER	1

**FIG. 12 - SPEED CONTROL PANEL (2225211)**



PART NO.	DESCRIPTION	QTY
1	*2227910 ASSY/GEARHEAD, 90 VDC, 7.0 IN-LB, 580 Gear Ratio	1
3	2223422 LEVER, MOTOR MOUNT includes:	1
4	2223423 CLEVIS, MOTOR MOUNT	2
6	2223433 SHAFT, MOTOR PIVOT	1
7	2223276 GEAR, PINION, MOTOR	1
8	2226711 BEARING, FLANGE, OILITE	2
11	SCREW, SET, OVAL PT, HEX SOCK, 1/4-28, STL, CAD/ZN PLT, 1" LG	1
12	61330908 SCREW, SET, CUP PT, HEX SOCK, #10-32, STL, ZN PLT, 1/4" LG	2
13	92046924 SCREW, SET, FLAT PT, HEX SOCK, #10-24, STL, ZN PLT, 1/2" LG	1
15	61340878 SCREW, CAP, HEX SOCK, #8-32, STILL, ZN PLT, 3/8" LG	4
17	64307887 WASHER, LOCK, NEXT TOOTH, #8, TYPE A, STL, ZN PLT	4
19	63340101 NUT, JAM, HEX, 1/4-28, HVY, SEMI-FIN, CD/ZN PLT, STL	1

**FIG. 13 MOTOR & PIVOT HIGH SPEED (2223429)**

\* REPLACEMENT GEARS FOR 2227910

2229261 FIBER GEAR  
 2229482 BRASS GEAR  
 2229483 STEEL WORM





**Literature Changes:**

"A" Edition 11/98

Page 5, Corrected callout on Fig. 2

Page 13, Added dimensional data to Fig. 11

Misc. Text Changes

"B" Edition 11/99

Page 6, Added PM torch heat shield P/N 2227375 information.

Page 13, Fig.-11, Changed instruction note for insulating motor.

Page 14, changed item 13 for Fig. 11 to P/N 2223277.

"C" Edition 4/2000

Page 13, Fig. 11, made modifications for relocation of P.C.board.

Page 14, Fig. 11, added item 55, (nylon insert stop).

Page 15, Fig. 12, changed item 13 to P/N 95W45.

Page 16, Fig. 13, changed item 1 to P/N 2227910.

"D" Edition 10/2000

Page 6, added information for Hook-Up Hose assemblies.

Page 6, added information for Jumper Hose Assemblies, (2228140, 2228141, 2228142).

Page 6, added information for High Temp Heat Shield Kit, (2228130).

Page 6, added information for Bottom Cover Insulation Set, (2228128).

Page 6, added information for Extended Rack for Torch Rigging, (2228133) & Rack Counterweight, (2228129).

Pages 14 and 15, added item No.16 (2228128).

Page 15, changed item No. 13 from 95W45 to 92W45.

"E" Edition 9/2004

Page 6, changed hose assembly p/n from: 2227058 to: 2228058.

Page 14, added 56, 57 & 58 callouts.

Page 15, added item 56, p/n 91W42, added item 57, p/n 2223248, & added item 58, p/n 2228281.

Page 17, added "replacement gears for p/n 2227910" information.

