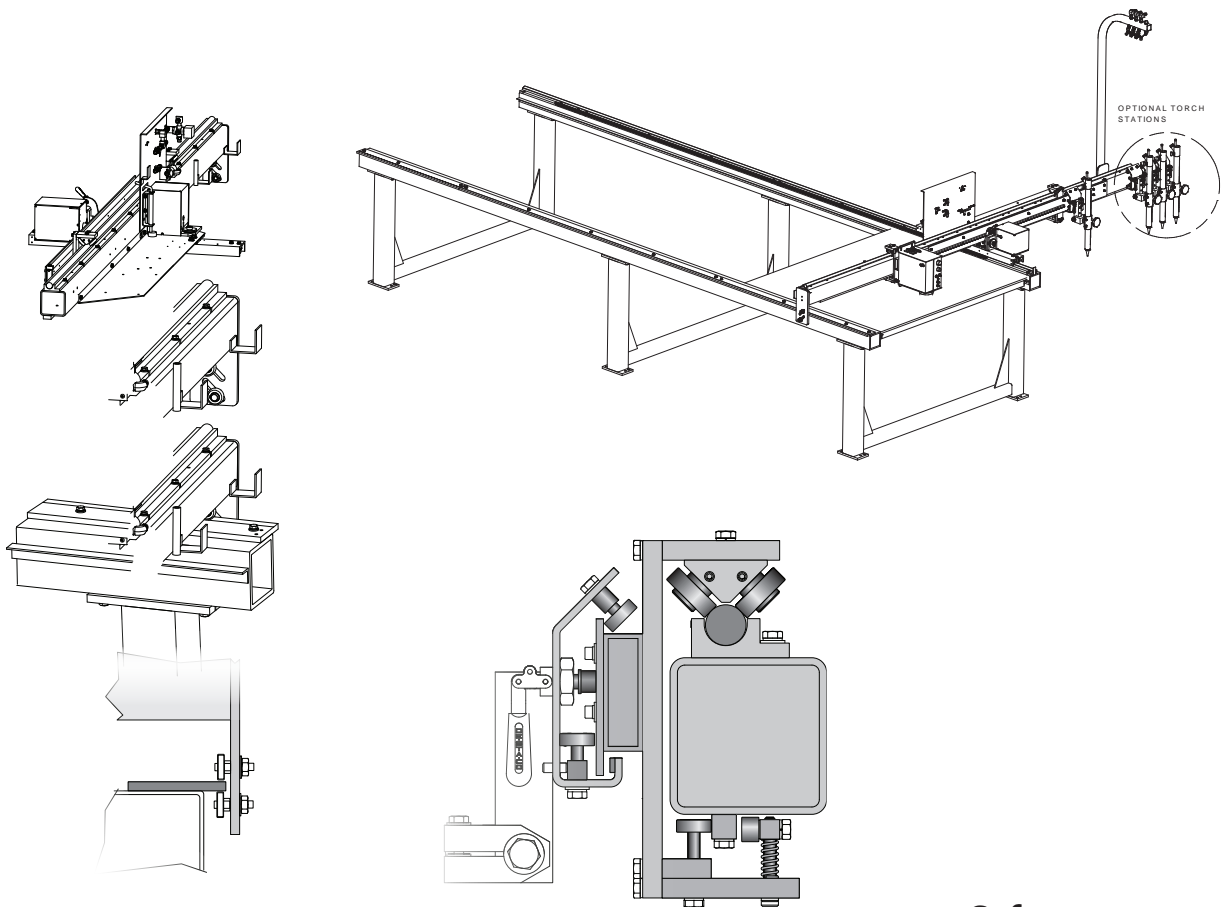




ESAB Welding &
Cutting Products

Silhouette 1000

Cantilever Cutting Machine



Form Number 0558006575

Date: 12-01-06

Safety
Installation
Operation
Maintenance
Replacement Parts

The equipment described in this manual is potentially hazardous. Use caution when installing, operating and maintaining this equipment.

The purchaser is solely responsible for the safe operation and use of all products purchased, including compliance with OSHA and other government standards. ESAB Cutting Systems has no liability for personal injury or other damage arising out of the use of any product manufactured or sold by ESAB. See standard ESAB terms and conditions of sale for a specific statement of ESAB's responsibilities and limitations on its liability.

ESAB Cutting Systems is not responsible for any errors that may appear in this document. Information in this document is subject to change without notice.

This manual is ESAB Part No. 0558006575

This manual is for the convenience and use of the cutting machine purchaser. It is not a contract or other obligation on the part of ESAB Cutting Systems.

* ESAB Cutting Systems, 2006

Printed In U.S.A.



**ESAB Welding &
Cutting Products**

Revision History

12/01/06: Original: Replaces manual number 51227 with part revisions, additional information and new illustrations.

Preface

This machine is a cantilevered gantry cutting machine manufactured by ESAB Cutting Systems of Florence, South Carolina. It may be equipped with either oxy-fuel or plasma cutting equipment. It is designed to provide years of dependable, accurate, repeatable part cutting, with a high degree of reliability, ease of service and operation.

There are optional features and configurations available. However, not all options described in this manual are present on all machines. In addition, more capabilities and features may be added in the future, which are not covered in this manual. ESAB Cutting Systems reserves the right to change or add features and capabilities without notice. Before operating the machine, one should become familiar with this manual in its entirety, with special attention to the SAFETY section.

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Safety

Introduction

The process of cutting metals with oxy-fuel or plasma equipment provides industry with a valuable and versatile tool. ESAB cutting machines are designed to provide both operation safety and efficiency. However, as with any machine tool, sensible attention to operating procedures, precautions, and safe practices is necessary to achieve a full measure of usefulness. Whether an individual is involved with operation, servicing, or as an observer, compliance with established precautions and safe practices must be accomplished. Failure to observe certain precautions could result in serious personnel injury or severe equipment damage. The following precautions are general guidelines applicable when working with cutting machines. More explicit precautions pertaining to the basic machine and accessories are found in the instruction literature. For a wide scope of safety information on the field of cutting and welding apparatus, obtain and read the publications listed in the Recommended References.

The following words and symbols are used throughout this manual. They indicate different levels of required safety involvement.

 DANGER	<p>Used to call attention to immediate hazards which if not avoided, will result in serious personal injury or death.</p>
 WARNING	<p>Used to call attention to potential hazards that could result in personal injury or loss of life.</p>
 CAUTION	<p>Used to call attention to hazards that could result in minor personal injury or equipment damage.</p>
 CAUTION	<p>Used to call attention to minor hazards to equipment.</p>
 NOTICE	<p>Used to call attention to important installation, operation or maintenance information not directly related to safety hazards.</p>

General Cutting Machine Safety



WARNING

Machine Starts Automatically.

This equipment moves in various directions and speeds. Moving machinery can crush.

- **Only qualified personnel should operate or service equipment.**
- **Keep all personnel, materials, and equipment not involved in production process clear of entire system area.**
- **Keep gear racks and rails clear of debris or obstructions, such as tools or clothing.**
- **Fence off entire work cell to prevent personnel from passing through area or standing in the working envelope of the equipment.**
- **Post appropriate WARNING signs at every work cell entrance. Follow lockout procedure before servicing.**

 **WARNING**

Read and Understand This Operator's Manual Before using machine.

Failure to follow operating instructions could result in death or serious injury.

- **Read entire procedure before operating or performing any system maintenance.**
- **Special attention must be given to all hazard warnings that provide essential information regarding personnel safety and/or possible equipment damage.**
- **All safety precautions relevant to electrical equipment and process operations must be strictly observed by all having system responsibility or access.**
- **Read all safety publications made available by your company.**

 **WARNING**

Read and Understand All Safety Warning Labels On Machine.

Failure to follow safety warning label instructions could result in death or serious injury.

Refer to operator's manual for additional safety information.

Electrical Grounding

Electrical grounding is imperative for proper machine operation and SAFETY. Refer to this manual's Installation section for detailed grounding instructions.

WARNING

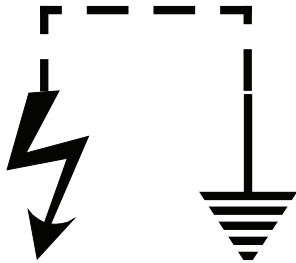


Electric Shock Hazard.

Improper grounding can cause severe injury or death.

Machine must be properly grounded before put into service.

CAUTION

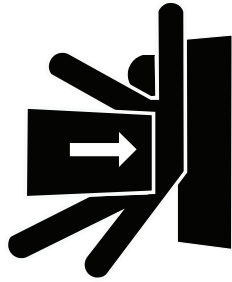


Improper Grounding Can Damage Machine and Electrical Components.

Machine must be properly grounded before put into service.

Cutting table must be properly grounded to a good Earth ground rod.

Operating A Cutting Machine

! WARNING**Crush Hazard.**

Moving machine can crush.

Machine moves automatically.

- **Stay clear of rails and cutting table during operation.**
- **Follow lockout procedure before servicing.**

! WARNING**Flying Debris and Loud Noise Hazards.**

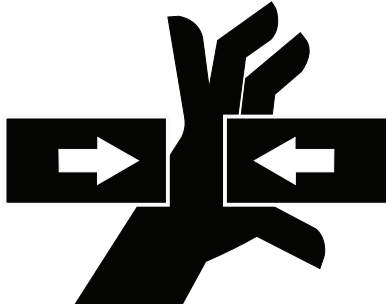
Hot spatter can burn and injure eyes.

Loud noise can injure ears.

- **Wear goggles to protect eyes from burns and flying debris generated during operation.**
- **Wear ear protection as required for cutting various materials.**

! WARNING**Burn Hazard.**

- **Hot metal can burn.**
- **Do not touch metal plate or parts immediately after cutting. Allow metal time to cool, or douse with water.**
- **Do not touch plasma torch immediately after cutting. Allow torch time to cool.**

! WARNING**Crush Hazard.**

- **Moving parts can cut and crush.**
- **Keep hands clear of drive gears.**
- **Do not operate with any protective covers removed.**
- **Follow lockout procedure before servicing.**

! WARNING**Hazardous Voltages.****Electric shock can kill.**

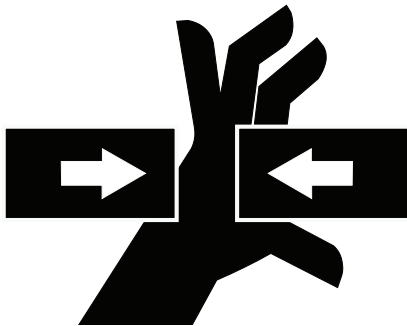
- **Do not operate with any protective covers removed or electrical component boxes open.**
- **Follow lockout procedures before servicing.**

 **WARNING**

Pinch Hazard.

- **Moving vertical slides can crush or pinch.**
- **Keep hands clear of torch and slide during operation.**

 **WARNING**



Pinch Hazard.

- **Moving carriages can crush or pinch.**
- **Keep hands clear of carriages during operation.**

Working with Plasma Cutting Equipment

WARNING

Hazardous Voltages.

Electric Shock Can Kill.

- **Do NOT touch plasma torch, cutting table or cable connections during plasma cutting process.**
- **Always turn power off to plasma power supplies before touching or servicing plasma torch.**
- **Always turn power off to plasma power supplies before opening or servicing plasma plumbing or flow control box.**
- **Do not touch live electrical parts.**
- **Keep all panels and covers in place when machine is connected to power source.**
- **Insulate yourself from workpiece and electrical ground: wear insulating gloves, shoes and clothing.**
- **Keep gloves, shoes, clothing, work area, and equipment dry.**

**WARNING****Toxic Fume Hazard.**

The cutting process can produce poisonous fumes and toxic gases.

Certain chlorinated solvents decompose and form phosgene gas when exposed to ultraviolet radiation.

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

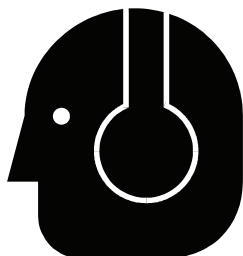
- Keep cutting area well ventilated.
- Wear proper breathing mask when cutting galvanized metal and use proper ventilation and fume removal methods.
- Insure chlorinated solvents are not in cutting area.

**WARNING****Radiation Hazard.**

- Arc rays can injure eyes and burn skin.
- Wear correct eye and body protection.
- Wear dark safety glasses or goggles with side shields. Refer to following chart for recommended lens shades for plasma cutting:

Arc Current	Lens Shade
<i>Up to 100 Amps</i>	<i>Shade No. 8</i>
<i>100-200 Amps</i>	<i>Shade No. 10</i>
<i>200-400 Amps</i>	<i>Shade No. 12</i>
<i>Over 400 Amps</i>	<i>Shade No. 143.</i>

- **Replace glasses/goggles when lenses are pitted or broken.**
- **Warn others in area not to look directly at the arc unless wearing appropriate safety glasses.**
- **Prepare cutting area to reduce reflection and transmission of ultraviolet light.**
- **Paint walls and other surfaces with dark colors to reduce reflections.**
- **Install protective screens or curtains to reduce ultraviolet transmission.**

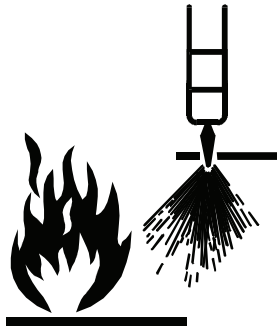
**WARNING****Noise hazard.**

Noise from plasma arc can damage hearing.

! WARNING**Fume Hazard.**

Fumes and gases generated by the plasma cutting process can be hazardous to your health.

- Do NOT breathe fumes.
- Do not operate plasma torch without fume removal system operating properly.
- Use additional ventilation to remove fumes if necessary.
- Use approved respirator if ventilation is not adequate.

! CAUTION**Spark Hazard.**

Heat, spatter, and sparks cause fire and burns.

- Do not cut near combustible material.
- Do not cut containers that have held combustibles.
- Do not have on your person any combustibles (e.g. butane lighter).
- Pilot arc can cause burns. Keep torch nozzle away from yourself and others when activating plasma process.
- Wear correct eye and body protection.
- 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.

**WARNING****Hydrogen Explosion Hazard.**

Hydrogen explosions can cause personal injury or death.

Hydrogen can create explosive gas pockets in the water table. These pockets will explode when ignited by sparks or the plasma arc.

- **Before cutting, be aware of possible hydrogen sources in the water table – molten metal reaction, slow chemical reaction and some plasma gases.**
- **Explosive gas pockets accumulate underneath the cutting plate and inside the water table.**
- **Clean slag (especially fine particles) from bottom of table frequently. Refill table with clean water.**
- **Do not leave plate on table overnight.**
- **If water table has not been used for several hours, vibrate or jolt it to break up hydrogen pockets before laying plate on the table.**
- **If possible, change water level between cuts to break up hydrogen pockets.**
- **Maintain water pH level near 7 (neutral).**
- **Programmed part spacing should be a minimum of twice the kerf width to ensure material is always under the kerf.**
- **If cutting underwater, aerate water under plate with compressed air to prevent hydrogen pockets.**
- **If cutting above water, use fans to circulate air between plate and water surface.**

 **WARNING**

Explosion Hazard.

Certain molten aluminum-lithium (Al-Li) alloys can cause explosions when plasma cut with water.

Do not plasma cut the following Al-Li alloys with water:

- | | |
|--------------------|----------------------|
| Alithlite (Alcoa) | X8192 (Alcoa) |
| Alithally (Alcoa) | Navalite (US Navy) |
| 2090 Alloy (Alcoa) | Lockalite (Lockhead) |
| X8090A (Alcoa) | Kalite (Kaiser) |
| X8092 (Alcoa) | 8091 (Alcan) |

These alloys should only be dry cut on a dry table.

DO NOT dry cut over water.

DO NOT water injection cut.

Contact your aluminum supplier for additional safety information regarding hazards associated with these alloys.

Working with Oxy-Fuel Gas Cutting Equipment

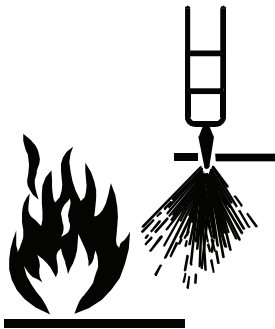
WARNING

Electric Shock Hazard.

Automatic torch igniters can cause electrical shock.

Never touch an oxy-fuel cutting torch during an automatic ignite sequence.

WARNING



Spark Hazard.

Heat, spatter, and sparks cause fire and burns.

- **Do not cut near combustible material.**
- **Do not cut containers that have held combustibles.**
- **Do not have on your person any combustibles (e.g. butane lighter).**
- **Wear correct eye and body protection.**
- **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.**

! WARNING**Burn Hazard.**

Oxy-fuel torch flames can cause severe burns.

- **Keep hands clear of oxy-fuel torches during automatic ignite sequence.**
- **Always confirm that no one is near oxy-fuel torches before starting an ignite sequence or starting a program that initiates an ignite sequence.**
- **Never work on an oxy-fuel cutting torch while machine is executing a program, or while someone is near machine's control console. They could accidentally start an ignite sequence or a program that initiates an ignite sequence.**

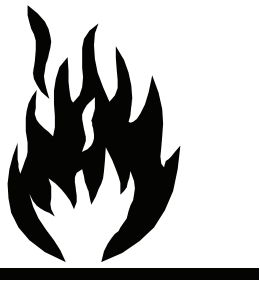
! WARNING**Explosion hazard.**

Oxy-fuel torches can create explosive gas pockets if flowing gas is not burned. These pockets can explode when torch is ignited.

- **Never leave gases turned on if a torch fails to ignite.**
- **If un-ignited gas has been flowing from a torch more than a few seconds, allow gas time to dissipate before re-igniting the torch.**
- **Explosive gas mixtures can accumulate underneath plate and inside cutting table. Use fans to dissipate any possible gas pockets if un-ignited gas has been flowing into cutting table.**

Working with Gas Control and Supply Systems

WARNING



Explosion and Fire Hazard.

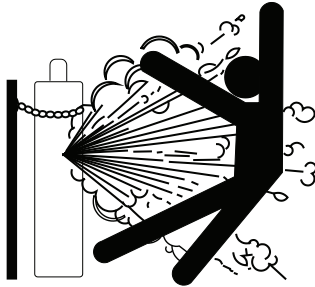
Ordinary materials can explode and burn in the presence of oxygen.

- **Keep all equipment clean and in good operating condition.**
- **Keep entire work area free from oil, grease, and other combustibles.**
- **Do not purge lines close to an ignition source (i.e., flame or cigarette), towards a person, or near clothing.**
- **Clean all parts used to repair or replace oxygen systems. They MUST be oil free.**
- **Never use oxygen as a substitute for compressed air to “dust” clothing, work area, or pressure testing.**
- **Never allow oil, grease, hydrocarbons, or similar organic materials to come in contact with oxygen or oxygen-fuel gas equipment. Oxygen-fuel gas apparatus does not require lubrication.**
- **Never use compressed air for blowing out oxygen-fuel gas passages. Compressed air contains oil that can burn.**
- **Always refer to oxygen by its proper name - Oxygen. Never call oxygen “air” which could be confused with compressed air.**

! WARNING**Explosion and Fire Hazard.**

Oxygen and fuel gas mixtures can explode and burn.

- **Keep all equipment clean and in good operating condition.**
- **Do not purge lines close to an ignition source (i.e., flame or cigarette), towards a person, or near clothing.**
- **Avoid or ventilate any work areas that might accumulate leaking gas.**
- **Isolate cutting area to protect yourself and others from heat, flame, sparks, and hot slag.**
- **Always identify fuel-gas by its proper name. Generally fuel-gas used will be acetylene, natural gas (usually methane), or liquid petroleum (LP) gases propane and butane. All personnel should be aware of gas type and characteristics being used.**

! WARNING**Explosion Hazard.**

Compressed gas can explode.

- **Before using machine, check for leaks at gas connections on all regulators, valves, and torches.**
- **Open gas valves slowly, and shut off when machine is inactive for an extended time. Also, bleed line pressure when machine is inactive for an extended time.**
- **Close source valves before servicing any oxygen or fuel-gas lines, connections, fittings, or regulators.**
- **Bleed regulators completely when changing gas cylinders. De-pressurize system before performing any maintenance or disassembly.**
- **Secure all cylinders to prevent falling.**
- **Never disconnect any part of system that is under pressure.**
- **Periodically check all fittings for leaks, cables and hoses for wear, corrosion or deterioration. Protect supply lines and cables from damage. Do not drive heavy equipment over them.**

Service Precautions

CAUTION

Establish and Adhere to Preventive Maintenance.

A composite program can be established from recommended schedules in the instruction literature.

Avoid leaving test equipment or hand tools on machine. Severe electrical or mechanical damage could occur to equipment or machine.

CAUTION

Extreme caution should be used when probing circuitry with an oscilloscope or voltmeter.

Although many steps have been taken to protect integrated circuits, they are susceptible to overvoltage damage. Test probes should be connected while machine power is off to prevent accidental shorting of components.

Be thorough when handling electronic components. When finished servicing, confirm that all circuit boards are securely seated in sockets, all cables are properly connected, all cabinets are closed and locked, all guards and covers are replaced.

Never plug or unplug a printed circuit board while machine power is on. Instantaneous surges of voltage and current can damage electronic components.

Never trace wiring with buzzer or light. Use an ohm meter or logic probe. When tracing circuits make certain that tracing currents do not damage solid-state devices.

Welding On and Around Machine

CAUTION



Special precautions must be observed if any arc welding is performed on this machine.

Failure to observe the following precautions can result in large induced currents causing severe damage to electronic components in machine control system. Machine damage caused by improper welding practices is considered abuse and voids certain warranty provisions.

- **Disconnect all cables to Relay Box, Numerical Controller, Tracer System, and Control Console.**
- **Always connect welder ground cable directly to the part to be welded and as close to the weld point as possible.**
- **Keep the current path between the ground point and the weld as short as possible.**
- **Never connect the ground to points where the welding current path could include moving parts or bolted joints. This can result in a high resistance circuit that could divert high current into the control system and damage mechanical components (e.g. bearings).**

Safety References

Introduction

The following nationally recognized publications on safety in welding and cutting operations are recommended. These publications have been prepared to protect persons from injury or illness and to protect property from damage, which could result from unsafe practices. Although some of these publications are not related specifically to this type of industrial cutting apparatus, the principles of safety apply equally.

Domestic

- "Precautions and Safe Practices in Welding and Cutting with Oxygen-Fuel Gas Equipment," Form 2035. ESAB Cutting Systems.
- "Precautions and Safe Practices for Electric Welding and Cutting," Form 52-529. ESAB Cutting Systems.
- "Safety in Welding and Cutting" - ANSI Z 49.1, American Welding Society, 2501 NW 7th Street, Miami, Florida, 33125.
- "Recommended Safe Practices for Shielded Gases for Welding and Plasma Arc Cutting" - AWS C5.10-94, American Welding Society.
- "Recommended Practices for Plasma Arc Welding" - AWS C5.1, American Welding Society. "Recommended Practices for Arc Cutting" - AWS C5.2, American Welding Society.
- "Safe Practices" - AWS SP, American Welding Society.
- "Standard for Fire Protection in Use of Cutting and Welding Procedures" - NFPA 51B, National Fire Protection Association, 60 Batterymarch Street, Boston, Massachusetts, 02110.
- "Standard for Installation and Operation of Oxygen - Fuel Gas Systems for Welding and Cutting" - NFPA 51, National Fire Protection Association.
- "Safety Precautions for Oxygen, Nitrogen, Argon, Helium, Carbon Dioxide, Hydrogen, and Acetylene," Form 3499. ESAB Cutting Systems. Obtainable through your ESAB representative or local distributor.
- "Design and Installation of Oxygen Piping Systems," Form 5110. ESAB Cutting Systems.
- "Precautions for Safe Handling of Compressed Gases in Cylinders", CGA Standard P-1, Compressed Gas Association.

Literature applicable to safe practices in welding and cutting with gaseous materials is also available from the Compressed Gas Association, Inc., 500 Fifth Ave., New York, NY 10036.

International**VBG- Unfallverhütungsvorschriften**

VBG 1

General Provisions
Allgemeine Unfallverhütungsvorschriften

VBG 4

Electrical Equipment and operating Equipment
Elektrische Anlagen

VBG 15

Welding, Cutting and related working methods
Schweißen un Schneiden un verwandte Verfahren

VBG 48

Shot Blasting Works
Strahlarbeiten

VBG 61

Gases
Gase

VBG 62

Oxygen
Sauerstoff

VBG 87

Operating liquid jet cutting machines
Arbeiten mit Flüssigkeitsstrahlem

VBG 93

Laser beams, accident prevention and Electro-technology
Laserstrahlung, Unfallverhütungs-vorschriften für Feinmechnik und Elektrotechnik

VBG 121

Noise

Lärm

VDE Regulations**VDE - Vorschriften**

VDE 0100

Erection of power installations with normal voltages up to 1000 volts
Bestimmungen für das Errichten von Stakstromanlagen mit Nennspannungen bis 1000 Volt

VDE0113

Electrical equipment of industrial machines
Elektrische Ausrüstung von Industriemaschinen

VDE 0837

Radiation safety of laser products; users guide (DIN EN 60825)
Strahlungssicherheit von Lasereinrichtungen und Benutzungsrichtlinien (DIN EN 60825)

VDE 0837-50

Specification for laser guards
Anforderung an Laserschutzwänden

TRAC Technical Rules for Acetylene and Carbide Stores**TRAC- Technische Regeln für Azetylenanlagen und Calciumcargidlager**

TRAC-204

Acetylene lines
Azetylenleitungen

TRAC-206

Acetylene cylinder battery systems
Azetylenflaschenbatterieanlagen

TRAC-207

Safety devices
Sicherheitseinrichtungen

TRG Technical Rules for Pressure gases**TRG – Technische Regeln für Druckgase**

TRG 100

General regulations for pressure gases
Allgemeine Bestimmungen für Druckgase

TRG 101

Pressure gases
Druckgase

TRG 102

Technical gas mixtures Technische Gasgemische

TRG 104

Pressure gases; alternative use of compressed gas tanks
Druckgase, wahlweise Verwendung von Druckgasbehältern

TRGS – Technische Richtlinien für Gefahrstoffe

TRGS-102

Techn. Richtkonzentration (TRK) für gefährliche Stoffe

TRGS-402

Ermittlung u. Beurteilung der Konzentration gefährlicher Stoffe in der Luft im Arbeitsbereich

TRGS-900

Grenzwerte in der Luft am Arbeitsplatz (Luftgrenzwerte)

TA

TA-Luft un TA-Lärm (BLm SchV)

DIN Standards**DIN-Normen**

DIN 2310

Part 1 Thermal cutting; terminology and nomenclature

Teil 1 Thermsiches Schneiden, Allgemeine Begriffe und Bennungen

Part 2 Thermal cutting; determination of quality of cut faces

Teil 2 Thermsiches Schneiden, Ermitteln der Güte von Schnittflächen

Part 4 Thermal cutting; arc plasma cutting; process principles, quality, dimensional tolerances

Teil 4 Thermsiches Schneiden, Plasmaschneiden, Verfah., Güte, Maßtoleranzen

Part 5 Thermal cutting; laser beam cutting of metallic materials; process principles

Teil 5 Laserstrahlschneiden von metallischen Werkstoffen, Verfah, Güte, Maßtoleranzen

Part 6 Thermal cutting; Classification, processes

Teil 6 Einführung, Verfahren

DIN 4844

Part 1 Safety markings (DIN EN 7287)

Teil 1 Sicherheitskennzeichen (Siehe EN 7287)

DIN EN ISO Harmonized Standards**DIN EN ISO-Harmonisierte Normen**

DIN EN 292/1 and 2

Safety of machinery

Sicherheit von Maschinen, Geräten und Anlagen

DIN EN 559

Hoses for welding, cutting and allied processes

Schläuche für Schweißen, Schneiden und verwandte Verfahren

DIN EN 560

Hose connections and hose couplings for equipment for welding, cutting and allied processes

Schlauchanschlüsse und Schlauchverbindungen für Geräte zum Schweißen, Schneiden und verwandte Verfahren

DIN EN 561

Gas welding equipment hose couplings
Gasschweißgeräte, Kupplungen

DIN EN 626-1

Safety of machines, reduction of risks to health
Sicherheit von Maschinen, Reduzierung des Gesundheitsrisikos

DIN EN 848-1

Single spindle vertical milling machines
Fräsmaschine für einseitige Bearbeitung mit drehendem Werkzeug

DIN EN 1829

High pressure water jet machines
Hochdruckwasserstrahlschneidmaschine

DIN EN 9013

Thermal cutting, oxygen cutting, process principles, dimensional tolerances
Thermisches Schneiden, Autogenes Brennschneiden, Verfahrensgrundlagen, Güte,
Maßtoleranzen

DIN EN 12584

Imperfections in oxy/fuel flame cuts, laser beam cuts and plasma
Unregelmäßigkeiten an Brennschnitten, Laserstrahl- und Plasmaschnitten

DIN EN 12626

Laser processing machines
Laserbearbeitungsmaschinen

DIN EN 28206

Acceptance testing for oxygen cutting machines
Abnahmeprüfung für Brennschneidmaschinen

DIN EN 31252

Laser Equipment
Lasengeräte

DIN EN 31553

Laser and laser related equipment
Laser und Laseranlagen

DIN EN 60204-1

Electrical equipment of machines
Elektrische Ausrüstung von Maschinen

DIN EN 60825

Radiation safety of laser products
Strahlensicherheit von Laseranlagen

DIN EN 999

Arrangement of protection devices
Anordnung von Schutzeinrichtungen

Guidelines

VDI 2906

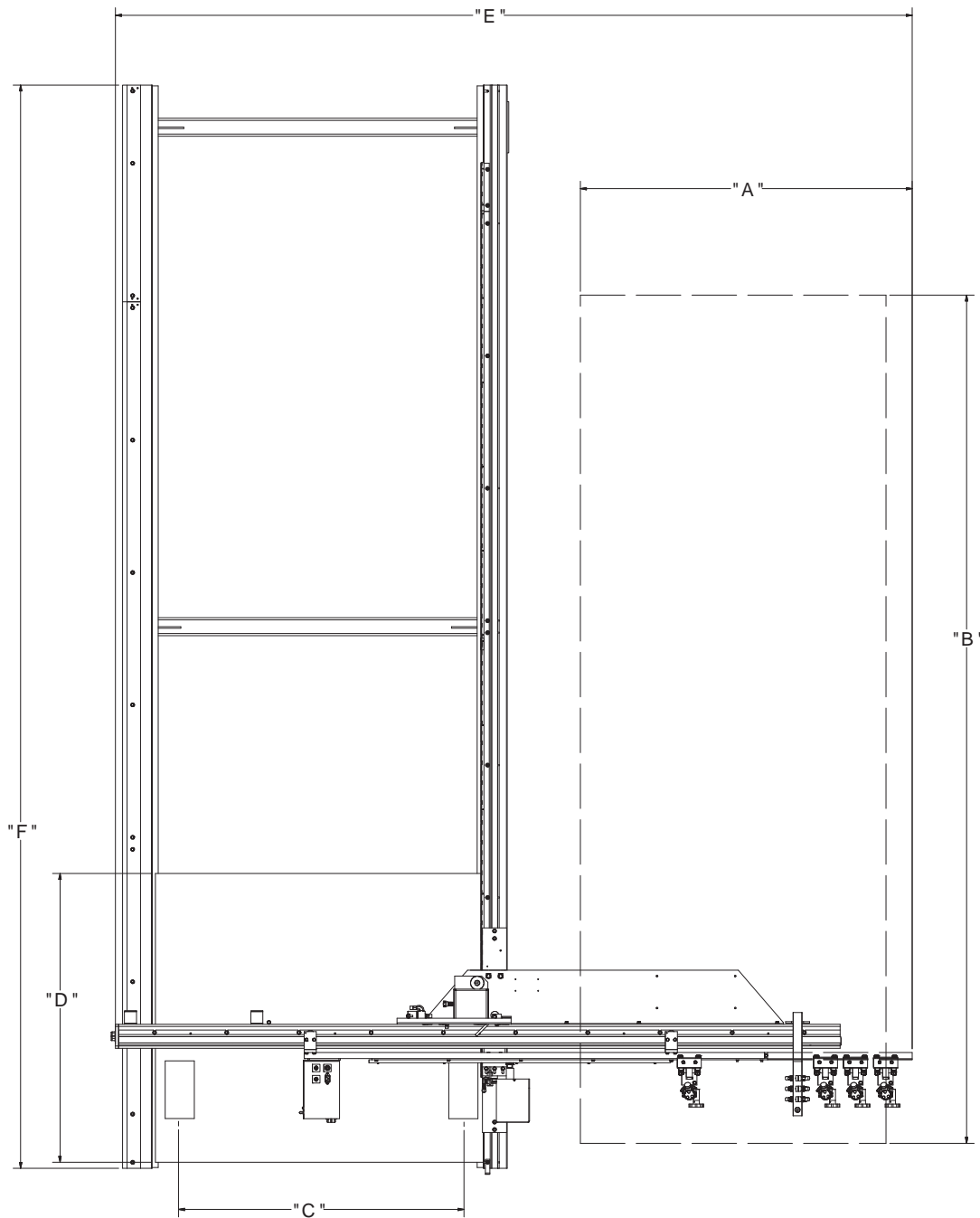
Quality of cut faces on metallic workpieces; abrasive water jet cutting and arc plasma cutting
Schnittflächenqualität beim Schneiden von Werkstücken aus Metall,
Abrasiv-Wasserstrahischneiden und Plasmastrahischneiden

VDI 2084

Room air; Technical systems for welding workshops
Raumluftechn. Anlagen für Schweißwerkstätten

Specifications

Outline Dimensions

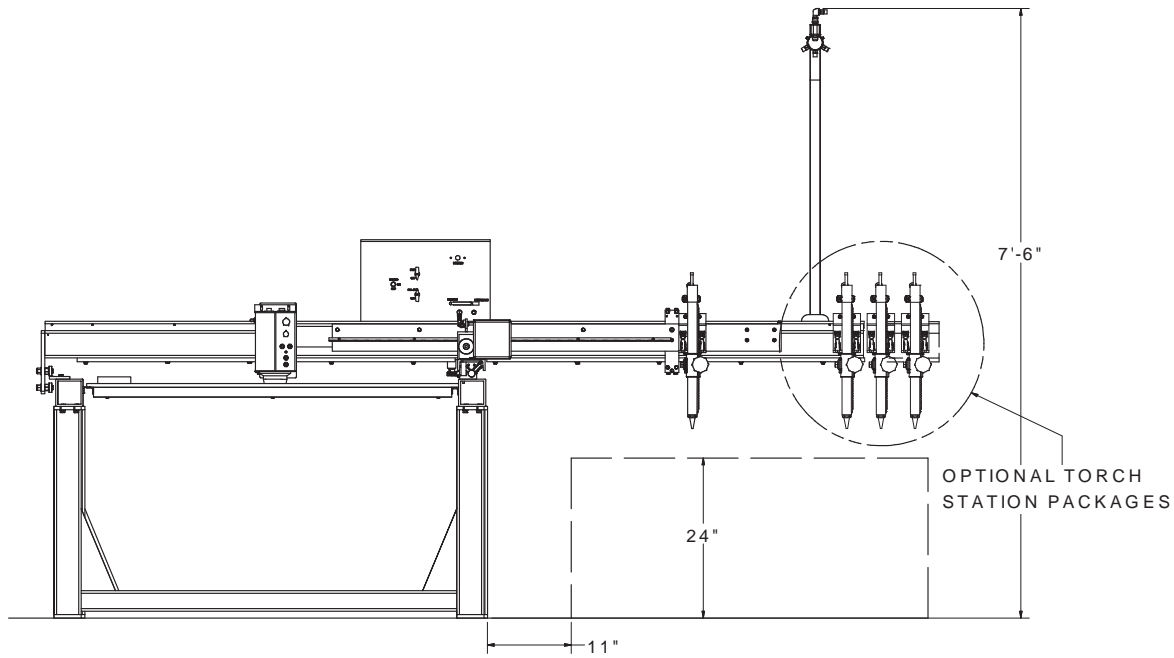


DESCRIPTION

SILHOUETTE MODEL #	CUTTING AREA		TRACING AREA		FLOOR AREA		AISLE WIDTH	TORCH/TOOL STATIONS (MAXIMUM)	SPEED (IPM)
	WIDTH	LENGTH	WIDTH	LENGTH	WIDTH	LENGTH			
	A	B	C	D	E	F			
4'	4' (1219mm)	SEE	4' (1219mm)	4' (1219mm)	10'-10" (3302mm)	SEE	11" (279.4mm)	5 *	2-120 (50.8 - 2032mm)
6'	6' (1829mm)	NOTES	6' (1829mm)	4' (1219mm)	14'-10" (4521mm)	NOTES	11" (279.4mm)	5	2-120 (50.8 - 2032mm)

* Note: Station capacity is 4 when the machine is equipped with an ALFE control.

DESCRIPTION



Performance

<i>Feature</i>	<i>IPM</i>	<i>CPM</i>
<i>Edge Trace Speed</i>	<i>2 - 120</i>	<i>50.8mm - 2032mm</i>
<i>Coordinate Speed (Manual)</i>	<i>2 - 120</i>	<i>50.8mm - 2032mm</i>
<i>Forward Offset</i>	<i>0.125 (3mm)</i>	

Requirements

<i>Voltage</i>	<i>100-115 VAC, Single phase, 60 HZ</i>
<i>Ambient Temperature</i>	<i>32 Deg to 122 Deg F</i>
<i>Pattern Line Width</i>	<i>0.02 to 0.055 inch</i>
<i>Pattern Line Separation</i>	<i>0.125 (3mm) minimum</i>

Capacities

<i>Number of Torches</i>	<i>Maximum of 5 (4, See note below)</i>
<i>Maximum Plate Width</i>	<i>6 ft. (1.83m)</i>
<i>Effective Cutting Area</i>	<i>Width: Model 1000-4: 4 feet (1.219m)</i>
	<i>Width: Model 1000-6: 6 feet (1.829m)</i>
	<i>Length: Rail Length minus carriage length ~ 3 ft.</i>
<i>Maximum Plate Thickness</i>	<i>6 inches</i>
<i>Cutting Isle Width</i>	<i>11 inches</i>
<i>Tracing Area</i>	<i>Model 1000-4: 4 ft. W X 4 ft. L</i>
	<i>Model 1000-6: 6 ft. W X 4 ft L</i>

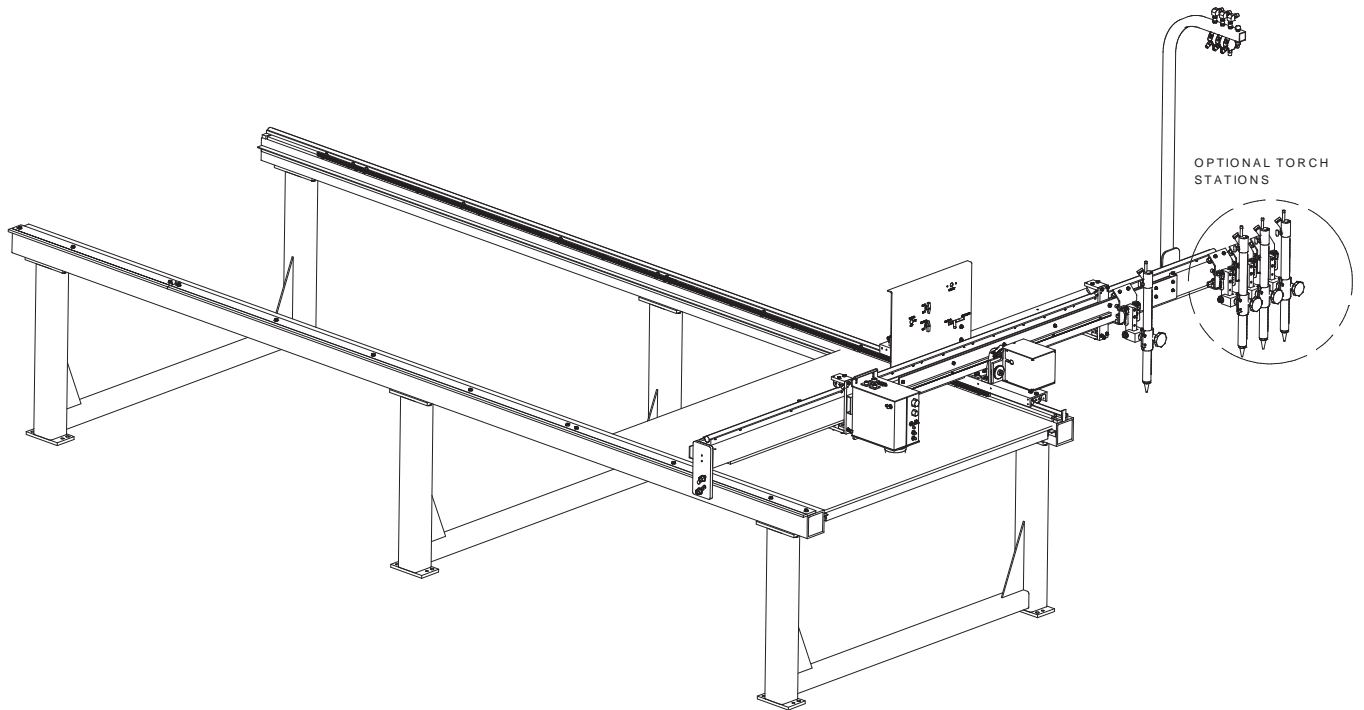
Note: Station capacity is 4 when the machine is equipped with an ESAB ALFE control.

Installation

General Information

Your Silhouette 1000 Shape Cutter was completely assembled and tested prior to shipment. Proper installation is required for dependable performance.

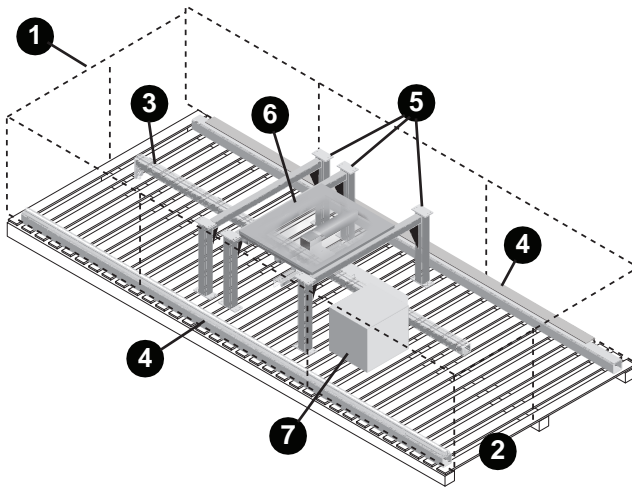
Modification of the machine or its parts without the express approval of ESAB Welding and Cutting will void the warranty.



Receipt of Components

Examine all components and assemblies as they are unpacked and report any damage or shortages to the carrier and to ESAB Welding and Cutting for immediate replacement.

- Remove all supports and packing materials.
- Carefully set components aside as you inspect them.



- 1 Wood Frame and Supports
- 2 Pallet
- 3 Main Beam
- 4 Rails
- 5 Rail Cradles
- 6 Tracing Table
- 7 Tracer/Control



CAUTION



Points of exposed nails and staples can cause serious injury.

Sharp points will be exposed while disassembling the machine crate.

Site Preparation

The customer is responsible for:

- preparation of the foundation
- unpacking the shipment
- installing the rails
- mounting machine on rails
- some machine assembly
- connection of utilities

Location of the Machine

Choice of machine location will usually be influenced by one or more of the following factors:

- Work flow..
- Sufficient clearance around and above the machine for operator safety.
- Proper air ventilation, noise protection and other conditions necessary for operator safety as related to machine processes. Information on the protection of personnel and surrounding property from the hazards associated with the use of electricity and high temperatures in cutting operations is available in U.S.A. Standard ANSI/ASC Z49.1-1983 "Safety in Welding and Cutting" and in National Fire Protection Association Bulletin NO. 51B "Standard for Fire Prevention in the Use of Cutting and Welding Processes". If plasma arc cutting is used with the machine, be sure to check the American Welding Society, INC. Bulletin NO. AWS C5.2-83 "Recommended Practices for Plasma Arc Cutting".
- Availability of electrical power, fuel gases, oxygen, air and water and water disposal (as required). Waste should be disposed of in accordance of local, State and Federal regulations
- Make arrangements with your local power company to provide proper service requirements and fusing as required by code. Contact local authorities concerning sufficient filtering or conditioning as processes require.
- Proper Foundation requirements. Cut quality may be influenced by vibration from equipment in adjacent areas such as punch presses or fork lift traffic. The cutting machine should be isolated either with a separate floor pad or vibration dampeners.
- Exposure to high frequency interference form neighboring equipment (i.e. plasma cutting systems) requires electronics of the Silhouette be provided with a separate grounding. This is to assure sufficient electrical isolation for reliable operation of the machine. Refer to ESAB manual F14-074 "Grounding" for more information.

Foundation

The following information are guidelines only and are not intended to be used as foundation specifications.

- The floor should be level within ± 0.5 in. and made of reinforced concrete (not asphalt) no less than 4 inches thick. If the existing floor is not of sufficient thickness or is not level, a new floor should be poured.
- The soil under the concrete floor must be well settled so the load of the machine and the floor do not cause further settling. This is especially important when pouring a new floor.
- Newly poured concrete floors need ample time to cure before installing the machine.
- Routing of in-floor conduits or utility trenches must be done in a manner not to weaken the flooring the area or the machine.

Utility Requirements

All utilities must be must be routed in a way that does not interfere with the free movement of the gantry assembly along the full length of the track rail system.

Electric Power

The machine power requirements are determined by its configuration. Power to the machine must meet the following requirements:

- Use a 3-conductor cable to provide 115 VAC electrical power to the tracer.
- One Conductor of the cable must be grounded.
- Provide circuit protection, such as a fused disconnect switch, with the proper size fuse or circuit breaker.
- Refer to the vendor provided manuals and specifications regarding electrical requirements for process equipment and accessories.
- Be sure the wiring to the machine meets the National Electrical Code (NEC) and any applicable local ordinances.

Grounding

For maximum operator protection and machine performance it is essential to have a positive earth ground of the machine, rail system and cutting table. A ground cable and instructions are provided for this purpose. The earth ground should be independent form the building ground and other electrical machinery.

- Ground rods should be at least 20 ft. apart.
- The ground rod should be at least ½ in. diameter can be copper or copper clad steel.
- Must be within 30 ft. of the machine.
- Minimum of 10 ft. deep.
- Refer to F14-074 for further grounding information.

Gas Supplies

Adequate supply is absolutely necessary for maximum machine performance.



WARNING

All pipelines and hoses must be clean and free of oil, combustible particles or other foreign matter that might cause performance or combustion problems.

Prior to connecting fuel gas and oxygen lines to the machine or if the lines have been disconnected for any reason, the lines must be purged.

Observe the rules and regulations contained in Pamphlet 51 published by the National Fire Protection Association and all locals ordinances relating to the purging fuel gas and oxygen lines.

INSTALLATION

Acetylene

Metal Thickness (inches)	Tip Size	Oxygen				Acetylene		Speed IPM	Kerf Width (inches)
		Cutting PSIG	Pre-Heat PSIG	Cutting SCFH	Pre-Heat PSIG	PSIG	SCFH		
0.125	000	20-25	3-5	12-14	3-5	3-5	3-5	28-32	0.04
0.250	00	20-25	3-5	22-26	4-6	3-5	4-6	27-30	0.05
0.375	0	25-30	3-5	40-52	5-9	3-5	5-8	24-28	0.06
0.500	0	30/35	3-6	46-58	7-11	3-5	6-10	20-24	0.06
0.750	1	30-35	4-7	70-80	9-14	3-5	8-13	17-21	0.07
1.000	2	25-40	4-9	110-126	11-18	3-6	10-16	15-19	0.09
1.500	2	40-45	4-12	128-140	13-20	3-7	12-18	13-17	0.09
2.000	3	40-45	5-14	180-200	15-24	4-9	14-22	12-15	0.11
2.500	3	45-50	5-16	200-215	18-29	4-10	16-26	10-13	0.11
3.000	4	40-50	6-17	225-260	20-33	5-10	18-30	9-12	0.12
4.000	5	45-55	7-18	240-275	24-37	5-12	22-34	8-11	0.15
5.000	5	50-55	7-20	260-275	29-41	5-13	26-38	7-9	0.15
6.000	6	45-55	10-22	300-340	33-48	7-13	30-44	6-8	0.18

*Applicable to 3-hose machine cutting torches only

Note: All pressures are measured at the regulator using 25 ft. X 1/4 in. hose through tip size 5: 25 ft. X 3/8 in. Hose for tip size 6 and larger. Indicated pressures and cubic flow are also necessary at each torch station.

Fuel Gas (Natural Gas, Propane, MAPP Gas)

Metal Thickness (inches)	Tip Size	Oxygen				Fuel Gas	Speed IPM	Kerf Width (inches)
		Cutting PSIG	Pre-Heat PSIG	Cutting SCFH	Pre-Heat PSIG	PSIG		
0.125	000	20-25	15-20	12-14	15-20	2-5	24-28	0.04
0.250	00	20-25	20-25	22-26	15-20	2-5	21-25	0.05
0.375	0	25-30	20-25	40-52	15-20	3-5	20-24	0.06
0.500	0	30/35	20-25	46-58	20-25	3-5	18-22	0.06
0.750	1	30-35	25-30	70-80	20-30	3-6	15-20	0.07
1.000	2	25-40	30-35	110-126	25-35	3-6	14-16	0.09
1.500	2	40-45	30-35	128-140	35-40	4-8	12-16	0.09
2.000	3	40-45	35-40	180-200	40-45	4-8	10-14	0.11
2.500	3	45-50	35-40	200-215	40-50	5-9	9-12	0.11
3.000	4	40-50	40-45	225-260	40-50	6-9	8-11	0.12
4.000	5	45-55	45-50	240-275	45-60	6-9	7-10	0.15
5.000	5	50-55	50-55	260-275	50-70	6-10	6-9	0.15
6.000	6	45-55	55-60	300-340	60-80	6-10	5-7	0.18
8.000	6	55-65	60-65	340-380	70-90	8-12	4-6	0.19

**Applicable to 3-hose machine cutting torches only*

Pressure ranges shown above apply only to equal pressure torches with spiral mixers. Injector type torches operate at pressures of 8 oz. to 5 PSIG maximum.

Notes: Preheat oxygen consumption figures apply to general cutting conditions. To determine fuel gas consumption, multiply oxygen pre-heat consumption by the following figures:

Natural Gas ... 0.55

Propane ... 0.25

MAPP Gas ... 0.33

Note: All pressures are measured at the regulator using 25 ft. X 1/4 in. hose through tip size 5: 25 ft.. X 3/8 in. hose for tip size 6 and larger . Indicated pressures and cubic flow are also necessary at each torch station.

- Fuel gas and oxygen supplies to the machine must be regulated to meet the maximum cutting requirements and must be adjustable to provide proper operating pressures. Shut-off valves and regulators are the responsibility of the customer.
- Gas terminals accept "B" size fittings. Fuel gas and oxygen supply lines are 3/8 in. ID hoses from terminals to the machine.

Water Supply

Machines equipped with water spray at the torch tips require approximately 1/3 GPM of water per torch at 30 PSI. Exact requirements will depend on the thickness and composition of plate being cut. If necessary, water must be filtered so that it contains no particles larger than 10 microns and having no more than 500 ppm of foreign matter.

Cutting Tables

Cutting tables can be purchase form ESAB Cutting Systems or constructed to meet your needs. Items to consider in the purchase or construction of a cutting table are:

- removal of slag or cut parts
- structural support for your heaviest plate
- replaceable work support slats
- water supply and drainage. (for water tables)
- provisions for clamping plate
- floor level and support
- procedures for plate alignment
- table height- dependent on plate thickness
- accessibility to load and unload plate

Oxy-fuel Torches

Oxy-fuel cutting torches are not included with the machine unless specifically ordered. The following requirements are given to aid in torch selection:

- torch barrel diameter must be $1\frac{3}{8}$ in. (1.375)
- torch rack must be $\frac{3}{16}$ in. (0.187) inches square
- torch length should be 15 to 20 inches
- torch configuration is three hose type (one fuel, one preheat oxy, and one cut oxy)

 **NOTICE**

Injector type torches are required when natural gas is used at less than 2 psi pressure.

Installation of Components



NOTICE

Read all of this procedure before beginning.

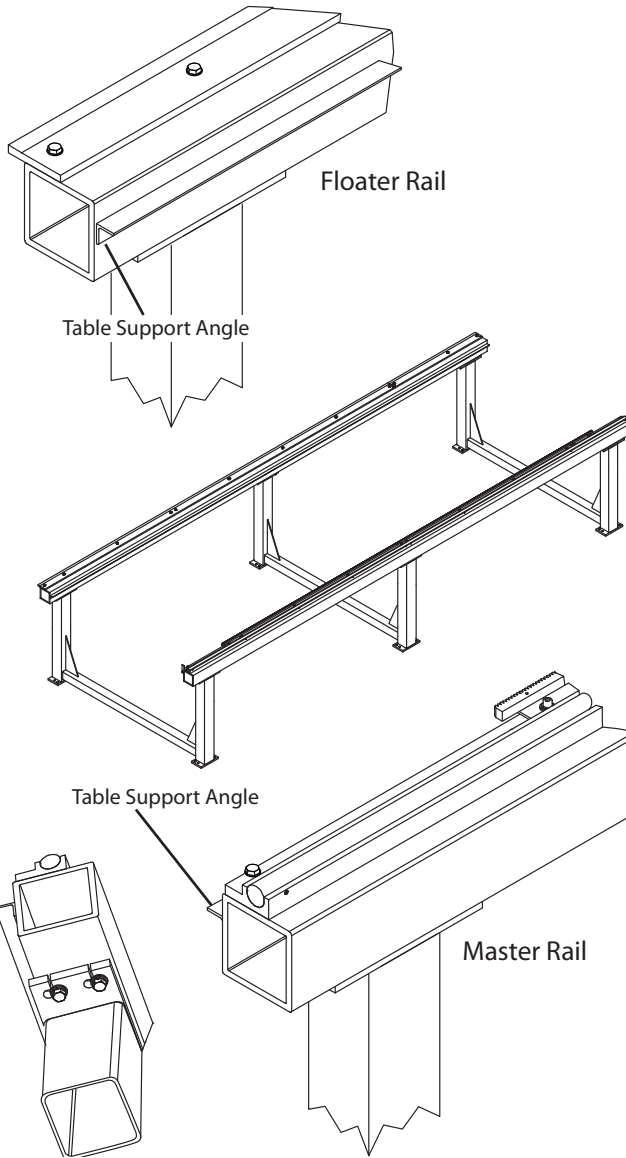
A thorough understanding of the steps necessary will save time.

Installation of pedestals and rails.

A 15 ft.. rail system for the Silhouette 1000 components is:

- 1 preassembled master rail
- 1 preassembled floater rail
- 3 Cradles

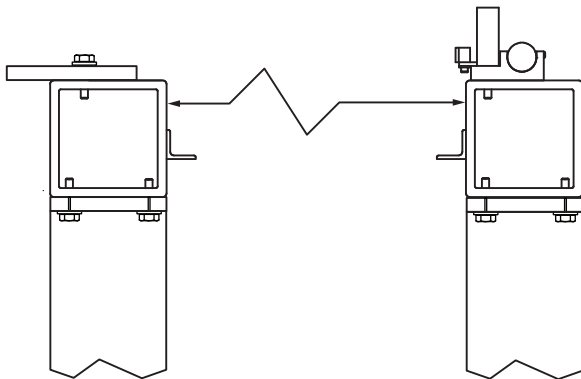
Rail extensions are available in 15 ft. sections.



Procedure

Bolt cradles to master and floater rails with racing table support angles on the inside.

Set rail to rail distance as shown, according to the model purchased.



Silhouette 1000-4	55 inches
Silhouette 1000-6	79 inches

Center the leveling pads on the cradle pedestals and position the rail system in the desired location.

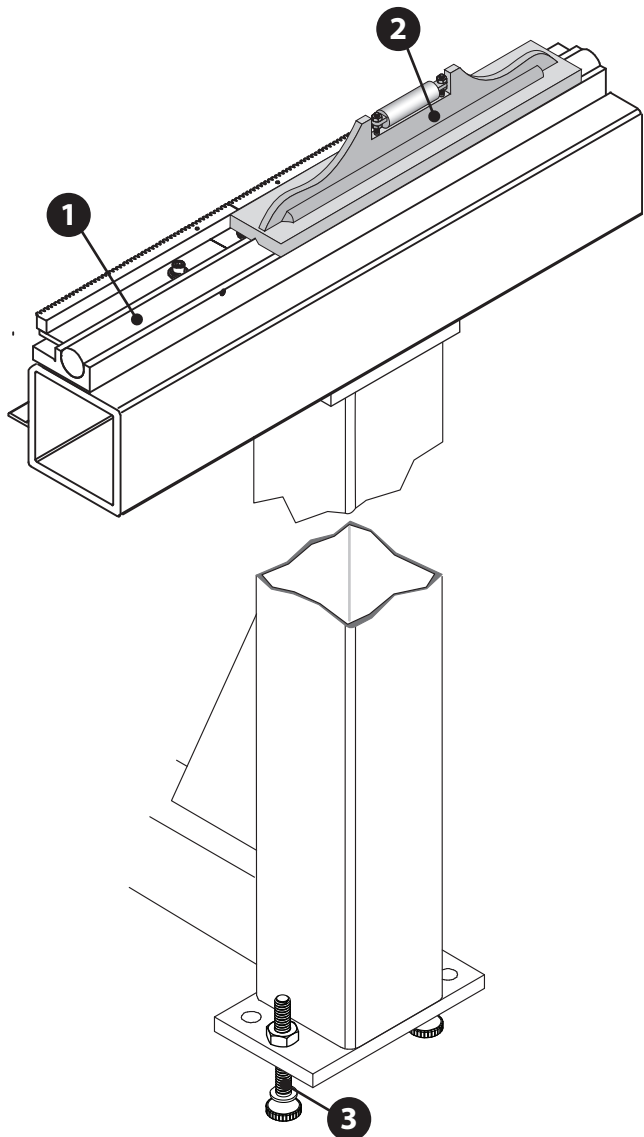
If the rail system is to be mounted to the floor, indicate the location of the anchors and install them accordingly.

I NOTICE

It is recommended to use floor anchors to maintain alignment when the rail system is longer than 15 ft..

I NOTICE

Rail extensions are always mounted behind the existing rail system (as viewed with the master rail on the right.)



Set master and floater rails the same height from the floor.

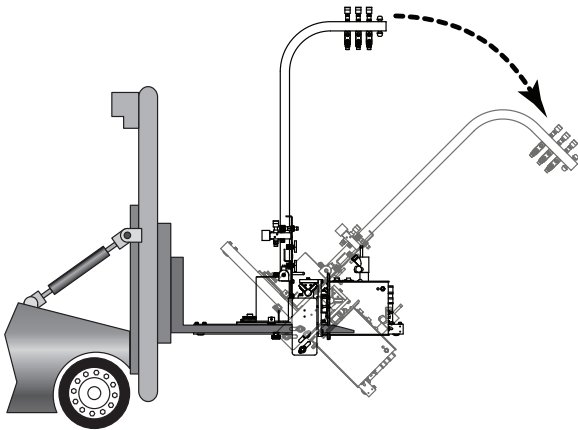
Level the master rail **1** with a precision level **2** by adjusting the cradle leveling screws **3**.

I Floater Rail will be leveled in the next several steps

I NOTICE

It is recommended to use floor anchors to maintain alignment when the rail system is longer than 15 ft..

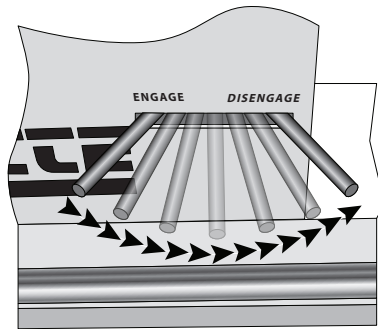
Rail extensions are always mounted behind the existing rail system (as viewed with the master rail on the right.) Connect together with spacing plates. Span the joints with the extension floater bar and the extension rack mount on the master rail.

! WARNING

Falling Equipment May Cause Serious Injury .

Use Extreme Caution. Machine is FRONT HEAVY and will roll when not supported properly.

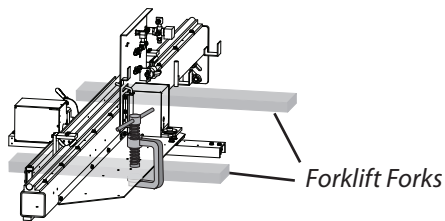
Refer to the gantry installation procedure to safely pickup the machine.



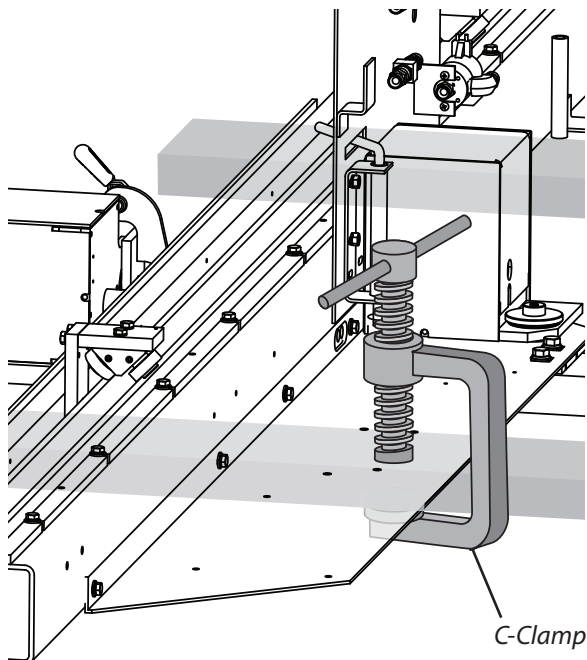
Forklift Technique



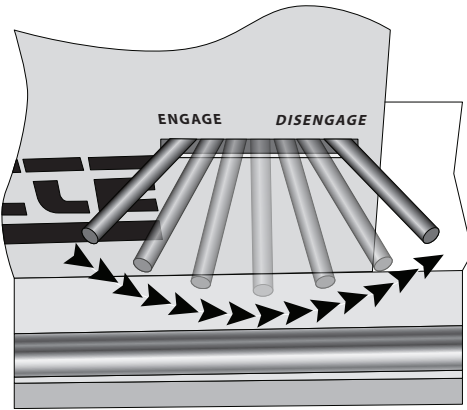
Remember to disengage the drive.



Clamp the main beam tray to a forklift fork to prevent the main beam assembly from rolling when the machine is picked up.



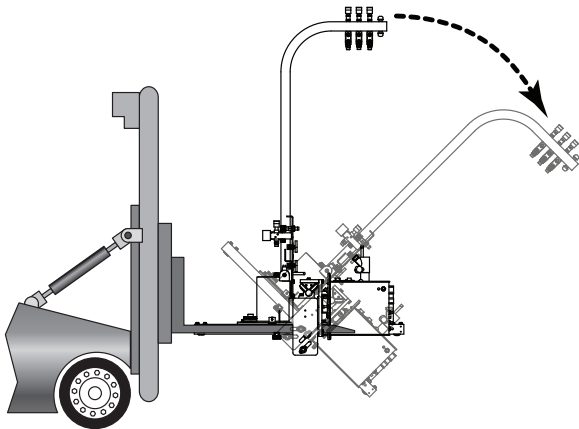
Mounting Main Beam on Rails

! CAUTION

Damage may occur when setting drive on rails.

Disengage the longitudinal drive before setting drive on rails to avoid damaging the drive pinion or rack.

INSTALLATION

! WARNING

Falling Equipment May Cause Serious Injury .

Use Extreme Caution. Machine is FRONT HEAVY and will roll when not supported properly.

Refer to the gantry installation procedure to safely pickup the machine.

Strongback Technique

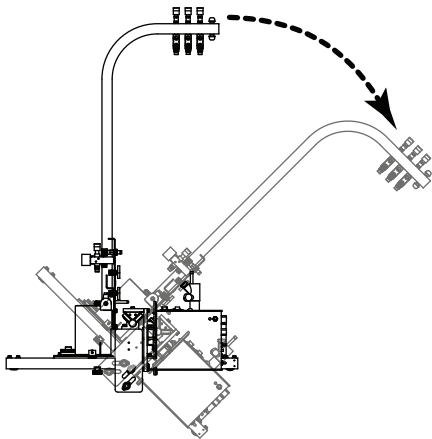
! CAUTION



Serious injury may occur when lifting heavy objects.

Always use proper lifting techniques when lifting or bending over.

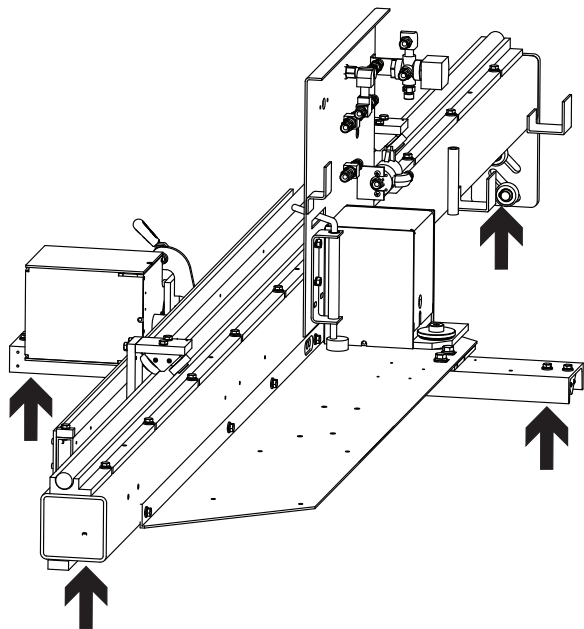
! WARNING



Falling Equipment May Cause Serious Injury .

Use Extreme Caution. Machine is FRONT HEAVY and will roll when not supported properly.

Refer to the gantry installation procedure to safely pickup the machine.

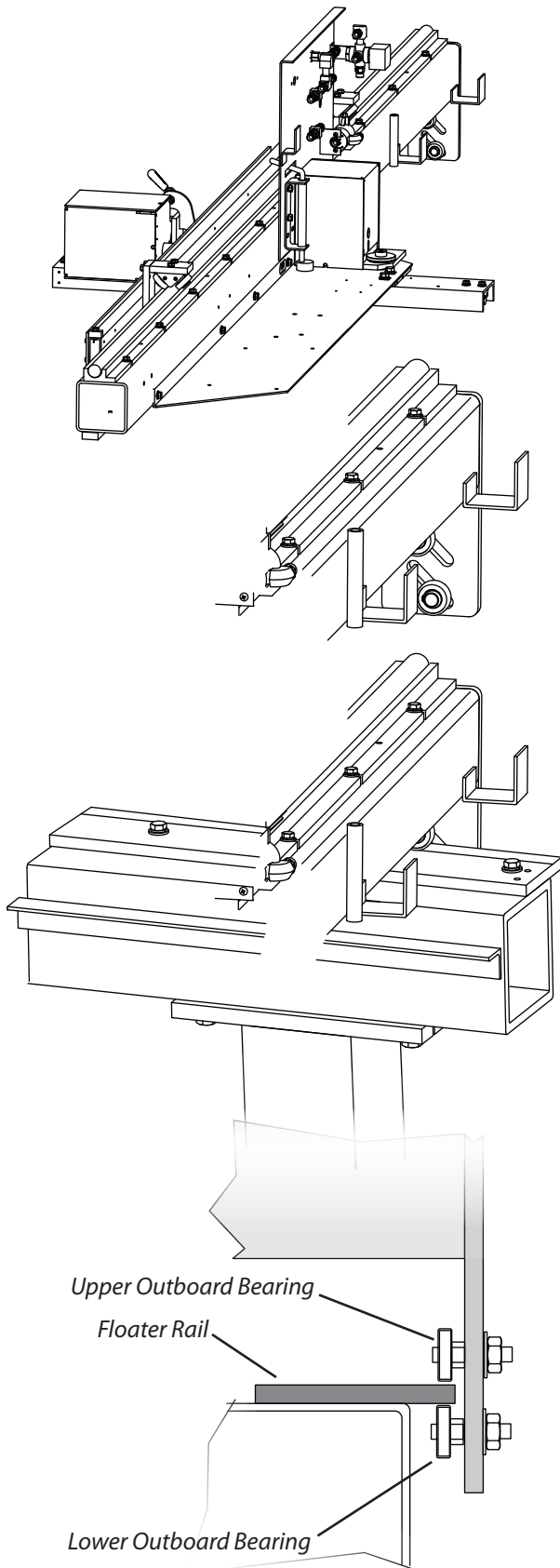


Support the machine at the four points indicated. Be sure to prevent the machine from rolling when it is picked up at the ends.

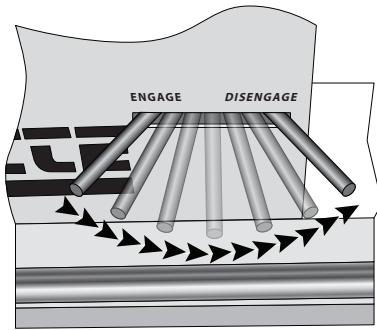
Use plenty of muscle, the machine may weigh as much as 150 pounds or more.

Lower the beam and place the upper outboard bearing on the floater rail.

The lower outboard bearing will make contact with the rail because of the machine weight distribution.

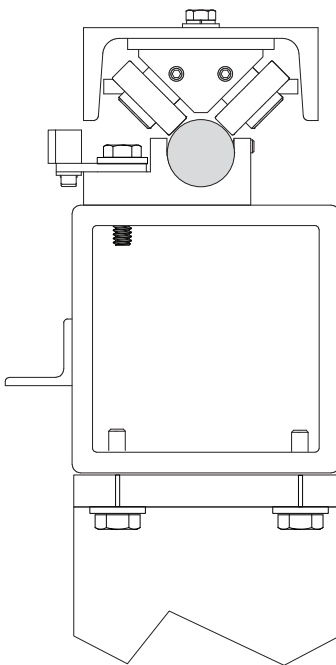


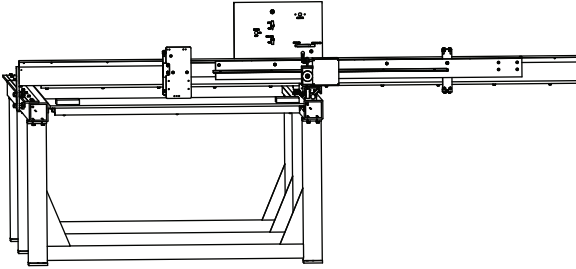
INSTALLATION



Remember to disengage the drive.

Set the master carriage on the round rail.





Place the table on the table rails between the floater and master rails.

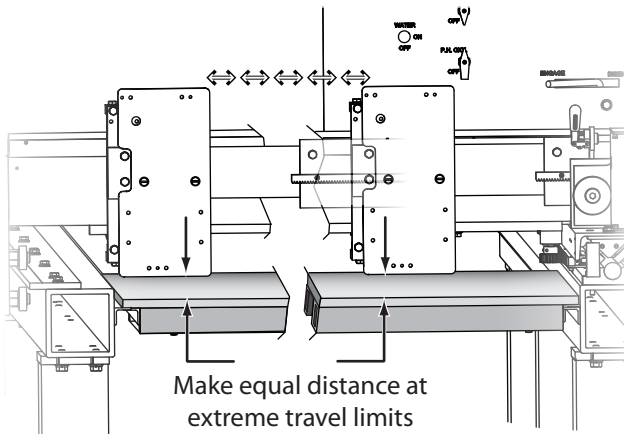
Disengage the cross drive and move the torch bar to the extreme right travel.

Measure the distance from the bottom of the tracer mount plate and the table surface. Write it down if necessary.

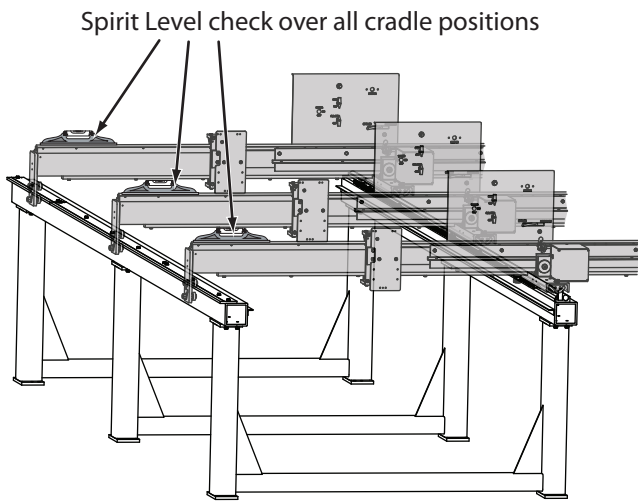
Move the torch bar to the extreme left travel.

Measure and compare the distance from the bottom of the tracer mount plate and the table surface.

Adjust the lower outboard bearing up or down as necessary to equalize the measured distances at the travel extremes.



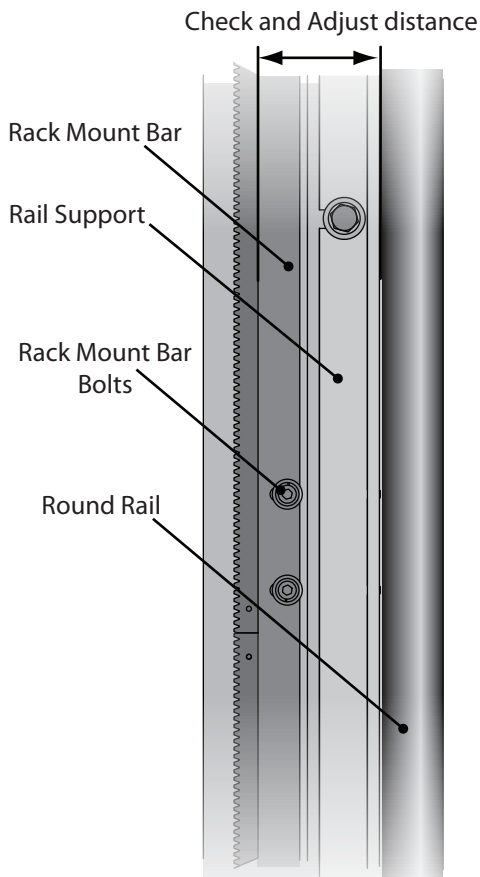
INSTALLATION



Check cantilever level over the forward cradle position with a spirit level. Adjust the floater rail leveling pad as needed.

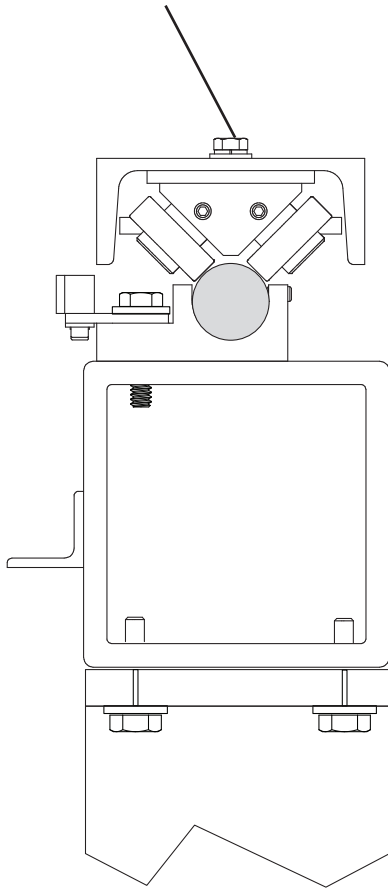
Reposition the gantry over the next cradle. Recheck and adjust as required.

Continue this procedure until the machine is level down the floater rail.

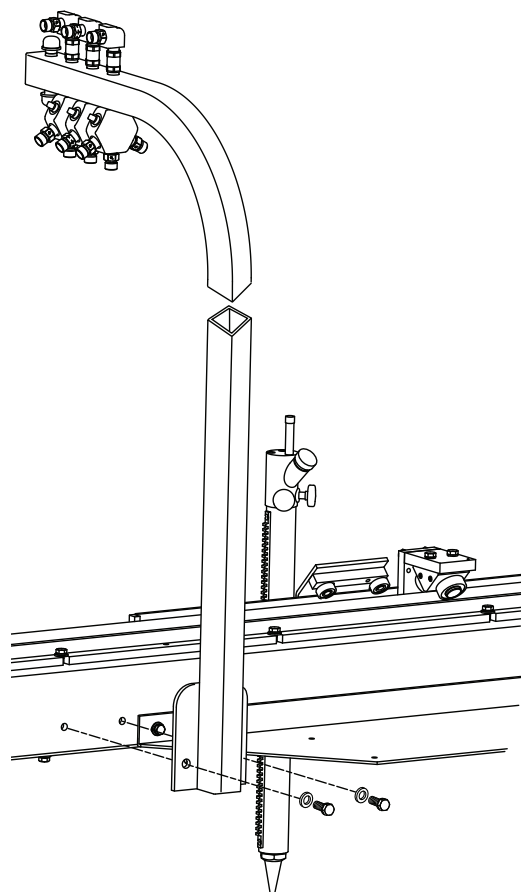


Measure the distance from the round rail to the rack at every rack mount bolt. Adjust as required to equalize this distance.

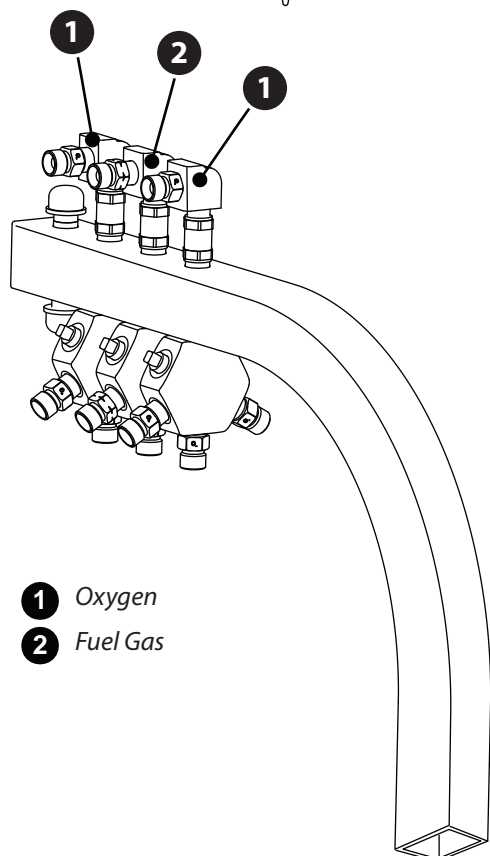
Bearing Block Mount Bolts



Loosen the bearing block mount bolts and roll the machine back and forth a few inches. This will allow the bearings to seat on the rail. Tighten the block mount bolts.

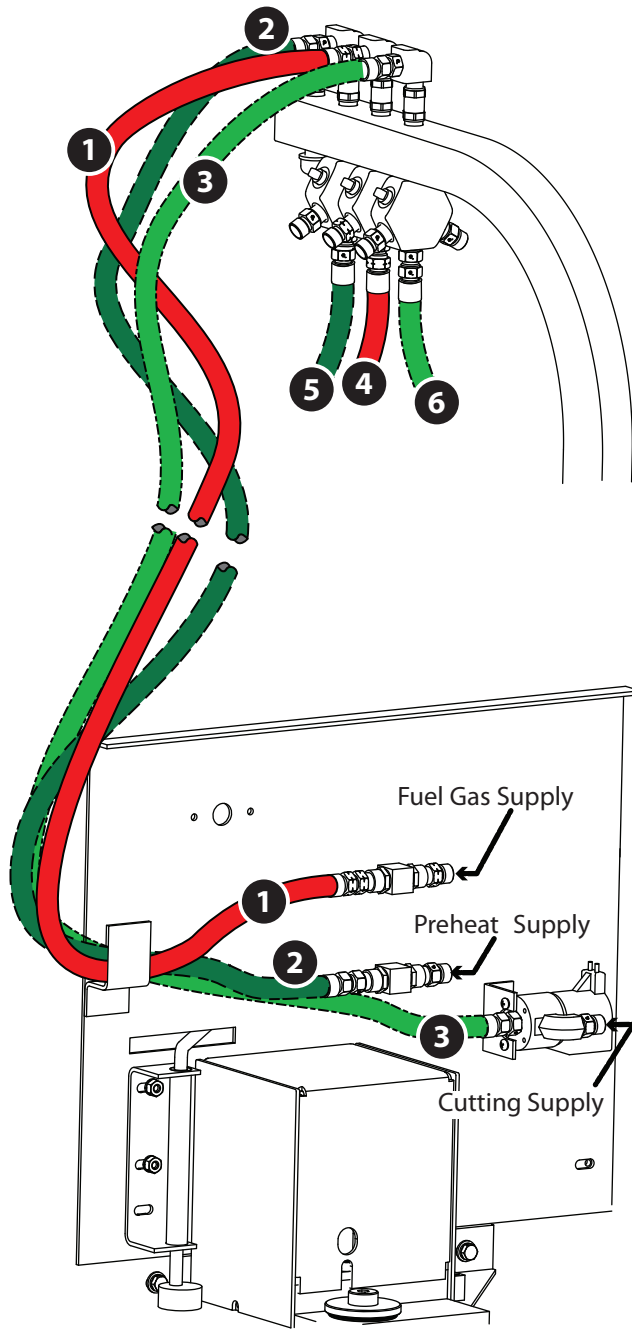


Mount the manifold to the back of the cantilever beam assembly.



Connect hoses from the gas panel to the manifold inlet.

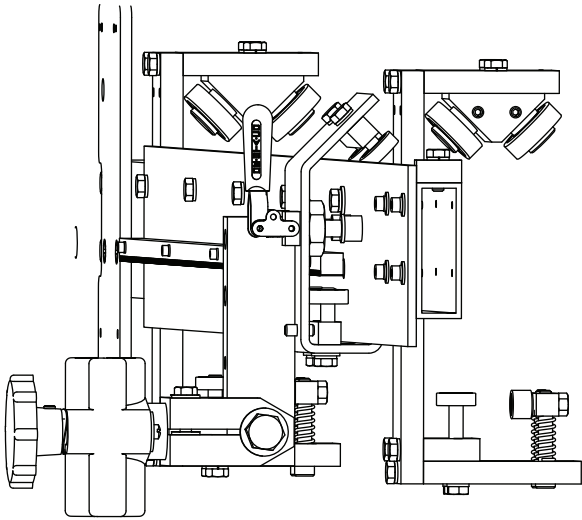
- 1** Oxygen
- 2** Fuel Gas



Connect oxygen and fuel gas hoses. Hoses are labeled "Preheat", "Cutting" and "Fuel". Be certain to keep preheat to preheat and cutting to cutting when connecting to the manifold.

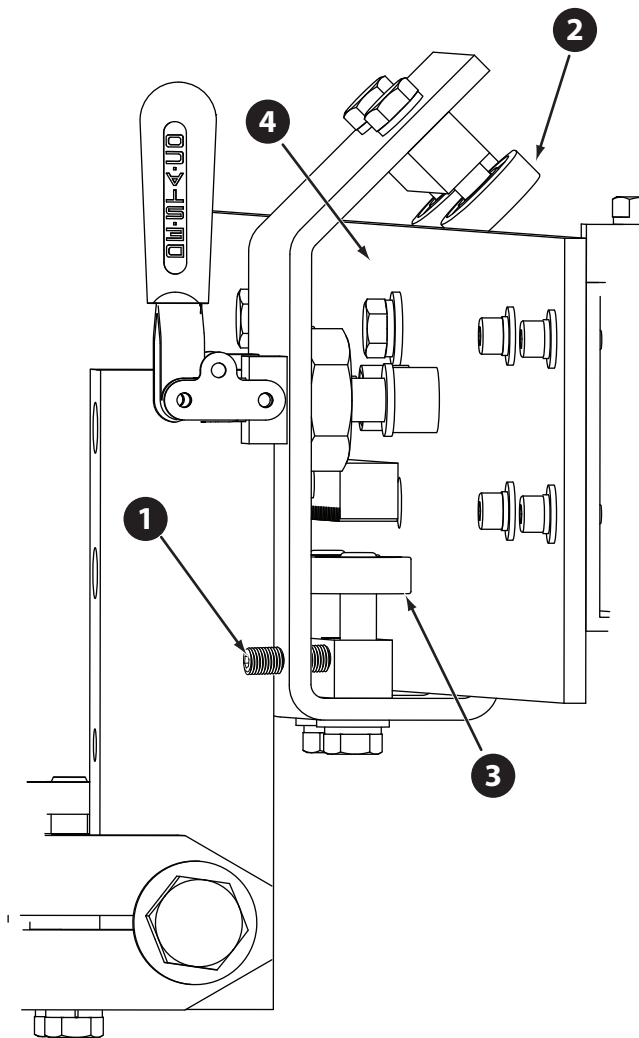
- 1 Fuel gas to manifold
- 2 Preheat Oxygen to Manifold
- 3 Cutting Oxygen to Manifold
- 4 Fuel Gas to Torch
- 5 Preheat Oxygen to Torch
- 6 Cutting Oxygen to Torch.

INSTALLATION



View the station carriage bearings while rolling it back and forth

Adjust the jack screws **1** to cause the upper **2** and lower **3** carriage bearings to make contact with the torch bar **4**.

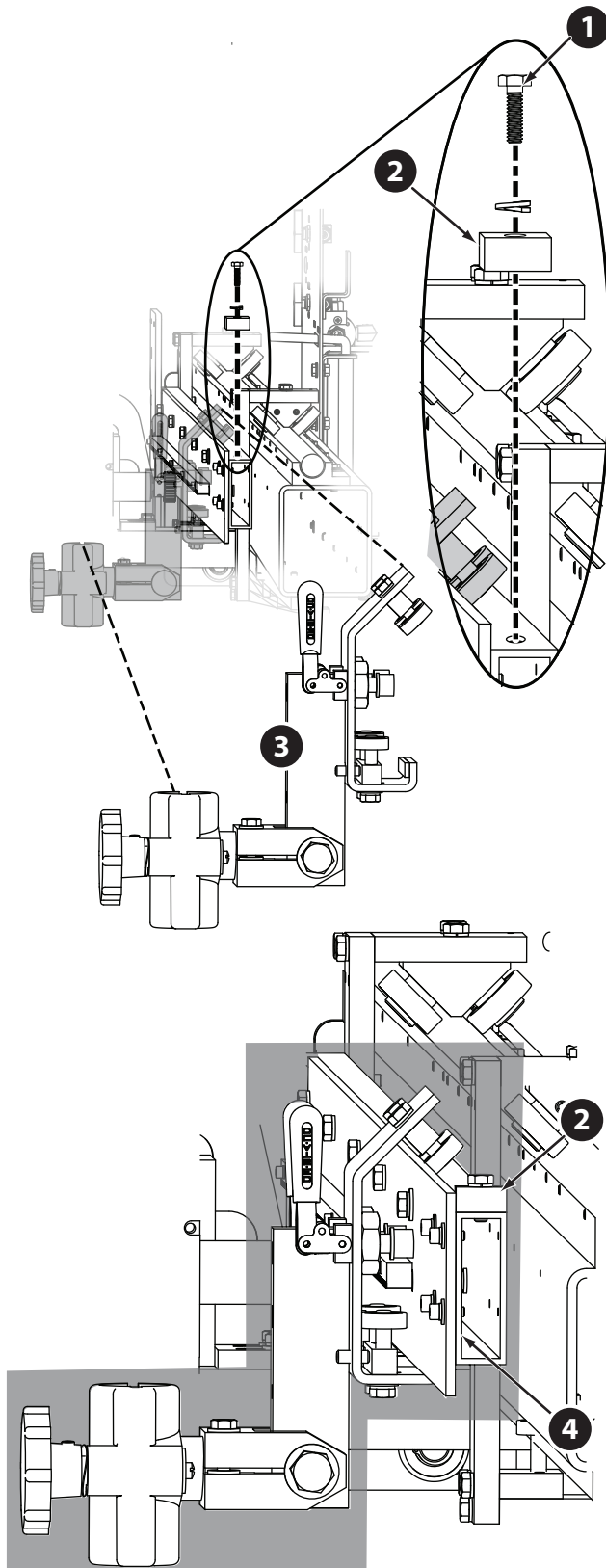


Torch Station Mounting

Remove the block mount bolt **1** and station stop block **2**.

Roll the station **3** on the torch bar **4**.

Re-mount the station stop block.



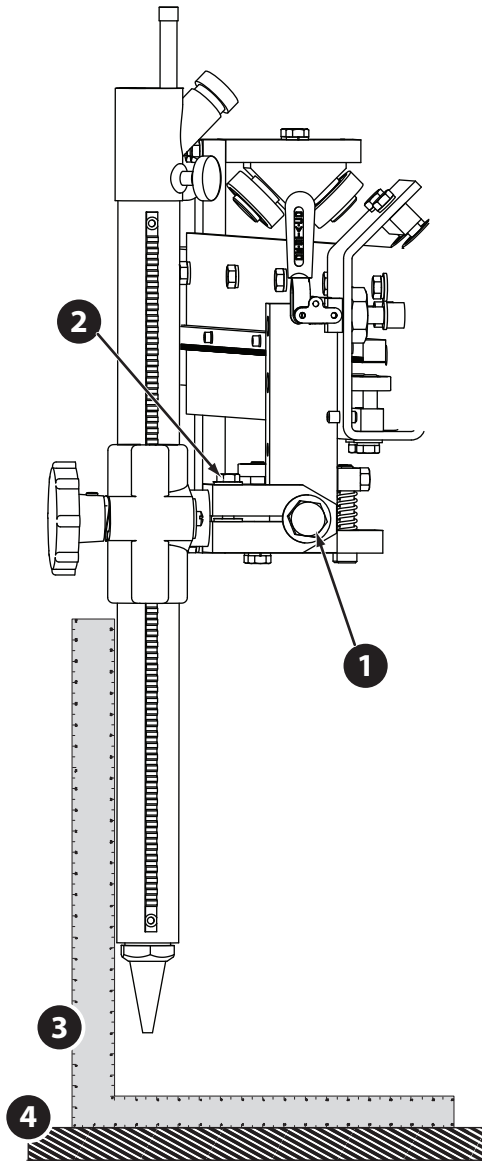
INSTALLATION

Torch Squaring

Place torch in torch holder, turning the height adjustment knob to lower.

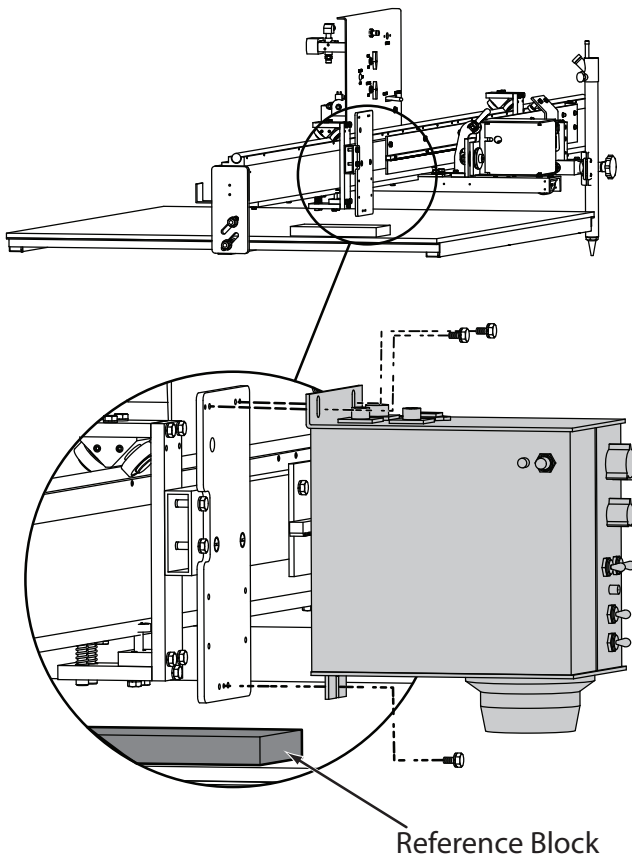
Use a carpenters square **3** to check the squareness to the cutting surface **4**. Check both parallel to the cross and rail axes.

Adjust by loosening **1** or **2** bolt depending on required adjustment.

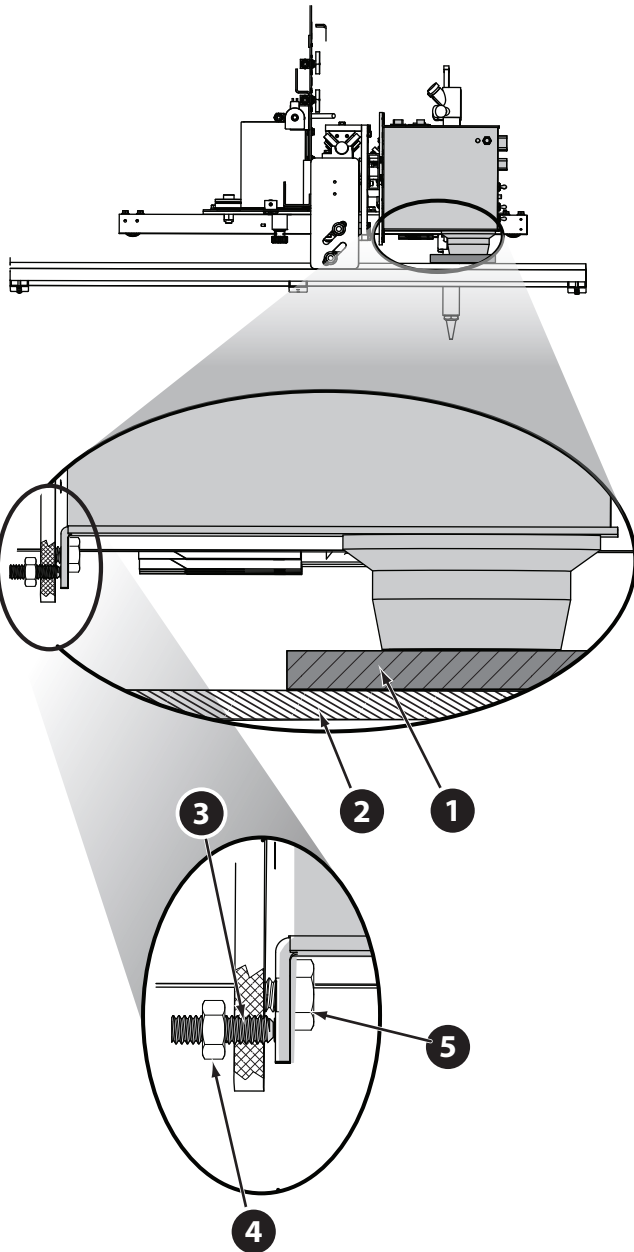


Tracer Mount and Leveling

Mount the tracer on the tracer mount plate using the 3 bolts as shown. Do not tighten until after leveling. Position the reference block under the tracing eye cover.



INSTALLATION



The machine must be leveled before this operation is completed.

To set the tracer height, slide the reference block **1** between the tracing table **2** and the tracer. See note below.

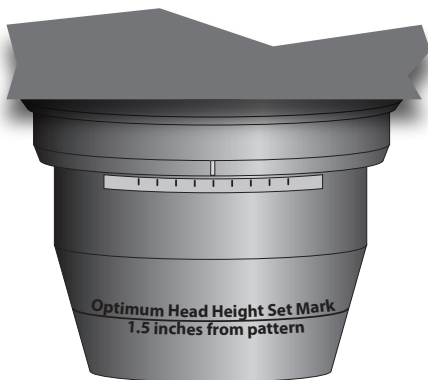
Thread the jack bolts **3** until they make contact with the tracer mount.

Tighten the tracer mount bolts and the jack screw lock nuts **4**.

The tracer should be perpendicular with the tracing table.

Tighten the tracer mount bolts **5**. (Bottom is referenced.)

See the tracing manual for further information.



Note: If a reference block is not available, set the distance from the set mark on the tracing eye cover to the table at 1½ inches all the way around.

Interconnection of components.

Attach the cut oxygen solenoid cable and both drive motor cables to the top of tracer control unit. Connections are labeled.

Plug tracer control power cable into any standard 115VAC outlet with ground.



See Grounding Instructions.

Install the oxygen and fuel gas hoses to the inlet side of the machine gas flow valves using standard 0.375 inch supply hoses and fittings.



It is the customers responsibility to regulate gas pressures at the source.



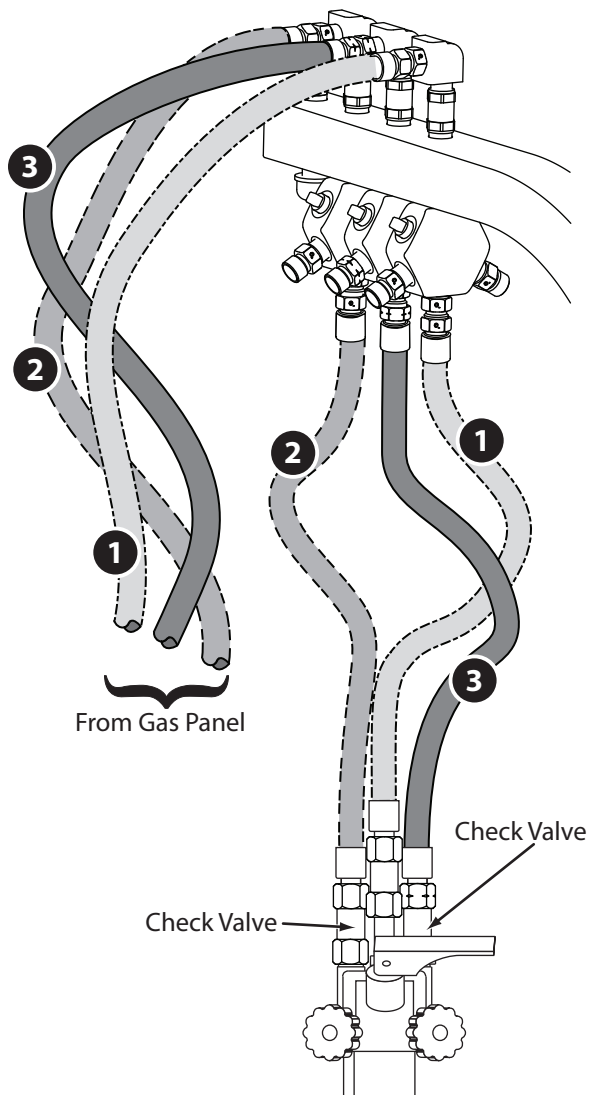
CAUTION

Torches must be equipped with preheat oxygen and fuel gas check valves between torch and hoses to prevent gas reverse flow.

The valves are not designed to stop flashback.

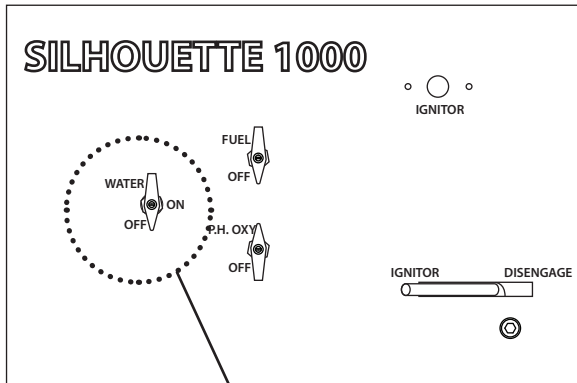
Such reverse flow can create a hazardous condition and may be caused by a damaged or plugged torch tip, a cylinder emptying during use, loss of pressure in one supply line, or failure of the operator to follow correct lighting procedures.

Test the check valves every six months or any time they have been subjected to torch backfiring or flashback. Replace the check valves every 5 years or sooner if testing indicates.



Connect the supplied hoses from the outlet side of the manifold on the manifold support arm to the torches. Ensure the integrity of preheat to preheat, cut oxygen to cut oxygen and fuel gas to fuel gas connections. Hoses are labeled to help keep connections straight

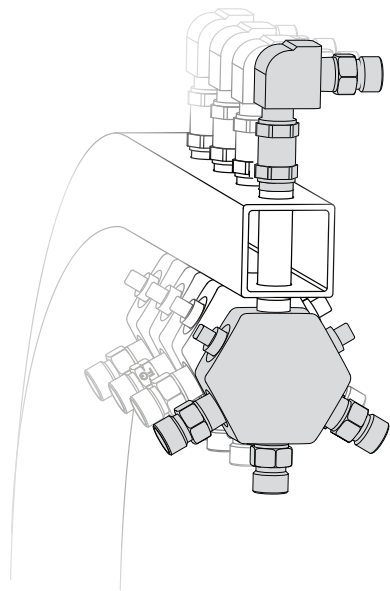
- 1 Cut Oxygen
- 2 Preheat Oxygen
- 3 Fuel Gas



Water Spray Control Valve

Water Spray Installation

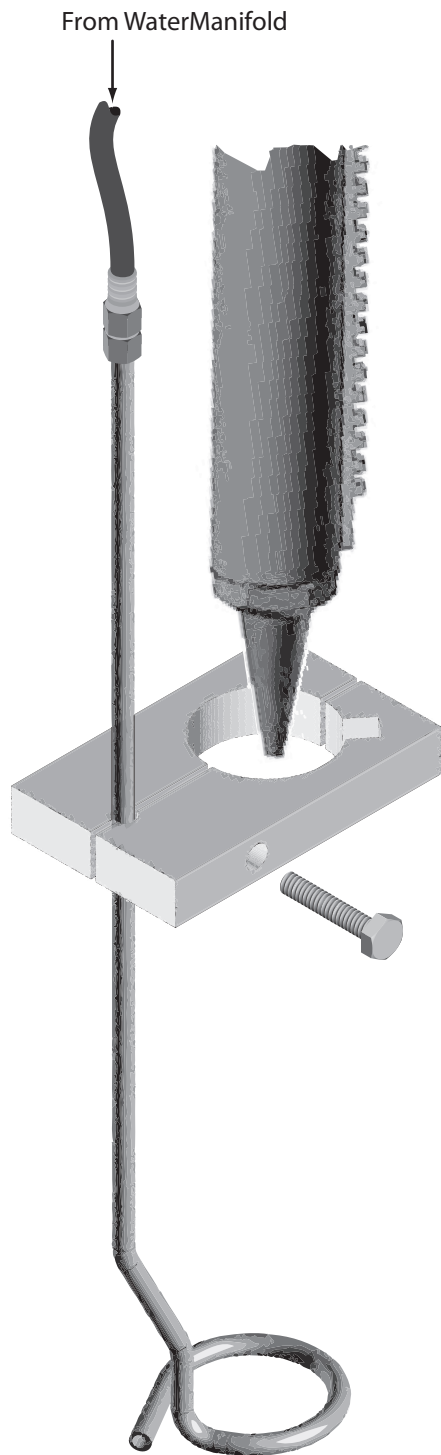
Mount the control valve in the pre-designated mount hole on gas control panel. Align movement with on/off indicators and tighten nut to lock in place.



Install water manifold in front of gas manifold on mount arm. Installation of the manifold block has to be done before any of the distribution fittings are applied.

Run water hoses from control valve outlet to manifold and from manifold to water spray heads on torches.

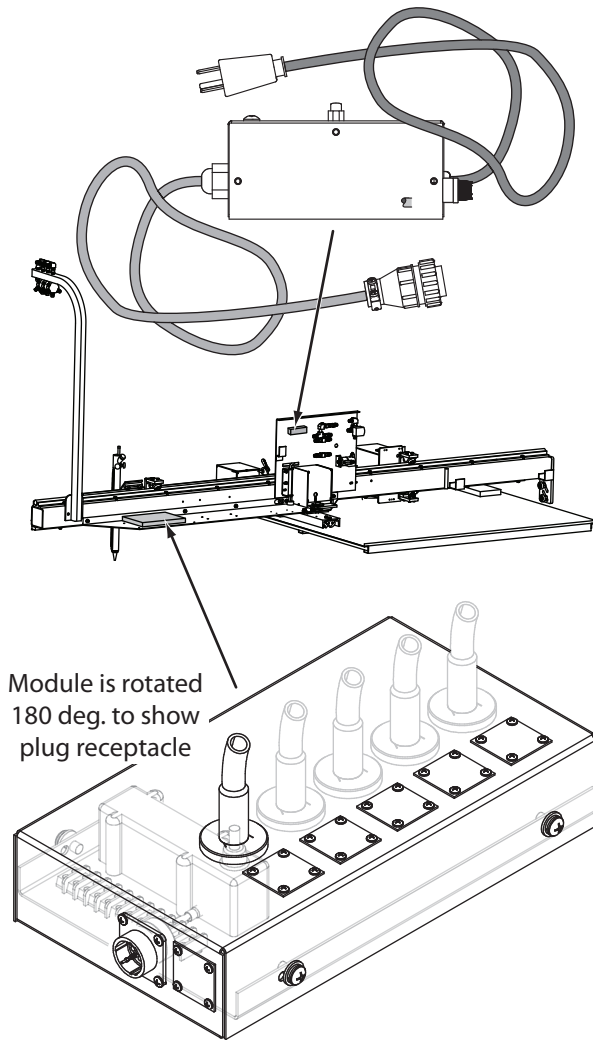
Clamp water spray heads to torches using bracket and position bottom of spray heads about 1 inch above bottom of torch tip.



Automatic Ignitor

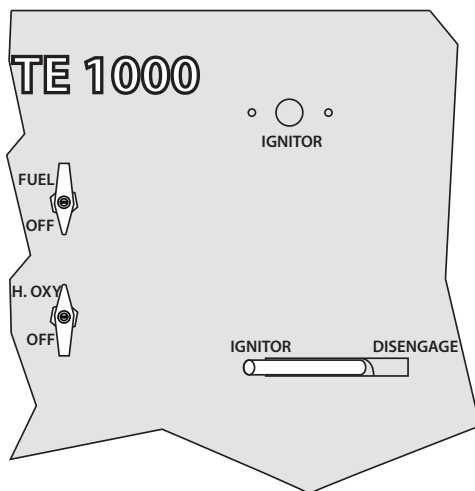
Introduction

The automatic oxy-fuel torch ignitor system provides hands free ignition for the multiple oxy-fuel torches. This system uses a high voltage spark between an electrode and the plate surface to ignite oxy-fuel preheat flames. When the system is energized, preheat fuel gas and oxygen flow from the torch nozzle. A high voltage transformer creates an ignition spark between the ignitor electrode end and the plate, which ignites fuel gas/oxygen mixture.

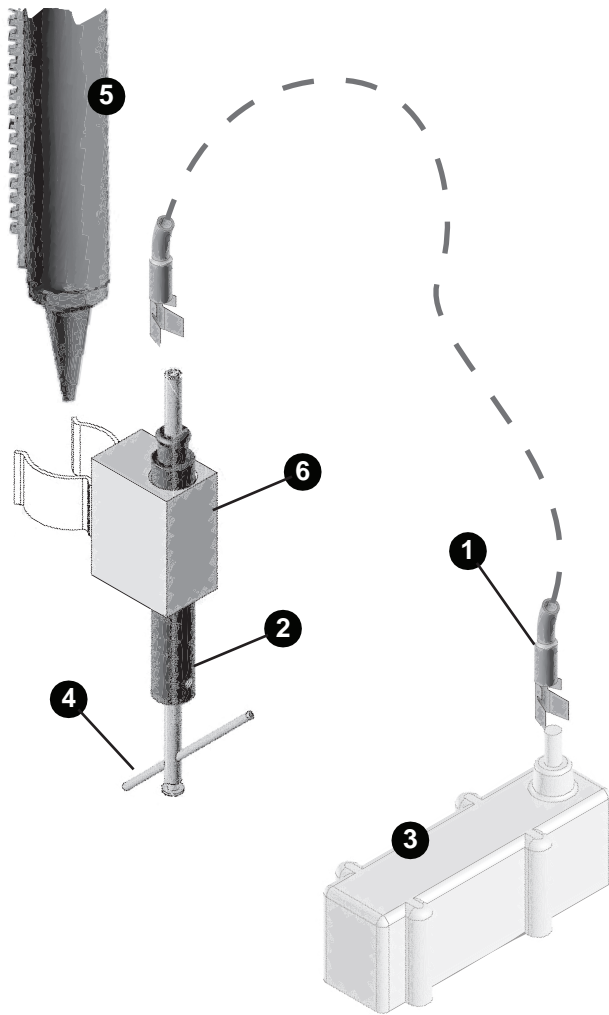


Ignitor installation

Mount ignitor module on the deck and the Ignition Start module on the gas panel in the location shown.



INSTALLATION



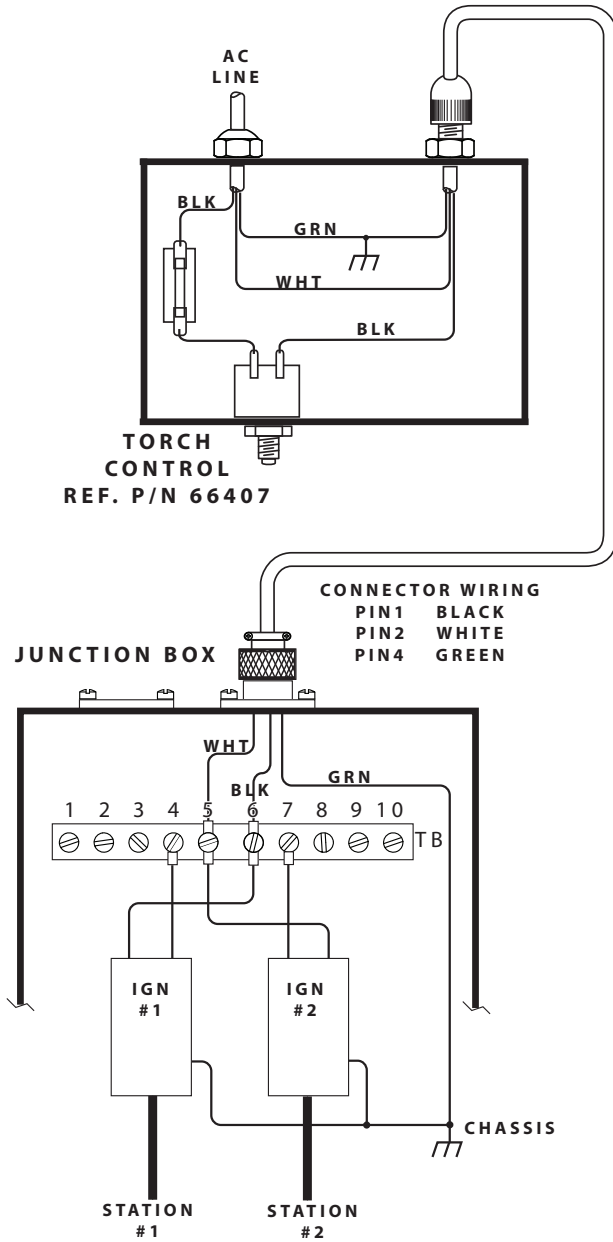
Slide the Ignitor Mount on to the torch over tip.

Fasten the ignitor cable to the ignitor transformer and the electrode holder, running the cable along the gas hoses to the manifold and down. Secure with plastic cable wraps.

INSTALLATION

- 1 High voltage cable
- 2 Insulator
- 3 Ignitor Transformer (inside the Ignitor Module)
- 4 Electrode
- 5 Oxweld torch
- 6 Ignitor Mount

Ignitor Wiring Schematic

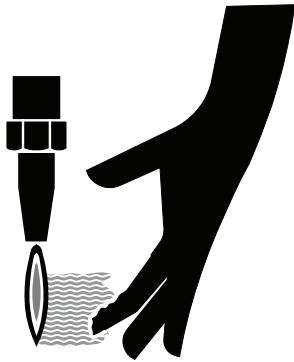


INSTALLATION

Ignitor Setup

Do this procedure before using ignitors the first time and check regularly.

WARNING



Burn hazard.

Oxy-fuel torch flames can cause severe burns.

Do not touch ignitors or torch during the five second ignite time the ignition spark is on.

WARNING

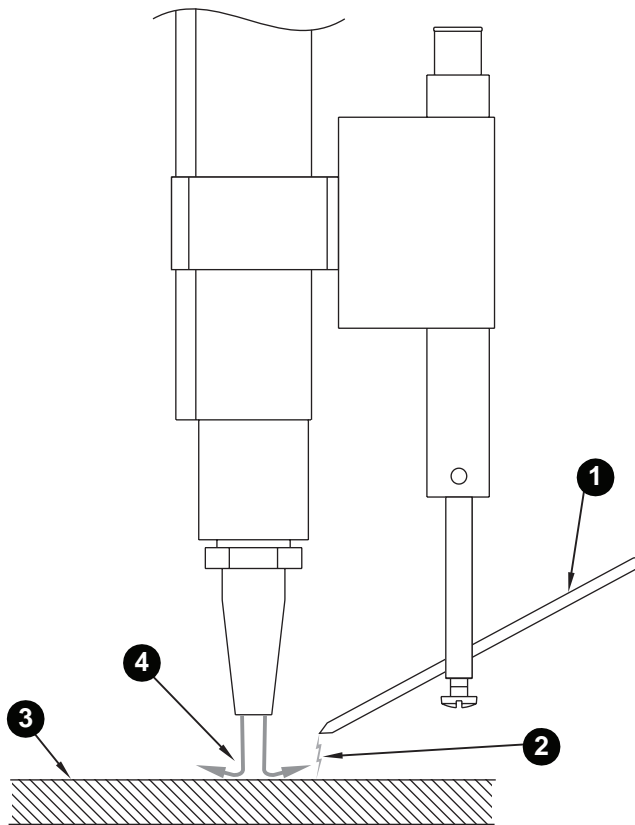
Explosion hazard.

Oxy-fuel torches can create explosive gas pockets if flowing gas is not burned. These pockets can explode when the torch is ignited.

Dissipate any accumulated gas before reigniting torch.

Setup Procedure

Adjust ignitor electrode on each torch so electrode end is just below the bottom and at least 1/2" (13mm) away from the torch nozzle.



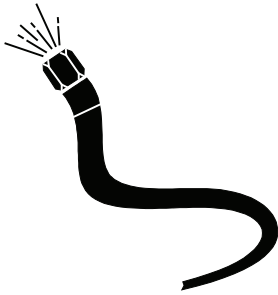
- ① *Electrode*
- ② *Ignition spark*
- ③ *Plate*
- ④ *Preheat gases*

INSTALLATION

Preparation for Initial Power-up

Purging Lines

CAUTION



Oil, dust and other foreign matter must be purged from all gas lines before operation of this machine.

Failure to purge the lines may result in a hazardous explosion or performance issues.

Observe the rules and regulations contained in pamphlet 51 published by the National Board of Fire Underwriters and all local ordinances relating to the purging of these lines.

Before connecting fuel gas or oxygen to the machine, or if these lines are disconnected from the machine for any reason, the oxygen and fuel gas delivery system must be purged.

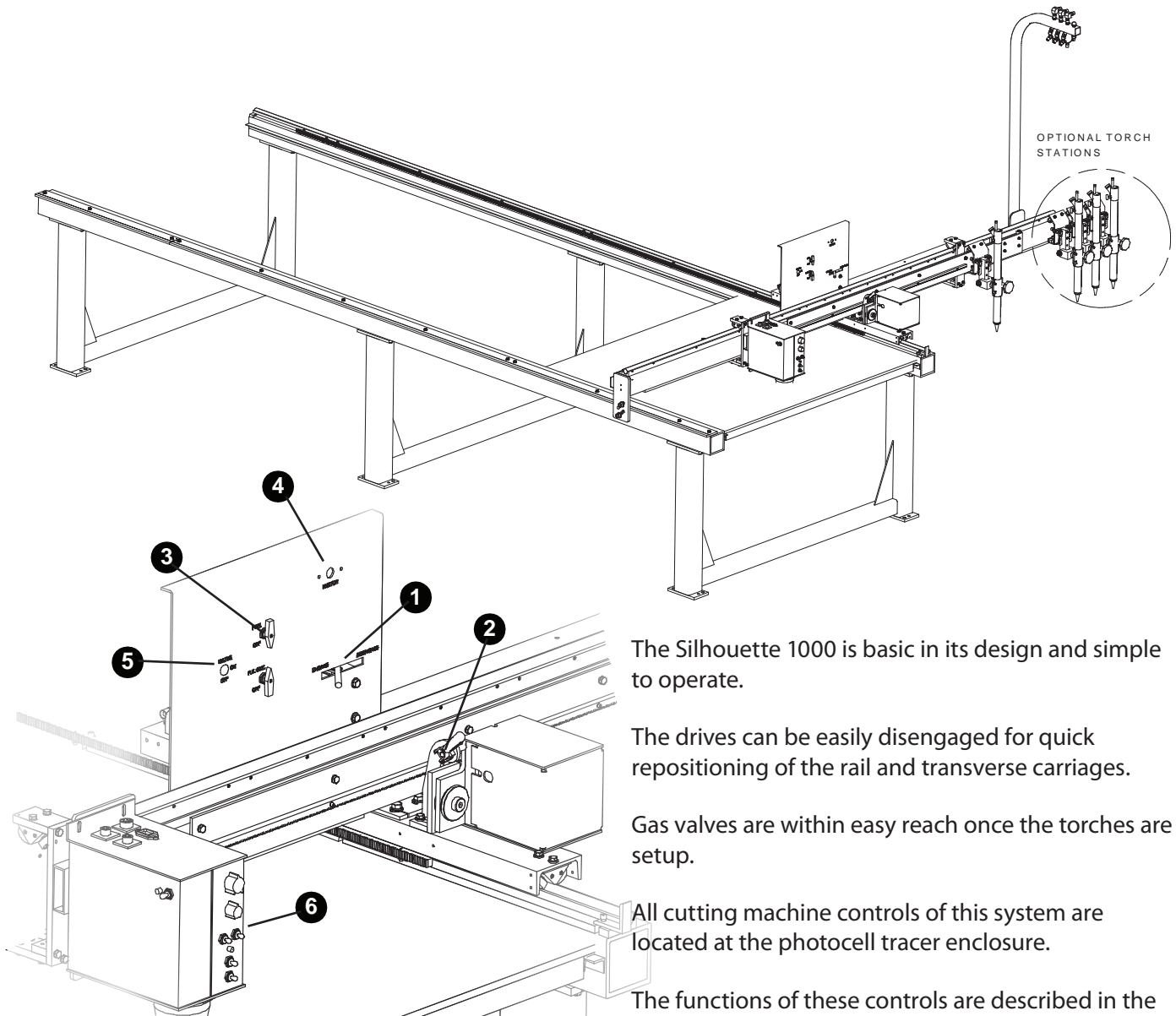
1. Connect a purge hose to an outlet of the pipeline system so that the system may be exhausted to outside atmosphere away from any combustible material or ignition source.
2. Slowly open the inlet valve to the pipeline system and allow pressure to build in the system to 20 psi. Inspect system for leaks.
3. Close the system inlet valve and open the outlet valve so that gas in the system discharges through the purge hose connected in step 1.
4. Close the outlet valve and repeat steps 2 and 3 four or five times. Disconnect the purge hose and make the connection to the machine.

Mechanical Check

Check the installation and assembly carefully. Check all mechanical assemblies and parts to be sure that they are correctly assembled and all hardware is tight.

Operation

Introduction



- 1 Rail Disengage
- 2 Transverse Disengage
- 3 Ignitor Control
- 4 Gas Valves
- 5 Water Valve
- 6 Photo tracer/Auto Controls

The Silhouette 1000 is basic in its design and simple to operate.

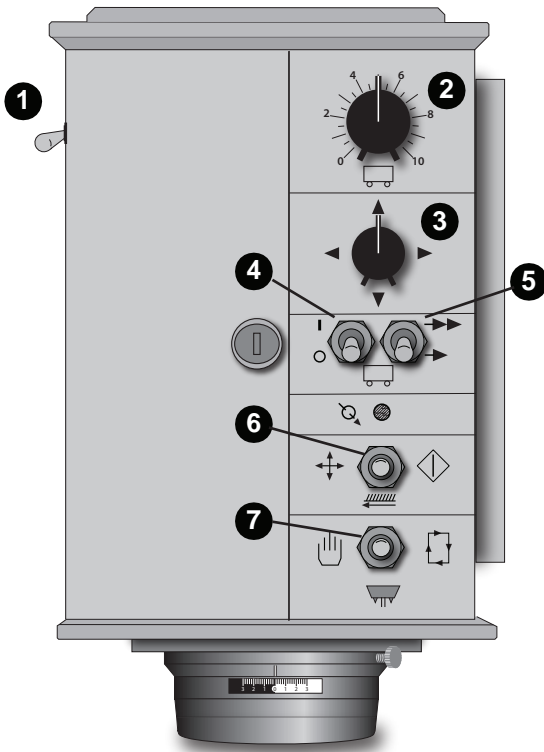
The drives can be easily disengaged for quick repositioning of the rail and transverse carriages.

Gas valves are within easy reach once the torches are setup.

All cutting machine controls of this system are located at the photocell tracer enclosure.

The functions of these controls are described in the following table.

OPERATION



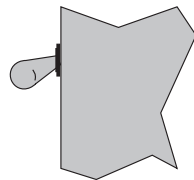
HL-90 Tracer

For more complete instructions, consult your Linatrol HL-90 Manual.

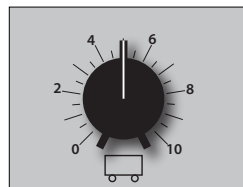
All tracing and auto functions are controlled with the tracer front panel. Basic function areas are identified at the left.

- 1 On/Off Switch
- 2 Speed Control
- 3 Direction Control
- 4 Movement Drive
- 5 Low/High Speed Ranges
- 6 Mode Switch: See details
- 7 Cut Oxygen Switch: See Details

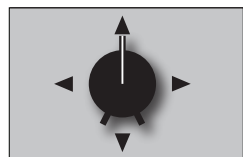
OPERATION



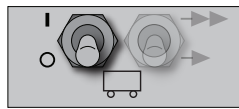
Tracer ON/OFF switch is located on the left side of the tracer housing. It is a 2 position switch, either being on or off. When off, the tracer will not function.



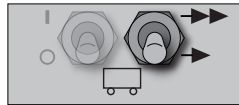
Speed Control is a variable device. Numbers are for reference only and do not indicate a specific rate of speed.



Direction Control. Used for the cutting mode and to enter or leave the pattern in the tracing mode. This is a 4 position rotary switch.



Movement ON/OFF. 2 position switch. When in the Off position (illustrated) drive amplifiers are not allowed.

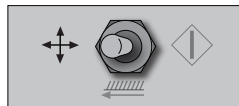


Movement - High or Low Range. 2 position switch. High range is 0 to maximum. Low range is 0 to 24 IPM.

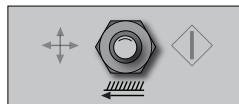


Indicator Light showing when tracer has detected the pattern line.

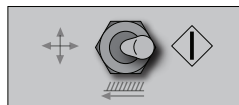
Mode Switch. 3 position switch.



Strip Position. Momentary Left Position (shown) allows tracer to move in the direction indicated on the direction switch at the speed set. When released the switch will return to the center position.



Trace Position. Default Center position (shown) allows the tracer to follow pattern until the switch is selected to the strip position. The tracer will travel in the direction set on the Direction switch and with the Cut Oxygen switch set to Auto, the cutting oxygen will automatically shut off.



Momentary Contact Position. The tracer will travel in the direction set on the Direction switch until a pattern is intercepted and the ON Pattern light is lit. When the switch is released, it will return to the trace position.

Template Preparation

Introduction

The template pattern is simple but it is an important detail of the tracer machine control. A great amount of time, effort and material can be wasted by a poorly prepared template. Patterns can be black lines or silhouettes drawn on white paper, or a cutout of white paper or card laid on a black table top. The pattern quality has a considerable influence on the accuracy and reliability of the tracer. Patterns can be drawn so that material waste is reduced and the efficiency of cutting operations improved. For accurate corner cuts, compensation for the lead/speed characteristics of the tracer may be made by adjusting the corners on the pattern. Draw the template at the exact size and shape to be cut. Compensate for kerf during the cut. (See kerf compensation later in this section). If kerf compensation larger than 0.12 inches (3.0mm) is required, make the additional increase during the template preparation. Consider the pattern line width when establishing dimensions on a center-to-center basis.

Template Guidelines

Factors that are associated to the template preparation that influence the tracing operation include:

- Contrast between line and background.
- Cleanliness of the pattern.
- Width of the line in line-draw patterns.
- Type of material on which the patterns are drawn.
- Type of material used to draw the patterns.

To produce patterns that provide best results, we recommend:

- The edge of the line should be drawn accurately, since it is the edge of the pattern that will be traced.
- A red pen or pencil can be used for pattern construction lines or observations. The tracer does not detect red.
- For optimum performance, lines should be drawn in black India Ink, with a minimum line width of 0.03 inch (0.7mm) on a white or buff background. H or HB grade pencil drawn lines with a minimum width of 0.016 inch (0.5mm) will also provide acceptable results.
- When using pencil, the lines should be dense and continuous. Drawing over a line several times tends to polish the surface, transforming it in a kind of mirror. This should be avoided.
- Some materials appear black to the human eye, but are seen differently to the tracer. These materials should be avoided. Refer to the Drawing Materials Table.
- Paper or card stock used for patterns should be moisture resistant. Some materials readily absorb moisture and may change size. See Drawing Materials Table.
- Patterns should be kept clean and free from grit, marks or smudges near the tracer's path.
- The minimum distance between adjacent lines on the pattern should not be less than the lead.

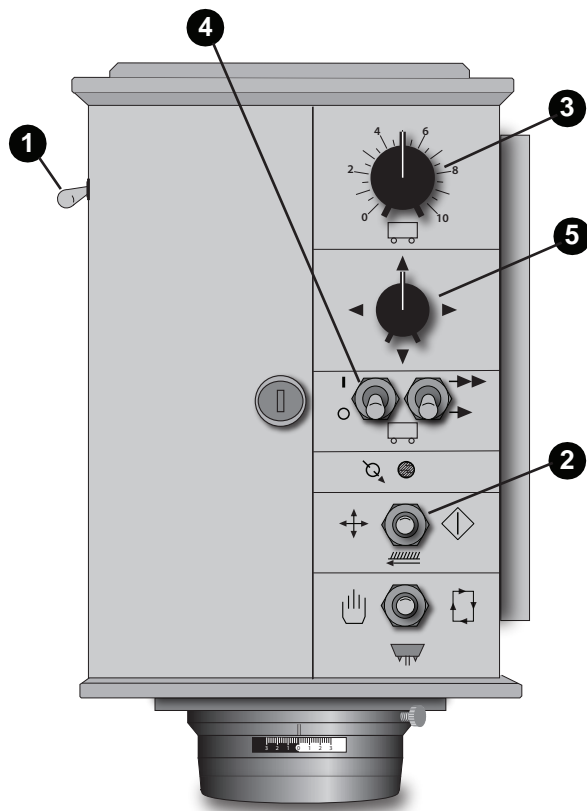
Drawing Materials

Types of Material	Remarks
Commercial Pattern Paper	Use black India ink or (H or HB) firmly drawn pencil. Ideal material for durability, dimensional stability and contrast.
Bristol Board (Buff or White)	Excellent contrast. Likely to absorb moisture.
Art Board (Buff or White)	Similar to Bristol Board. Thickness may require refocusing the tracing eye.
Heavyweight Bond Paper	Similar to Bristol Board. Usually most popular to one-off patterns.
Mylar	Excellent dimensional stability, durable, requires a white sheet behind it. Tendency to curl requires a means to maintain uniform contact with backing sheet/tracing table to prevent an out of focus condition.
Diazo Transparencies	Reflect infrared and will require a special lens. Good dimensional stability.
Photographic Negatives	Not recommended.
Tracing Paper	White backing sheet required. Changes size with moisture. Not recommended.
Felt Pens	Some felt-tipped pens reflect infrared. May require a special lens on the tracing head.
Plexiglas	It is used as a protective cover and keep patterns flat. Susceptible to pitting from cutting splatter. It should be used with caution.

Machine Operation

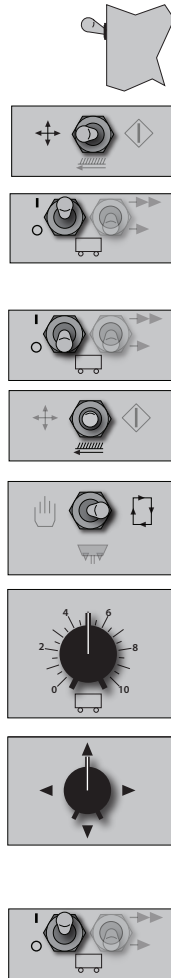
Introduction

The tracer can work either in the tracer mode, using a pattern or in the cutting mode for manual cutting.



Straight Line Cutting (without template)

1. Turn on Tracer/Control **1**
2. Select the Mode Switch to Strip **2** and select desired speed range **3**.
3. Place the drive switch **4** to the ON position and move the machine to the initial desired position, using the Direction switch and the Speed Control.
4. Turn the drive switch to OFF when the initial position is achieved.
5. Set the Speed control to select the desired cutting speed.
6. Set the Direction Control **5** for the desired cutting direction.
7. Place the plate to be cut in the cutting area and make sure it is squared with the major axis of the machine travel.
8. Prepare the torches to be pre-heated.
9. When the work is ready, place the Cut Oxy switch in Manual.
10. Place the drive switch ON.
11. When everything is done, place the Cut Oxy and Drive switches in OFF.



Tracer Controlled Cutting (with template)

1. Place the Power, Drive and Cut Oxygen switches to OFF.
2. Place the template on the tracing table.
3. Turn power ON.
4. Place the Mode switch in Strip and select the desired speed rate.
5. Place the Drive switch in ON and using the Direction switch and speed control, pilot the machine to the initial desired position.
6. After reaching initial position, place the Drive switch to OFF.
7. Mode switch to Trace.
8. Place the Cut Oxy switch in the Auto position.
9. Adjust speed for the desired operating speed.
10. Adjust Direction Control for the desired Approach direction to the pattern.
11. Prepare torches and preheat the material off of the part for lead-in.
12. When everything is ready, place the drive switch to ON and Keep Mode Switch in Start. The cutting Oxygen will turn on and the tracer will reach the pattern. When the pattern is detected and the ON Pattern indicator illuminates, release the mode switch.
13. Adjust the direction switch in a way that at the end of cutting, the tracer will leave the pattern.
14. At the end of the cut, place the Mode switch in Strip. The tracer will leave the pattern and cutting oxygen will automatically shut off.
15. Place the Drive switch to OFF.

Lost Cut Procedure

If the tracer loses the pattern edge while cutting, it will be necessary to return the to the lost point and resume cutting.

Losing the tracing is covered in the maintenance section with other troubleshooting subjects.

Procedure:

1. Retrace the pattern to the point of cut loss.



Use the speed dial to temporarily travel faster to get to the lost point. Don't forget to return to cutting speed!

2. Using previously outlined procedures preheat material to the proper temperature and activate cut process.



Kerf compensation

Kerf Compensation

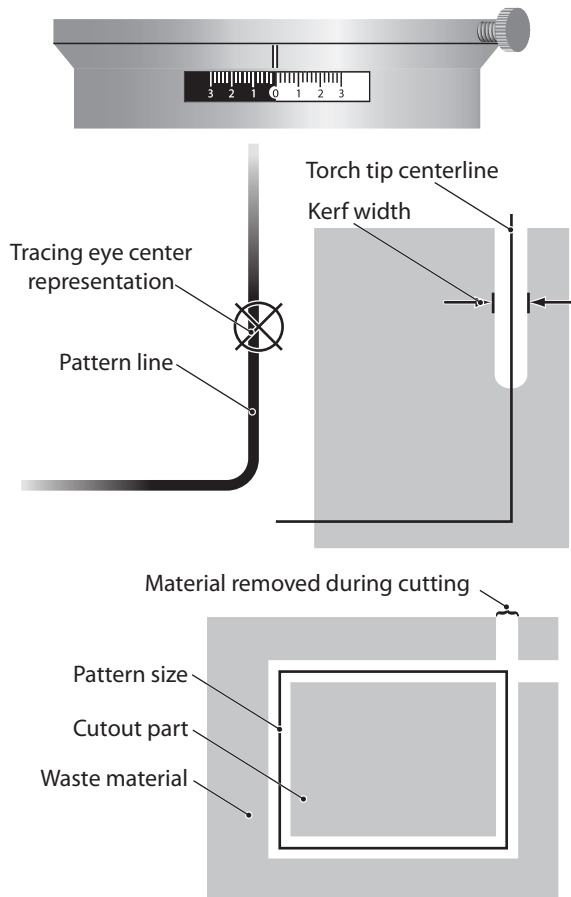
Tracer controlled cutting of dimensional shapes requires compensation for the kerf by the cutting torch. Kerf compensation is accomplished by offsetting the tracer head and cutting torch with respect to the top template line edge.

The necessary kerf during cutting is determined by:

- type of torch and nozzle used
- type of fuel gas
- material being cut
- material thickness.

The most practical method to determine correct kerf width is to make a cut in similar scrap material and measure it.


Kerf offset range is determined by the lead of the lens in the photocell tracer. Compensation is adjusted by rotating the scanner in the housing unit. Loosen the lock screw and adjust the reader's position so that the torch is offset by $\frac{1}{2}$ the kerf width.



There are 4 examples of cut/trace scenarios.

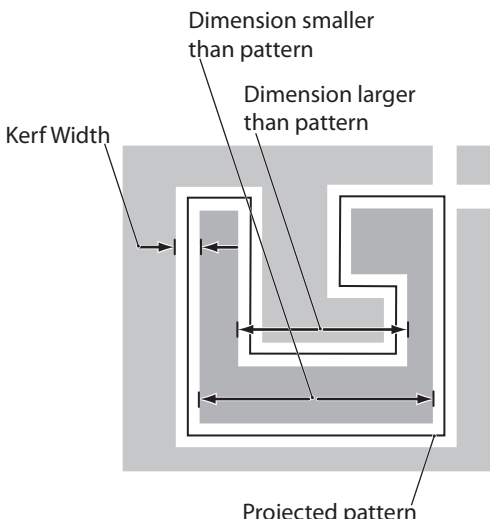
Example 1.

The control is set for “zero” kerf offset. With zero offset, the kerf width centerline (tool) corresponds to template line edge. The resulting cut part will be smaller (or larger ... or a combination of both, see below!) than the template by 1 kerf width.



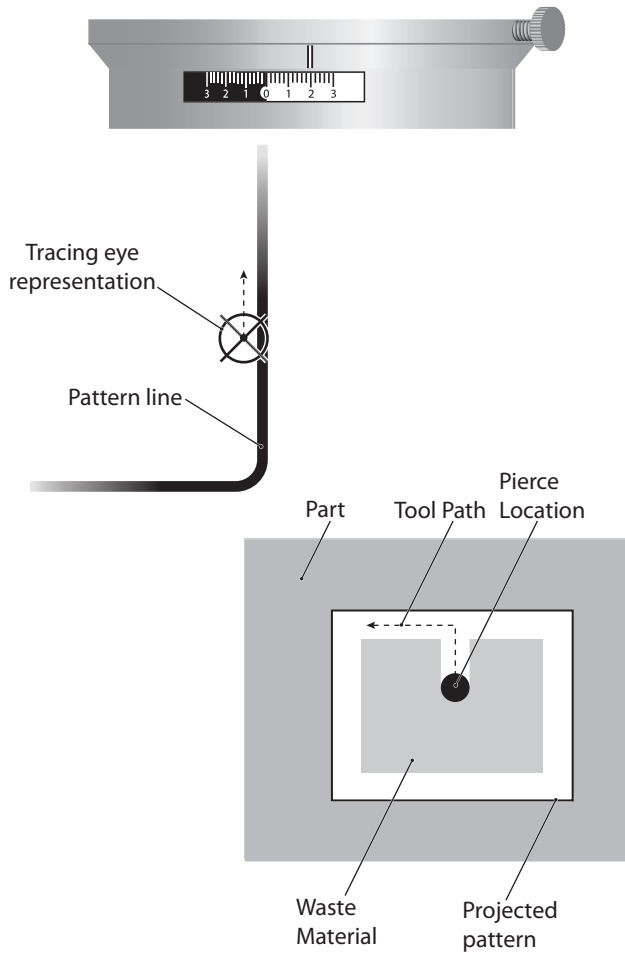
NOTICE

The effects of kerf on part size has an opposite affect in certain circumstances.



Using zero kerf as a basis, cutting around the outside of a part, dimensions will always be small compared to the pattern dimensions **unless** the part has *internal* features as the example at the left. Here the dimensions will be larger than the pattern because of the affect of kerf. Cutting holes in a larger part is another example of internal features being larger that the pattern because of zero kerf.

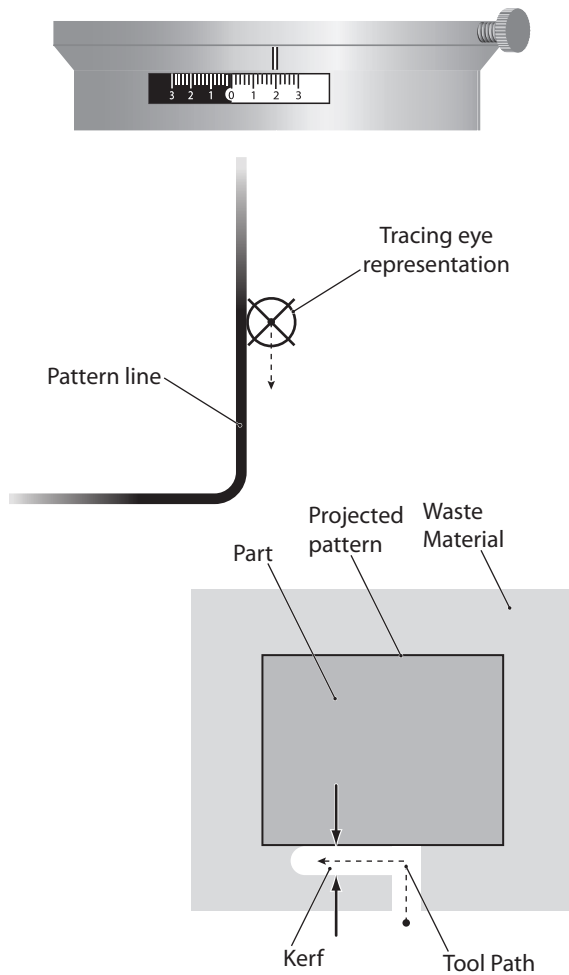
OPERATION



Example 2.

Illustrates a “white to black inside trace-cut”. With tracer and torch travel directions as shown, the compensation is inside of the template line.

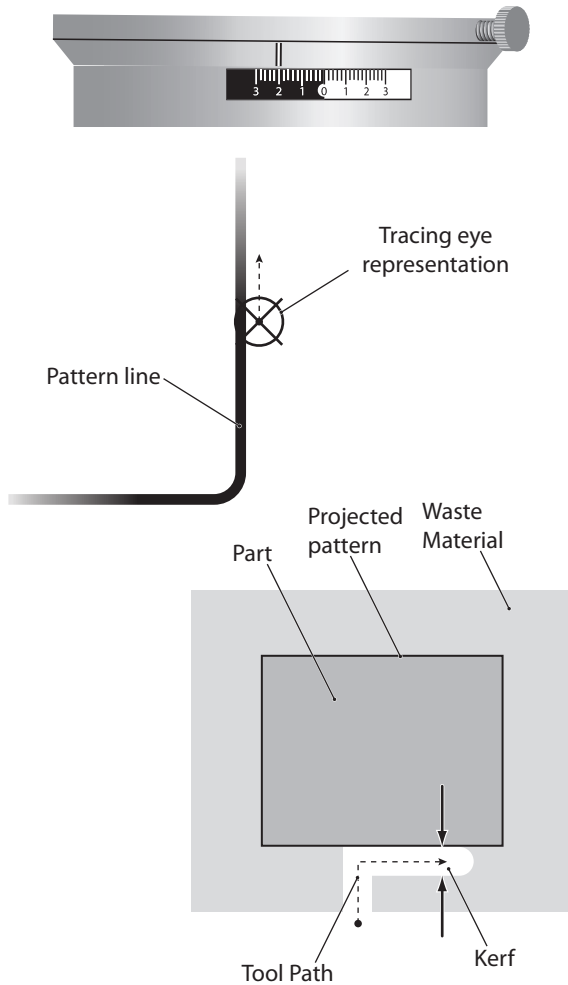
Note direction of travel is counter-clockwise.



Example 3.

Illustrates "white to black" outside trace-cut. With the torch and tracer travel direction as shown, the tracer is offset to the outside of the template. Establish the amount of kerf required based on measured kerf width.

Note direction of travel is clockwise around the template pattern.



Example 4.

Illustrates a “black to white” trace-cut. With travel direction as shown, the tracer is offset to the outside of the pattern line. Establish the amount of offset required based on measured kerf width.

Note direction of travel is counter-clockwise.

OPERATION

I NOTICE

In all cases, consider the template dimension points. Failure to make this consideration may result in cutting oversize (or undersize), depending on the direction of kerf offset.

I NOTICE

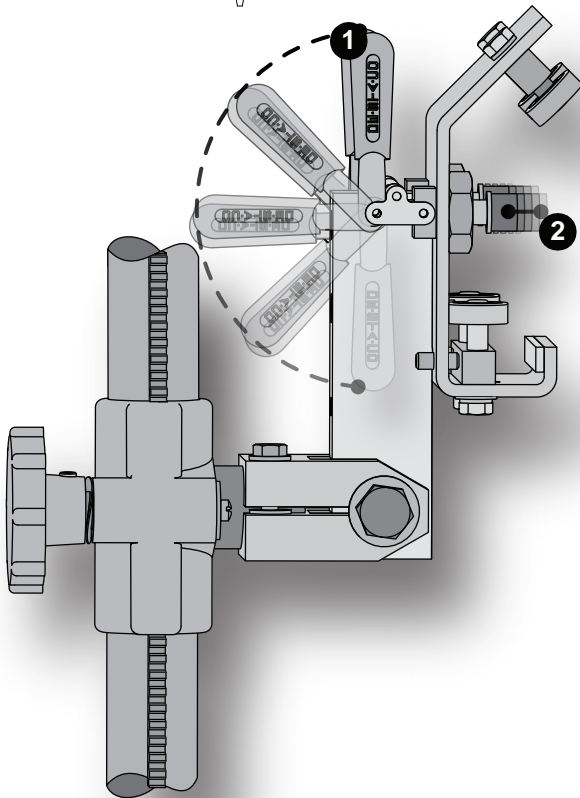
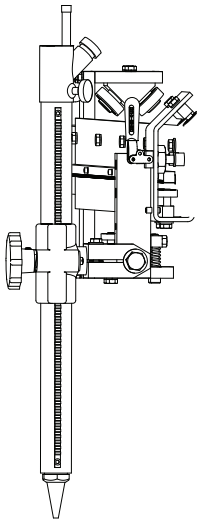
See the tracer manual for more information.

Notes on Pattern and Kerf Requirements.

- Pattern lines should be drawn with uniform density and high contrast to the pattern background. Optimum tracing performance is achieved with patterns consisting of a dense black line on a white background. Corners should be smoothly drawn and the line should not have breaks. Patterns may be drawn with India ink, newsprint ink, pencil (soft and black), some ball point pens containing a repro ink.
- Red or purple leads and ink are practically invisible to all optical systems. Most felt tip pens use a red-pigment ink that is not acceptable.
- Ideal line width is 0.030 to 0.035 inch (0.76 to 0.89mm) Minimum distance between lines is 0.125 inch (3mm).
- When preparing patterns, the creation of the least amount of scrap should always be a consideration. Chain drawings of irregular pattern shapes are one way that is used to hold scrap to a minimum.
- To help the operator during set-up and maintain consistency from one setup to the next run, include the following notation on each pattern drawing:
 - ... Arrows to indicate direction of travel.
 - ... Center to center distances between torch tips (if multiple torches are used)
 - ... Longitudinal and transverse axis reference locations.
 - ... Any special instructions necessary to produce the part.

Torch Carriage Positioning

Torch carriages ride on rail bearings and must be locked when placed in their cutting position. 2 toggle clamps **1** are mounted for this purpose. Rubber stops **2** push on the cross axis slide locking the carriage in place.

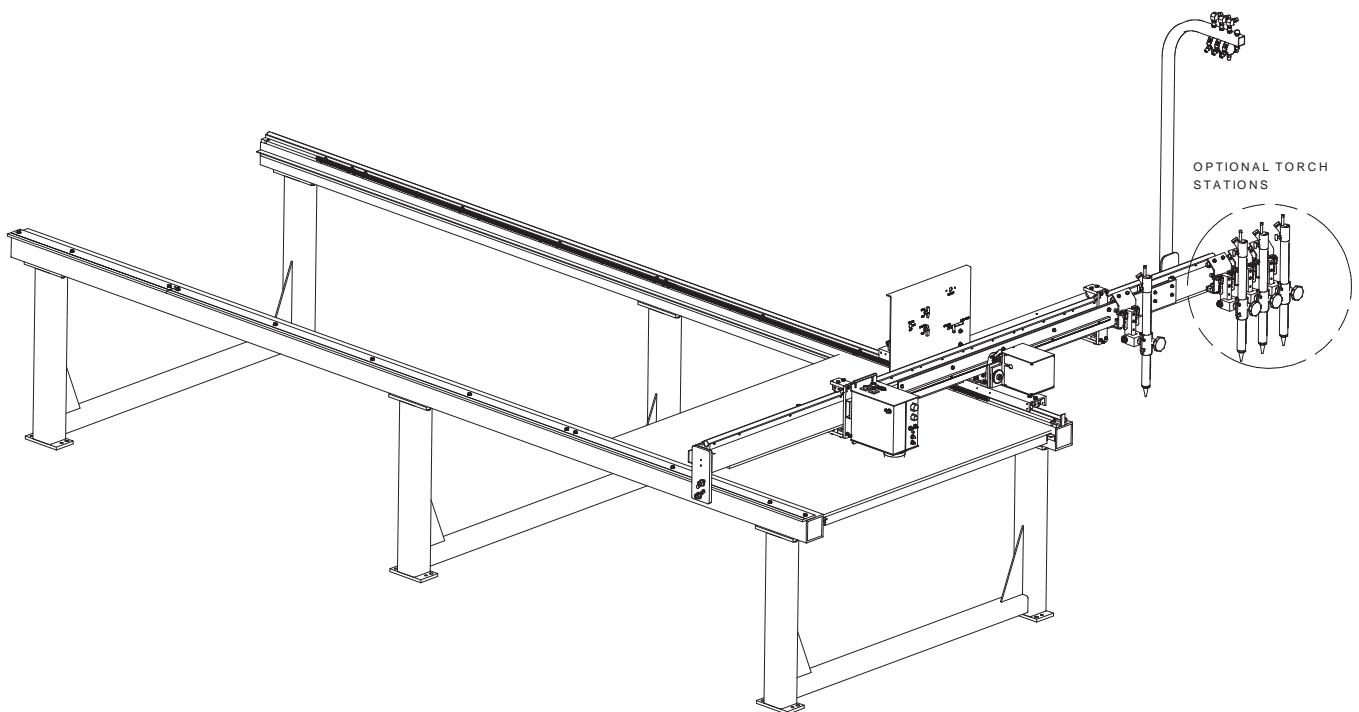


Silhouette 1000 Maintenance

General Information

The Silhouette 1000 Shape Cutter is designed to operate over a long period of time with a minimum of maintenance. However, continued satisfactory operation of the machine depends upon the careful performance of a few simple inspection and cleaning procedures. Troubleshooting procedures are included to help diagnose and correct problems as they occur.

Be sure to become familiar with the Safety Section at the beginning and notices throughout this manual before maintenance or operating the machine.



Daily Inspection and Maintenance.

Inspect the entire machine each day before operating. Check all parts and components visually and perform the following steps to check machine systems and operation.

Refer to the troubleshooting subsection for identifying and faults or malfunctions.

1. Inspect all operating parts of the machine for cleanliness. Wipe off the round shafts and the bearing surfaces of the carriages.
2. Spray the polished surfaces on these rails with a rust inhibitor such as Mobiliarama 257 or equivalent. Wipe off excess with a clean dry cloth.



CAUTION

Do not use oil or grease to clean or lubricate rails and bearing surfaces.

Oily lubricant will attract dirt , creating an abrasive compound.

3. Check to see that the cantilever assembly moves freely forward and back along the track rails with the longitudinal drive disengaged.
4. Close the main disconnect switch to apply electrical power to the machine and turn on gas and oxygen supplies at the machine station outlets. Check for gas or oxygen leaks.
5. Lift the power toggle switch to the ON position to apply electrical power to the machine.

6. Check the machine drive operation by operating the machine in both axes with the direction knob. Drive speed may be varied with the Speed Knob to see that the drives are functioning properly.
7. Check operation of the solenoid valve which controls gas flow to the torches.
8. Check operation of all tracer controls to see that they are operating properly. If possible, check operation of the machine under tracer control using a line or edge type pattern.
9. When the proceeding checks have been made and the machine appears to be in good operating condition, return the power toggle switch to OFF position.

Periodic Inspection and Maintenance

When daily inspection checks have been regularly performed, these additional inspections are required less frequently, approximately every 60 to 80 hours of operation.

- Check for loose wiring and tighten connections if required.
- Check for loose hardware and tighten as required.
- Inspect for damaged/broken parts and replace as needed.
- Check drive pinions on both the X and Y drive motors and tighten the setscrews to secure them to the drive shafts.
- Inspect the polished round steel rails for pits, nicks and wear spots. Lightly sand or polish nicks smooth.
- When the rails start to wear flat spots, the setscrews in the rail supports can be loosened and the round rail rotated and reset in the support. These rails are hardened but over time they will wear. See the procedure later in this section.

Lubrication



This machine is designed to operate without lubrication of any kind. Bearings are sealed and should never be lubricated or cleaned with solvent.



Do not lubricate drive rack, drive pinons or other machine parts.

It is suffecint to keep all such parts clean and free of foreign materials.

Rail System

Rails may be bumped, nearby machinery vibration or temperature variations are factors that may result in the rails becoming un-level. Rails should be level checked monthly (or more often if conditions warrant). Refer to Installation Section for rail leveling procedures.

Rail Rotation and Replacement.

As wear occurs on the cylindrical rail surface rotation to expose a fresh surface will be necessary. (look for a flat on the most used portion of the rail length.)

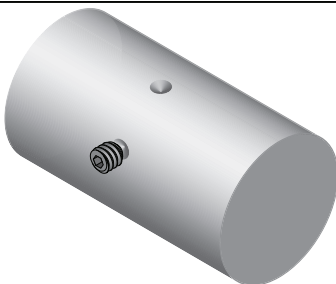
1. Loosen the set screws along the length of the rail support.
2. Rotate the round rail approximately 10 degrees.
3. Gradually tighten the set screws down the length while lightly tapping the round rail with a softface deadblow (recoilless) hammer. If stricken too hard the rail may bounce up. Make several passes along the length, gradually tightening as you go.

CAUTION

Metal cutting is a dirty process. Do not allow dirt/dust to accumulate. This will dramatically expedite wearing out of machine surfaces.

Keep your machine wear surfaces, rails, bearings , drive rack and pinions wiped clean.

NOTICE



Round rail setscrews are cone point.

After rotating the rail, polish the previous contact areas with a fine stone/or fine sandpaper to remove setscrew dimples making the rail smooth.

Tracing Table

Keep the tracing table clean and clear of dirt and debris.

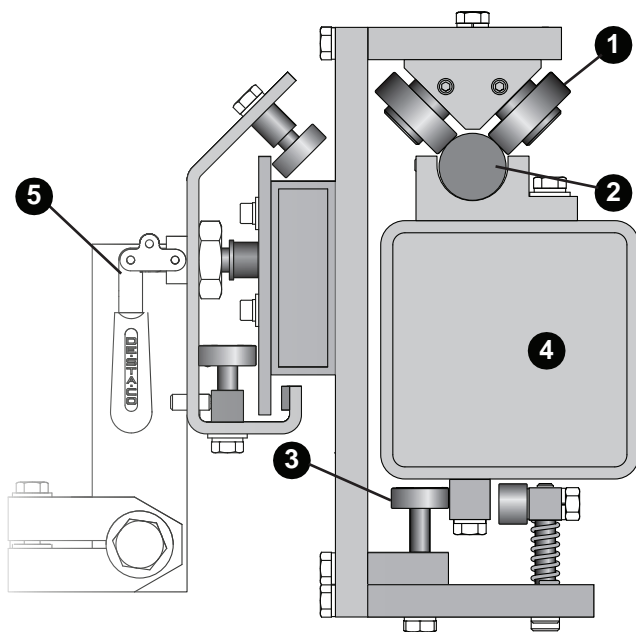
Troubleshooting

The troubleshooting subsection serves as an aid in diagnosing potential operational problems. This chart should be used in conjunction with the tracer manual.

Problem	Possible Cause	Solution
No machine movement (manual or phototracer)	<i>Power switch on control is in OFF position</i>	<i>Move switch to ON position</i>
	<i>Drive switch is in OFF position</i>	<i>Move switch to ON position</i>
	<i>No Power to the machine</i>	<i>Check fuses at disconnect switch</i>
	<i>Machine fuse blown.</i>	<i>Check fuse on control panel. Replace if necessary.</i>
No machine movement in X axis (manual or phototracer)	<i>Logitudinal drive not engaged</i>	<i>Move handle to engage position</i>
	<i>Loose drive motor cable</i>	<i>Check cable</i>
	<i>Fault in drive system</i>	<i>See tracer manual</i>
No machine movement in Y axis (manual or phototracer)	<i>Transverse drive not engaged</i>	<i>Move disengage handle on master carriage</i>
	<i>Loose drive motor cable</i>	<i>Check cable</i>
	<i>Fault in drive system</i>	<i>See tracer manual</i>
Torches "lag" behind tracer in longitudinal (X) direction	<i>Master rail/truck bearing worn</i>	<i>Replace bearings</i>
	<i>Truck wheel mounting blocks loose</i>	<i>Tighten attaching screws</i>
	<i>Input hoses and cables causing drag on the floater end</i>	<i>Rearrange hoses and cables so there is no drag on torch</i>
Machine "jumps" while cutting	<i>Floater track bar dirty</i>	<i>Clean track bar</i>
	<i>Pattern dirty or break in pattern line</i>	<i>Check and clean pattern</i>
	<i>Hoses or cables dragging</i>	<i>Rearrange hoses and cables so there is no drag on torch</i>
Machine stops and off-pattern indicator light comes on	<i>Imporper pattern</i>	<i>Check pattern requirements</i>
	<i>Hoses or cables dragging</i>	<i>Rearrange hoses and cables so there is no drag on torch</i>
	<i>Incorrect pattern to tracer height</i>	<i>Check height and adjust</i>
	<i>Drive system problems</i>	<i>See tracer manual</i>
Machine stops and the off-pattern indicator light comes on	<i>Drive pinion not contacting drive rack properly</i>	<i>Check and adjust drive pinion</i>
	<i>Hoses or cables dragging</i>	<i>Rearrange hoses and cables so there is no drag on torch</i>
	<i>Drive system problems</i>	<i>See tracer manual</i>

Edge of parts not square with surface	<i>Torch not vertical</i>	<i>Adjust torch</i>
	<i>Cutting table not level</i>	<i>Level table</i>
Cut part short in dimension	<i>Pattern incorrect or does not allow for kerf</i>	<i>Check pattern reset kerf</i>
	<i>Tracer head not vertical</i>	<i>Realign head</i>
	<i>Drag on outboard bearing</i>	<i>Rearrange hoses and cables so there is no drag</i>
	<i>Master rail not straight</i>	<i>Realign master rail</i>
No preheat fuel gas at torch	<i>Faulty regulator</i>	<i>Check regulators</i>
	<i>Flow control valve closed</i>	<i>Open flow control valve</i>
No cutting oxygen	<i>Faulty regulator</i>	<i>Check regulator</i>
	<i>Flow control valve closed</i>	<i>Open flow control valve</i>
	<i>Faulty solenoid valves</i>	<i>Inspect repair or replace</i>

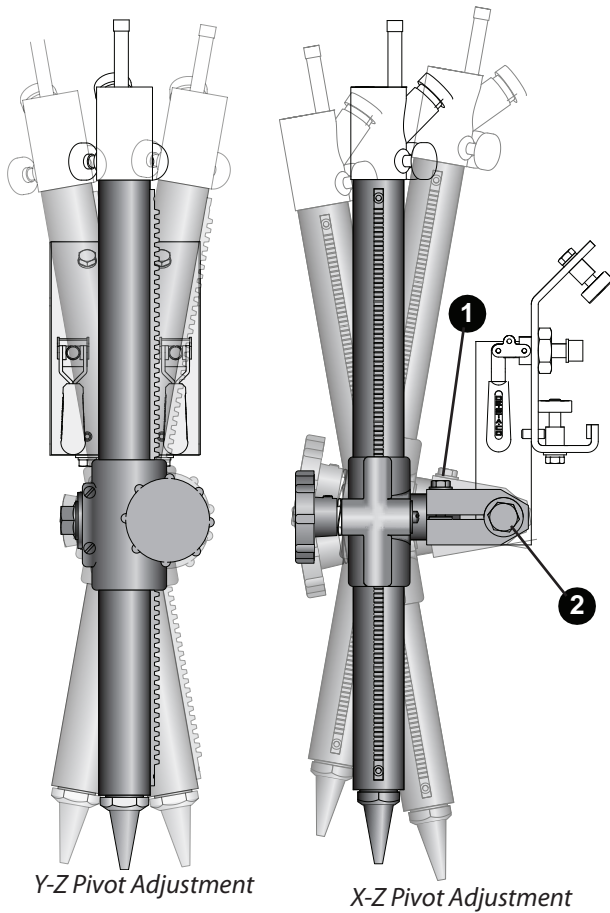
Tracer/Torch Bar and Torch Carriages



- 1 Roller Bearings
- 2 Round Rail
- 3 Roller Bearings
- 4 Cantilever Beam
- 5 Locking Lever

The tracer/torch bar and torch carriages provide the transverse motion of these components in the cutting operation. The bar runs on the surface hardened round rail mounted on top of the cantilever beam and bearing bar mounted on the bottom of the cantilever beam. Upper bearing rollers run on the round rail and are mounted so they contact the rail at two points 90° apart. The lower bearing rollers run on a bearing bar and are designed to provide stability and spring tension for containment and consistent alignment.

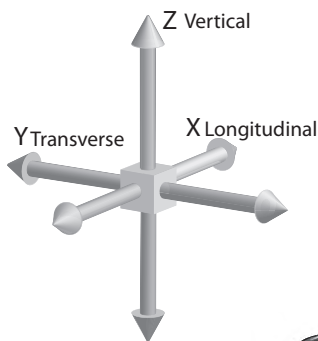
A mounting plate is permanently fixed to the tracer/torch bar for attaching the tracer head. Slots in the tracer head provide for the necessary height adjustment. The torch carriages which carry the torch holders are slaved to the tracer eye by the tracer/torch bar. The carriages can then be independently positioned and locked into position.



Cutting torches are mounted in the torch holder so that a pinion on the adjustment knob shaft meshes with the torch barrel rack.

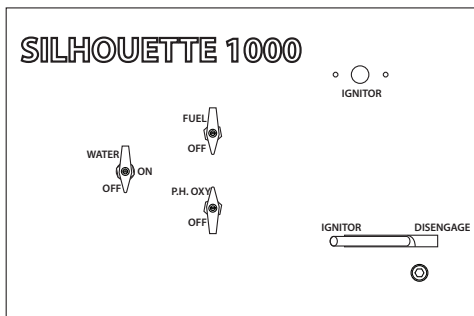
The torch holder may be turned in the torch holder clamp **1** so that the torch may be rotated in a transverse plane (Y-Z).

The clamp **2** pivots on the torch bar to provide rotation in a longitudinal plane (X-Z).



Torch Level

Use a torch level to adjust the vertical alignment of the cutting torch.

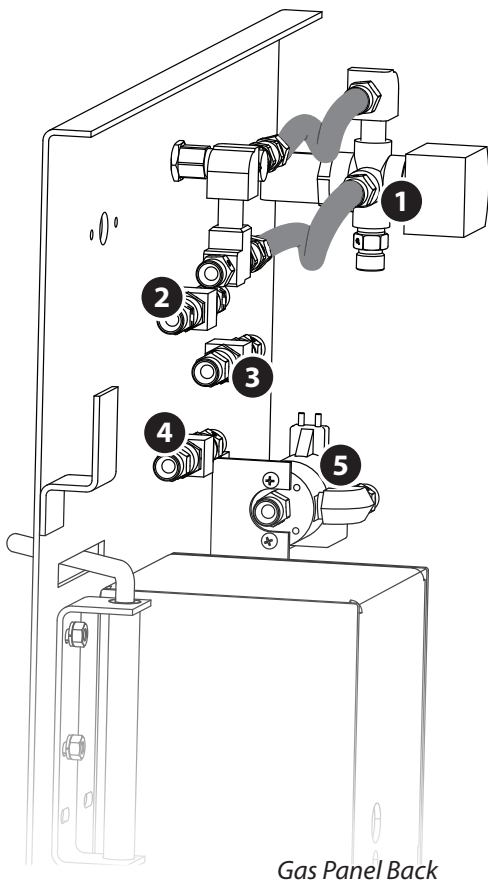


Gas Panel Front

Gas Supply System

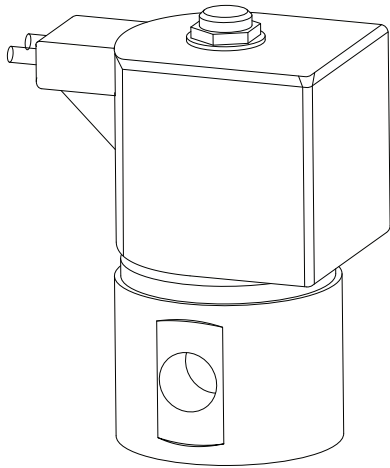
The gas supply system includes flow control valves, solenoid valves (fuel gas and oxygen), gas manifold blocks and interconnecting hose assemblies for fuel, preheat oxygen and cutting oxygen. Supplies to the machine must be externally regulated to a pressure higher than the pressure used in the cutting operation, allowing for line pressure drop. Final regulation for the desired cutting pressures are made at the torch with the three torch mounted valves.

All gas control systems have been designed to allow up to 20 cumulative torch inches and a maximum plate thickness of 8 inches providing the gas source has adequate pressure and flow.

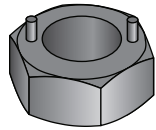
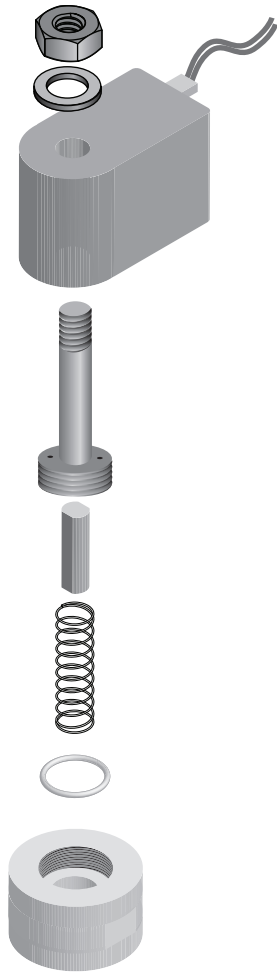


Gas Panel Back

- 1 Oxygen Pierce Rate Control (Option)
- 2 Fuel Gas Valve
- 3 Water Valve
- 4 Preheat Oxygen Valve
- 5 Cut Oxygen Solenoid



A periodic cleaning of the solenoid valve is desirable. Time between cleanings will vary depending on the shop environmental conditions. In general if the voltage to the solenoid coil is correct, sluggish valve operation or excessive leakage will indicate cleaning is required. The valve need not be removed from the line for inspection or servicing and solder connections should not be broken unless absolutely necessary.



Valve Wrench
(Not to Scale)

Solenoid Disassembly Procedure

1. Remove nut from the top of the valve
2. Slide the housing and coil form sleeve assembly.
3. Unscrew the sleeve from the body using the valve wrench
4. If foreign matter is causing valve malfunction, it will be between the plunger and the seat body. Examine and clean these parts carefully.
5. Re-assemble the valve in reverse order of disassembly, making certain that the gasket and sleeve seal properly.

Electrical System

See Tracer Manual

Motorized Lift

Description

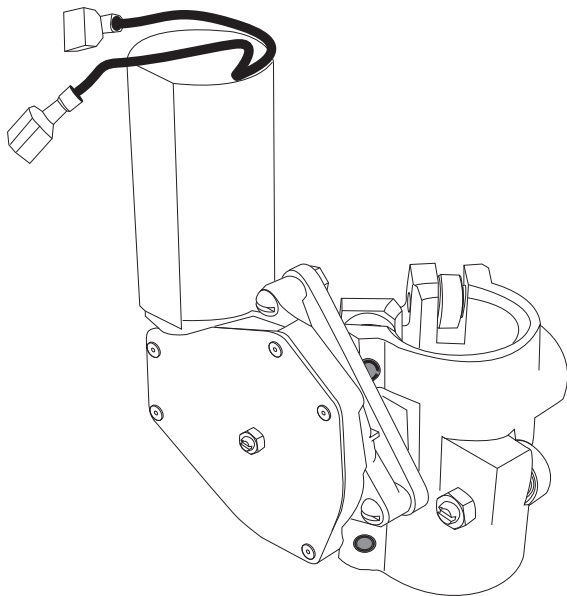
This electric lift has three main components. Motor, gear box and torch holder. The torch is held in the in line with 5 sealed ball bearings. One bearing is on an eccentric shaft for torch barrel (handle) tension adjustment.



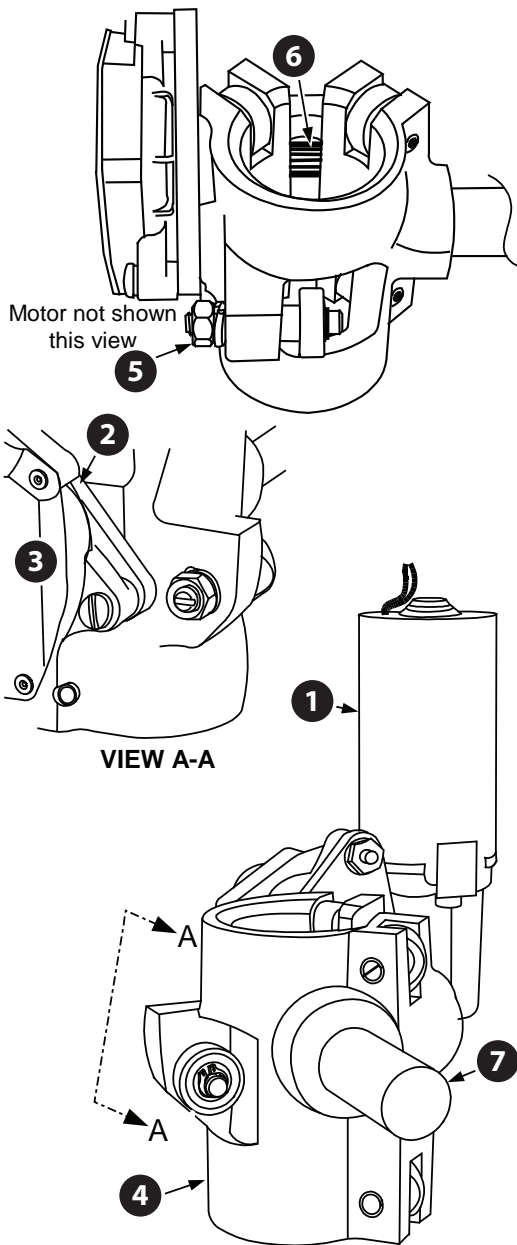
Do not over tighten eccentric bearing on torch handle.

Torch damage is possible.

A hard body torch (steel) is required with this lift. Do not use with a brass body torch.



Motorized Lift Maintenance



- Clean Rack on torch to prevent buildup on pinion
- Adjust eccentric bearing just enough to prevent “rocking” of the torch. DO NOT Overtighten.
- Clean torch handle to encourage smooth operation

- 1 motor
- 2 adaptor plate
- 3 gearbox
- 4 torch holder
- 5 eccentric bearing assembly
- 6 lift pinion
- 7 mount shaft

MAINTENANCE

Notes

Horizontal lines for taking notes.

MAINTENANCE



ESAB Welding & Cutting Products

Introduction

General Information

This section provides replacement parts information and will assist during machine maintenance. It is arranged by functional groups or assemblies for easy identification of individual parts and replaceable assemblies. The Replacement Parts List consists of a parts list for the main assembly and one for each major assembly and subassembly. Item numbers that identify parts in the illustration are given in the list where applicable, along with part numbers and descriptive information.

The four column parts list for each figure is arranged to show the assembly relationship of parts and subassemblies.

Common hardware items or other parts readily available from commercial sources are not included. Parts purchased from vendors by ESAB are listed by ESAB part numbers. Hardware is specified as items in the parts list but normally doesn't have an ESAB part number.

Do not use this number as a recommended quantity of spare parts. The customer must determine how many spare parts to purchase.

Ordering Information

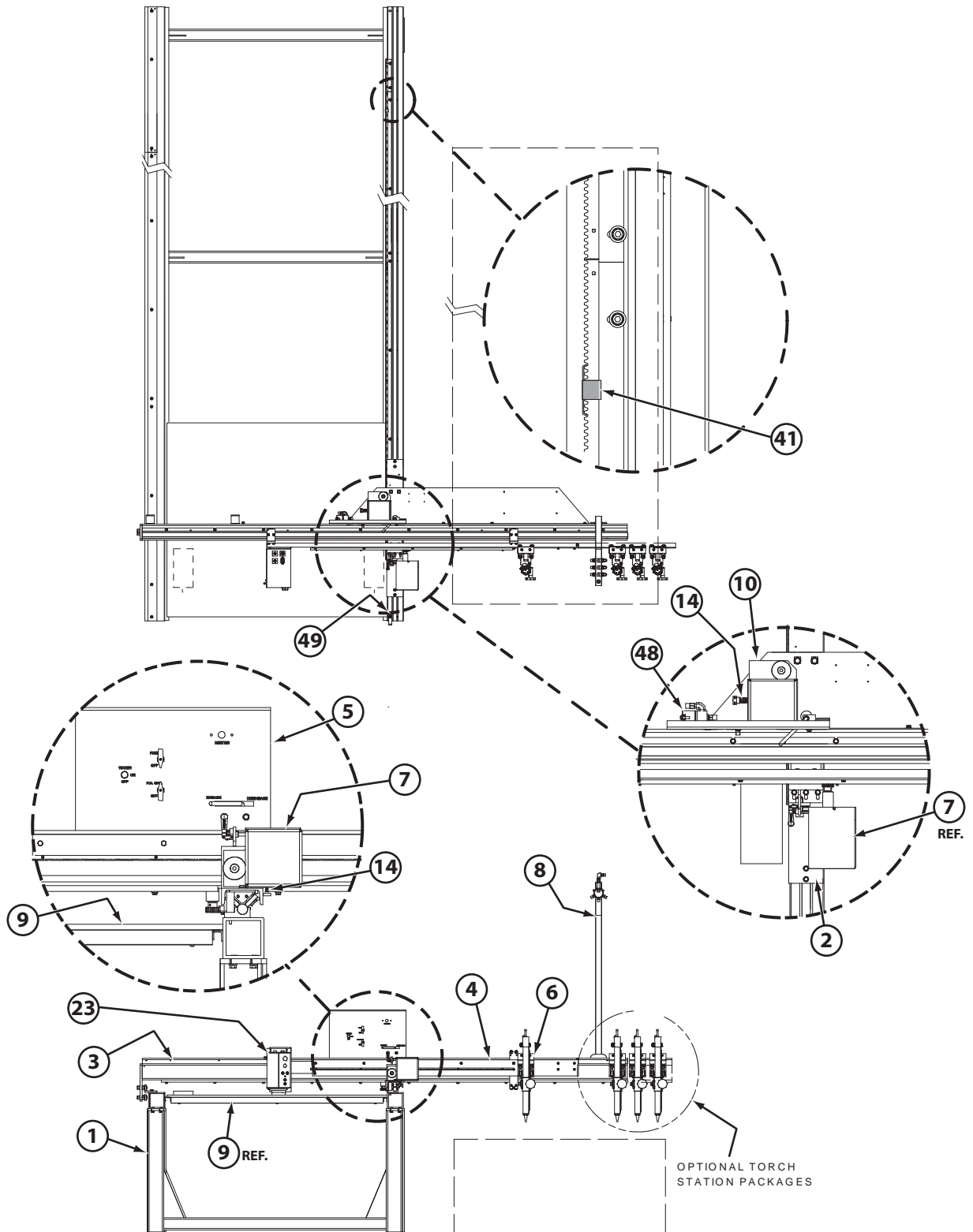
When ordering replacement parts, order by part number and complete part description as given in the description column. Also, give machine model number and serial number. Address all inquiries to your local ESAB Distributor or to ESAB Cutting Systems, P.O. Box 100545, Florence, South Carolina, 29501.

**NOTICE**

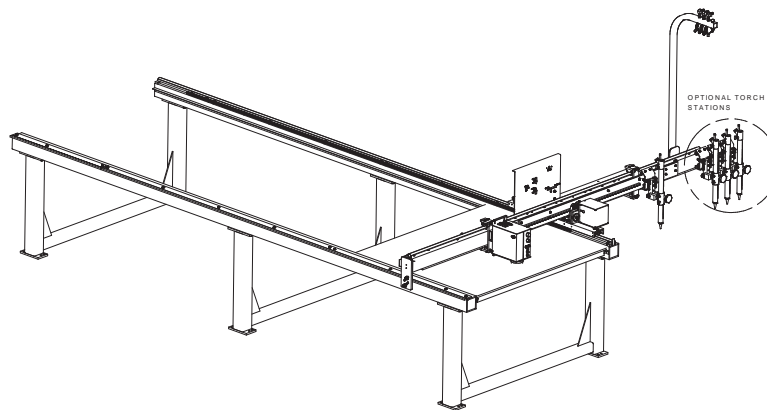
This manual may contain part illustrations not applicable to your specific machine. To avoid unnecessary delays, positively identify your correct assembly before ordering replacement parts.

Silhouette 1000, Basic Machine, 4 and 6FT.

0560938838 Rev OR



REPLACEMENT PARTS



Parts List

ITEM	PART NUMBER	QTY	DESCRIPTION
1	0560938851	REF.	RAIL SYSTEM ASSY - SIL 1000-6
1	0560938839	REF.	RAIL SYSTEM ASSY - SIL 1000-4
2	0560938837	REF.	MASTER CARRIAGE ASSY
3	2235504	REF.	MAIN BEAM ASSY - 1000-6
3	2235502	REF.	MAIN BEAM ASSY - 1000 -4
4	41101329	REF.	TORCH BAR ASSY - 1000-6
4	40901329	REF.	TORCH BAR ASSY - 1000-4
5	2235832	REF.	GAS CONTROL ASSY
6	69971	REF.	STANDARD MANUAL TORCH STATION ASSY
7	66451	REF.	CROSS DRIVE MOTOR ASSY.
8	40201829	REF.	MANIFOLD SUPPORT ASSY
9	4113001	REF.	TABLE, TRACING ASSY - 1000-6
9	4103001	REF.	TABLE, TRACING ASSY - 1000-4
10	41001289	REF.	RAIL DRIVE ASSY
11	52675	REF.	TORCH HOLDER ASSY. (1 per STATION)
12	639110	8	OXY. CHECK VALVE
13	0560985522	4	FUEL CHECK VALVE
14	60101301	2	MOTOR SPRING
15	40001501	4	CLUTCH SPRING
16	41001801	2	BALL VALVE
17	F13363	2	TEST TEMPLET, SOLID P
18	F13368	2	TEST TEMPLET, SQUARE
19	F14100	1	VIDEO, SILHOUETTE 1000
20	12510133	1	NAMEPLATE - ESAB
21	2234954	1	DECAL, ESAB/LTEC - YELLOW
22	2234957	1	DECAL, ESAB/LTEC - CLEAR 1
23	2236315	1	HL90 W/OUT DR. HS #332
24	2236502	1	DECAL, SILHOUETTE 10000 (CLEAR)
25	2238956	1	TAG, METAL AMT MEMBER
26	5014450	1	TEMPLET, MATERIAL SAMPLES
27	51022	2	MOTOR, GMT9434F832
28	51227	2	MANUAL, SILHOUETTE 1000
29	52703	3	CON SEAL # 11 AMP
30	56999206	1	GUARD PINCH W/ WIPER S
31	56999234	1	HOSE SUPPORT, SILHOUETTE 1000

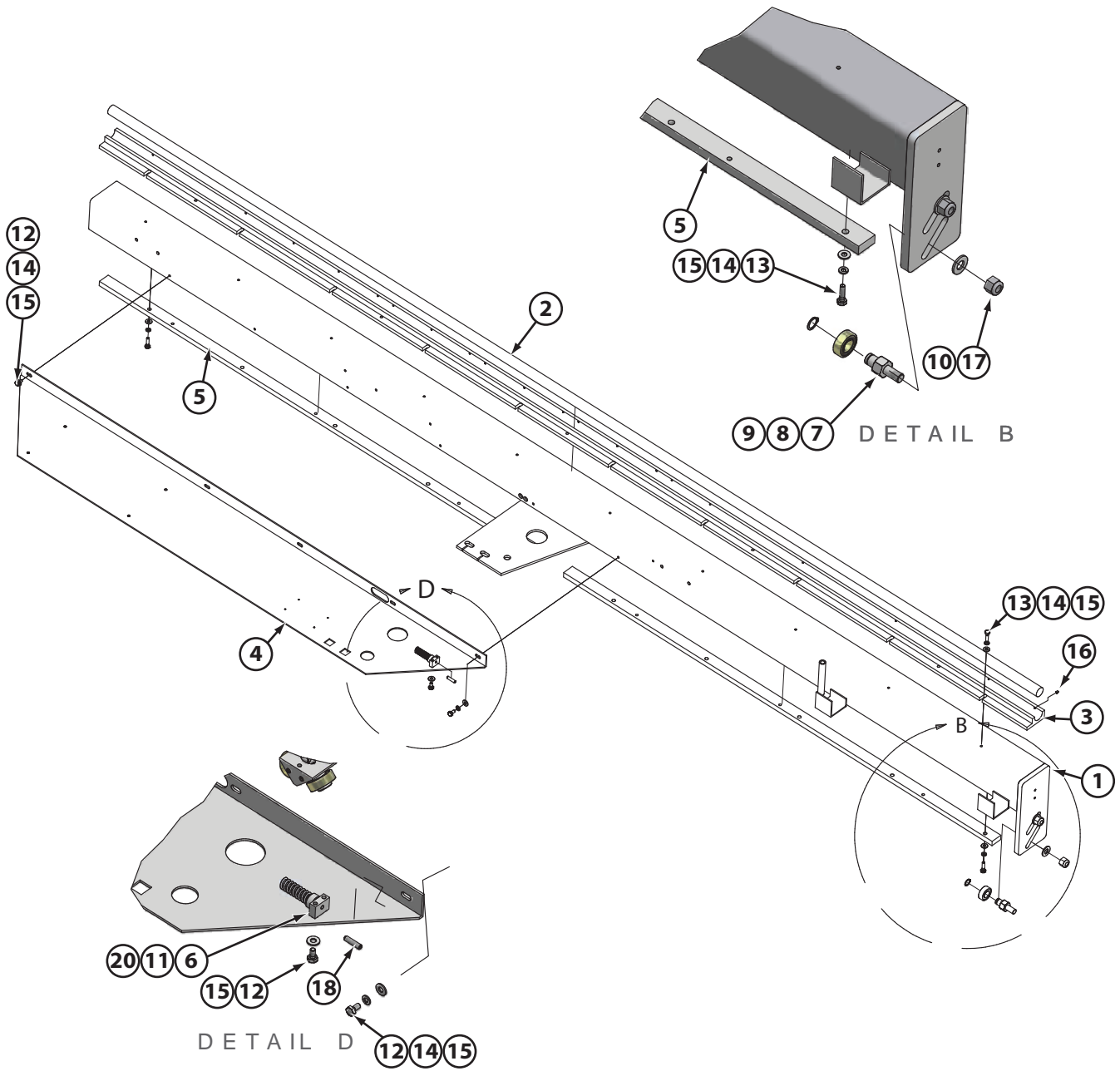
ITEM	PART NUMBER	QTY	DESCRIPTION
32	64407	1	1/2" BONDING STRAP LE
33	64914	1	AC OUTLET STRIP (CSA)
34	66321	1	EARTH GROUND TEST DEC
35	66423	1	CUT SOLENOID CABLE
36	66424	2	CXA DRIVE MOTOR CABLE
37	67121	2	2871, HEYCO BUSHING .31 ID.
38	67330	2	HEYCO 1217, SR-6N-4, .3
39	93000601		WIRE 600V 90C MTW 6AW
40	954698	1	LABEL, WARNING - GEAR PINCH
41	2058467	2	BACK CLIP DERAILER
42	83390	12	ADAPTER, FUEL 1/4"
43	83389	20	ADAPTER, OXY 1/4"
44	51178	1	TERMINAL GROUND LUG
45	68265	1	VALVE WRENCH
46	50901803	1	CONNECTOR HOUSING
47	50901807	2	PIN CONNECTOR
48	51914	1	VALVE, SOLENOID
49	52692	1	BUMPER, RUBBER
50	67997	2	RETAINING RING, TRUARC 5100-62
51	2115696	4	COUPLING, BRASS 1/4"
52	51216	6	BEARING, 6206-RS
53	9300601	ROLL	GROUND WIRE (50 FT. PER MACHINE)
54	93081801	ROLL	300V 18AWG COMM. CABLE (20FT. PER STATION)
55	611F05	ROLL	1/4" ID GREEN OXY HOSE
56	611F06	ROLL	1/4" ID RED FUEL HOSE
57	0560988744	1	DECAL, CUTTING SYSTEMS PATENT

SUPPLIED WITH MOTORIZED STATIONS ONLY			
ITEM	PART NUMBER	QTY	DESCRIPTION
58	2235503	REF.	MOTORIZED TORCH STATIONS (1 REQ'D per STATION)
59	66402	1	MOTOR LIFT
60	57000635	1	BODY, BUDGET LIFT w/ SHAFT
61	41016197	1	PINIION

62	0560936062	REF.	SCHEMATIC PACKAGE
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Main Beam

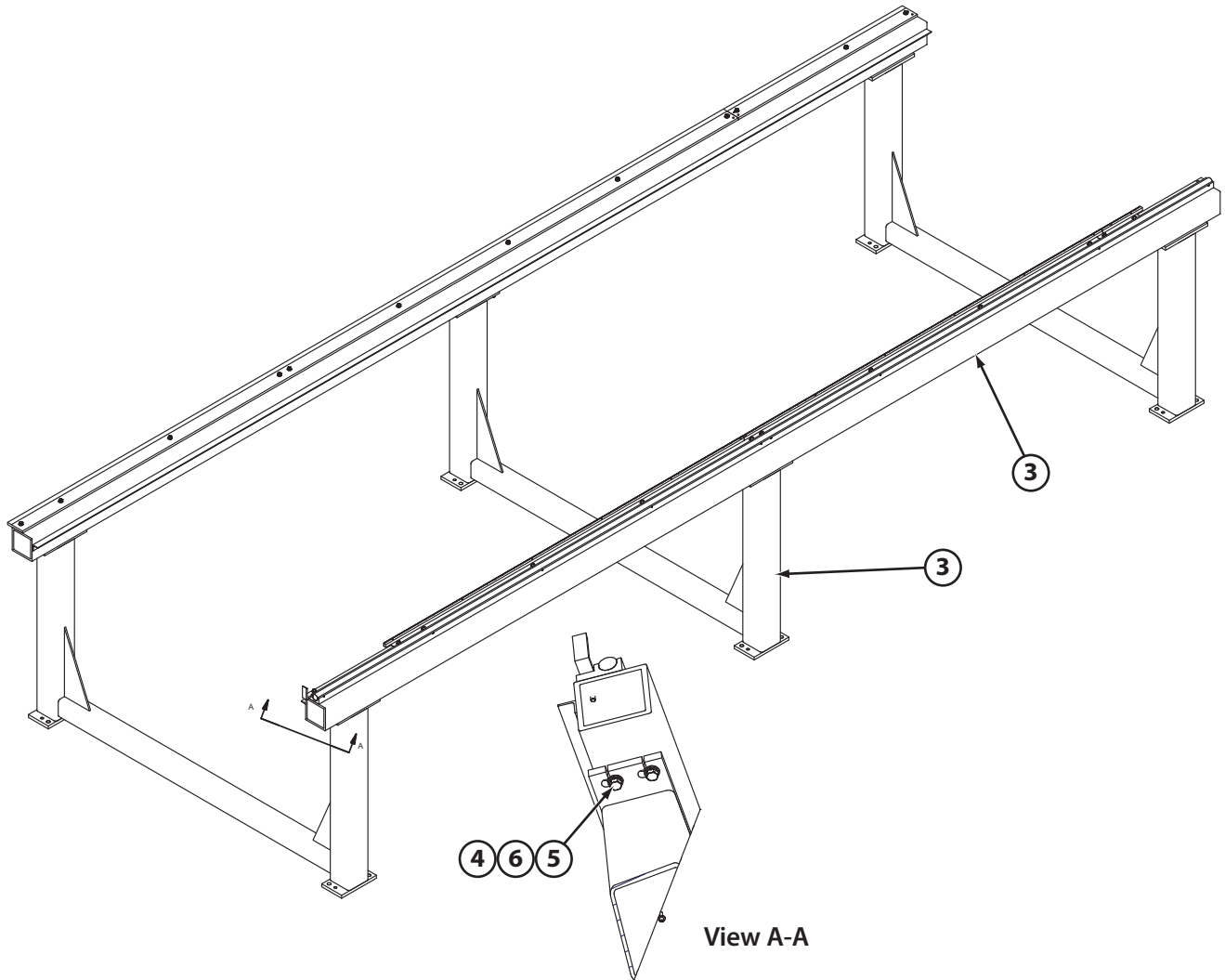
2235502 Rev1



Parts List			
ITEM	PART NUMBER	QTY	DESCRIPTION
1	41001149	1	MAIN BEAM WELD ASSY -SIL 1000-4
2	41011121	1	SHAFT - RAIL
3	4004111	1	RAIL SUPPORT
4	41011115	1	REAR BRACE - SIL 1000
5	4101115	2	GUIDE BAR
6	41013161	1	SPRING BLOCK -RAIL
7	41011117	2	BEARING AXLE
8	51216	2	BEARING
9	SCREW	2	SET #6-32 x 1/4 LG. CUP P INT
10	63311183	3	NUT LOCKING HEX 1/2-13
11	41012157	1	SPRING PLUNGER PLATING
12	SCREW	7	HEX HD 1/4-20 UNC x 1/2 LG.
13	SCREW	23	HEX HD 1/4-20 UNC x 1 LG.
14	WASHER	28	LOCK, 1/4
15	WASHER	30	FLAT, 1/4
16	SCREW	20	SET, #10-32 x 1/4 IG.
17	WASHER	2	FLAT, 1/2
18	SCREW	1	SET, 1/4 -20 UNC x 1 1/2 LG. CUP POINT
19	SCREW	4	HEX HD, 3/8-16 UNC x 1 LG.
20	WASHER	4	FLAT 3/8
21	WASHER	4	LOCK, 3/8

Rail System Assembly

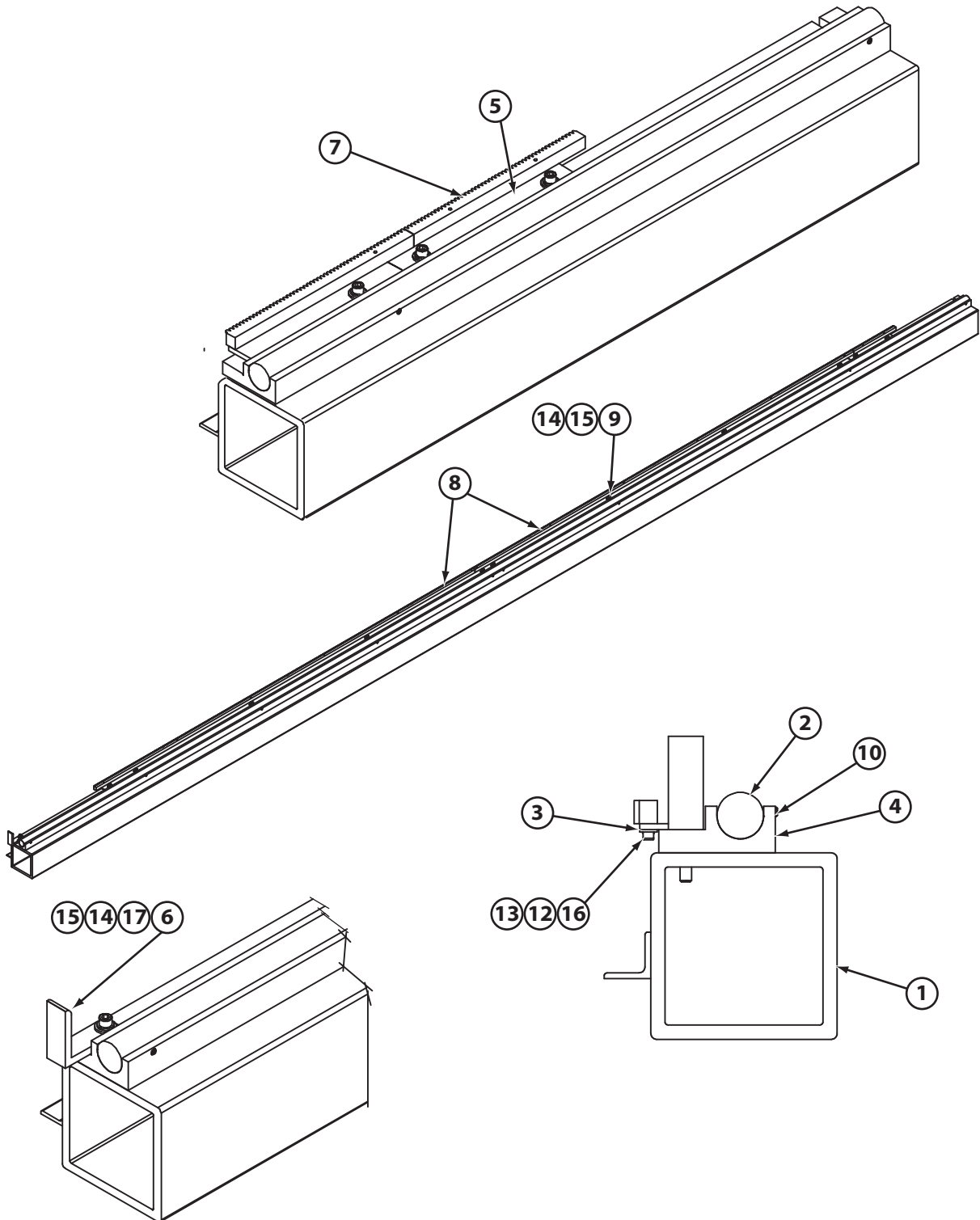
0560938839 Rev 1



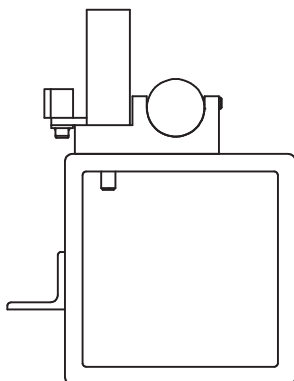
Parts List			
ITEM	PART NUMBER	QTY	DESCRIPTION
1	0560938843	1	RAIL ASSY - MASTER SIL -1000
2	0560938840	1	FLOATER RAIL ASSY
3	4110199	3	CRADLE WELD ASSY 1000-6
3	41001929	3	CRADLE WELD ASSY 1000-4
4		24	3/8 -16 UNC x 1" LG. SHCS
5		24	3/8 FLAT WASHER
6		24	3/8 LOCK WASHER

Rail System Master Rail

0560938843 Rev 1



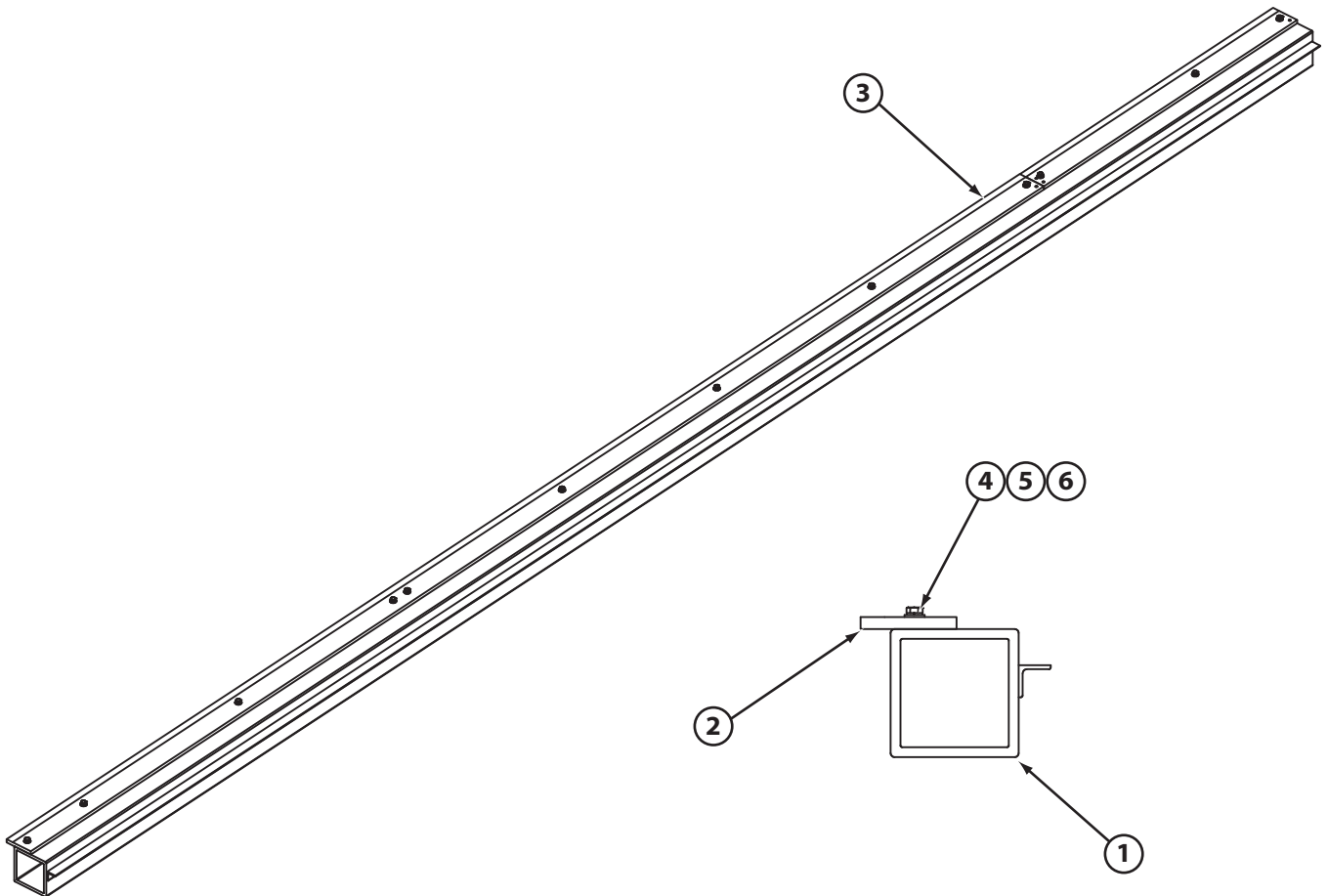
REPLACEMENT PARTS



Parts List			
ITEM	PART NUMBER	QTY	DESCRIPTION
1	0560938844	1	RAIL, MASTER WELD ASSY
2	0560988227	1	RAIL, 1" RD HARDENED 180" LG.
3	0560938883	1	RACK MOUNT BAR
4	0560988226	1	EXTRUSION RACK MTG - SHADOW 2 - SIL 1000
5	0560938851	1	RACK MOUNT BAR 8"
6	56996507	1	STOP, MACHINE
7	0560938882	1	RACK, 20 DP 20 PA 1/2 SQ 8"
8	0560988222	2	RACK, 20 DP 20 PA 1/2 SQ 71"
9		8	1/4 - 20 x 1 HEX HD CAP SCREW
10		9	#10-32 UNF x 1/4 HEX HD CAP SCREW
11		3	1/4 - 20 x 1/2 HEX HD CAP SCREW
12		14	M6 FLAT WASHER
13		11	M6 LOCK WASHER
14		12	1/4 FLAT WASHER
15		12	1/4 LOCK WASHER
16		14	6 - 32 x 1/2 SHCS
17		1	1/4 - 20 x 1 1/2

Rail System Floater Rail

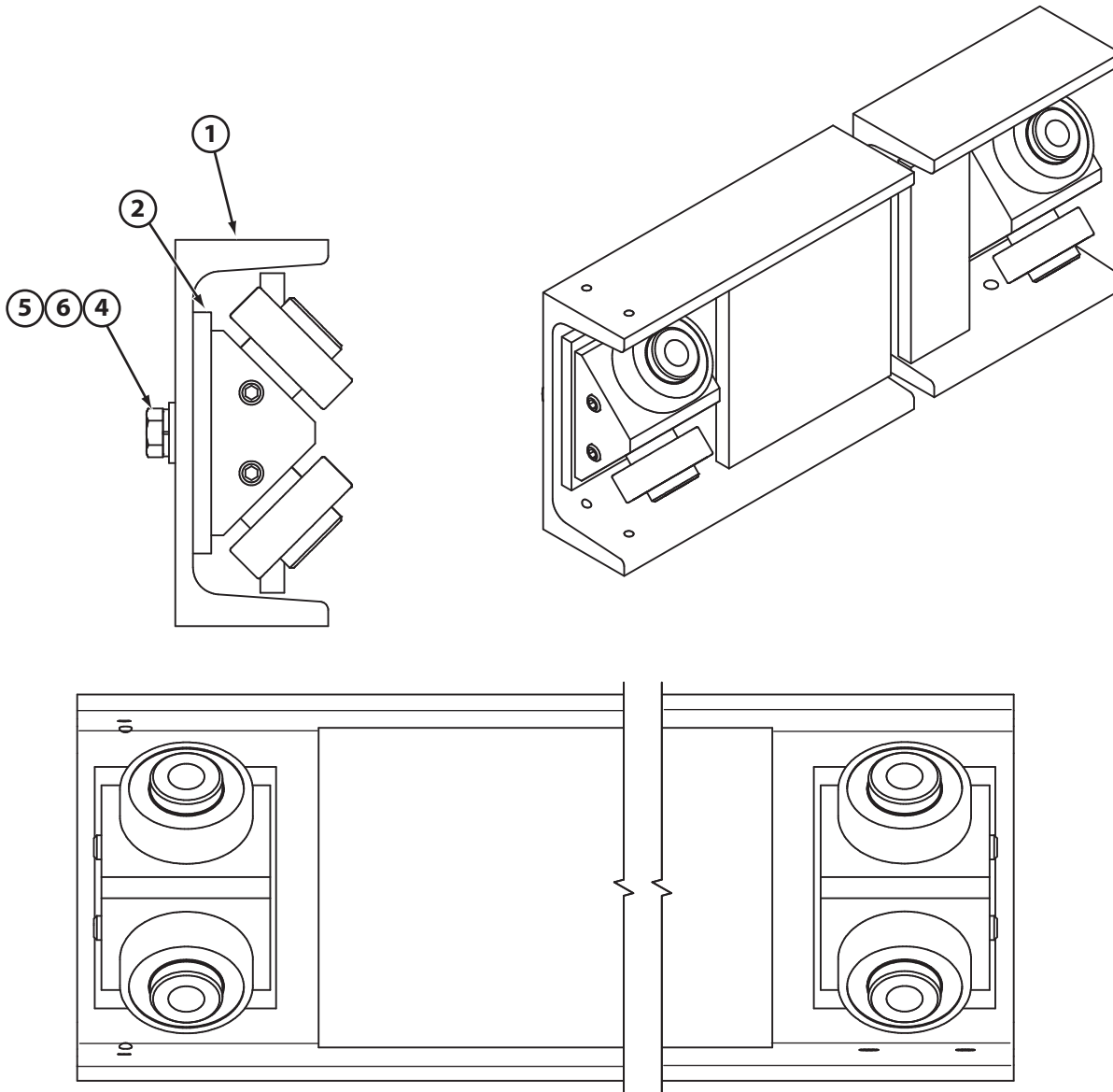
0560938840 Rev 1



Parts List			
ITEM	PART NUMBER	QTY	DESCRIPTION
1	0560938845	1	RAIL, FLOATER WELD ASSY
2	4101915	1	FLOATER RAIL BAR
3	0560938884	1	FLOATER RAIL BAR 36"
4		22	1/4-20 UNC x 3/4 LG. SHCS
5		22	1/4 LOCK WASHER
6		22	1/4 FLAT WASHER

Master Carriage

0560938837 Rev 1

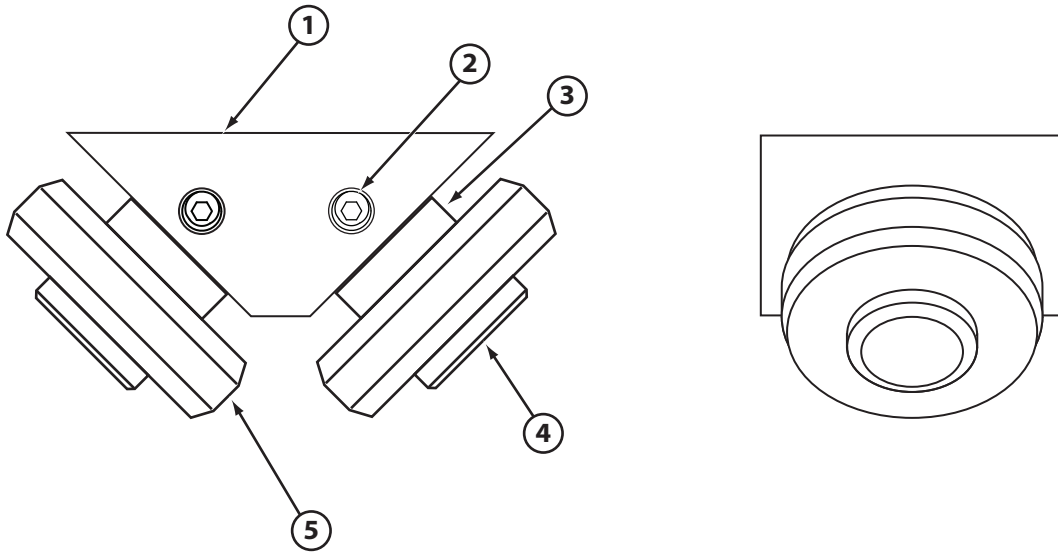


Parts List			
ITEM	PART NUMBER	QTY	DESCRIPTION
1	4110129	1	MASTER CARRIAGE WELD ASSY
2	41012135	2	SPACER
3	41001239	2	BEARING BLOCK ASSY
4		4	1/4-20 UNC x 3/4 LG. HEX HD CAP SCREW
5		4	1/4 FLAT WASHER
6		4	1/4 LOCK WASHER

REPLACEMENT PARTS

Bearing Block Assembly

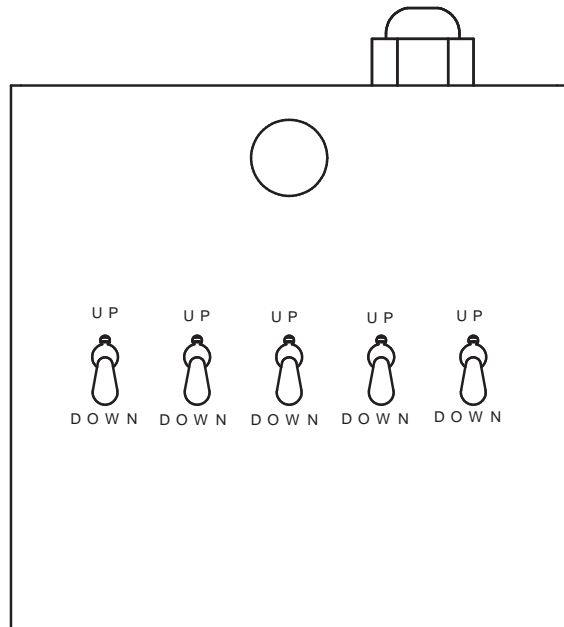
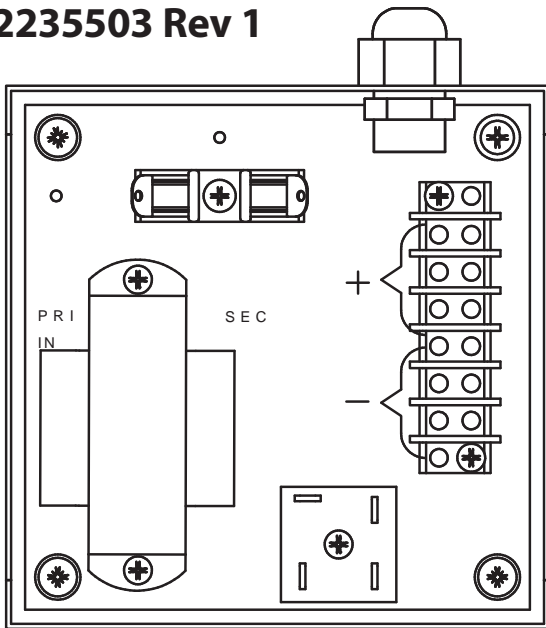
51216 Rev OR



Parts List				
ITEM	PART NUMBER	QTY	DESCRIPTION	
1	40030123	1	Bearing Block	
2	61338087	2	1/4-20 X 1/2 Set Screw	
3	70512143	2	Bearing Spacer	
4	51216	4	Bearing	
5	70212145	4	Bearing Stud	

Station Control Assembly

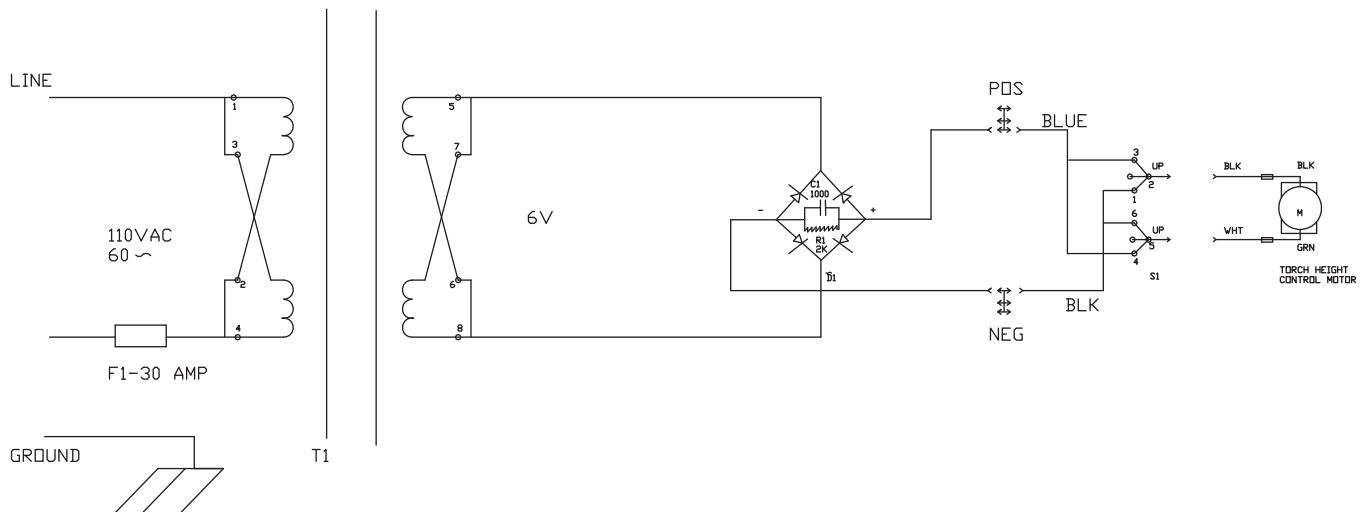
2235503 Rev 1



Parts List			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	66421	MOTORIZED TORCH CONTROL

NOTES:

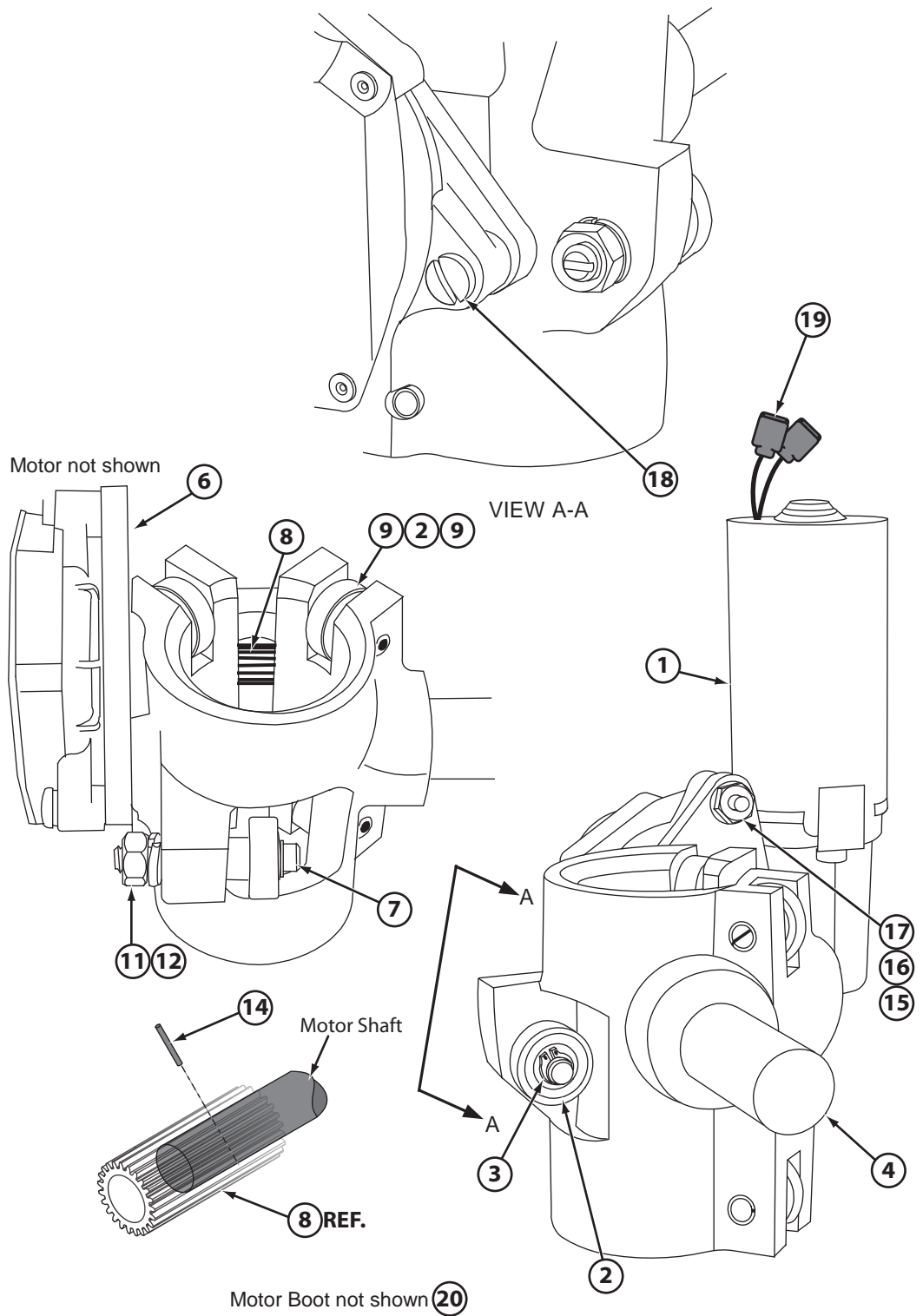
1. TYP HOOKUP FOR (1) MOTOR, ADDITIONAL MOTORS MAY BE CONNECTED IN PARALLEL AT TERMINAL + AND -
2. NON TYP. HOOKUP FOR 4 OR LESS STATIONS TO INCREASE LEFT SPEED HOOK SECONDARY IN SERIES (12V)
 SERIES CONNECT 6 & 7
 PARALLEL CONNECT 5 & 7, 6 & 8
 230V PRI.-CONNECT 2 & 3
 110V PRI.-CONNECT 1 & 3, 2 & 4
3. ADD OUTLET STRIP 64914 TO BACK OF BEAM (ABOVE TABLE) FOR MULTIPLE 115 VAC
4. ALLOW MIN 6" LEAD IN FOR DIFFERENT CHASSIS CONFIG.



REPLACEMENT PARTS

Motorized Lift

2237347 Rev 3

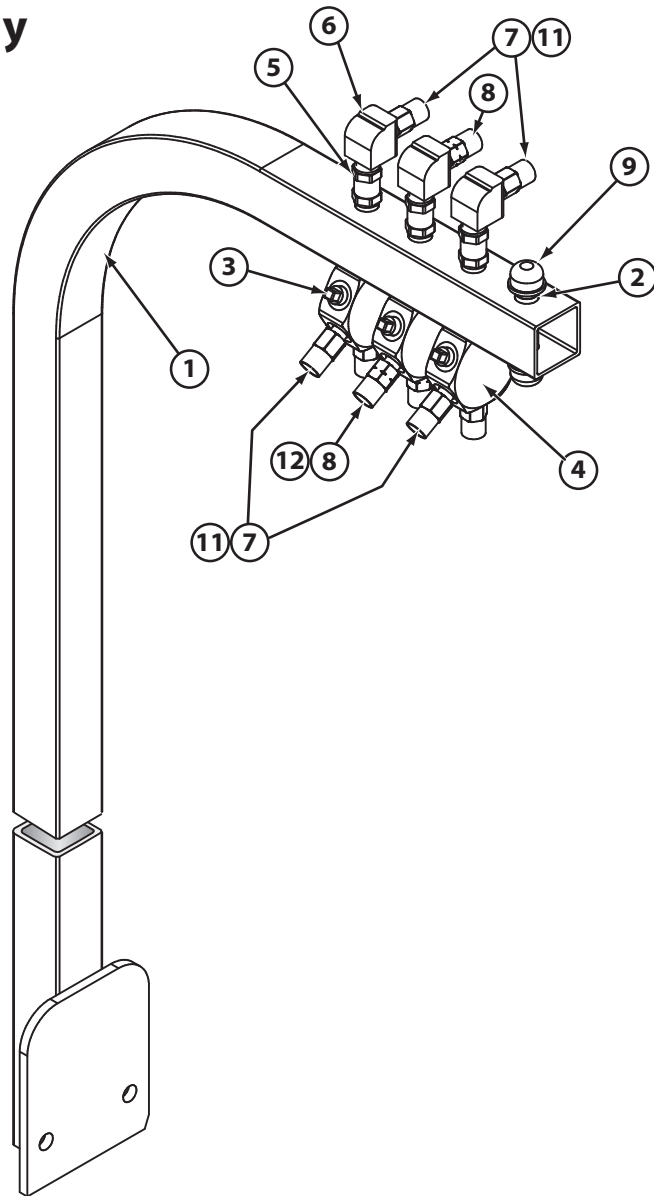


REPLACEMENT PARTS

Parts List			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	66402	MOTOR ASSY
2	5	66403	BEARING - FAFNIR #S1-KED
3	1	51335	SNAP RING - WALDES #5100-25
4	1	50111155	TORCH HOLDER PIVOT
5	1	41016191	LIFT BODY
6	1	41016193	MOTOR PLATE
7	1	41016195	ECCENTRIC BEARING POST
8	1	41016197	PINION
9	8	66386	WASHER 1/4 ID x .03 THK.
10	4	62250519	1/4 x 1 ROLL PIN
11	1	64302996	1/4 LOCK WASHER
12	1	63300100	1/4 - 20 HEX NUT
13	3	61307910	10-32 x 1/8 LG. RD HD MACHINE SCREW
14	1	62240032	1/8 x 1/2 LG. ROLL PIN
15	2	61301913	10-32 x 7/8 LG. RD HD MACHINE SCREW
16	2	64304050	#10 FLAT WASHER
17	2	63300917	10-32 HEX NUT
18	1	61301921	10-32 x 5/8 LG. RD HD MACHINE SCREW
19	2	950904	PIN DNF 18-250 FIM MALE 18-22 INS COUPLER
20	1	56998729	COVER, LIFT MOTOR

Manifold Support Assembly

40201829 Rev 1

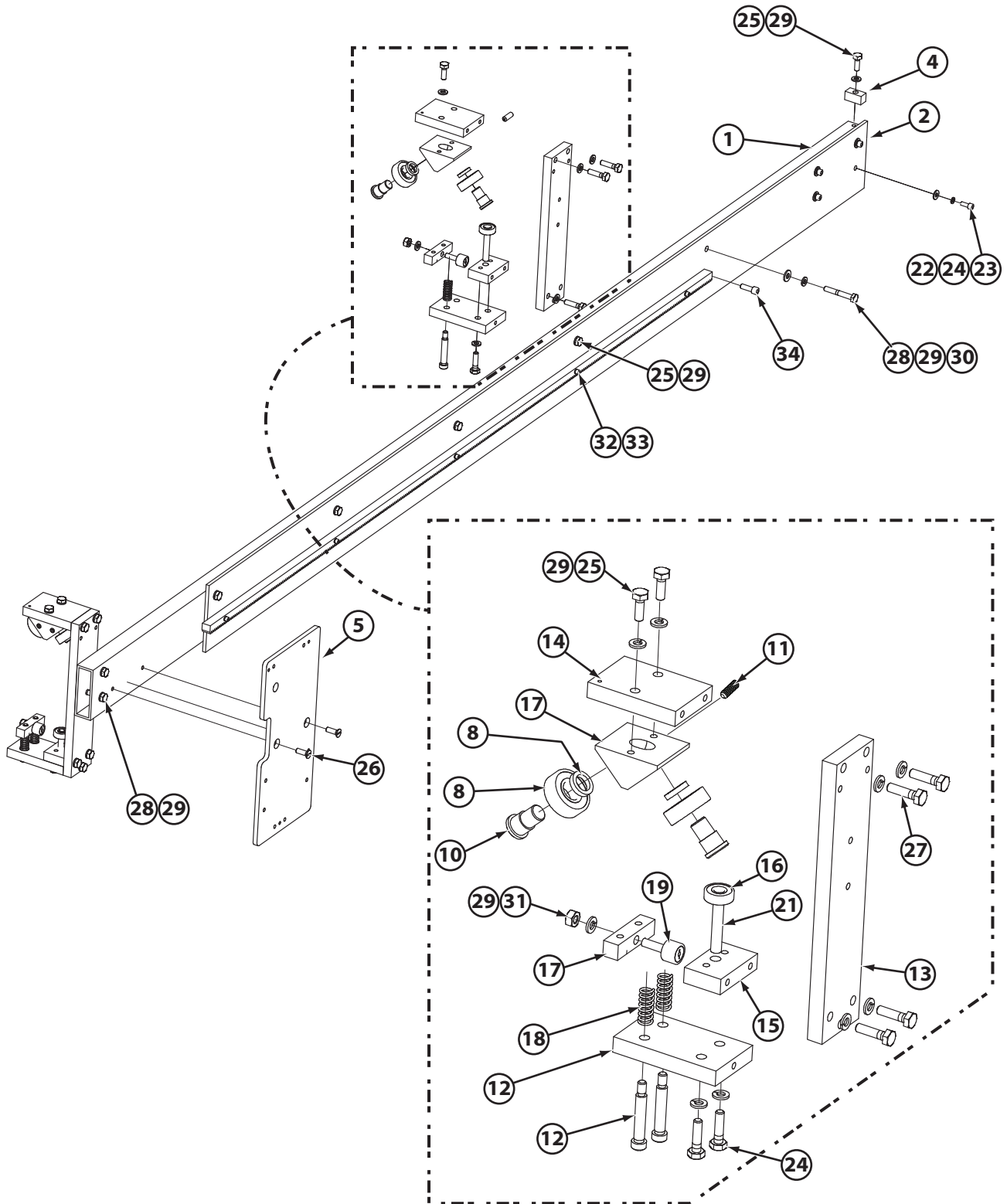


Parts List			
ITEM	PART NUMBER	QTY	DESCRIPTION
1	40201819	1	MANIFOLD SUPPORT WELD ASSY
2	2115696	4	NIPPLE, BLACK PIPE 1/4 NPT
3	60601075	6	1/4" NPT PIPE PLUG
4	68023	3	MANIFOLD BRASS
5	43150520	3	COUPLING 1/4 NPT F-F BLACK PIPE
6	0560995891	3	ELBOW STREET 90 1/4 NPTF x 1/4 NPTM
7	83389	8	ADAPTER 1/4 NPT - 'B' OXY
8	83390	4	ADAPTER 1/4 NPT - 'B' FG
9	44101250	2	CAP 1/4 PIPE SCREWED BRASS
10	44401900	6	PLUG 1/4 NPT SQR HD BRS
11	41001869	REF.	OXY. HOSE ASSY 1/4 ID x 6 FT. (GREEN)
12	41001879	REF.	FUEL HOSE ASSY 1/4 ID x 6 FT. (RED)

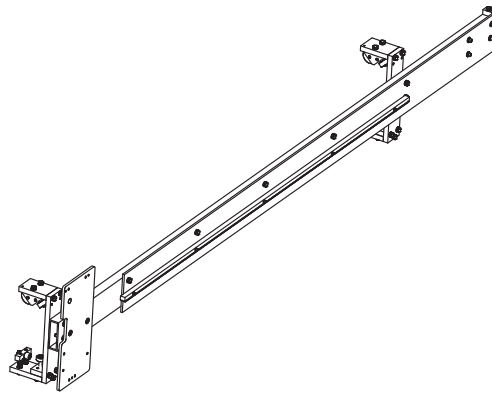
REPLACEMENT PARTS

Torch Bar Assembly

40901329 Rev 1



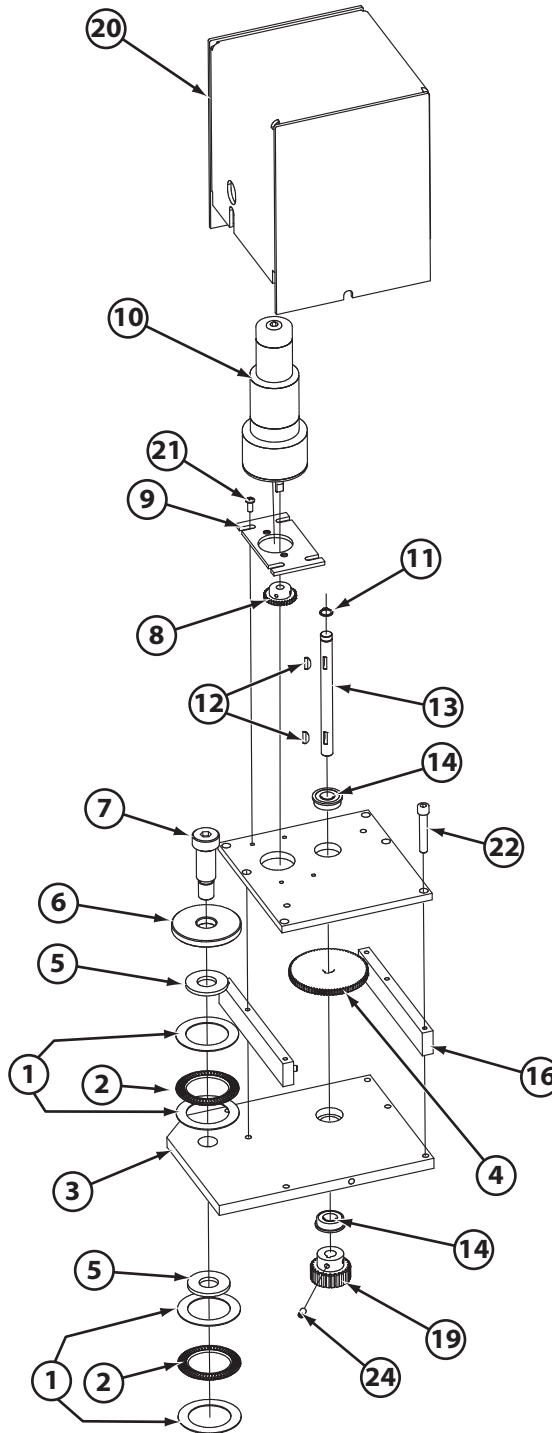
REPLACEMENT PARTS



Parts List			
ITEM	PART NUMBER	QTY	DESCRIPTION
1	4091315	1	TORCH BAR GUIDE RAIL
2	4091311	1	TORCH BAR
45	41013115	1	Y -DRIVE RACK 50.12 LG.
4	41013123	1	STOP BLOCK
5	41014133	1	PLATE, MOUNT, TRACER EYE
6	51220	REF.	BOTTOM BEARING BLOCK ASSY.
7	40030123	1	BEARING BLOCK
8	51217	2	SPACER
9	51216	2	BEARING
10	51221	2	SHAFT
11		2	1/4-20 x 3/8 LG. SET SCREW
12	41013111	2	LOWER BEARING PLATE
13	4101315	2	CROSS SLIDE BAR
14	4101317	2	UPPER BEARING PLATE
15	41013125	2	LOWER BEARING BLOCK
16	51342	2	BEARING
17	41013113	2	SPRING BAR
18	40001501	4	CLUTCH SPRING .480 OD x 1.00 LG.
19	22802401	2	BEARING, CAM FOLLOWER
20		4	BOLT, SHLDR 5/16 DIA. x 1 1/2 LG.
21	62900959	2	PIN, DOWEL 5/16 DIA. x 1 1/2 LG.
22		4	#10-32 UNF x 1/2 LG. SHCS
23		4	#10 FLAT WASHER
24		4	#10 STAR WASHER
25		11	1/4 -20 UNC x 3/4 LG. HEX CAP SCREW
26		2	1/4 -20 UNC x 3/4 LG. FLAT HD SCREW
27		12	1/4 - 20 UNC x 1 LG. HEX HD. CAP SCREW
28		2	1/4 - 20 x 1 3/4 LG. HEX HD CAP SCREW
29		24	WASHER, LOCK 1/4
30		4	WASHER, FLAT 1/4
31		2	1/4 -20 UNC HEX NUT
32		5	#6-32 x 1 LG. SHCS
33		5	#6 LOCK WASHER
34		1	1/4-20 UNC x 3/4 LG. SHCS

Drive Motor Assembly-Rail

41001289 Rev 1

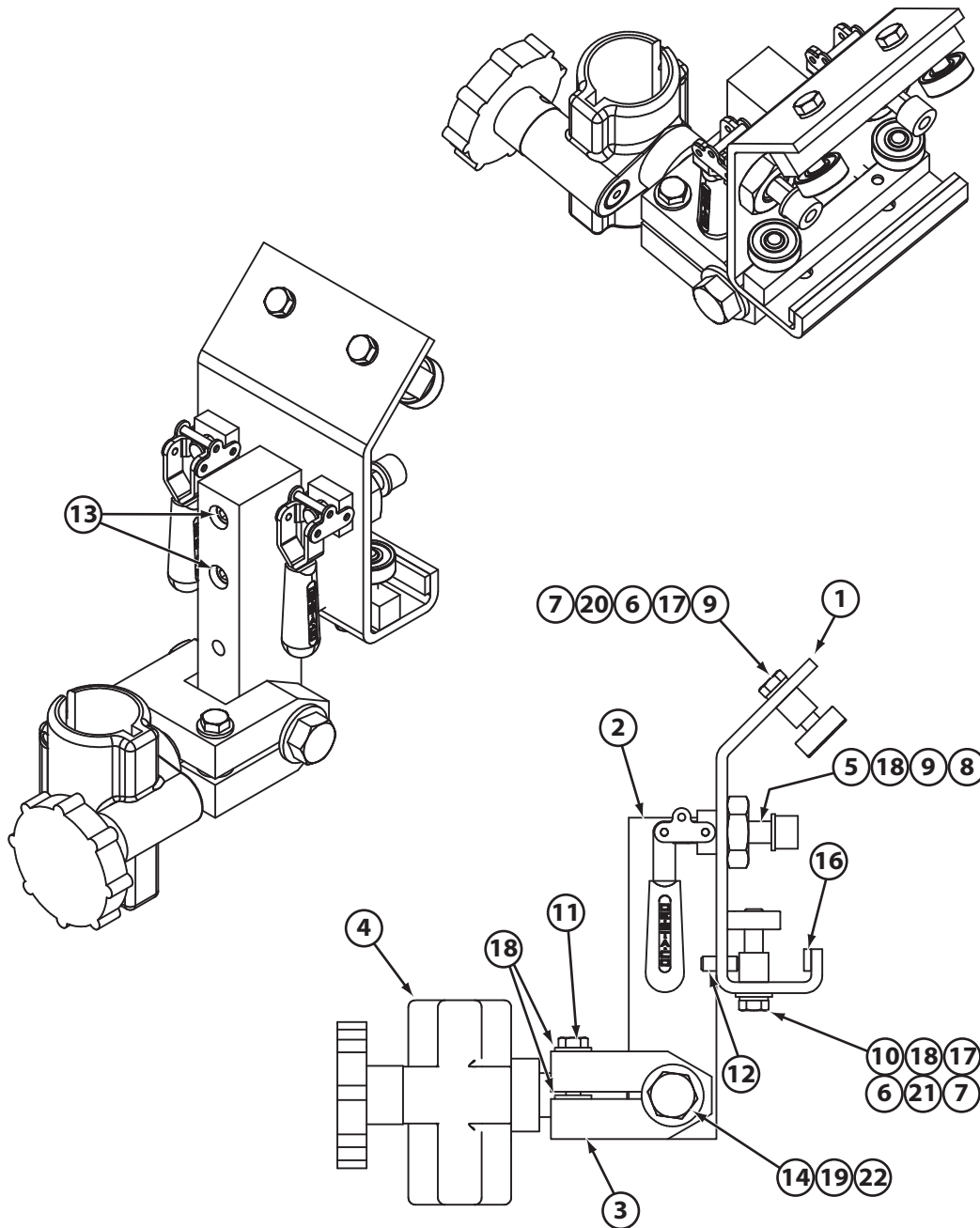


REPLACEMENT PARTS

Parts List			
ITEM	PART NUMBER	QTY	DESCRIPTION
1	51254	4	THRUST RACE
2	51255	2	THRUST BEARING, NEEDLE
3	41001369	1	BOTTOM PLATE WELD ASSY (B)
3	41001269	1	BOTTOM PLATE WELD ASSY (A)
4	41012171	1	DRIVE GEAR MODIFIED .375 ID
5	42010185	2	SPACER, THRUST BEARING
6	42010153	1	THRUST PLATE
7	61292631	1	BOLT, SHLDR. 5/8 DIA. x 1 1/4 LG.
8	41012173	1	PINION .25 ID - BOSTON GEAR # YSS3232
9	41012145	1	MOTOR MOUNT PLATE
10	51022	1	DRIVE MOTOR
11	50956	1	SNAP RING
12	22301801	1	WOODRUFF KEY
13	41012143	1	DRIVE SHAFT
14	41001207	2	BEARING
15	41012175	1	TOP PLATE
16	41012151	2	VERTICAL PLATE
17	50961	1	TOGGLE CLAMP (B)
18	4100379	1	PIVOT PLATE WELD ASSY (B)
19	2237806	1	PINION .375 ID 24 TEETH
20	41012155	1	MOTOR COVER X & Y
21	61307878	4	#8-32 x 3/8 LG. BINDING HD SCREW
22	61240092	6	1/4 -20 UNC x 1 1/2 LG. HEX HD. BOLT
23	61244910	2	#10 - 32 UNF x 3/8 LG. FLAT HEAD SCREW
24	61230908	2	10-32 UNF x 1/4 LG. SET SCREW
25	63311183	1	LOCK NUT 1/2 -13 UNC

Manual Torch Station

41001689 Rev 1

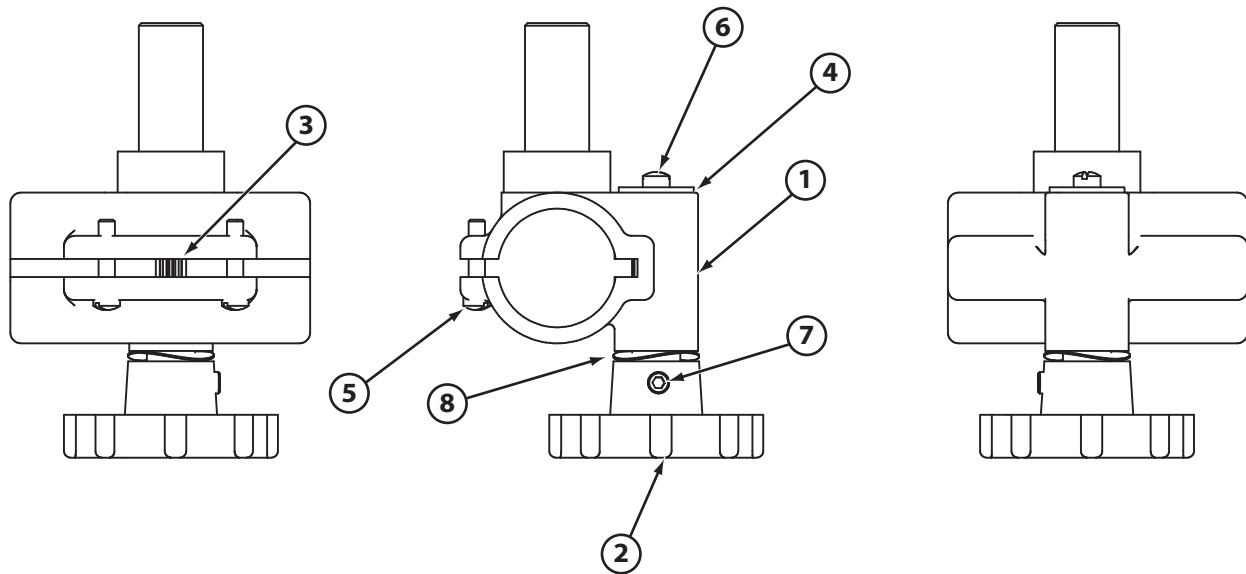


REPLACEMENT
PARTS

Parts List			
ITEM	PART NUMBER	QTY	DESCRIPTION
1	41016183	1	TORCH SLIDE FRAME
2	4101617	1	TORCH MOUNT BAR
3	2239842	1	TORCH CLAMP HOLDER
4	52675	1	TORCH HOLDER ASSY
5	56996481	2	CLAMP TOGGLE
6	4101613	2	BEARING BLOCK (UPPER)
7	22802401	4	BEARING .312 ID x .86 OD x .312 WIDE
8	56996487	2	NEOPRENE CAP
9		4	1/4-20 UNC x .5 LG. HEX HD BOLT
10		2	1/4-20 UNC x .75 LG. HEX HD BOLT
11		1	1/4-20 UNC x 1.5 LG. HEX HD BOLT
12		2	1/4-20 UNC x 5/8 LG. SET SCREW
13		2	1/4 - 20 x 1 1/2 LG. SOC. HD CAP SCREW
14		1	1/2-13 UNC x 3 LG. HEX HD BOLT
15		1	1/2-13 NUT WHIZ
16		1	1/8 x 3/8 x 4 LG. TEFLON
17		4	LOCK WASHER 1/4
18		5	FLAT WASHER 1/4
19		1	FLAT WASHER 1/2
20		2	5/16 x 1" LG. DOWEL PIN
21		2	5/16 x 1.25" LG. DOWEL PIN

Torch Holder

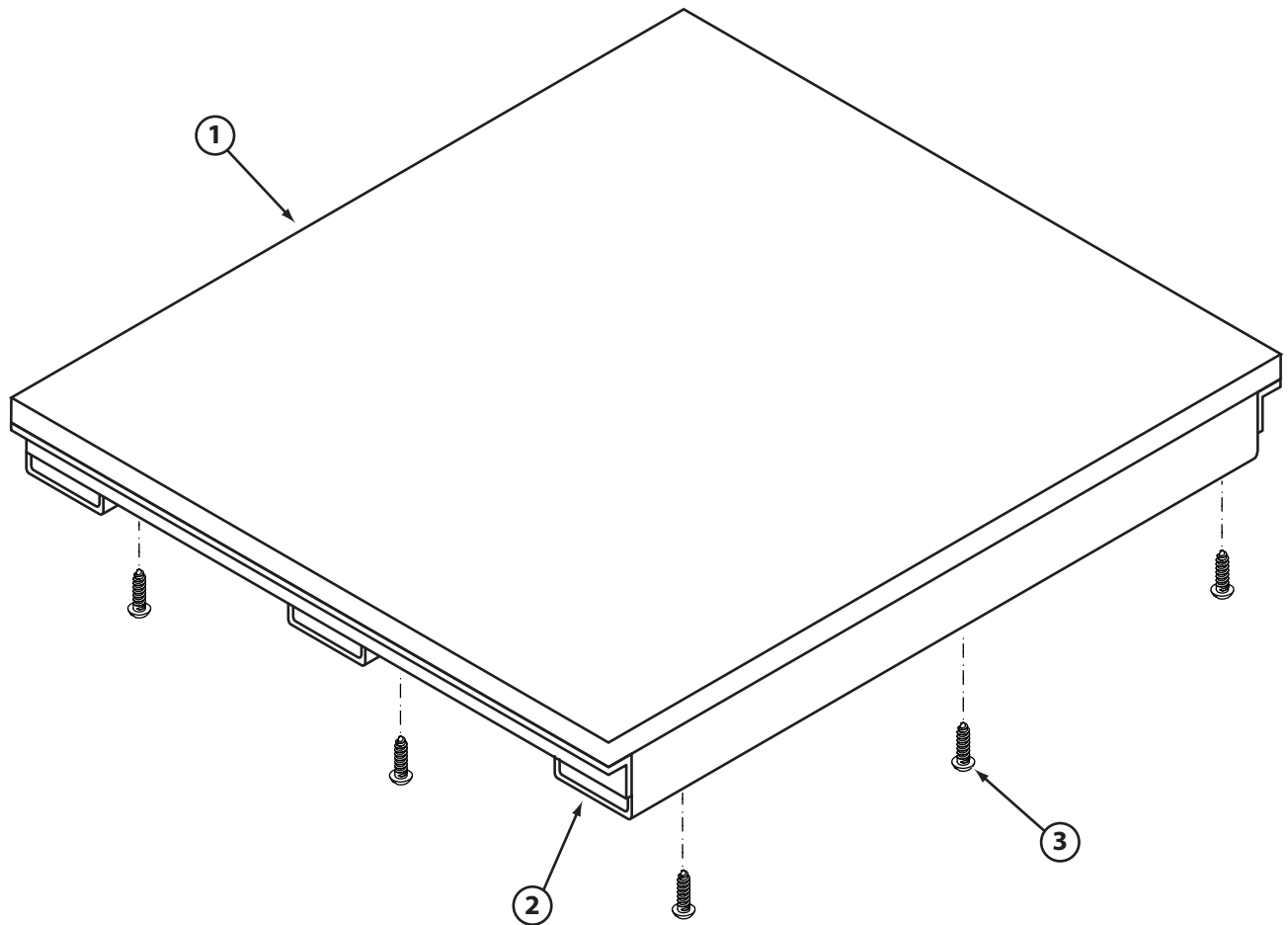
52675 Rev 1



Parts List			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	51338	TORCH HOLDER BODY ASSY MACHINED
2	1	1691111	MACHINED ALUMINUM HANDWHEEL
3	1	13012155	PINION 32 DP. 16T 14.5 PA
4	1	13012183	WASHER PINION
5	2	61300976	#10-24 x 7/8 FILLISTER HD SCREW
6	1	61307006	#10-32 x 1/2 FILLISTER HD SCREW
7	1	61330084	1/4-20 x 1/4 LG. SET SCREW
8	1	50944	SPRING WASHER 9/16 U BEND

Tracing Table Assembly

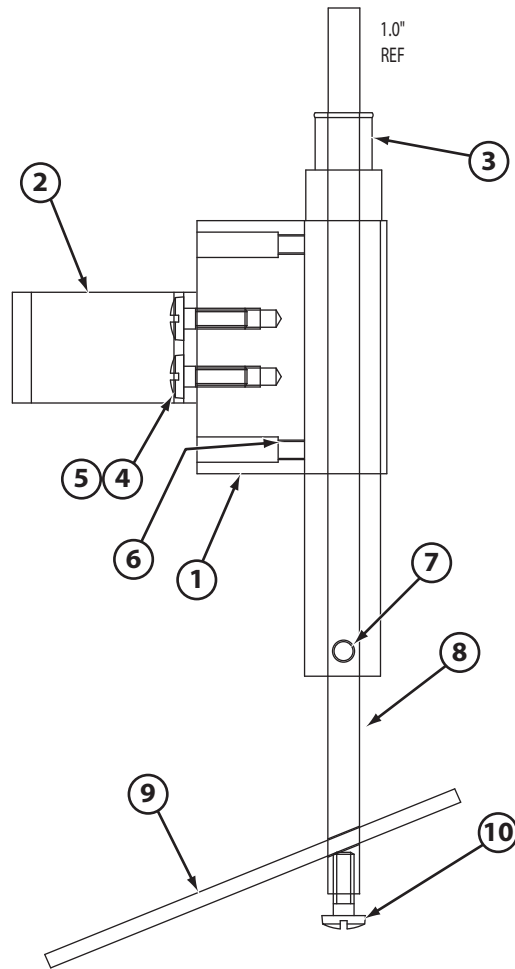
4113001 Rev 1



Parts List			
ITEM	PART NUMBER	QTY	DESCRIPTION
1	41101501	1	TABLE TOP
2	41101519	1	TABLE FRAME
3	61311305	9	#10 x 2 IN. ROUND HEAD WOOD SCREWS

Budget Ignitor Assembly

57000323 Rev A



BILL OF MATERIALS

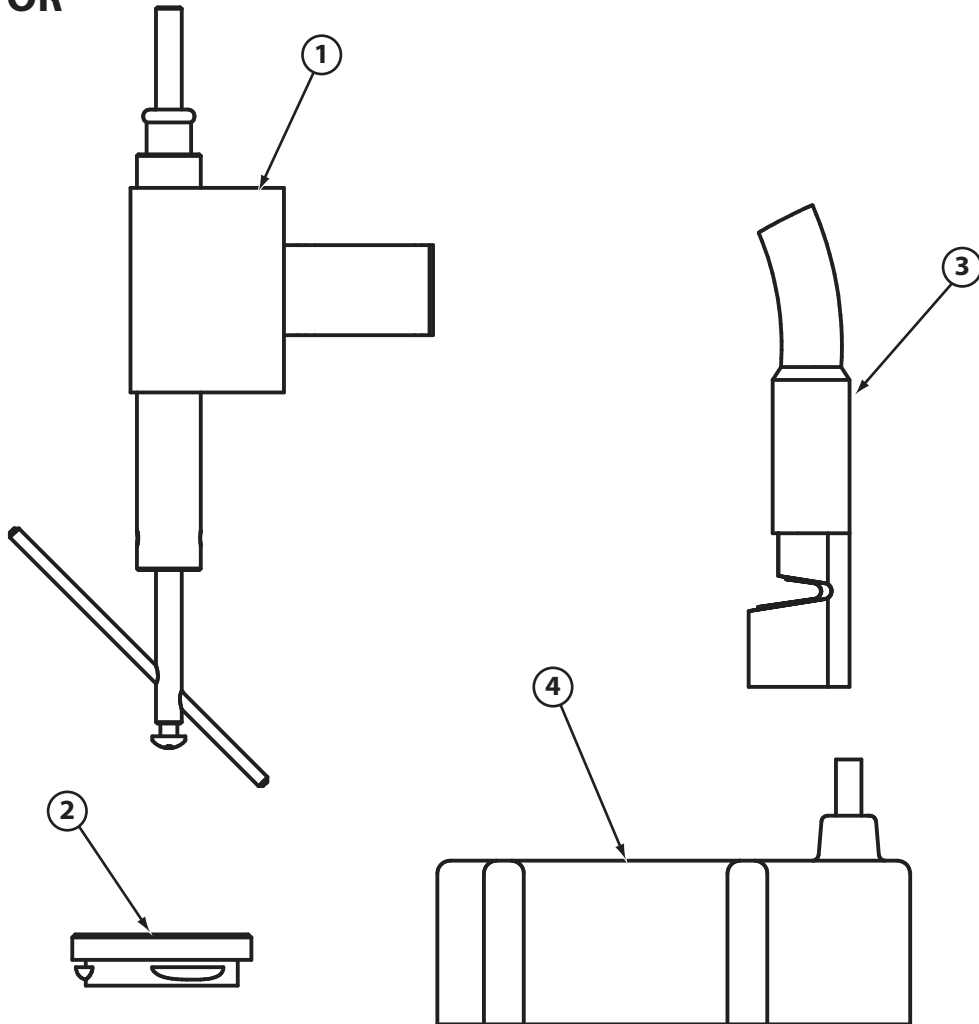
QUANTITIES ARE IN U/M ESTIMATED BY INVENTORY

ITEM NO.	PART OR CODE NO.	QTY.	DESCRIPTION
1	12810123	1	MOUNT, BLOCK
2	50001403	1	CLIP, COMPONENT
3	12810167	1	INSULATOR
4		2	#6-32 X 3/8 PAN HD MACH SCREW
5		2	#6 LOCKWASHER
6	61330849	2	#6-32 X 1/4 A.H. SET SCREW
7	61330908	2	#10-32 X 1/4 A.H. SET SCREW
8	57000324	1	ROD, CONDUCTOR
9	12810173	1	ELECTRODE, TUNGSTEN
10		1	#8-32 X 1/2 FIL HD MACH SCREW

REPLACEMENT PARTS

Torch Ignitor Module

69972 Rev OR

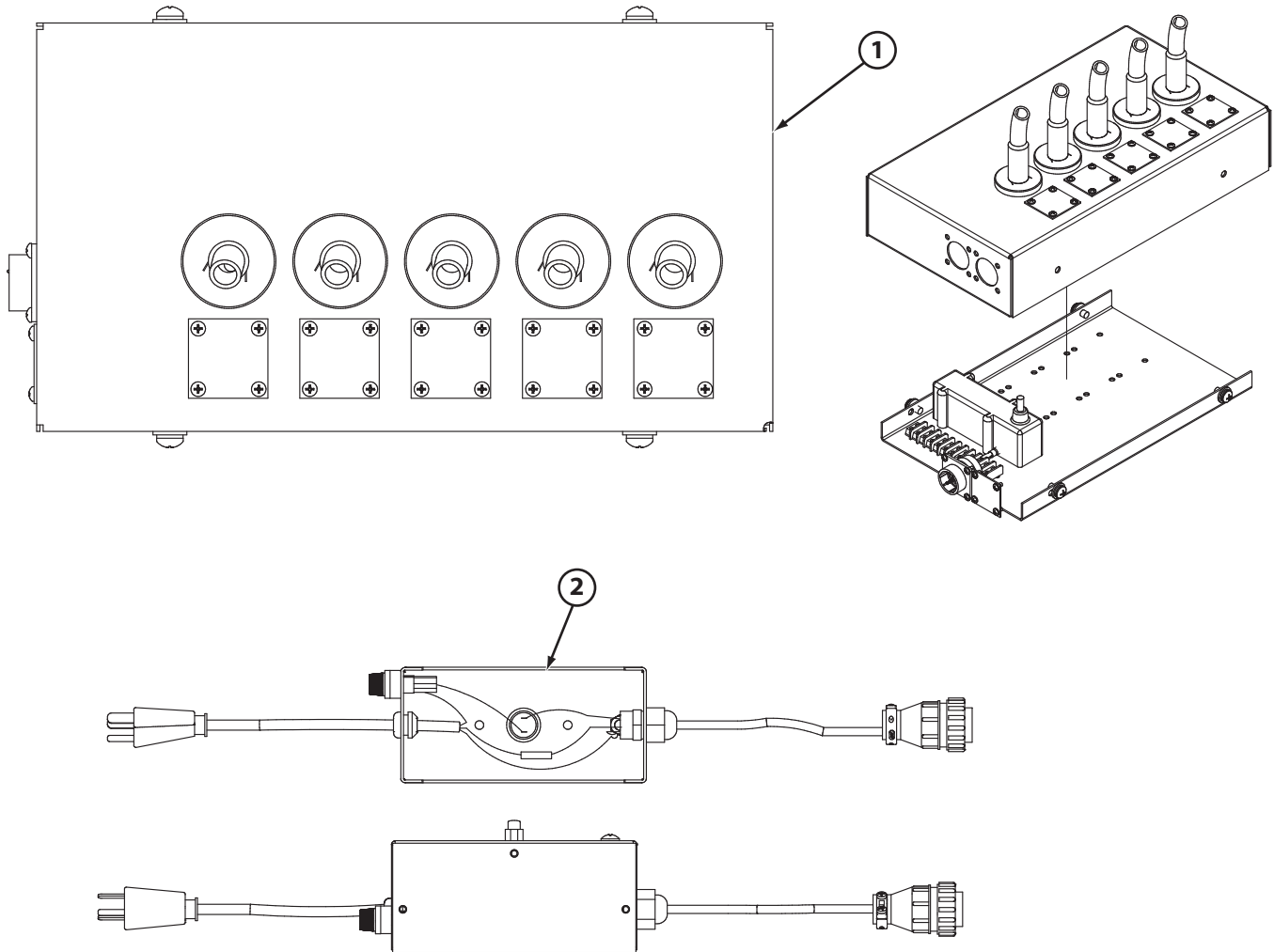


Parts List			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	57000323	ASSY, IGNITER BUDGET
2	1	51422	BUSHING
3	1	52709	IGNITOR CABLE ASSY
4	1	51432	IGNITOR 115V
5	1	199N06	LABEL 4 X 2 THERMAL
6	1	52705	WIRE HARNESS
7	1	70210155	POLYBAG 8 X 10.5
8	REF	86601001	BUBBLE WRAP
9	1	956813	CARTON 11 X 10.8 X 2

REPLACEMENT PARTS

Torch Ignitor Control Module

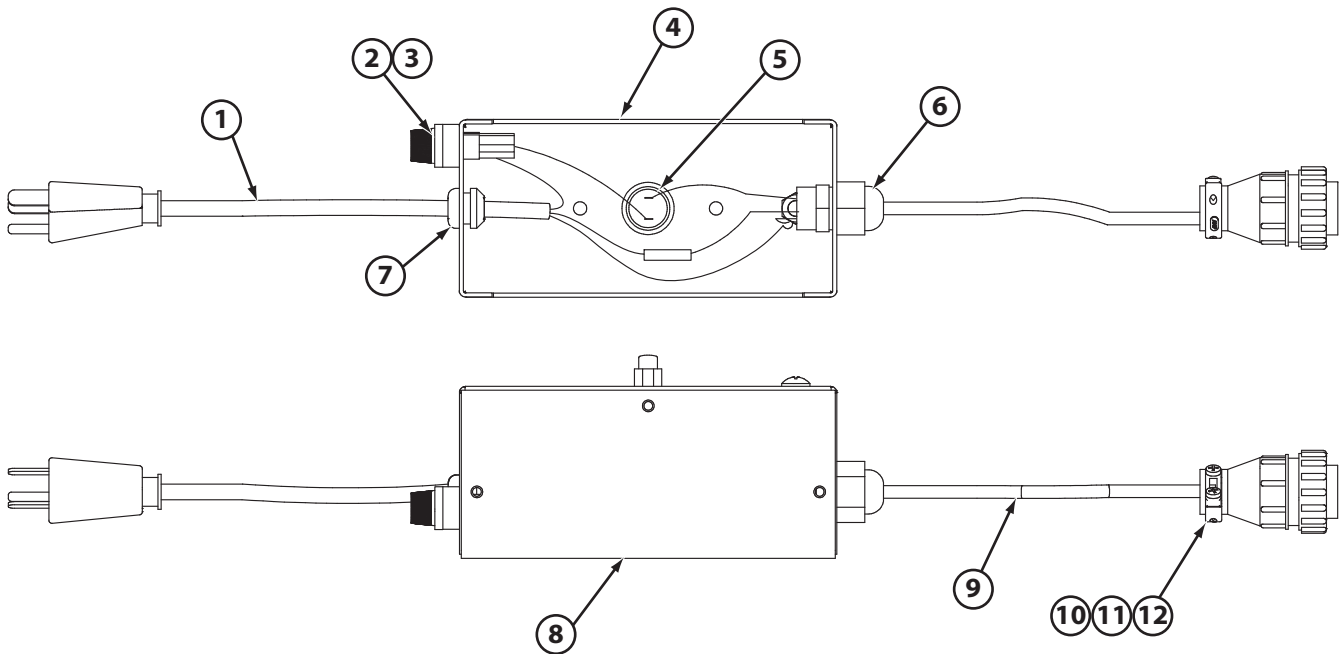
69973 Rev 1



Parts List			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	66412	JUNCTION BOX ASSY
2	1	66407	IGNITION CONTROL BOX

Ignition Control Box

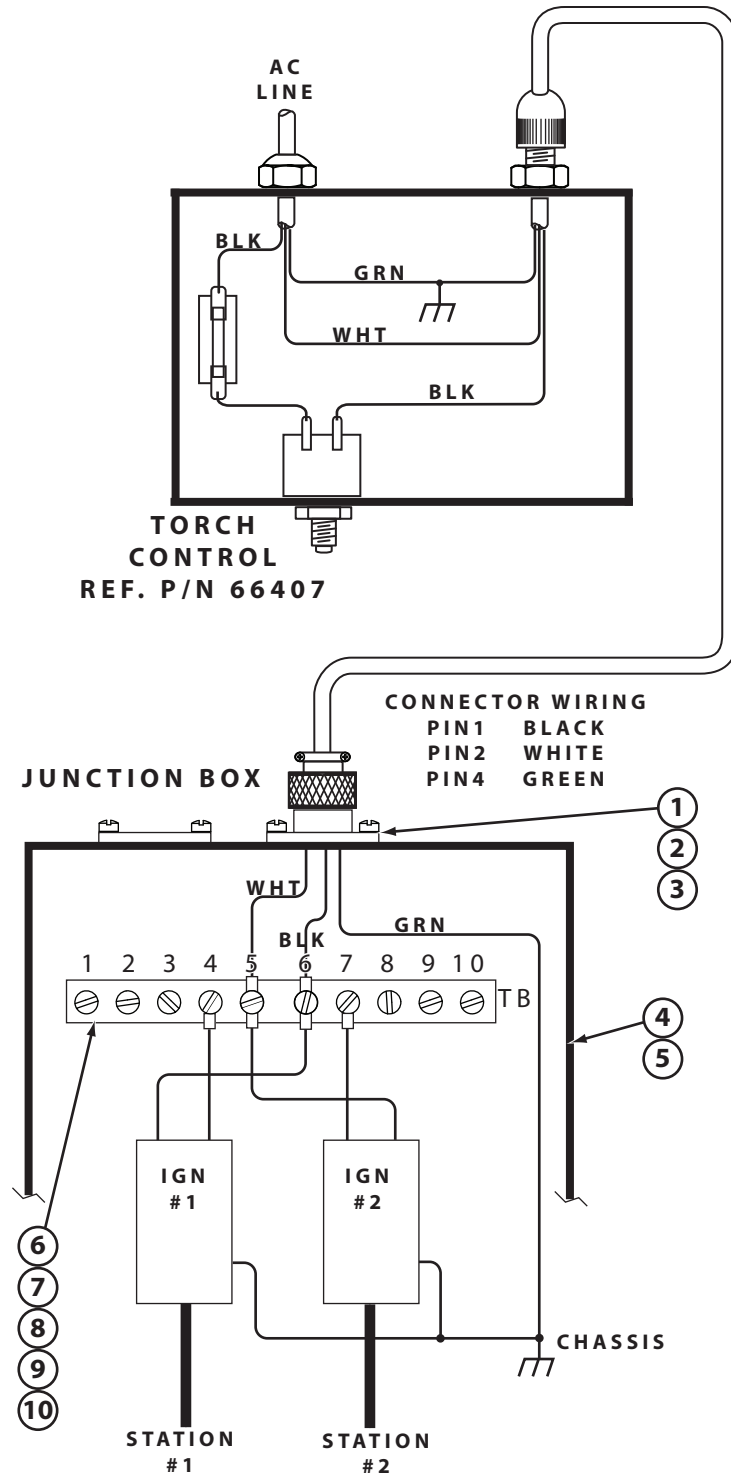
66407 Rev B



Parts List			
ITEM	PART NUMBER	QTY	DESCRIPTION
1	51249	1	Pwr Cable
2	50927	1	Fuse Holder
3	950553	1	Fuse 3A, SB
4	2236156	1	Control Box Cover
5	50928	1	Switch
6	52425	1	Strain Relief
7	51917	1	Strain Relief
8	66388	1	Ignition Control Box
9	50924	1	Cable, 4 conductor
10	2062024	1	Conn. Strain Relief
11	2062025	1	Connector Plug
12	52146	1	Con Coct

Ignitor J-Box and Wiring Diagram

66412 Rev OR

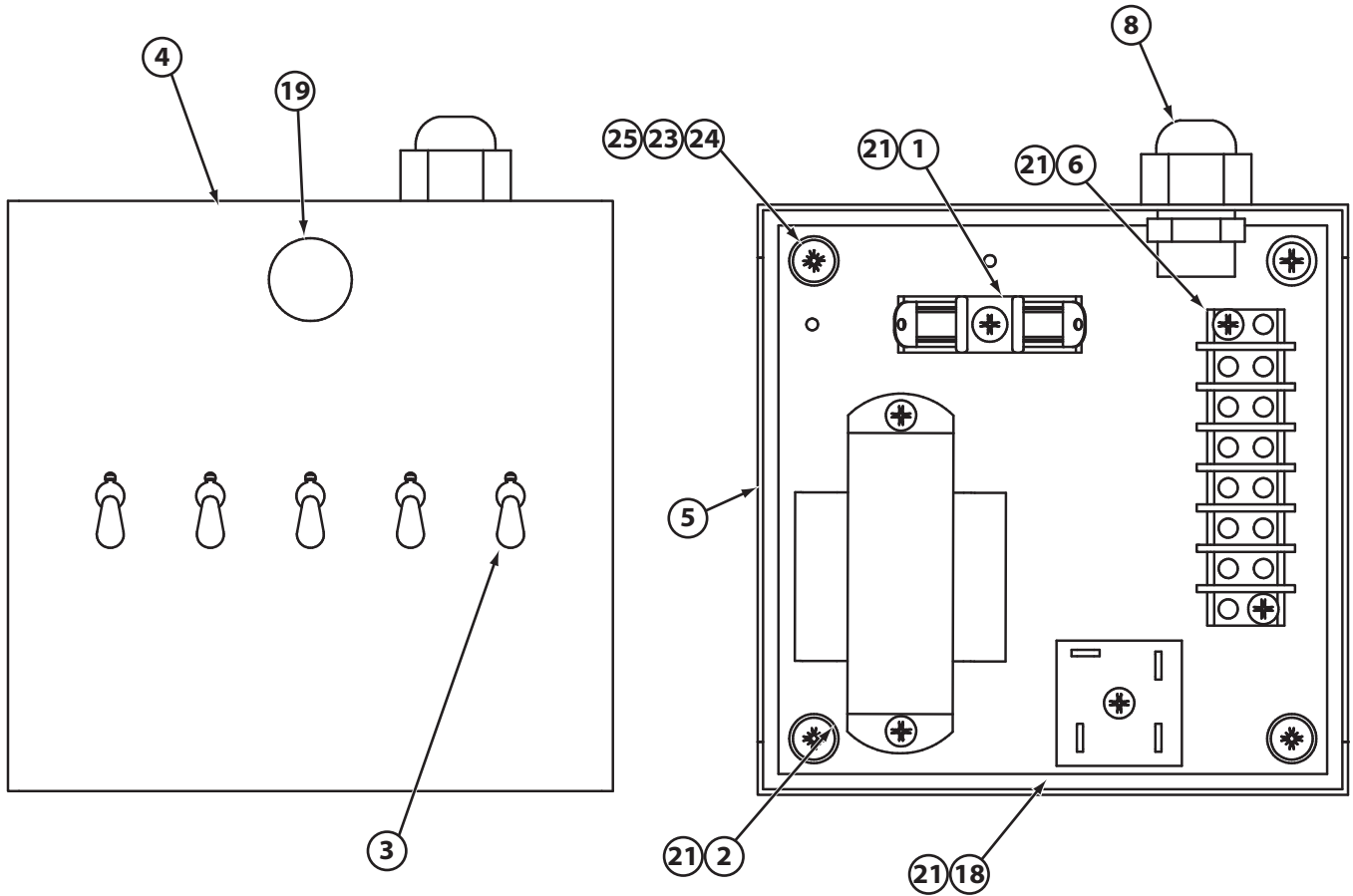


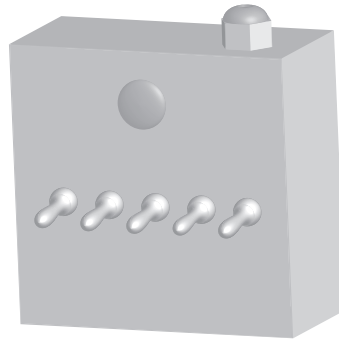
REPLACEMENT PARTS

Parts List			
ITEM	PART NUMBER	QTY	DESCRIPTION
1	2062026	REF	CONNECTOR BODY
2	52145	REF	CON CONCT
3	51101	REF	CONTACT SEAL
4	41014121	REF	IGNITOR MOUNT BRACKET
5	41014123	REF	STATION JUNCTION BOX
6	563803	REF	TERMINAL STRIP
7	994718	REF	MARKER STRIP
8	52471	REF	TERMINAL LUG
9	52472	REF	ETC SGL HLE TWN KT30
10	52547	REF	JUMPER, TERM 3712

Motorized Station Control Box

66421 Rev OR

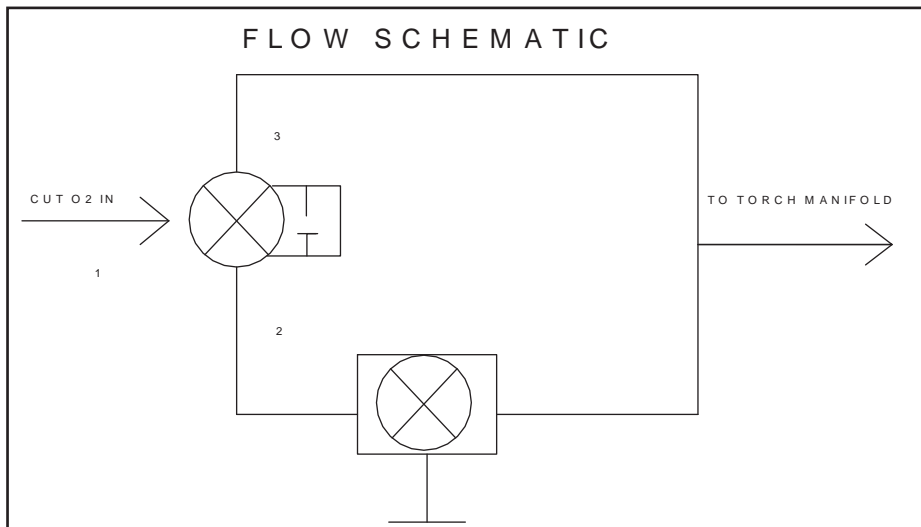
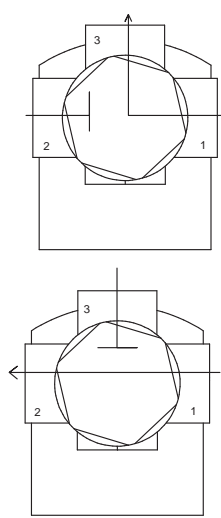
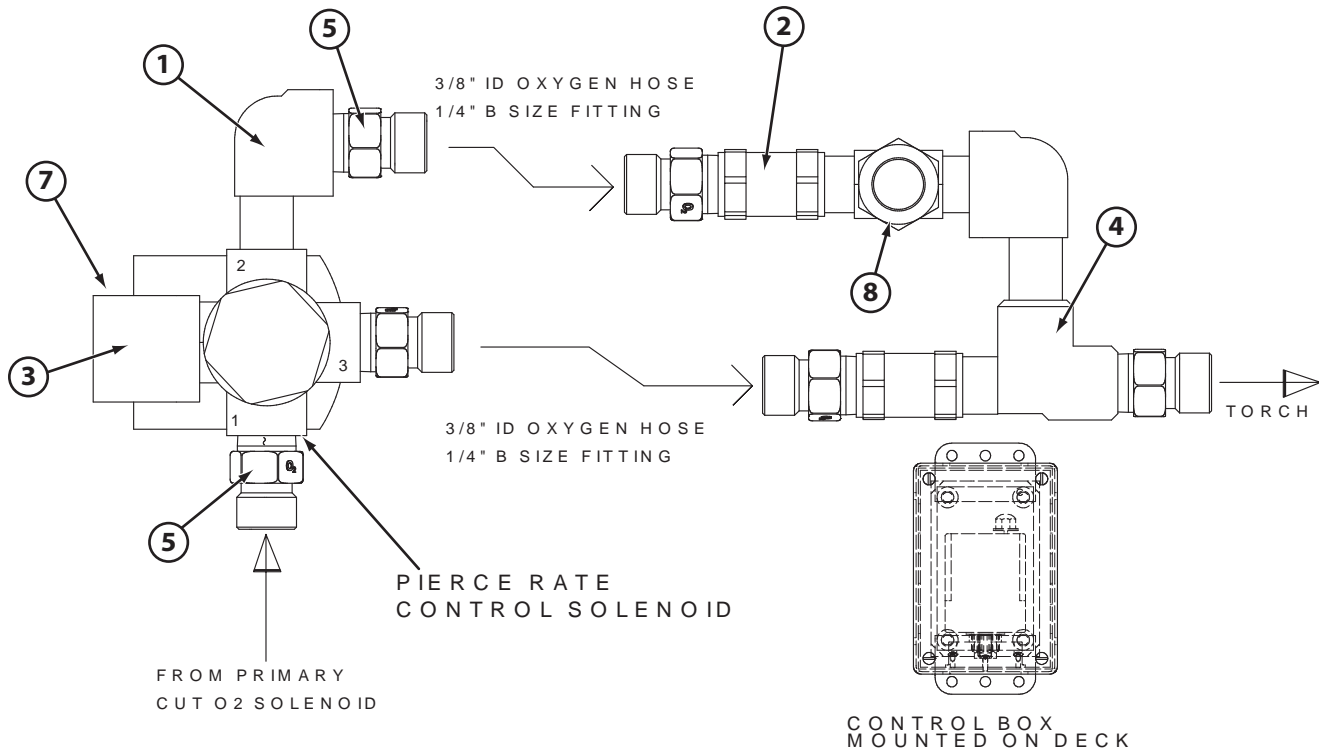




Parts List			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	66437	FUSE BLOCK, 3AG SGL POLE
2	1	52950	TRANSFORMER STANCOR P6376
3	5	2081951	SWITCH MOMENTARY
4	1	41014145	COVER MTZ TORCH CONTROL
5	1	41014137	SHELL-MTZ TORCH CONTROL
6	1	2235814	KULKA T-BLOCK #600-6
7	1	1002600	CHASSIS, MTR TRCH CONTROL
8	1	52425	STRAIN RELIEF
9	1	52547	JUMPER ETC #3412
10	1	52472	ETC SGL HLE TWIN TAB #3423 90 DE
11	1	66022	FUSE 3AG .3 AMP 125V
12	1	17115220	RES 2K, 1/4W, 5% TYPE RC07
13	1	52167	ETC
14	1	52168	ETC
15	1	2017587	POWER PLUG
16	1	73635014	15' POWER CORD
17	1	50704405	SPACER #8/32 X 3/8 LG
18	1	30001403	MOTO. MDA 980-5 OR IR 100JB4L, BRIDGE
19	1	66435	207-60201-00 FASTEX
20	1	-	No. 6 - Type AWasher A
21	6	-	No. 6 - 32 - 1/2 Machine Screw
22	1	-	No. 8 - 32 - 3/8 Machine Screw
23	4	-	No. 8 - Type AWasher A
24	3	-	No. 10 - 32 - 3/8 Machine Screw
25	4	-	10 - 24 Hex Machine Screw Nut UNC

Oxygen Pierce Rate Control Assembly

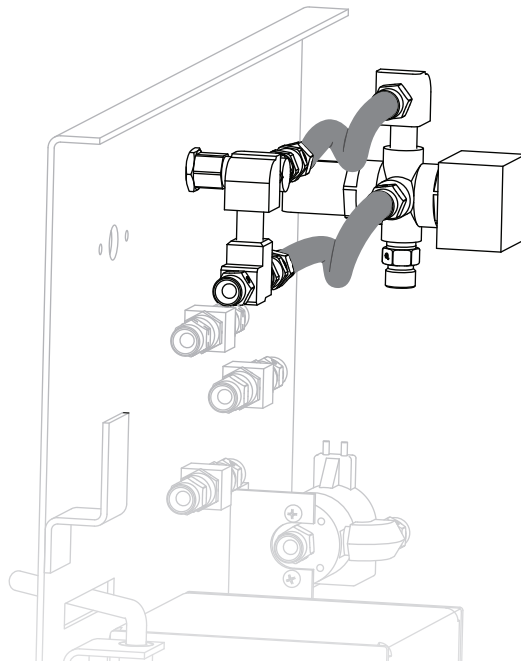
0560939141 Rev 2



FLOW INSTRUCTIONS:

- FLOW FROM CUT O2 SERVICE MUST GO INTO POSITION 1 ON THE SOLENOID TEE
- DE-ENERGIZED: FLOW WILL GO FROM 1 TO 3
- ENERGIZED: FLOW WILL GO FROM 1 TO 2

REPLACEMENT PARTS



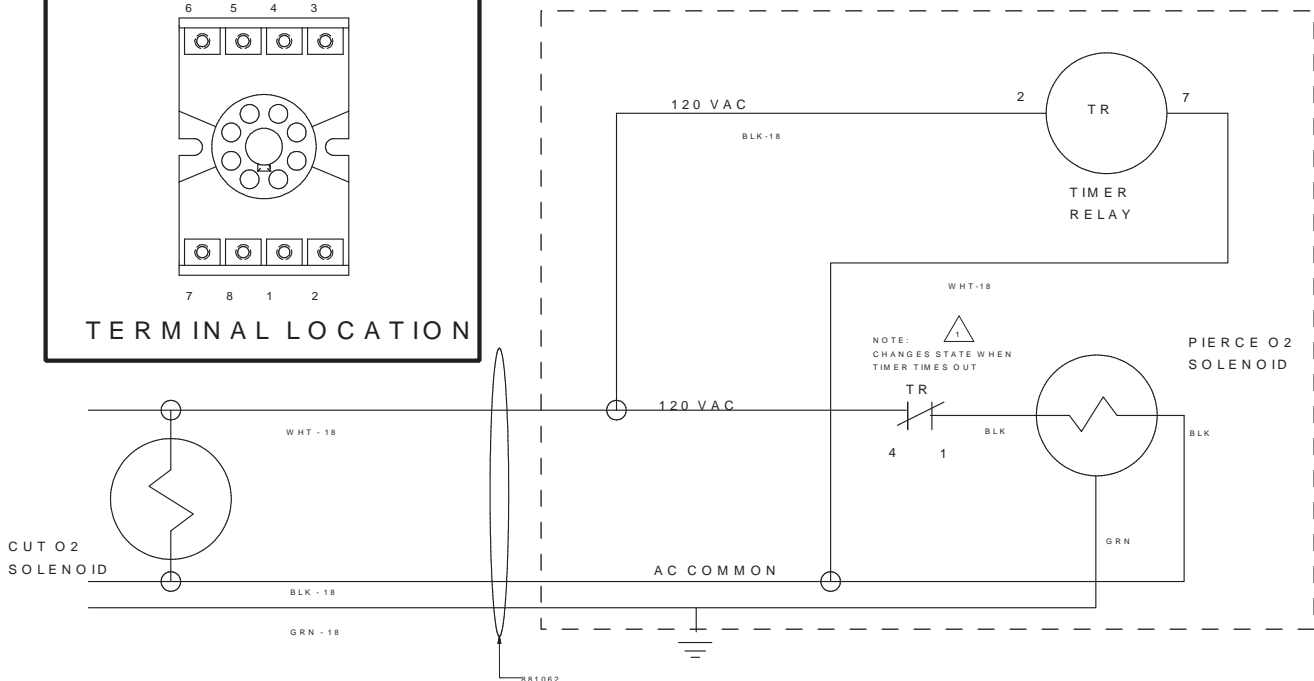
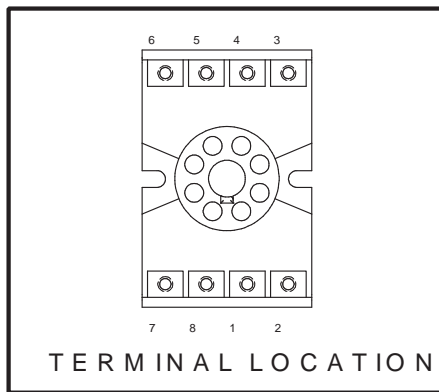
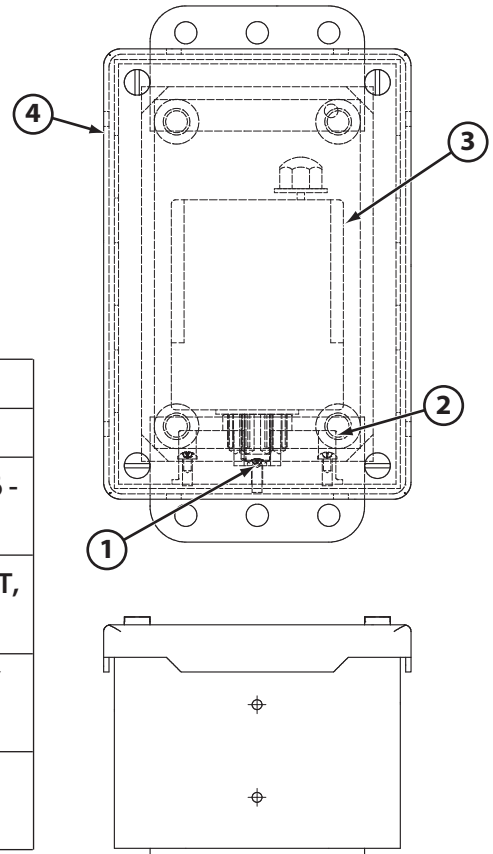
Parts List

ITEM	QTY	PART NUMBER	DESCRIPTION
1	2	182W82	ELBOW STREET 90 1/4 NPTF x 1/4 NPTM
2	2	43150520	COUPLING 1/4 NPT F-F BLACK PIPE
3	1	2059553	VALVE, 3 WAY SOLENOID
4	1	2236750	TEE, STREET 1/4 NPTF x 1/4 NPTM
5	6	83389	ADAPTER 1/4 NPT - 'B' OXY
6	1	0560940441	OXY PIERCE CONTROL BOX ASSY
7	REF	0560940444	3 WAY SOLENOID MOUNT
8	1	100634600	1/4" NPT NEEDLE VALVE
18	1		1/2 - 13 Hex Jam Nut

Oxygen Pierce Rate Control Box

0560940441 Rev 1

Parts List			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	10	-	ANSI B18.6.3 - No. 6 - 32 - 3/8
2	1	00560940443	TIME RELAY SOCKET, 27E122
3	1	0560939153	RELAY, TIME DELAY #CB-1003B-70
4	1	0560986784	ENCL DRL J-BOX LANCER



REPLACEMENT PARTS

Customer / Technical Support

(843)-664-4405

(800) ESAB-123 (372-2123)

ESAB Welding and Cutting Products

PO Box 100545 Ebenezer Rd

Florence, SC 29501-0545

<http://www.esab.com>

<http://www.esabcutting.com>

ESAB Cutting Systems - Canada

6010 Tomken Road

Mississauga, Ontario Canada L5T 1X9

Phone: (905) 670-0220

Fax: (905) 670-4879

ESAB-Cutting Systems GmbH

Robert-Bosch-Strasse 20

Postfach 1128

D-61184 Karben 1

Phone 011-49-6039-400

Fax 011-49-6039-403-02

<http://www.esab.com>

