AutoDrive® SA Torch

For use with machines having Code Numbers:

12315  (K4128-1) (100iC, MA1440)
12316  (K4128-2) (120iC, 100iC-6L)
12317  (K4128-3) (120iC-10L, MA2010)
12318  (K4128-4) (MA3120)

Register your machine:
www.lincolnelectric.com/register

Authorized Service and Distributor Locator:
www.lincolnelectric.com/locator

Save for future reference

Date Purchased

Code: (ex: 10859)

Serial: (ex: U1060512345)
THANK YOU FOR SELECTING A QUALITY PRODUCT BY LINCOLN ELECTRIC.

PLEASE EXAMINE CARTON AND EQUIPMENT FOR DAMAGE IMMEDIATELY

When this equipment is shipped, title passes to the purchaser upon receipt by the carrier. Consequently, claims for material damaged in shipment must be made by the purchaser against the transportation company at the time the shipment is received.

SAFETY DEPENDS ON YOU

Lincoln arc welding and cutting equipment is designed and built with safety in mind. However, your overall safety can be increased by proper installation ... and thoughtful operation on your part. DO NOT INSTALL, OPERATE OR REPAIR THIS EQUIPMENT WITHOUT READING THIS MANUAL AND THE SAFETY PRECAUTIONS CONTAINED THROUGHOUT. And, most importantly, think before you act and be careful.

KEEP YOUR HEAD OUT OF THE FUMES.

DON'T get too close to the arc. Use corrective lenses if necessary to stay a reasonable distance away from the arc.

READ and obey the Safety Data Sheet (SDS) and the warning label that appears on all containers of welding materials.

USE ENOUGH VENTILATION or exhaust at the arc, or both, to keep the fumes and gases from your breathing zone and the general area.

IN A LARGE ROOM OR OUTDOORS, natural ventilation may be adequate if you keep your head out of the fumes (See below).

USE NATURAL DRAFTS or fans to keep the fumes away from your face.

If you develop unusual symptoms, see your supervisor. Perhaps the welding atmosphere and ventilation system should be checked.

WEAR CORRECT EYE, EAR & BODY PROTECTION

PROTECT your eyes and face with welding helmet properly fitted and with proper grade of filter plate (See ANSI Z49.1).

PROTECT your body from welding spatter and arc flash with protective clothing including woolen clothing, flame-proof apron and gloves, leather leggings, and high boots.

PROTECT others from splatter, flash, and glare with protective screens or barriers.

IN SOME AREAS, protection from noise may be appropriate.

BE SURE protective equipment is in good condition.

Also, wear safety glasses in work area AT ALL TIMES.

SPECIAL SITUATIONS

DO NOT WELD OR CUT containers or materials which previously had been in contact with hazardous substances unless they are properly cleaned. This is extremely dangerous.

DO NOT WELD OR CUT painted or plated parts unless special precautions with ventilation have been taken. They can release highly toxic fumes or gases.

Additional precautionary measures

PROTECT compressed gas cylinders from excessive heat, mechanical shocks, and arcs; fasten cylinders so they cannot fall.

BE SURE cylinders are never grounded or part of an electrical circuit.

REMOVE all potential fire hazards from welding area.

ALWAYS HAVE FIRE FIGHTING EQUIPMENT READY FOR IMMEDIATE USE AND KNOW HOW TO USE IT.
SECTION A: WARNINGS

CALIFORNIA PROPOSITION 65 WARNINGS

WARNING: Breathing diesel engine exhaust exposes you to chemicals known to the State of California to cause cancer and birth defects, or other reproductive harm.

• Always start and operate the engine in a well-ventilated area.
• If in an exposed area, vent the exhaust to the outside.
• Do not modify or tamper with the exhaust system.
• Do not idle the engine except as necessary.

For more information go to www.P65warnings.ca.gov/diesel

WARNING: This product, when used for welding or cutting, produces fumes or gases which contain chemicals known to the State of California to cause birth defects and, in some cases, cancer. (California Health & Safety Code § 25249.5 et seq.)

WARNING: Cancer and Reproductive Harm www.P65warnings.ca.gov

ARC WELDING CAN BE HAZARDOUS. PROTECT YOURSELF AND OTHERS FROM POSSIBLE SERIOUS INJURY OR DEATH. KEEP CHILDREN AWAY. PACEMAKER WEARERS SHOULD CONSULT WITH THEIR DOCTOR BEFORE OPERATING.

Read and understand the following safety highlights. For additional safety information, it is strongly recommended that you purchase a copy of “Safety in Welding & Cutting - ANSI Standard Z49.1” from the American Welding Society, P.O. Box 351040, Miami, Florida 33135 or CSA Standard W117.2-1974. A Free copy of “Arc Welding Safety” booklet E205 is available from the Lincoln Electric Company, 22801 St. Clair Avenue, Cleveland, Ohio 44117-1199.

BE SURE THAT ALL INSTALLATION, OPERATION, MAINTENANCE AND REPAIR PROCEDURES ARE PERFORMED ONLY BY QUALIFIED INDIVIDUALS.

FOR ENGINE POWERED EQUIPMENT.

1.a. Turn the engine off before troubleshooting and maintenance work unless the maintenance work requires it to be running.

1.b. Operate engines in open, well-ventilated areas or vent the engine exhaust fumes outdoors.

1.c. Do not add the fuel near an open flame welding arc or when the engine is running. Stop the engine and allow it to cool before refueling to prevent spilled fuel from vaporizing on contact with hot engine parts and igniting. Do not spill fuel when filling tank. If fuel is spilled, wipe it up and do not start engine until fumes have been eliminated.

1.d. Keep all equipment safety guards, covers and devices in position and in good repair. Keep hands, hair, clothing and tools away from V-belts, gears, fans and all other moving parts when starting, operating or repairing equipment.

1.e. In some cases it may be necessary to remove safety guards to perform required maintenance. Remove guards only when necessary and replace them when the maintenance requiring their removal is complete. Always use the greatest care when working near moving parts.

1.f. Do not put your hands near the engine fan. Do not attempt to override the governor or idler by pushing on the throttle control rods while the engine is running.

1.g. To prevent accidentally starting gasoline engines while turning the engine or welding generator during maintenance work, disconnect the spark plug wires, distributor cap or magneto wire as appropriate.

1.h. To avoid scalding, do not remove the radiator pressure cap when the engine is hot.

ELECTRIC AND MAGNETIC FIELDS MAY BE DANGEROUS

2.a. Electric current flowing through any conductor causes localized Electric and Magnetic Fields (EMF). Welding current creates EMF fields around welding cables and welding machines.

2.b. EMF fields may interfere with some pacemakers, and welders having a pacemaker should consult their physician before welding.

2.c. Exposure to EMF fields in welding may have other health effects which are now not known.

2.d. All welders should use the following procedures in order to minimize exposure to EMF fields from the welding circuit:

2.d.1. Route the electrode and work cables together - Secure them with tape when possible.

2.d.2. Never coil the electrode lead around your body.

2.d.3. Do not place your body between the electrode and work cables. If the electrode cable is on your right side, the work cable should also be on your right side.

2.d.4. Connect the work cable to the workpiece as close as possible to the area being welded.

2.d.5. Do not work next to welding power source.
### ELECTRIC SHOCK CAN KILL.

3.a. The electrode and work (or ground) circuits are electrically “hot” when the welder is on. Do not touch these “hot” parts with your bare skin or wet clothing. Wear dry, hole-free gloves to insulate hands.

3.b. Insulate yourself from work and ground using dry insulation. Make certain the insulation is large enough to cover your full area of physical contact with work and ground.

In addition to the normal safety precautions, if welding must be performed under electrically hazardous conditions (in damp locations or while wearing wet clothing; on metal structures such as floors, gratings or scaffolds; when in cramped positions such as sitting, kneeling or lying, if there is a high risk of unavoidable or accidental contact with the workpiece or ground) use the following equipment:

- Semiautomatic DC Constant Voltage (Wire) Welder.
- DC Manual (Stick) Welder.
- AC Welder with Reduced Voltage Control.

3.c. In semiautomatic or automatic wire welding, the electrode, electrode reel, welding head, nozzle or semiautomatic welding gun are also electrically “hot”.

3.d. Always be sure the work cable makes a good electrical connection with the metal being welded. The connection should be as close as possible to the area being welded.

3.e. Ground the work or metal to be welded to a good electrical (earth) ground.

3.f. Maintain the electrode holder, work clamp, welding cable and welding machine in good, safe operating condition. Replace damaged insulation.

3.g. Never dip the electrode in water for cooling.

3.h. Never simultaneously touch electrically “hot” parts of electrode holders connected to two welders because voltage between the two can be the total of the open circuit voltage of both welders.

3.i. When working above floor level, use a safety belt to protect yourself from a fall should you get a shock.

3.j. Also see Items 6.c. and 8.

### ARC RAYS CAN BURN.

4.a. Use a shield with the proper filter and cover plates to protect your eyes from sparks and the rays of the arc when welding or observing open arc welding. Headshield and filter lens should conform to ANSI Z87.1 standards.

4.b. Use suitable clothing made from durable flame-resistant material to protect your skin and that of your helpers from the arc rays.

4.c. Protect other nearby personnel with suitable, non-flammable screening and/or warn them not to watch the arc nor expose themselves to the arc rays or to hot spatter or metal.

### FUMES AND GASES CAN BE DANGEROUS.

5.a. Welding may produce fumes and gases hazardous to health. Avoid breathing these fumes and gases. When welding, keep your head out of the fume. Use enough ventilation and/or exhaust at the arc to keep fumes and gases away from the breathing zone. When welding hardfacing (see instructions on container or SDS) or on lead or cadmium plated steel and other metals or coatings which produce highly toxic fumes, keep exposure as low as possible and within applicable OSHA PEL and ACGIH TLV limits using local exhaust or mechanical ventilation unless exposure assessments indicate otherwise. In confined spaces or in some circumstances, outdoors, a respirator may also be required. Additional precautions are also required when welding on galvanized steel.

5.b. The operation of welding fume control equipment is affected by various factors including proper use and positioning of the equipment, maintenance of the equipment and the specific welding procedure and application involved. Worker exposure level should be checked upon installation and periodically thereafter to be certain it is within applicable OSHA PEL and ACGIH TLV limits.

5.c. Do not weld in locations near chlorinated hydrocarbon vapors coming from degreasing, cleaning or spraying operations. The heat and rays of the arc can react with solvent vapors to form phosgene, a highly toxic gas, and other irritating products.

5.d. Shielding gases used for arc welding can displace air and cause injury or death. Always use enough ventilation, especially in confined areas, to insure breathing air is safe.

5.e. Read and understand the manufacturer’s instructions for this equipment and the consumables to be used, including the Safety Data Sheet (SDS) and follow your employer’s safety practices. SDS forms are available from your welding distributor or from the manufacturer.

5.f. Also see item 1.b.
6.a. Remove fire hazards from the welding area. If this is not possible, cover them to prevent the welding sparks from starting a fire. Remember that welding sparks and hot materials from welding can easily go through small cracks and openings to adjacent areas. Avoid welding near hydraulic lines. Have a fire extinguisher readily available.

6.b. Where compressed gases are to be used at the job site, special precautions should be used to prevent hazardous situations. Refer to “Safety in Welding and Cutting” (ANSI Standard Z49.1) and the operating information for the equipment being used.

6.c. When not welding, make certain no part of the electrode circuit is touching the work or ground. Accidental contact can cause overheating and create a fire hazard.

6.d. Do not heat, cut or weld tanks, drums or containers until the proper steps have been taken to insure that such procedures will not cause flammable or toxic vapors from substances inside. They can cause an explosion even though they have been "cleaned". For information, purchase “Recommended Safe Practices for the Preparation for Welding and Cutting of Containers and Piping That Have Held Hazardous Substances”, AWS F4.1 from the American Welding Society (see address above).

6.e. Vent hollow castings or containers before heating, cutting or welding. They may explode.

6.f. Sparks and spatter are thrown from the welding arc. Wear oil free protective garments such as leather gloves, heavy shirt, cuffless trousers, high shoes and a cap over your hair. Wear ear plugs when welding out of position or in confined places. Always wear safety glasses with side shields when in a welding area.

6.g. Connect the work cable to the work as close to the welding area as practical. Work cables connected to the building framework or other locations away from the welding area increase the possibility of the welding current passing through lifting chains, crane cables or other alternate circuits. This can create fire hazards or overheat lifting chains or cables until they fail.

6.h. Also see item 1.c.

6.i. Read and follow NFPA 51B “Standard for Fire Prevention During Welding, Cutting and Other Hot Work”, available from NFPA, 1 Batterymarch Park, PO box 9101, Quincy, MA 022690-9101.

6.j. Do not use a welding power source for pipe thawing.

7.a. Use only compressed gas cylinders containing the correct shielding gas for the process used and properly operating regulators designed for the gas and pressure used. All hoses, fittings, etc. should be suitable for the application and maintained in good condition.

7.b. Always keep cylinders in an upright position securely chained to an undercarriage or fixed support.

7.c. Cylinders should be located:
   • Away from areas where they may be struck or subjected to physical damage.
   • A safe distance from arc welding or cutting operations and any other source of heat, sparks, or flame.

7.d. Never allow the electrode, electrode holder or any other electrically "hot" parts to touch a cylinder.

7.e. Keep your head and face away from the cylinder valve outlet when opening the cylinder valve.

7.f. Valve protection caps should always be in place and hand tight except when the cylinder is in use or connected for use.

7.g. Read and follow the instructions on compressed gas cylinders, associated equipment, and CGA publication P-1, “Precautions for Safe Handling of Compressed Gases in Cylinders,” available from the Compressed Gas Association, 14501 George Carter Way Chantilly, VA 20151.

8.a. Turn off input power using the disconnect switch at the fuse box before working on the equipment.

8.b. Install equipment in accordance with the U.S. National Electrical Code, all local codes and the manufacturer’s recommendations.

8.c. Ground the equipment in accordance with the U.S. National Electrical Code and the manufacturer’s recommendations.

Refer to
TABLE OF CONTENTS

Product Overview ..................................................................................................................................................7
General Physical Description ...........................................................................................................................7
General Functional Description .......................................................................................................................7
Recommended Processes and Equipment .......................................................................................................7
- Recommended Processes .............................................................................................................................7
- Process Limitations .....................................................................................................................................7
- Equipment Limitations ...............................................................................................................................7
- Recommended Power Sources .....................................................................................................................7
Location .............................................................................................................................................................7
Design Specifications .........................................................................................................................................8
K4128-1 AutoDrive® SA Torch Front 3 Quarter View .....................................................................................9
Components (Door not shown) .........................................................................................................................9
K4128-1 AutoDrive® SA Torch Front Quarter View .......................................................................................10
Front View ......................................................................................................................................................11
Side View (Buttons) .......................................................................................................................................12
Design Features ..............................................................................................................................................13

Installation .......................................................................................................................................................Section A
System Set-up ..................................................................................................................................................A-1
Torch Assembly ...............................................................................................................................................A-2
Feed Torch Motor Cables back through Break Away Disc ..............................................................................A-3
Install the rear Aluminum Housing ................................................................................................................A-3
Threading through of Water, Gas Wire Conduit and Power Cables ................................................................A-4
Couple the Torch to the Cable Assembly ........................................................................................................A-5
Final Torch Installation ..................................................................................................................................A-6
Gooseneck Installation ..................................................................................................................................A-7
Cable Station ....................................................................................................................................................A-7
- Torch 14 Pin ...............................................................................................................................................A-7
- Torch 6 Pin ..................................................................................................................................................A-7
Wire Drive Configuration ..................................................................................................................................A-8
Procedure to Replace Drive Roll ....................................................................................................................A-8
Procedure to Replace Idler Arm Assembly ......................................................................................................A-9
Proper Torch Drive Roll Tension ....................................................................................................................A-9
Conduit Installation .........................................................................................................................................A-10
Water Fitting Valve Replacement ....................................................................................................................A-10
Liner Replacement .........................................................................................................................................A-11

Operation .......................................................................................................................................................Section B
Cold Inch Forward / Reverse ...........................................................................................................................B-1
Gas Purge ........................................................................................................................................................B-1
LED Light ........................................................................................................................................................B-1
Graphic Symbols that appear on the AutoDrive® SA Torch or Wire Feeder or in this Manual .........................B-1

Accessories .....................................................................................................................................................Section C
Optional Kits and Accessories .........................................................................................................................C-1
Idler Roll Kit, Tip Holders, Goosenecks, Diffuser Cap ....................................................................................C-1
Optional Kits and Accessories .........................................................................................................................C-2

Maintenance ...................................................................................................................................................Section D
Safety Precautions ..........................................................................................................................................D-1
Periodic Maintenance ....................................................................................................................................D-1
Drive Rolls ......................................................................................................................................................D-1
- Gooseneck and Conduit Liners ....................................................................................................................D-1
- Aluminum Oxide Shavings ........................................................................................................................D-1
Calibration Specification ................................................................................................................................D-1

Troubleshooting ...........................................................................................................................................Section E
Safety Precautions ..........................................................................................................................................E-1
How to Use Troubleshooting Guide ................................................................................................................E-1
Troubleshooting Guide ..................................................................................................................................E-2 - E-3

Diagrams .........................................................................................................................................................Section F
- Dimension Print ............................................................................................................................................F-1
- Schematic ..................................................................................................................................................F-2

Parts List ..........................................................................................................................................................parts.lincolnelectric.com

Content/details may be changed or updated without notice. For most current Instruction Manuals, go to parts.lincolnelectric.com.
PRODUCT OVERVIEW

PRODUCT SUMMARY

General Physical Description
The AutoDrive® SA Torch is one component in an advanced robotic welding system, part of Lincoln Electric’s Aluminum Solutions product line. The AutoDrive® SA Torch is a highly advanced welding torch which incorporates a servo motor and digital feedback to very precisely control wire feed speed and therefore tightly control weld parameters and bead appearance. The wire guide components on the AutoDrive® SA are optimized for aluminum welding to ease the feeding of the aluminum wire and replacement.

The AutoDrive® SA Torch is to be used only in conjunction with the AutoDrive® SA. The AutoDrive® SA is a robot arm mounted wire feeder. The two components used together create one of the most advanced aluminum feeding solutions on the market today. The result is superior wire feedability, fewer burn backs, and excellent bead appearance.

General Functional Description
The AutoDrive® SA torch features a dual channel, high resolution tachometer for precision wire feeding both forwards and in reverse.

The high resolution tachometer allows welding schedule’s including Touch Retract, Low Frequency Pulse, and Heat Wave.

RECOMMENDED PROCESSES AND EQUIPMENT

RECOMMENDED PROCESSES
• Aluminum GMAW (0.035”, 3/64” and 1/16” wires)

PROCESS LIMITATIONS
• Steel GMAW is possible with the AutoDrive® SA but not recommended at this time.
• Maximum wire size = 1/16 (1.6mm) aluminum wire

LOCATION
This equipment is for industrial use only and it is not intended for use in residential locations where the electrical power is provided by the public low-voltage supply system. There can be potential difficulties in residential locations due to conducted as well as radiated radio-frequency disturbances. The EMC or RF classification of this equipment is Class A.

EQUIPMENT LIMITATIONS
Torch K Numbers
K4128-1 (100iC, MA1440)
K4128-2 (120iC, 100iC-6L)
K4128-3 (120iC-10L, MA2010)
K4128-4 (MA3120)

Feeder K Numbers
K4129-1

Cable K Numbers
K4130-1 (100iC) Approx. 29.00 in (73.6cm)
K4130-2 (100iC-6L) Approx. 37.50 in (95.3cm)
K4130-3 (120iC) Approx. 36.50 in (92.7cm)
K4130-4 (120iC-10L) Approx. 44.75 in (113.6cm)

Gun Tube K Numbers
KP4125-22
KP4125-45
KP4125-180

• The AutoDrive® SA Torch is compatible with FANUC 100iC, 120iC, 100iC/6L, and 120iC/10L Fanuc robot arms. It is also compatible with select Yaskawa/Motoman robot arms. See product literature for complete compatibility list.
• The AutoDrive® SA Torch is only to be used in conjunction with the AutoDrive® S wire feeder
• The AutoDrive® SA system is only compatible with Lincoln Electric PowerWave technology
• The AutoDrive® SA Torch does not come with a gooseneck, this is a separate K Number
• The AutoDrive® SA Torch does not come with a Thru The Arm cable bundle, this is a separate K Number
• AutoDrive® SA Torch comes installed with a 3/64” U-Groove drive roll. Other drive roll kits can be purchased as a KP number
• Robot and power source software will need to be updated to function with the AutoDrive® SA Torch.
• Numerous gooseneck and nozzle combinations exist
• The AutoDrive® SA has a 100% Duty Cycle at 350Amps
• The AutoDrive® SA is a water cooled welding torch. It cannot be air cooled.

RECOMMENDED POWER SOURCES
• Power Wave i400
• Power Wave R350
• Power Wave R500
• Power Wave S350
• Power Wave S500
• Power Wave S700
# Design Specifications

<table>
<thead>
<tr>
<th>AutoDrive SA</th>
</tr>
</thead>
</table>
| K# (Torch) | K4128-1  
K4128-2  
K4128-3  
K4128-4 |
| K# (Cable) | K4130-1  
K4130-2  
K4130-3 |
| KP# (Gooseneck) | KP4125-22  
KP4125-45  
KP4125-180 |

## Ratings

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wire Feed Speed</td>
<td>30 - 800 ipm (0.8 – 30.5m/min)</td>
</tr>
<tr>
<td>Wire Sizes, Solid (Aluminum)</td>
<td>.035 - 1/16&quot; (0.6 – 1.6 mm)</td>
</tr>
<tr>
<td>Welding Current</td>
<td>350 Amps @ 100%</td>
</tr>
<tr>
<td>Welding Shielding Gas</td>
<td>100% Argon</td>
</tr>
</tbody>
</table>

## Electrical

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Voltage</td>
<td>40 VDC</td>
</tr>
<tr>
<td>Input Current</td>
<td>10 A Max</td>
</tr>
<tr>
<td>Motor Power</td>
<td>220 Watt</td>
</tr>
<tr>
<td>Cable Connection</td>
<td>14 pin, 6pin Amphenol</td>
</tr>
<tr>
<td>Note</td>
<td>All inputs come through ArcLink Cable from Wire Feeder</td>
</tr>
</tbody>
</table>

## Physical

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length (With Gooseneck)</td>
<td>17.50 in. (445mm)</td>
</tr>
<tr>
<td>Width</td>
<td>3.27 in. (83mm)</td>
</tr>
<tr>
<td>Height</td>
<td>6.50 in. (165mm)</td>
</tr>
<tr>
<td>Weight</td>
<td>7.0lbs (3.18kg)</td>
</tr>
</tbody>
</table>

| Compatible Robots | Fanuc 100iC, Fanuc 100iC/6L, Fanuc 120iC, Fanuc 120iC/10L, Select Yaskawa/Motoman Arms Yaskawa/Motoman MA3120 |

| Replaceable Motor | Yes |

## Cooling Requirements

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum flow rate (with Gooseneck installed)</td>
<td>.32 Gal/Min (1.5L/min)</td>
</tr>
<tr>
<td>Minimum Inlet Pressure</td>
<td>50psi (345kpa)</td>
</tr>
<tr>
<td>Maximum Inlet Pressure</td>
<td>70psi (483kpa)</td>
</tr>
<tr>
<td>Minimum Cooling Power</td>
<td>0.30kw (1023 btu/hr) @ 1.5L/min</td>
</tr>
</tbody>
</table>

## Approvals and Markings

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSA/CUS</td>
<td>Yes</td>
</tr>
<tr>
<td>CAN/CSA-E60974-7, ANSI/IEC60974-7</td>
<td>Yes</td>
</tr>
<tr>
<td>CE</td>
<td>Yes</td>
</tr>
<tr>
<td>EN 60974-7, EN60974-10</td>
<td></td>
</tr>
<tr>
<td>GB15579.7-2013</td>
<td>Yes</td>
</tr>
<tr>
<td>CCC</td>
<td>No</td>
</tr>
<tr>
<td>IP rating</td>
<td>N/A</td>
</tr>
</tbody>
</table>
K4128-1 AutoDrive® SA Torch

Front 3 Quarter View:

Components (Wire drive cover not shown):

- Drive Roll Tension Setting *
- Drive Roll
- Idler Roll
- Pivot Pin

* Drive roll tension set at the factory. There should be no reason for the user to change this setting.
K4128-1 AutoDrive® SA Torch
Front 3 Quarters:
Front View:

Figure 1: Three pins on the gooseneck plug into the front of the torch. Two of these pins open small valves inside the torch to allow water to flow when the gooseneck is installed and prohibit the flow of water when the gooseneck is removed.
Side View (Buttons):

Figure 2: Four buttons are installed on the side of the torch. These buttons are used when the operator is programming the robot. The buttons can cold feed wire in the + or – direction, gas purge, and toggle the programming LED on/off.
DESIGN FEATURES

STANDARD FEATURES
• High-resolution tachometer for precise low wire feed speed control and fast dynamic response.
• Optimized wire guides for feeding aluminum wire with minimal friction
• Quick change gooseneck liner as well as thru-the-arm polymer liner
• Direct drive servo motor to deliver wire for advanced feeding applications such as low frequency pulse and touch retract starting.
• Water-cooled gooseneck and power cable to keep consumables cool.
• Auto shutoff water-cooled valves for quick change of gooseneck and liner without turning off power to the water cooler.
• Ability to use Magnum® PRO 350A or 550A contact tips and various nozzle configurations for hard to reach joints.
• Preset drive roll tensions.

SPECIAL FEATURES
• Four torch mounted buttons to control cold inch +/-, gas purge, and LED light
• LED light to illuminate welding area for programming
INSTALLATION

SYSTEM SET-UP

Pre-Installation Note:

The AutoDrive® SA Torch comes completely assembled with hardware included in the assembly. The scope of the torch install is to un-assemble parts of the Torch and then re-assemble the torch on the robot arm. The torch needs to first be disassembled (partially) in order to install components and reveal required hardware. See the below instructions and photos to disassemble properly. Replacement hardware can be ordered from the parts page.

Torch Disassembly (Preparation for robot assembly)

1.) To get the Torch in a state where it can be mounted on the robot the Break Away disc needs to be removed from the assembly. This also requires the rear Aluminum Housing to be removed from the torch. Start by removing the two radial screws as seen in the figure.

2.) After those are removed then remove the two long bolts that hold the Torch together, as seen in the figure.

3.) At this point pivot up the tension lever arm to allow clearance for the rear Aluminum Housing to be removed. Carefully pivot and remove the rear Aluminum Housing.

4.) Once the rear Aluminum Housing and Break Away disc are free from the rest of the Torch assembly then remove the four socket head screws to free the Break Away Disc from the Aluminum Rear Housing. There will be four metric socket head screws trapped inside. These screws mount the Break Away Disc to the robot arm (these are metric screws).

5.) This completes the Torch disassembly, the Torch is now ready to be mounted to a robot arm.

FIGURE A.1 Torch assembly as it comes shipped from Lincoln Electric

FIGURE A.2 Remove radial screws.

FIGURE A.3 Remove 2 long bolts.

FIGURE A.4 Pivot up the tension lever arm.
Torch Assembly

1.) Install Break Away Disc (Supplied with torch)

   a. Use the 4x M4 Socket Head screws to affix the break away disk to the robot arm. Align the locating pin on the disk to the locating hole on the robot arm. The disc will only install one way.

   FIGURE A.8 Install breakaway disc. Line up locating dowel on break away disc with locating hole on the robot mounting face.

FIGURE A.5 The torch with the aluminum housing removed.

FIGURE A.6 Remove the four socket head screws that hold the break away disc to the aluminum rear housing. This will allow the disc to be removed from the housing.

FIGURE A.7 A break away disc separated from the rear aluminum housing.
Feed Torch Motor Cables back through Break Away Disc

a. Position the robot arm close to a table so the AutoDrive® SA Torch can be sitting next to the robot face. Do not allow the AutoDrive® SA Torch to dangle from the robot face by the motor cables or Cable Bundle.

b. Feed the Torch Motor Cables (and Amphenols) back through the wrist (see Figure A.9). Carefully feed the cables through the Break Away disc one at a time. The motor cables should not be crossed, kinked or knotted. The motor cables should be rotated and sitting below the rest of the cable bundle once they have been fed through.

Install the rear Aluminum Housing

a. Line up the scribe mark on the Break Away Disc with that of the Rear Aluminum Housing and press the Aluminum Housing into the Break Away Disc.

b. The two motor cables do not go through the hole in the Rear Housing; they will go through a relief cutout where the Rear Housing meets the Break Away Disc (see Figure A.10). Be careful not to pinch the motor cables.

c. Affix the Rear Housing to the Break Away Disc using the supplied socket head cap screws

d. Insert the black insulating cylinder into the Rear Housing, this insulator only installs one way. The two thru holes should be as shown. Thread down the two radial socket head screws just enough to hold the insulating cylinder in place. Do not thread these screws down enough that they protrude to the inner diameter of the insulating cylinder at this point.
Threading through of Water, Gas, Wire Conduit and Power Cables

a. Pass all four tubes through the center bore in the Rear Aluminum Housing. Take care not to cross the tubes or create a tangle. The tubes need to be neatly oriented from the Wire Feeder to the Torch to ensure the integrity of the system.

b. Install the four tubes into the Brass Cable Connector. Start with the red Wire Conduit; press the conduit into the circular fitting on the Brass Cable Connector until it bottoms out. The four tubes only install one way into the cable connector (as shown). Simply press the pins into the slots.

c. Apply a film of silicone grease to all o-ring surfaces to ensure correct fitment and prevent leaks.

**FIGURE A.12** These are the four tubes and one of the Brass Cable Connectors which are supplied with the Cable Bundle. The fittings will only install in one orientation. Be sure not to cross or table the tubes as they are routed down the robot arm.

**FIGURE A.13** The tubes have been inserted into the Rear Aluminum Housing.

**FIGURE A.14** The fittings have been installed in the Brass Cable Connector. To install the fittings simply press the fittings into the slots as shown. The fittings will only install in one orientation.

**FIGURE A.15** Insert the black insulating cylinder back into the Rear Aluminum Housing. The two radial holes in the insulating cylinder need to line up with the radial holes in the Rear Aluminum Housing.
Couple the Torch to the Cable Assembly

a. Position the Torch in front of the Cable Bundle. The Torch and Cable bundle will only mate one way. Line up with three pins with their obvious corresponding hole and press the two together while rotating the brass collar to engage the threads between the two.

b. Continue to thread the collar down to draw the two assemblies together. Use the supplied custom Spanner Wrench to apply additional torque. Do not use any additional tools or movement arms to achieve more torque on the spanner wrench.

NOTE: The collar will be threaded down completely when substantial torque has been applied with the spanner wrench. Also, the water cooled power cable will be locked so that you will not be able to rotate the cable in the assembly any longer.

FIGURE A.16 Insert the Brass Cable Connector with the fitting installed into the rear of the Torch.

FIGURE A.17 Use the supplied custom Spanner Wrench to tighten the brass collar. This will allow the user to put more torque on the collar and lock the taper on the Water Cooled Power Cable.

FIGURE A.18 This is what the cable connection will look like after the connection has been torqued with the wrench. Note: there are still threads showing, and this is okay. Also, note the tubes going into the block are not twisted or crossed.
Final Torch Installation

a. Carefully push the Torch into the Rear Aluminum Housing while simultaneously pushing/pulling the Motor Cables to feed through as much slack as possible through the relief cutout in the Rear Aluminum Housing.

b. Once there is no gap between the Torch Body and the Rear Aluminum housing (a little gap is okay, when the socket head screws are tightened this will eliminate the gap) insert the two long socket head cap screws and torque them alternately until tight. Note: Do not allow the Motor Cables to become pinched or crossed, they should neatly get routed up the relief cutout and through the arm of the robot.

c. Once the two long socket head screws are torqued then insert the two smaller socket head screws that get inserted into the radial holes on the Rear Aluminum Housing. Torque these screws.

d. Apply Drive Roll Cover

e. Plug in gooseneck (Separate K-Number). Line up scribe or dowel pin to clock gooseneck to Torch face. Tighten black nut snug to make good contact.

**FIGURE A.20** Once the two long socket head screws are tight then the two radial screws can be tightened.

**FIGURE A.19** Once the Torch body is pushed into the Rear Aluminum Housing then the two long socket head screws can be tightened. As those screws get tight they will draw in the Torch body and eliminate any gap that is present between the Torch Body and the Rear Aluminum Housing.
Gooseneck Installation

a. Be sure to rub a film of silicone grease on all the o-rings on the mating end of the gooseneck. This will ensure a proper seal of the o-rings and prevent water leaks.

b. Line up the scribe on the vertical axis of the gooseneck with the vertical scribe on the torch. You can also line up the locating dowel pin with the hole on the Torch interface.

c. Simply press the gooseneck onto the torch body lightly rocking the connection back and forth until the fittings are mating.

d. Thread down the black locking ring. Provide significant torque to create a solid connection between the gooseneck and torch.

CABLES

Feeder to Torch Cables (Supplied with and assembled on the Torch)

Feeder to Torch cables are used to connect the AutoDrive® SA Wire Feeder to the Torch. There are two multi conductor electrical cables that communicate between the Torch and Feeder.

One cable has a 14 pin connector at each end. Both ends of the cable have a collar and the cables cannot be “daisy chained” to make a longer cable.

<table>
<thead>
<tr>
<th>FIGURE A.1 TORCH POWER</th>
<th>FIGURE A.2 TORCH FEEDBACK</th>
</tr>
</thead>
<tbody>
<tr>
<td>TABLE A.3 TORCH POWER</td>
<td>TABLE A.4 TORCH FEEDBACK</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POWER SOURCE/CONTROL BOX</th>
<th>FUNCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>PIN</td>
<td>FUNCTION</td>
</tr>
<tr>
<td>A</td>
<td>MOTOR PHASE 1</td>
</tr>
<tr>
<td>B</td>
<td>MOTOR PHASE 2</td>
</tr>
<tr>
<td>C</td>
<td>MOTOR PHASE 3</td>
</tr>
<tr>
<td>D</td>
<td>LED</td>
</tr>
<tr>
<td>E</td>
<td>LED</td>
</tr>
<tr>
<td>F</td>
<td>RESERVED</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>WIRE FEEDER</th>
</tr>
</thead>
<tbody>
<tr>
<td>PIN</td>
</tr>
<tr>
<td>A</td>
</tr>
<tr>
<td>B</td>
</tr>
<tr>
<td>C</td>
</tr>
<tr>
<td>D</td>
</tr>
<tr>
<td>E</td>
</tr>
<tr>
<td>F</td>
</tr>
<tr>
<td>H</td>
</tr>
<tr>
<td>J</td>
</tr>
<tr>
<td>K</td>
</tr>
<tr>
<td>L</td>
</tr>
<tr>
<td>M</td>
</tr>
<tr>
<td>N</td>
</tr>
<tr>
<td>P</td>
</tr>
<tr>
<td>R</td>
</tr>
</tbody>
</table>
WIRE DRIVE CONFIGURATION

**WARNING**

**ELECTRIC SHOCK CAN KILL.**

- Turn the input power OFF at the welding power source before installation or changing drive rolls and/or guides.
- Do not touch electrically live parts.
- When inching with the gun trigger, electrode and drive mechanism are "hot" to work and ground and could remain energized several seconds after the gun trigger is released.
- Do not operate with covers, panels or guards removed or open.
- Only qualified personnel should perform maintenance work.

Procedure to Replace Drive Roll

The Drive Rolls for the AutoDrive® SA Torch are specially designed stainless steel rolls to optimize the feeding of aluminum welding wire. The rolls have a "U" Groove profile to hug the wire while not deforming the wire (See Section on Drive Roll Tension). The Torch drive rolls are designed to last at least 6 months of production welding before they wear out and loose enough feeding force to merit a replacement. The aluminum oxide that flakes off the aluminum wire is a very hard substance that deteriorates the drive roll over time. See M21544-1 for customer supplied instruction sheet.

To remove drive roll:
1. Turn power off at the welding power source.
2. Open the idler arm
3. Rotate drive roll to allow access to Torx screw
4. Use supplied Torx Key (T10) to loosen drive roll and pull off motor shaft

To install drive roll:
1. Turn off power at the welding power source.
2. Open the idler arm.
3. Place the Drive Roll Height Gauge (included with new drive roll kit) on the base of the torch
4. Slide drive roll on to motor shaft and allow the roll to bottom out on the height gauge. This will position the drive roll groove in the center of the wire path.
5. Tighten Torx screw with supplied Torx key until snug (do not over tighten)
6. Remove drive roll height gauge

**FIGURE A.22** Removal and installation of the Torch drive roll. See M21544-1 for customer supplied instruction sheet.
1. Start by loosening the two socket head cap screws that hold the conduit liner clamp in place.
Procedure to Replace Idler Arm Assembly

The Idler Arm Assembly kit contains the parts to replace the entire pivoting idler assembly. This assembly contains a sealed idler bearing that should last significantly longer than a drive roll. In the case of a failed idler bearing the following procedure should be followed to replace the Idler Arm assembly. There is a small retaining ring that needs to be removed to replace the Idler Arm assembly. A small set of retaining ring pliers is required to replace this assembly. Please see M21544-2 for customer supplied installation instructions.

FIGURE A.23 The Idler Arm Assembly kit contains the Idler Arm, Bearing, and retaining ring that holds the assembly onto the pivot pin.

FIGURE A.24 The Idler Arm Assembly is pictured here with the retaining ring. See M21544-2 for full instructions.

Proper Torch Drive Roll Tension

Significant time has been spent determining an ideal tension setting for the AutoDrive® SA torch. There is an ideal setting to be able to feed aluminum wire successfully without too much tension (which deforms the wire) or too little tension (which causes the drive roll to slip on the wire). The ideal tension setting has been set at Lincoln Electric when the AutoDrive® SA Torch was assembled. It is understood that not all end user situations are the same and the tension setting may need to be adjusted in the field. If the customer does need to adjust the tension setting please follow the below instructions.

There is a set screw and spring configuration in the Tension Arm. The amount the set screw is threaded into the Tension Arm determines the amount the spring is compressed, and therefore the amount of tension that is applied to the wire. The Tension Arm has been designed such that the ideal tension setting is when the head of the set screw is flush with the face of the Tension Arm.

Since the AutoDrive® SA Torch is only to be used in conjunction with an AutoDrive® SA Wire Feeder the amount of wire the Torch will be feeding is always known. Therefore the amount of tension that is needed to feed wire from the Wire Feeder to the Torch is always known. This is why the Torch Drive Roll Tension is set at the factory and ideally does not need to be adjusted.

FIGURE A.25 Drive Roll Tension is set by adjusting the set screw indicated in the image above. By tightening the set screw more tension is being applied to the wire.
**Conduit Installation**

The conduit liner that runs from the torch to the feeder should be replaced from the feeder end. There is a small space to pull out the old liner and replace with a new liner. The conduit liner is held in place at the torch with a small aluminum clamp. The back end of the conduit is free to move with the motion of the robot arm. The conduit liner should terminate to within 0.12" of the torch drive roll. The goal is to support the wire for as much of the distance as possible to prevent bird nesting of the wire.

**Water Fitting Valve Replacement**

**Tools Required:**
- K4214-1 Valve Fitting Tool

**Valve Removal and Replacement:**

1.) Ensure that robot and power source are deenergized.
2.) Disconnect SA torch from water cooler to prevent water flow during valve replacement.
3.) Remove gooseneck assembly by loosening lock nut and pulling gooseneck from torch.
4.) Remove SA torch body from robot face and hoses per installation instructions.
5.) Lightly depress each check valve and release, to ensure that water pressure has been relieved.
6.) Place torch on body on flat work surface so that front face / gooseneck mating surface is vertical.

**Valve Installation:**

1.) Using K4214-1 Valve Fitting Tool, remove Slotted Hollow Set Screw with o-ring installed.
2.) Remove Water Pin with o-ring installed.
3.) Remove spring.
4.) Verify that Spring Plug is installed into water valve port on SA torch. This part is not normally replaced, but is included with kit if needed. If replacement is necessary, install Spring Plug with taper inwards and spring seat outwards.

**FIGURE A.26** The 0.1875” OD Nylon conduit liner extends from the AutoDrive® SA Wire Feeder to the Torch. The liner is only held in place by the Liner Clamp pictured above. The liner should be held as close to the Drive Roll and Idler Roll as possible without rubbing, this supports the wire as much as possible to minimize birds nesting.

*FIGURE A.27* Water Valve removal and replacement.
Liner Replacement

Procedure:

1.) Position arm to be straight from feeder to torch.

2.) Loosen the front torch locking screws.

3.) Remove the lower drive rolls from the feeder.

4.) Slide the liner out from the feeder.

5.) Install replacement liner.

6.) Adjust so that liner is close to the torch drive rolls but not touching.

7.) Tighten screws to lock liner in position.

8.) Trim excess liner in the rear so that it is flush with the guide pin.

9.) Reinstall drive rolls.
OPERATION

The AutoDrive® SA Wire Feeder and Torch are fully controlled and operated by a robot, control box or user interface on the power source. The AutoDrive® SA system requires a Generation III Power Wave® Power Source. A software update may be required prior to use.

However, there are four buttons on the AutoDrive® SA- Torch. These four buttons are only functional when the robot is not welding.

<table>
<thead>
<tr>
<th>BUTTON 1</th>
<th>COLD INCH FORWARD</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUTTON 2</td>
<td>COLD INCH REVERSE</td>
</tr>
<tr>
<td>BUTTON 3</td>
<td>GAS PURGE</td>
</tr>
<tr>
<td>BUTTON 4</td>
<td>LED LIGHT ON/ OFF</td>
</tr>
</tbody>
</table>

**Cold Inch Forward/ Reverse:** This button is to cold inch wire in/out of the contact tip to set a CTWD or feed wire through the torch. The speed the wire advances at is set in the Teach Pendant from the robot. It will only feed at the Cold Inch Slow Speed in the Teach Pendant. The wire will not increase to a Fast Cold Inch Speed like if wire was inched from the Pendant.

**Gas Purge:** The Gas Solenoid will open in the wire feeder for as long as this button is pressed.

**LED Light:** The bright light on the nosecone of the torch can be toggled on or off with this button. This button will often be used for programming purposes only and switched off when the robot is welding.

FIGURE B.1 Image showing button orientation.
OPTIONAL KITS AND ACCESSORIES

**Drive Roll Kits, 4 Roll Drive**

<table>
<thead>
<tr>
<th>DRIVE ROLL KITS, ALUMINUM WIRE</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>KP4413-035A 0.035</td>
<td>Includes: 1 U-Groove Drive roll, Torx Key, and Drive Roll Height Gauge</td>
</tr>
<tr>
<td>KP4413-364A 3/64&quot;</td>
<td></td>
</tr>
<tr>
<td>KP4413-116A 1/16&quot;</td>
<td></td>
</tr>
</tbody>
</table>

**Idler Roll Assembly**

<table>
<thead>
<tr>
<th>IDLER ROLL KIT</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>KP4415-1 ALL WIRE SIZES</td>
<td>Includes: 1 Idler Roll Assembly, Retaining Ring</td>
</tr>
</tbody>
</table>

**Tip Holders**

<table>
<thead>
<tr>
<th>TIP HOLDERS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>KP4122-1 TIP HOLDER - 350A</td>
<td>Includes: 1 tip holder, or 25 if a bulk pack</td>
</tr>
<tr>
<td>KP4122-1-B25 TIP HOLDER - 350A (25 x BULK PACK)</td>
<td></td>
</tr>
<tr>
<td>KP4123-1 TIP HOLDER - 550A</td>
<td></td>
</tr>
<tr>
<td>KP4123-1-B25 TIP HOLDER - 550A (25 x BULK PACK)</td>
<td></td>
</tr>
</tbody>
</table>

**Goosenecks**

<table>
<thead>
<tr>
<th>GOOSENECKS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>KP4125-22 22 Degree Gooseneck</td>
<td>Includes: 1 gooseneck</td>
</tr>
<tr>
<td>KP4125-45 45 Degree Gooseneck</td>
<td></td>
</tr>
<tr>
<td>KP4125-180 180 Degree Gooseneck</td>
<td></td>
</tr>
</tbody>
</table>

**Diffuser Cap**

<table>
<thead>
<tr>
<th>DIFFUSER CAP</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>KP4124-1 DIFFUSER CAP</td>
<td>Includes: 1 diffuser cap, or 25 if a bulk pack</td>
</tr>
<tr>
<td>KP4124-1-B25 DIFFUSER CAP (25 x BULK PACK)</td>
<td></td>
</tr>
</tbody>
</table>

See product information sheet for latest nozzle and contact tip offering.
**WARNING**

ELECTRIC SHOCK can kill.

- Turn the input power OFF at the welding power source before installation or changing drive rolls and/or guides.
- Do not touch electrically live parts.
- Welding power source must be connected to system ground per the National Electrical Code or any applicable local codes.
- Only qualified personnel should perform maintenance work.

---

## Optional Kits and Accessories

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Includes</th>
<th>Photo</th>
</tr>
</thead>
<tbody>
<tr>
<td>KP3376-2</td>
<td>Gooseneck Liner</td>
<td>5x Teflon Liner Pieces (Customer to cut to length)</td>
<td>![Image]</td>
</tr>
<tr>
<td>KP3991-6</td>
<td>Conduit Liner</td>
<td>1x 4’ Long Teflon Conduit Liner (Customer to cut to length)</td>
<td>![Image]</td>
</tr>
<tr>
<td>K4214-1</td>
<td>Water Fitting Tool</td>
<td>1 tool</td>
<td>![Image]</td>
</tr>
<tr>
<td>KP4215-1</td>
<td>Water Fitting Repair (K4214-1 tool required)</td>
<td>Fittings, o-rings, springs</td>
<td>![Image]</td>
</tr>
<tr>
<td>KP4216-1</td>
<td>Gooseneck O-Ring Kit</td>
<td>2 sets of Gooseneck O-Rings</td>
<td>![Image]</td>
</tr>
</tbody>
</table>
# ROUTINE MAINTENANCE

**WARNING**

- Before carrying out service, maintenance and/or repair jobs, fully disconnect power to the machine.
- Use Personal Protective Equipment (PPE), including safety glasses, dust mask and gloves to avoid injury. This also applies to persons who enter the work area.
- MOVING PARTS can injure.
  - Do not operate with doors open or guards off.
  - Keep away from moving parts.
- Have qualified personnel do all maintenance and troubleshooting work.

## PERIODIC MAINTENANCE

<table>
<thead>
<tr>
<th>DRIVE ROLLS</th>
<th>The custom drive rolls manufactured for use on the AutoDrive® SA-Torch are designed to last around 7000lbs of wire. Please see the table on page C-1 with replacement drive rolls.</th>
</tr>
</thead>
<tbody>
<tr>
<td>GOOSENECK AND CONDUIT LINERS</td>
<td>The Teflon liners in the gooseneck and conduit are meant to create a smooth surface for the aluminum wire to glide over. These surfaces are going to wear over time. Please see the table on page C-3 with replacement Teflon liners.</td>
</tr>
<tr>
<td>ALUMINUM OXIDE SHAVINGS</td>
<td>Over time aluminum oxide breaks off the surface the aluminum wire. This oxide builds up below drive rolls and wear surfaces. It is important to periodically blow out these areas with compressed air to avoid the buildup of aluminum oxide which can contribute to feeding issues.</td>
</tr>
</tbody>
</table>

**CALIBRATION SPECIFICATION**

Calibration of the AutoDrive® SA is critical to its operation. Once the unit has been calibrated after installation, it generally will not need adjustment. However, neglected or improperly calibrated machines may not yield satisfactory weld performance. To ensure optimal performance, it is recommended that the calibration of wire feed speed be checked yearly.

The calibration procedure itself requires the use of a certified actual meter for wire feed speed. The accuracy of calibration will be directly affected by the accuracy of the measuring equipment you use. When the unit is first installed, or if the welding performance changes, use the calibration section of the Power Wave Manager utility to make the appropriate adjustments. The utility and its instruction manual, which includes detailed instructions for carrying the calibration procedure, are available at www.powerwavesoftware.com.

If for any reason you do not understand the procedures or are unable to perform the maintenance or repairs safely, contact your Lincoln Authorized Service Facility for technical troubleshooting assistance before you proceed.

WWW.LINCOLNELECTRIC.COM/LOCATOR
HOW TO USE TROUBLESHOOTING GUIDE

WARNING

Service and Repair should only be performed by Lincoln Electric Factory Trained Personnel. Unauthorized repairs performed on this equipment may result in danger to the technician and machine operator and will invalidate your factory warranty. For your safety and to avoid Electrical Shock, please observe all safety notes and precautions detailed throughout this manual.

This Troubleshooting Guide is provided to help you locate and repair possible machine malfunctions. Simply follow the three-step procedure listed below.

Step 1. LOCATE PROBLEM (SYMPTOM).
Look under the column labeled “PROBLEM (SYMPTOMS)”. This column describes possible symptoms that the machine may exhibit. Find the listing that best describes the symptom that the machine is exhibiting.

Step 2. POSSIBLE CAUSE.
The second column labeled “POSSIBLE CAUSE” lists the obvious external possibilities that may contribute to the machine symptom.

Step 3. RECOMMENDED COURSE OF ACTION
This column provides a course of action for the Possible Cause, generally it states to contact your local Lincoln Authorized Field Service Facility.

If you do not understand or are unable to perform the Recommended Course of Action safely, contact your local Lincoln Authorized Field Service Facility.

WARNING

ELECTRIC SHOCK can kill.

- Turn the input power OFF at the welding power source before installation or changing drive rolls and/or guides.
- Do not touch electrically live parts.
- Welding power source must be connected to system ground per the National Electrical Code or any applicable local codes.
- Only qualified personnel should perform maintenance work.

Observe all additional Safety Guidelines detailed throughout this manual.

CAUTION

If for any reason you do not understand the test procedures or are unable to perform the tests/repairs safely, contact your Local Lincoln Authorized Field Service Facility for technical troubleshooting assistance before you proceed.
### PROBLEMS (SYMPTOMS)

**The torch does not feed wire and the drive rolls do not spin.**

1. Verify the power source is turned on.
2. Verify the circuit breaker for the wire feeder on the power source has not tripped.
3. Verify the two electrical cables that run from the torch to the feeder are plugged in and secured in the wire feeder.
4. Verify power is being supplied to the wire feeder.

**The wire feeds erratically.**

1. Verify the correct drive rolls and inner wire guide are installed in the wire drive.
2. Check for sharp bends in the gun liner or conduit.
3. Examine the contact tip for wear and proper size. Replace as necessary.
4. Check the gun liner and conduit. The welding electrode should slide easily through both.
5. Verify the proper gun liner is installed.
6. Verify the pressure arms are set properly. Too much pressure may crush the wire.
7. Inspect the motor rotation with no wire installed. If rotation is smooth then wire path is most likely compromised.

**No shielding gas**

1. Verify the gas supply is turned on and not empty.
2. Check the gas hose for cuts. Make sure it is not crushed.
3. Verify the shielding gas hose is connected to the back of the wire feeder.

**Variable or "hunting" arc.**

1. Check for proper size contact tip. Make sure the contact tip is not worn, free of spatter and not melted.
2. Clean and tighten all electrode and work connections.
3. Verify the proper polarity is being used for the weld procedure.
4. Make sure the proper electrode stick-out is being maintained.
5. Check the gas flow rate and mixture.
6. Verify the cable pack assembly is tight at the torch and wire feeder.
7. Verify the electrode lead is connected to the proper connection block on the feed head.

If all recommended possible areas of adjustment have been checked and the problem persists, **Contact your local Lincoln Authorized Field Service Facility.**

#### CAUTION

If for any reason you do not understand the test procedures or are unable to perform the tests/repairs safely, contact your **Local Lincoln Authorized Field Service Facility** for technical troubleshooting assistance before you proceed.
<table>
<thead>
<tr>
<th>PROBLEMS (SYMPTOMS)</th>
<th>POSSIBLE CAUSE</th>
<th>RECOMMENDED COURSE OF ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>The motor overload errors occur.</td>
<td>1. Check for sharp bends in the gun liner and conduit.</td>
<td>If all recommended possible areas of misadjustment have been checked and the problem persists, Contact your local Lincoln Authorized Field Service Facility.</td>
</tr>
<tr>
<td></td>
<td>2. Examine the contact tip for wear and proper size. Replace as necessary.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Check the gun liner and conduit. The welding electrode should slide easily through both.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. Verify the proper gun liner is installed.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5. Reduce the pressure arm setting at wire feeder.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. O-rings at torch/cable interface.</td>
<td>2. Buy as parts from Parts Pages.</td>
</tr>
</tbody>
</table>

**CAUTION**

If for any reason you do not understand the test procedures or are unable to perform the tests/repairs safely, contact your Local Lincoln Authorized Field Service Facility for technical troubleshooting assistance before you proceed.
NOTE: This diagram is for reference only. It may not be accurate for all machines covered by this manual. The specific diagram for a particular code is pasted inside the machine on one of the enclosure panels. If the diagram is illegible, write to the Service Department for a replacement. Give the equipment code number.
NOTE: This diagram is for reference only. It may not be accurate for all machines covered by this manual. The specific diagram for a particular code is pasted inside the machine on one of the enclosure panels. If the diagram is illegible, write to the Service Department for a replacement. Give the equipment code number.
CUSTOMER ASSISTANCE POLICY

The business of The Lincoln Electric Company is manufacturing and selling high quality welding equipment, consumables, and cutting equipment. Our challenge is to meet the needs of our customers and to exceed their expectations. On occasion, purchasers may ask Lincoln Electric for advice or information about their use of our products. We respond to our customers based on the best information in our possession at that time. Lincoln Electric is not in a position to warrant or guarantee such advice, and assumes no liability, with respect to such information or advice. We expressly disclaim any warranty of any kind, including any warranty of fitness for any customer’s particular purpose, with respect to such information or advice. As a matter of practical consideration, we also cannot assume any responsibility for updating or correcting any such information or advice once it has been given, nor does the provision of information or advice create, expand or alter any warranty with respect to the sale of our products. Lincoln Electric is a responsive manufacturer, but the selection and use of specific products sold by Lincoln Electric is solely within the control of, and remains the sole responsibility of the customer. Many variables beyond the control of Lincoln Electric affect the results obtained in applying these types of fabrication methods and service requirements.

Subject to Change – This information is accurate to the best of our knowledge at the time of printing. Please refer to www.lincolnelectric.com for any updated information.