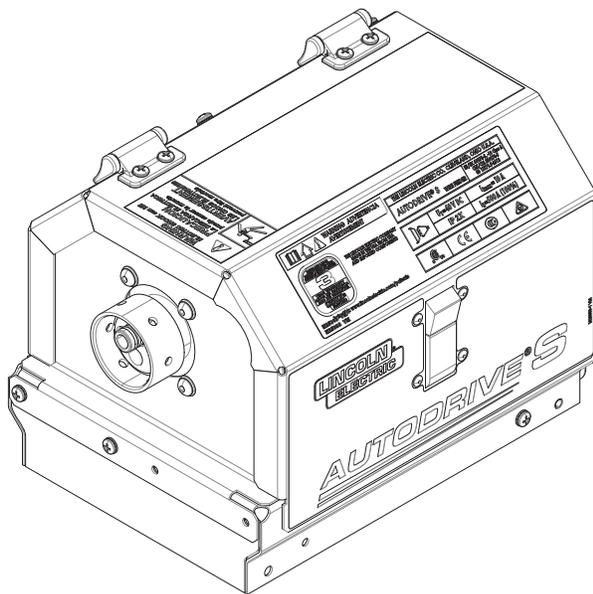


Operator's Manual

AutoDrive[®] S Wire Feeder



For use with machines having Code Numbers:

12863



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.

WARNING

This statement appears where the information must be followed exactly to avoid serious personal injury or loss of life.

CAUTION

This statement appears where the information must be followed to avoid minor personal injury or damage to this equipment.



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.



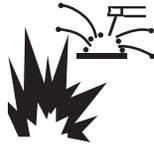
FUMES AND GASES CAN BE DANGEROUS.



- 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.



WELDING AND CUTTING SPARKS CAN CAUSE FIRE OR EXPLOSION.



- 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.



CYLINDER MAY EXPLODE IF DAMAGED.



- 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.



FOR ELECTRICALLY POWERED EQUIPMENT.



- 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
<http://www.lincolnelectric.com/safety>
for additional safety information.

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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 DESCRIPTION

GENERAL PHYSICAL DESCRIPTION

The AutoDrive® S wire feeders are powerful yet compact wire drives for robotic applications.

The Servo Controlled 4 roll wire drive gives accurate feeding of 0.035" thru 0.045" solid steel and metal cored wires. The drive features a quick change liner configuration and tool-less drive roll changing all mounted in a precision die cast aluminum frame. A right angle precision gear box efficiently transfers motor power for both high torque and high speed.

The AutoDrive® S is optimized for most "thru arm" style robotic arms. The small, light weight package maximizes arm speed and working envelope. Quick change mounting brackets along with a new unified cable system make for fast servicing of the feeder and torch.

GENERAL FUNCTIONAL DESCRIPTION

The AutoDrive® S wire drive features a high resolution encoder for precision wire feeding both forwards and in reverse.

RECOMMENDED PROCESSES

- GMAW

PROCESS LIMITATIONS

AutoDrive® S

- Maximum wire size = 0.045" (1.2mm)

EQUIPMENT LIMITATIONS

AutoDrive® S

- Maximum GMAW gun length = 10' (3.1m)
- Maximum wire drive control cable length = 100ft (31m)
- Robot, power source and wire feeder software may need to be updated.
- Only 0.045" drive rolls are included with the feeder.

RECOMMEND POWER SOURCES

- All Lincoln Power Wave series Power Sources

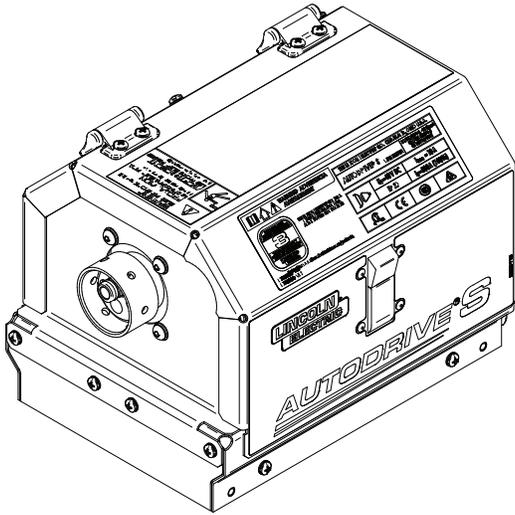
TECHNICAL SPECIFICATIONS

AUTODRIVE S	
PRODUCT #	K4303-2
RATINGS	
WIRE FEED SPEED	30 - 800 IPM (0.8 –20.32M/MIN)
WIRE SIZES, SOLID	.035- .045" (0.9–1.2MM)
WELDING CURRENT	500 AMPS @ 100%
ELECTRICAL	
INPUT VOLTAGE	40 VDC
INPUT CURRENT	10A MAX
MOTOR POWER	109 WATT
CABLE CONNECTION	5 PIN ARCLINK®
PHYSICAL	
LENGTH	9.1" (231MM)
WIDTH	7.5" (191 MM)
HEIGHT	8.4" (213MM)
WEIGHT	14.5 LB (6.6 KG)
FEEDING DIRECTION	RIGHT HAND
CONDUIT BUSHING	QUICK CONNECT (WIRE WIZARD® COMPATIBLE)
RECOMMENDED MAXIMUM CONDUIT LENGTH	25 FT (MAXIMUM CONDUIT LENGTH DEPENDS ON THE NUMBER AND SIZE OF RADII IN THE PATH)
SHIELD GAS INLET PRESSURE	SHIELD GAS INLET PRESSURE
COOLING REQUIREMENTS	
MINIMUM FLOW RATE	GOOD .32 GAL/MIN (1.2L/MIN) - (WATER COOLED TORCH ONLY)
MINIMUM INLET PRESSURE	50 PSI (345 KPA) - (WATER COOLED TORCH ONLY)
MAXMUM INLET PRESSURE	70 PSI (483 KPA) - (WATER COOLED TORCH ONLY)
MAXIMUM COOLING POWER	0.30 KW (1023 BTU/HR) @1.2L/MIN - (WATER COOLED TORCH ONLY)
APPROVALS AND MARKINGS	
CSA C/US CAN/CSA-E 60974-5, ANSI/IEC 60974-5	YES
CE EN 60974-5, EN60974-10	YES
IP RATING	IP2X

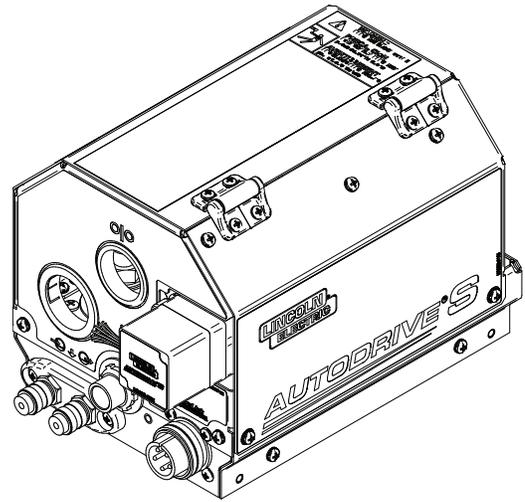
COMPATIBLE ROBOTS
ABB IRB 1520ID
ABB IRB 1600ID
ABB IRB 1660ID
ABB IRB 2660ID-15/1.85
ABB IRB 2660ID-8/2.00
FANUC ARCIMATE 100 SERIES
FANUC ARCIMATE 120 SERIES
FANUC M710IC/12L
KAWASAKI BA006L
KAWASAKI BA006N
KUKA KR16-HW
KUKA KR16-L8-HW
KUKA KR5-HW-2
KUKA KR6-R1820-HW
KUKA KR8-R1420-HW
KUKA KR8-R1620-HW
KUKA KR8-R2100-HW
YASKAWA/MOTOMAN MA1440
YASKAWA/MOTOMAN MA2010

PRODUCT VIEWS K4303-2 AUTODRIVE® S

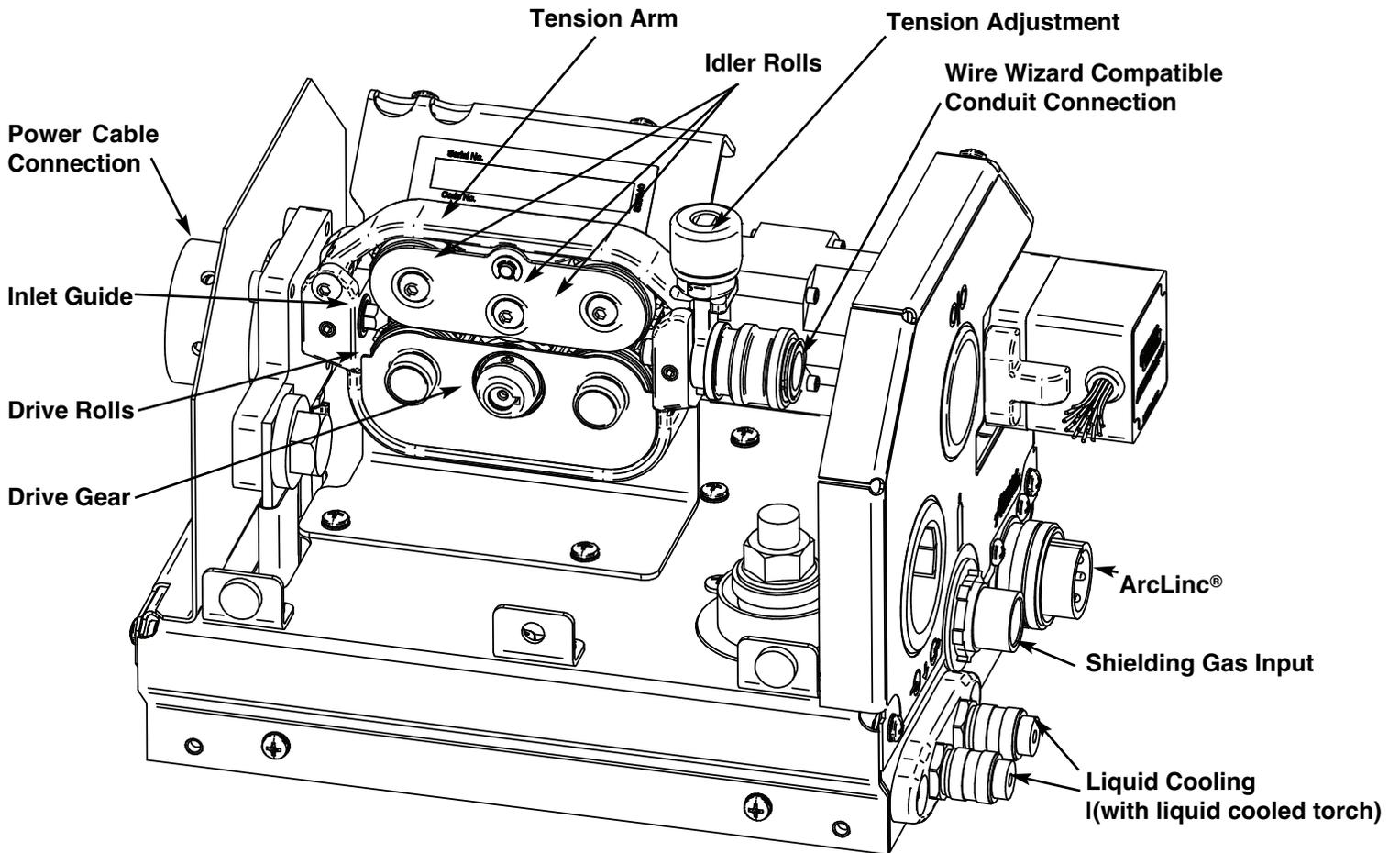
Front



Back



Components (Cover not shown):



DESIGN FEATURES

- Closed loop servo motor and servo controller allows for the highest precision wire placement.
- High resolution encoder for precise low wire feed speed control and fast dynamic response.
- Optimized gear reduction boosts motor efficiency for more output in a smaller package.
- Four drive roll design improves traction on solid wire.
- The adjustable tension results in maximum drive roll clamping pressure without wire distortion.
- Each drive roll has independent ball bearings inside each hub.
- All gear driven rolls maximize traction.
- Precision machined components ensure proper alignment and virtually eliminate wire jams.
- No tools required to change the drive rolls.
- Wire liner can be quickly changed without removing the torch assembly.
- Quick disconnect wire input compatible with many industry standard wire delivery systems.

DRIVE ROLL SELECTION ASSISTANT

When changing drive roll size or type on the AutoDrive S system the drive roll size and type must be updated in POWER WAVE MANAGER to correspond with the drive roll being used. There are two options available on the AutoDrive S system for doing this: 1) Enabling Drive Roll Selection Assistant or 2) Disabling Drive Roll Selection Assistant. Drive roll selection assistant can be enabled or disabled by navigating to the SETTINGS tab in the MISCELLANEOUS section of the POWER SOURCE SETTINGS section of POWER WAVE MANAGER.

- 1) The AutoDrive S system features the new drive roll selection assistant. When enabled, there is no need to go into POWER WAVE MANAGER and manually select the drive roll size and type. The correct drive roll size and type will be selected by the system based upon the selected weld mode. Drive roll selection assistant will be disabled from the factory and it will be required for the user to enable this feature if desired. NOTE: When drive roll selection assistant is enabled, not all weld modes will be visible. Drive roll selection assistant only works with specific AutoDrive S compatible weld modes with a defined wire type and size. (EX: 0.035" STEEL GMAW PULSE). Drive roll selection assistant DOES NOT work with weld modes such as weld mode 5 (GMAW CV) or 40 (GMAW POWER) and therefore these modes will not be available to select. When drive roll selection assistant is enabled the following guidelines will be used to select the drive roll type for the corresponding wire type of compatible weld modes:

V-Groove: Steel, Stainless, Ni-Cu Alloy, and Ni-Cr Alloy.

U-Groove: Aluminum, Si-Br Alloy, and Copper.

The user must ensure that the correct drive roll size and type is installed for the selected weld mode to ensure proper welding performance.

- 2) To enable all weld modes, drive roll selection assistant must be disabled. When drive roll selection assistant is disabled it will be required for the user to manually change the drive roll size or type in POWER WAVE MANAGER. This can be done by navigating to the SETUP PARAMETERS in the WIRE FEEDER section of POWER WAVE MANAGER. Select the appropriate drive roll size and type, such as "045V" or "035U", as printed on the drive roll.

Refer to POWER WAVE MANAGER (IM8002) for detailed usage.

INSTALLATION

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.



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.

NOTE: UPDATE POWER SOURCE SOFTWARE FROM POWERWAVESOFTWARE.COM

IMPORTANT!

Install Torch first. Refer to appropriate manual for torch installation instructions.

Hardware parts breakdown included with hardware pack included with feeder bracket.

Mount only in a dry environment.

FEEDER INSTALLATION

Hardware parts breakdown included with hardware pack included with feeder bracket.

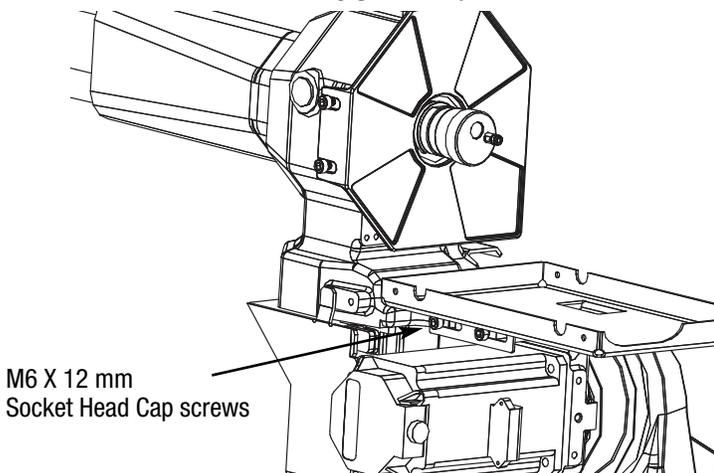
Firmly install the Autodrive® S wire feeder to a robot arm or fixture. Ensure that torch cable rear connector is in approximate orientation shown. If torch is not in this approximate orientation, remove torch cable and reposition. Refer to Magnum Pro Thru Arm Torch for AutoDrive S literature for torch installation instructions. (See Figures A.1a thru A.1g for proper robot arm).

Position robot arm such that the arm is in horizontal position.

1) Attach mounting bracket loosely to arm per below:

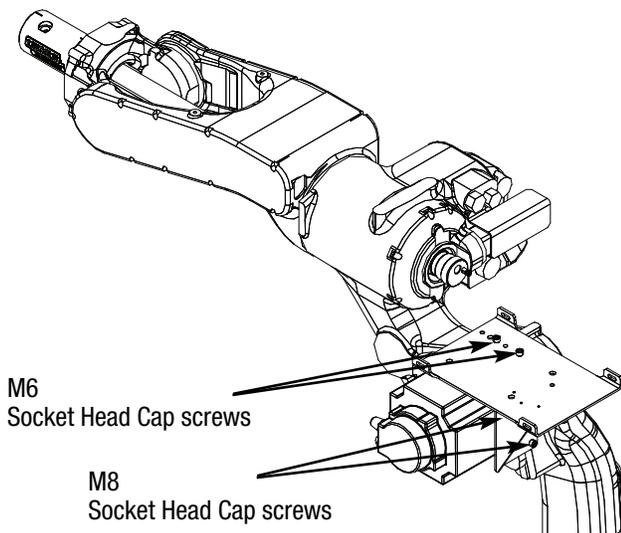
a) FANUC Robot Arms, Fig.A.1a: install FANUC 100iC/120iC mounting bracket loosely to arm using (3) M6X12 mm Socket Head Cap screws and washers. Slide bracket to rearmost position.

FIGURE A.1a



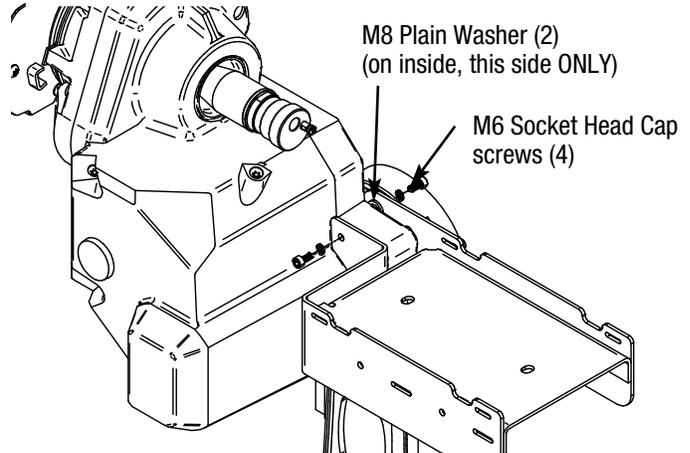
b) MOTOMAN MA1440 or MA2010 Robot Arms, Fig. A.1b install bracket to robot arm using (2) M6 & (2) M8 Socket Head Cap screws and washers. Tighten screws.

FIGURE A.1b



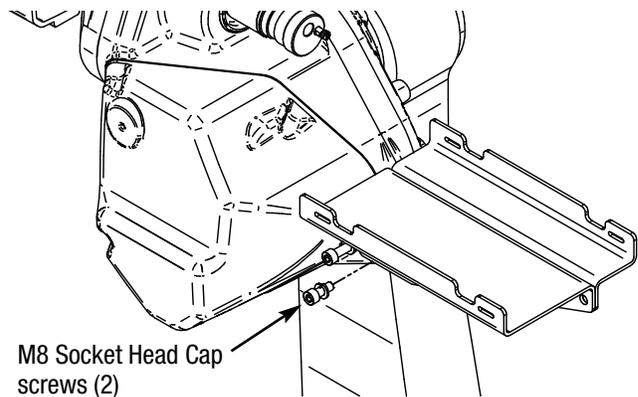
c) ABB IRB 1520ID Robot Arm, Fig. A.1c: install bracket to robot arm using (4) M6 Socket Head Cap screws, (2) M8 Plain washers (placed between bracket and feeder arm on RIGHT side) and washers. Tighten screws.

FIGURE A.1c



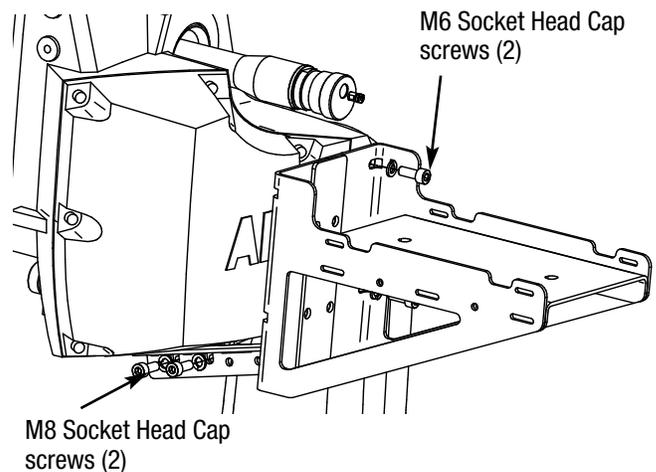
d) ABB IRB 1600ID and 1660ID Robot Arm, Fig. A.1d: Install mounting bracket onto LEFT side of robot arm; install (2) M8 Socket Head Cap screws and washers. Tighten screws.

FIGURE A.1d



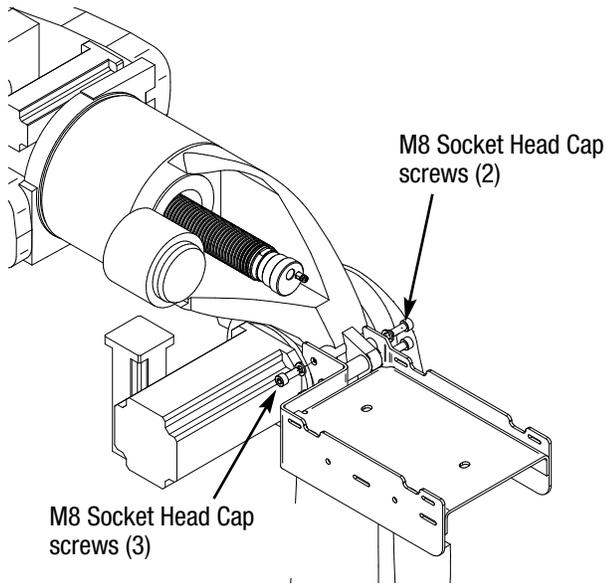
e) ABB IRB 2600 ID Robot Arm, Fig. A.1e: install bracket to robot arm using (4) M8 Socket Head Cap screws and washers. Tighten screws.

FIGURE A.1e



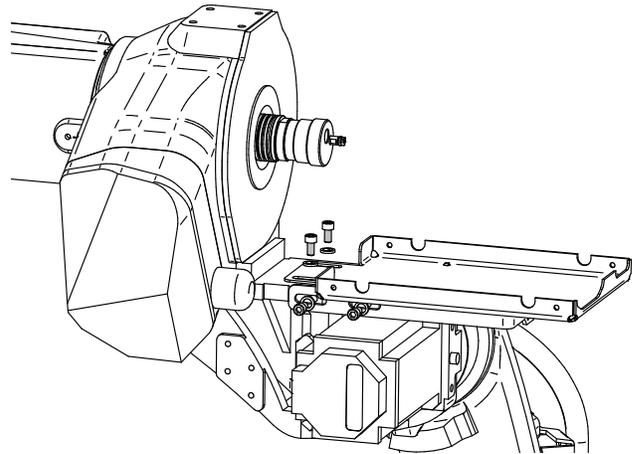
- f) KUKA KR5-HW-2 Robot Arm, Fig. A.1f: install bracket to robot arm using (5) M8 Socket Head Cap screws and washers. Tighten screws.

FIGURE A.1f



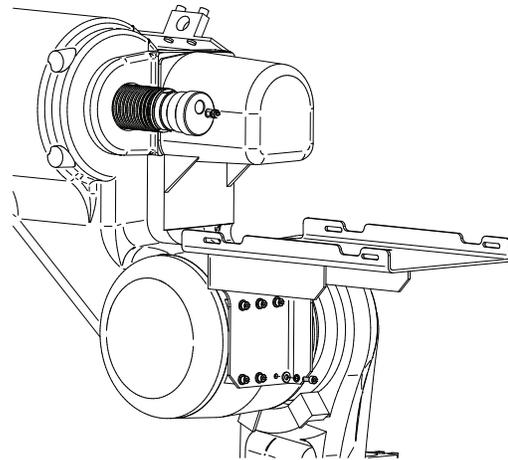
- h) FANUC iD Robot Arms, Fig A.1h: Install Fanuc iD mounting bracket loosely to arm using (5) M8 socket head cap screws and washers. Slide bracket to rearmost position.

FIGURE A.1h



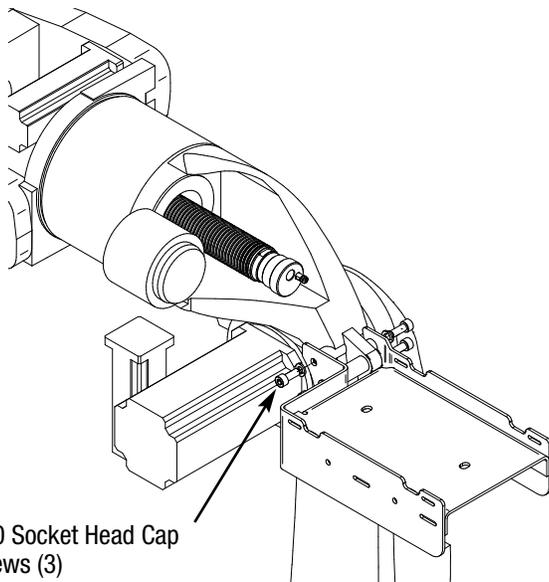
- i) KAWASAKI BA006 Robot Arms, Fig A.1i: Install mounting bracket to arm using (6) M4 socket head cap screws and washers. Tighten screws.

FIGURE A.1i



- g) KUKA KR16-HW and KR16-HW-L8 Robot Arm, Fig. A.1g: install bracket to robot arm using (3) M10 Socket Head Cap screws and washers. Tighten screws.

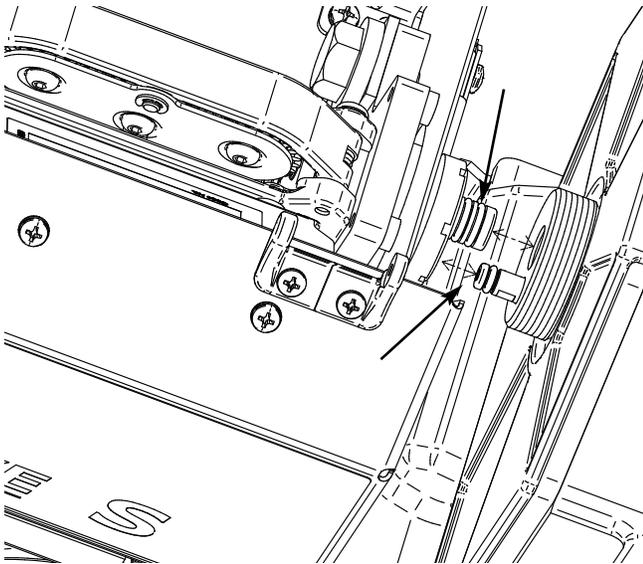
FIGURE A.1g



- 2) Place feeder onto the mounting bracket. **It may be necessary to lift feeder and slide slightly to give enough room to align connection.**

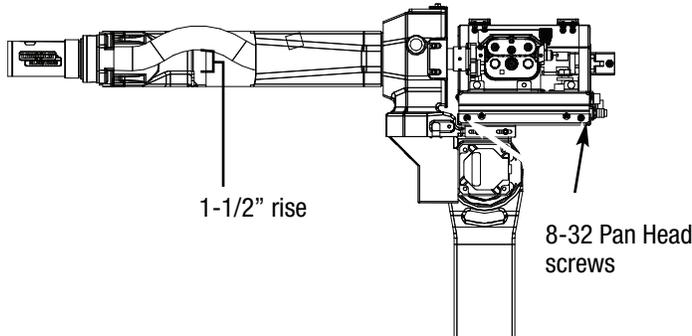
- 3) Align port and pin (gas) on rear power connection with pin (liner guide) and port on feeder. Rotate locking nut counter-clockwise (viewed from front), engaging threads on rear power connection.

FIGURE A.2 (TYPICAL)



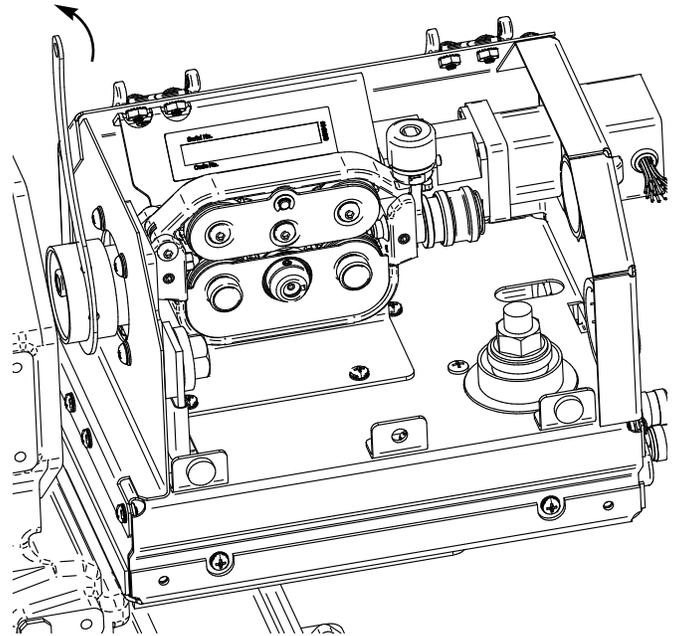
- 4) Install feeder washers and #8-32 Pan Head screws. On MOTOMAN, ABB, KUKA and KAWASAKI, install loosely so that feeder can still move. On FANUC, tighten feeder screws.

FIGURE A.3 (TYPICAL)



- 5) Using the supplied spanner wrench, tighten locking nut by continuing to rotate counter clockwise, Fig. A.4. **DO NOT** use lever arms or breaker bars on spanner wrench. This connection is designed to be tightened **ONLY** with provided tool, with a medium force.
- 6) Adjust feeder until an approximate 1-1/2" rise is visible in torch power cable. Secure all remaining screws left loose during installation of feeder and mounting bracket (See Figure A.3).

FIGURE A.4



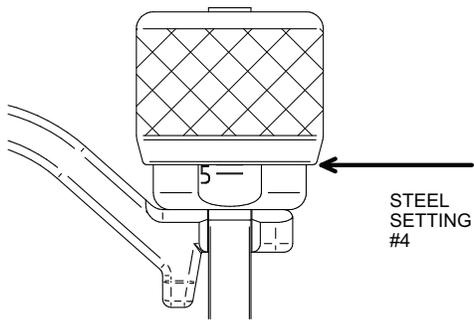
DRIVE ROLL ADJUSTMENT

Default setting is line #4 with wire installed.
(See Figure A.9)

Adjust tension to obtain optimal feedability.

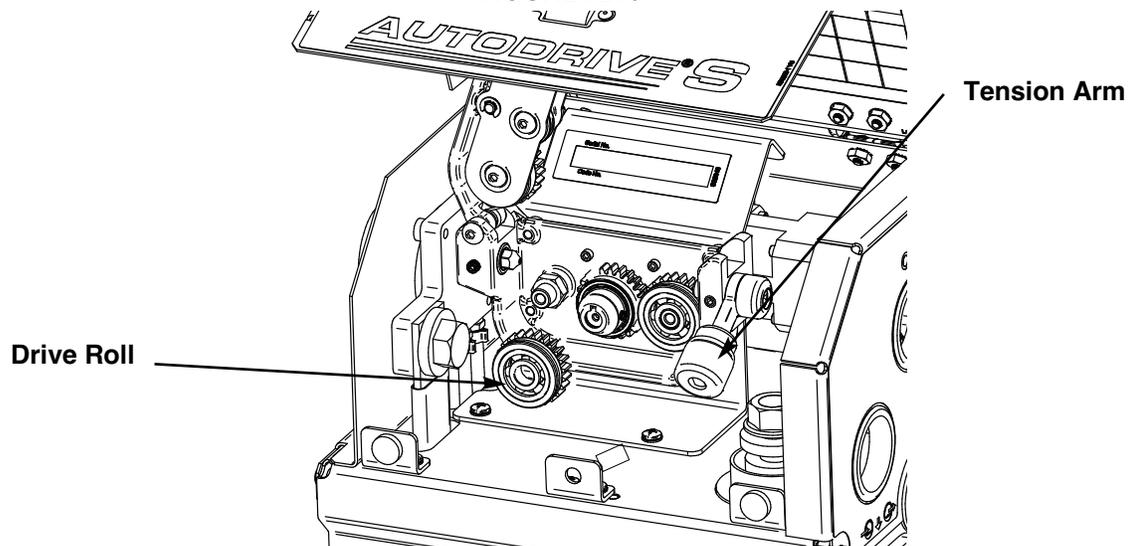
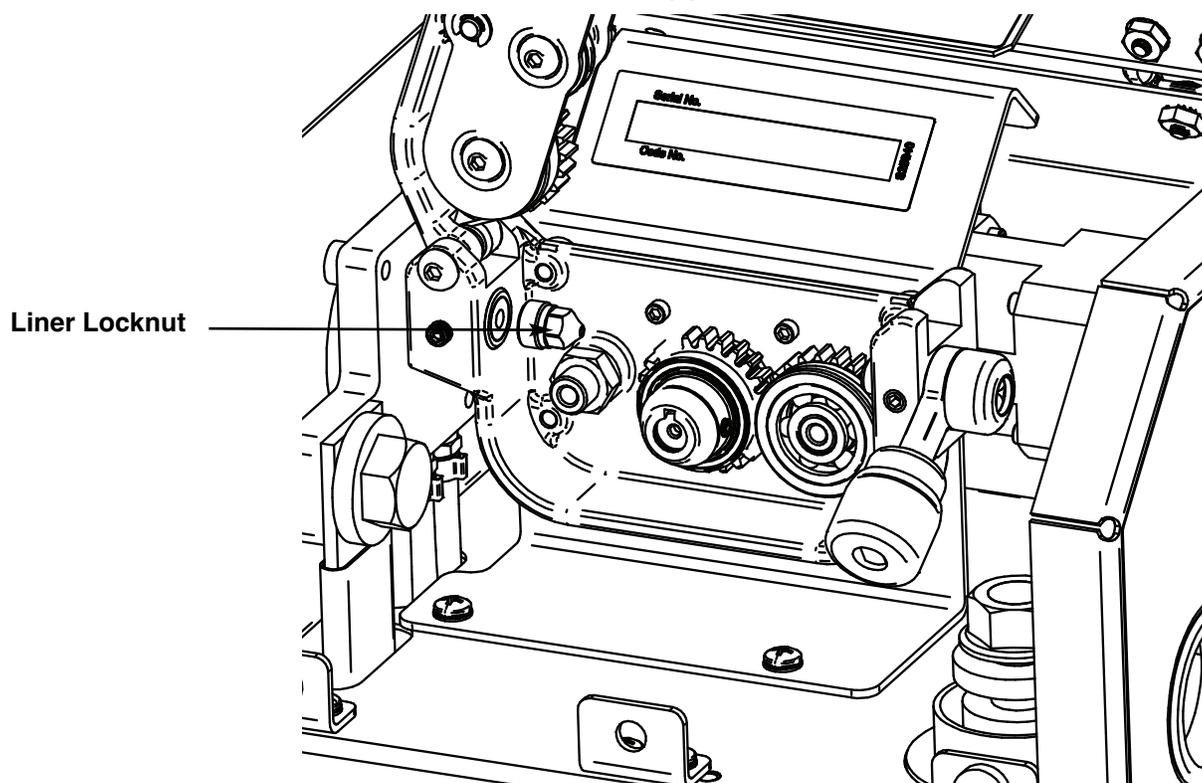
SYSTEM SET-UP**New Arms**

Please refer to Installation Section A and follow the provided steps,
and Operation Section B for basic operation.

FIGURE A.9

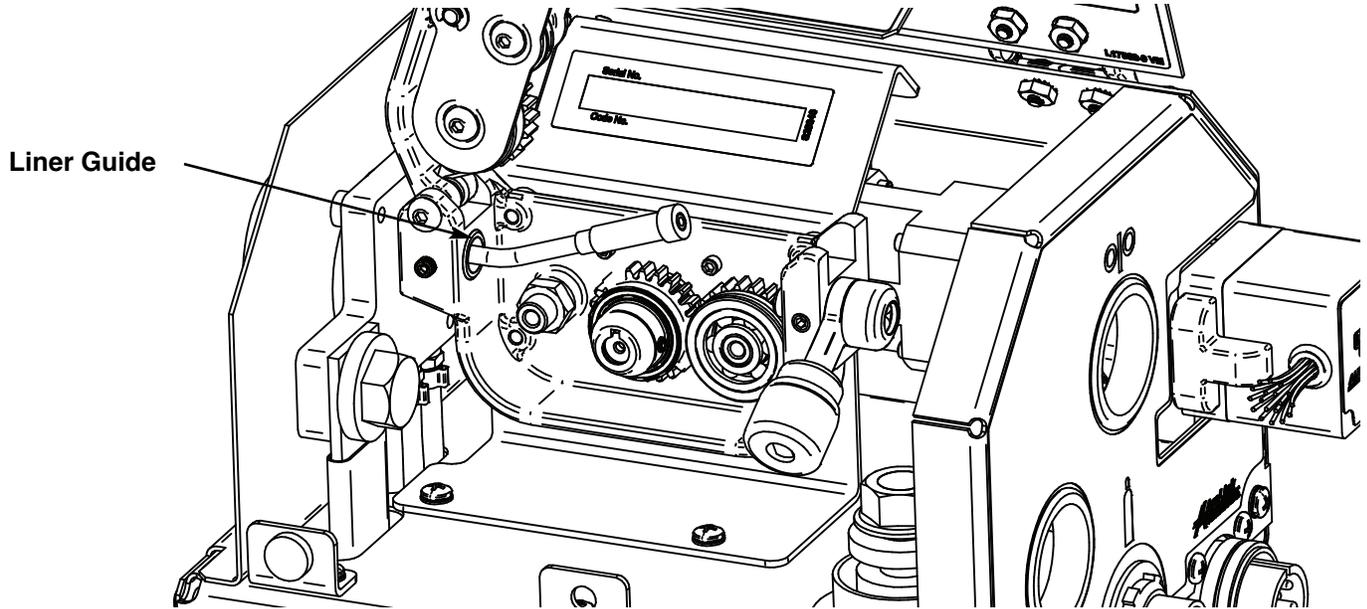
MAGNUM PRO LINER INSTALLATION AND REPLACEMENT

1. Position torch assembly into a horizontal position.
2. Open feeder door.
3. Release tension arm on feed plate and allow to flip up to a vertical position.
4. Remove thumbscrews and feed plate drive roll cover.
5. Remove front drive roll. (See Figure A.10)
6. With 5/16" open-end wrench, remove liner lock nut, (See Figure A.11)

FIGURE A.10**FIGURE A.11**

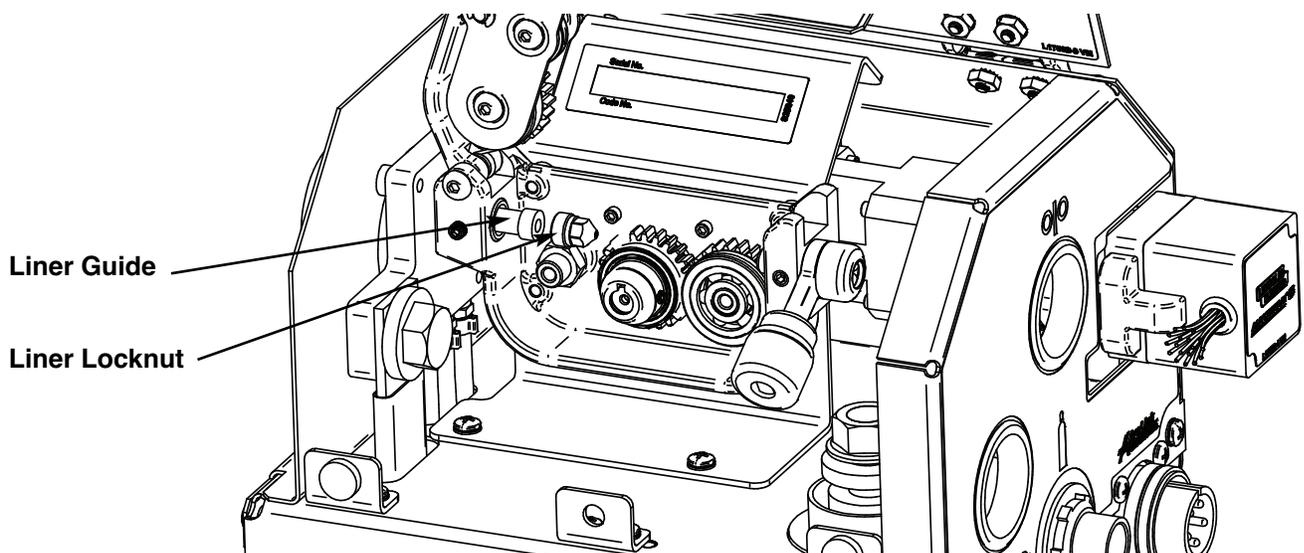
7. Remove nozzle, insulator, and gas diffuser from front of torch.
8. Push on Magnum PRO liner end protruding from gooseneck.
9. Pull Magnum PRO liner towards rear and remove from liner guide and feeder, (See Figure A.12).

FIGURE A.12



10. Feed new Magnum PRO liner into liner guide, taking care to not damage liner coils.
11. Push Magnum PRO liner into liner guide; install liner lock nut and tighten with 5/16" open-end wrench until snug. (See Figure A.13)
12. Reinstall drive roll and feedplate drive roll cover, **label facing outside.**
12. Trim Magnum PRO liner to 5/8" stick out from front end of gooseneck
13. Reinstall insulator, gas diffuser and nozzle.

FIGURE A.13



WELD CABLE SIZES

Tabulated below are copper cable sizes recommended for different currents and duty cycles. Lengths stipulated are the distance from the welder to work and back to the welder again. Cable sizes are increased for greater lengths primarily for the purpose of minimizing cable drop.

TABLE A.5 CABLE SIZES

RECOMMENDED CABLE SIZES (RUBBER COVERED COPPER - RATED 75°C)**						
Amperes	Percent Duty Cycle	CABLE SIZES FOR COMBINED LENGTHS OF ELECTRODE AND WORK CABLES				
		0 to 50 Ft.	50 to 100 Ft.	100 to 150 Ft.	150 to 200 Ft.	200 to 250 Ft.
200	60	2	2	2	1	1/0
200	100	2	2	2	1	1/0
225	20	4 or 5	3	2	1	1/0
225	40 & 30	3	3	2	1	1/0
250	30	3	3	2	1	1/0
250	40	2	2	1	1	1/0
250	60	1	1	1	1	1/0
250	100	1	1	1	1	1/0
300	60	1	1	1	1/0	2/0
325	100	2/0	2/0	2/0	2/0	3/0
350	60	1/0	1/0	2/0	2/0	3/0
400	60	2/0	2/0	2/0	3/0	4/0
400	100	3/0	3/0	3/0	3/0	4/0
500	60	2/0	2/0	3/0	3/0	4/0

** Tabled values are for operation at ambient temperatures of 40°C and below. Applications above 40°C may require cables larger than recommended, or cables rated higher than 75°C.

WIRE DRIVE CONFIGURATION

Procedure to Assemble Drive Rolls and Wire Guides

NOTE: When changing drive roll size or type ("V" groove to "U" groove or vice versa) on the AutoDrive SA system the drive roll size and type must be updated in POWER WAVE MANAGER to correspond with the drive roll being used. There are two options available on the AutoDrive SA system for doing this: 1) Enabling Drive Roll Selection Assistant or 2) Disabling Drive Roll Selection Assistant. Please see the Drive Roll Selection Assistant section for more information on this feature.

WARNING

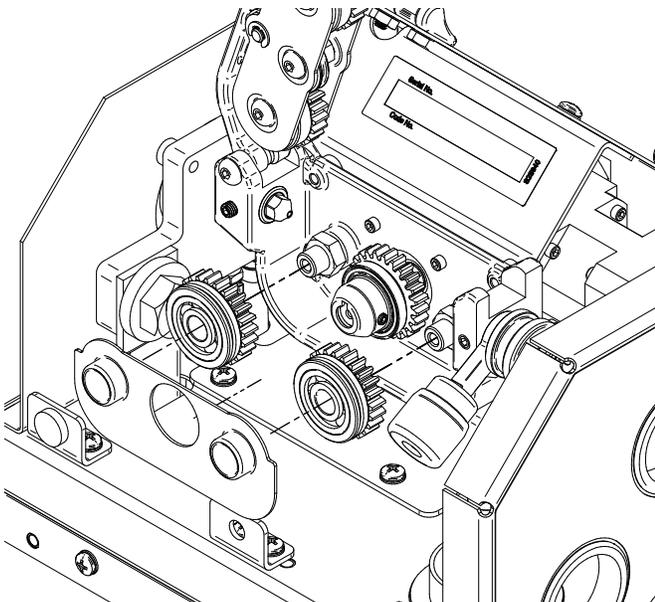
ELECTRIC SHOCK can kill.

- 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.



To remove drive rolls:

1. Turn power off at the welding power source.
2. Remove the outer protective cover by loosening the thumb screws.
3. Open the idle arm.
4. Remove the drive rolls.

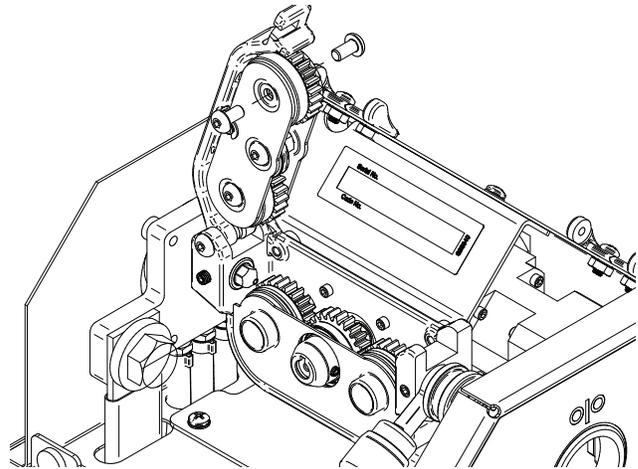


To install drive rolls:

1. Turn off power at the welding power source.
2. Open the idle arms.
3. Slide the drive rolls onto the drive hubs.
4. Close the idle arm.
5. Assemble the outer protective cover, label facing outside.
6. Adjust the tension of the pressure arm to the proper setting.

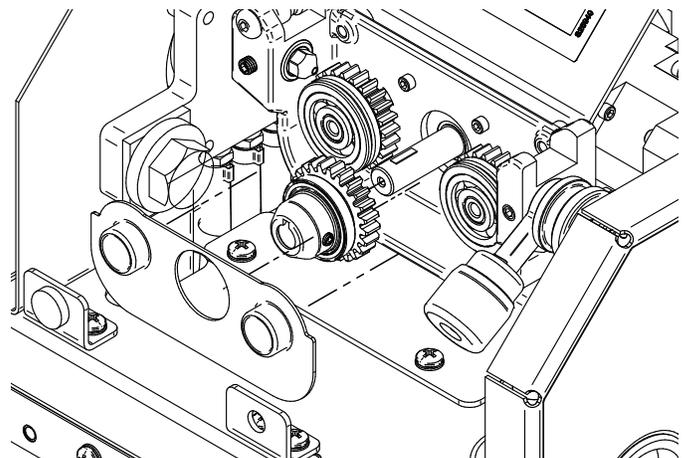
To change idler rolls:

1. Turn off power at the welding power source.
2. Open the idle arm.
3. Using a hex wrench remove the screws on both sides of the idler rolls.
4. Remove worn idler rolls and replace with new ones
5. Re-install screws and torque to hand tight.



To change main drive gear:

1. Turn off power at the welding power source.
2. Open the idle arm.
3. Remove the drive rolls.
4. Loosen hex setscrew on main gear.
5. Remove the main drive gear from the drive shaft.
6. Install replacement drive gear and tighten the setscrew hand tight.



SHIELDING GAS CONNECTION**⚠ WARNING****CYLINDER may explode if damaged.**

- Keep cylinder upright and chained to support.
- Keep cylinder away from areas where it may be damaged.
- Never lift welder with cylinder attached.
- Never allow welding electrode to touch cylinder.
- Keep cylinder away from welding or other live electrical circuits.

**BUILD-UP OF SHIELDING GAS may harm health or kill.**

- Shut off shielding gas supply when not in use.



SEE AMERICAN NATIONAL STANDARD Z-49.1, "SAFETY IN WELDING AND CUTTING" PUBLISHED BY THE AMERICAN WELDING SOCIETY.

Maximum inlet pressure is 100 psi. (6.9 bar.)

Ensure that gas type and mixture are correct for the procedure being used.

Install the shielding gas cylinder supply as follows:

1. Secure the cylinder to prevent it from falling.
2. Remove the cylinder cap. Inspect the cylinder valves and regulator for damaged threads, dirt, dust, oil or grease. Remove dust and dirt with a clean cloth.

⚠ WARNING**DO NOT ATTACH THE REGULATOR IF OIL, GREASE OR DAMAGE IS PRESENT!**

Inform your gas supplier of this condition. Oil or grease in the presence of high pressure oxygen is explosive.

3. Stand to one side away from the outlet and open the cylinder valve for an instant. This blows away any dust or dirt which may have accumulated in the valve outlet.
4. Attach the flow regulator to the cylinder valve and tighten the union nut(s) securely with a wrench. Note: if connecting to 100% CO₂ cylinder, insert regulator adapter between regulator and cylinder valve. If adapter is equipped with a plastic washer, be sure it is seated for connection to the CO₂ cylinder.
5. Attach one end of the inlet hose to the outlet fitting of the flow regulator. Attach the other end to the welding system shielding gas inlet. Tighten the union nuts with a wrench.
6. Before opening the cylinder valve, turn the regulator adjusting knob counterclockwise until the adjusting spring pressure is released.
7. Standing to one side, open the cylinder valve slowly a fraction of a turn. When the cylinder pressure gage stops moving, open the valve fully.
8. The flow regulator is adjustable. Adjust it to the flow rate recommended for the procedure and process being used before making a weld.

OPERATION

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

GRAPHIC SYMBOLS THAT APPEAR ON THE AutoDrive® S TORCH OR WIRE FEEDER OR IN THIS MANUAL



**WARNING OR
CAUTION**



WIRE FEEDER



GAS PURGE



**SHIELDING GAS
INLET**

I_1

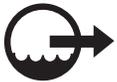
INPUT CURRENT

I_2

OUTPUT CURRENT



LIQUID INLET



LIQUID OUTLET

OPTIONAL KITS AND ACCESSORIES

Procedure to Assemble Drive Rolls and Wire Guides

NOTE: When changing drive roll size or type (“V” groove to “U” groove or vice versa) on the AutoDrive SA system the drive roll size and type must be updated in POWER WAVE MANAGER to correspond with the drive roll being used. There are two options available on the AutoDrive SA system for doing this: 1) Enabling Drive Roll Selection Assistant or 2) Disabling Drive Roll Selection Assistant. Please see the Drive Roll Selection Assistant section for more information on this feature.

⚠ 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.



DRIVE ROLL KITS						
KIT NUMBER	GROOVED DRIVE ROLL	QTY.	MAIN DRIVE GEAR	QTY.	SMOOTH DRIVE ROLLS	QTY.
KP4335-035S	0,9 / .035 V	2	INCLUDED IN KIT	1	INCLUDED IN KIT	2
KP4335-040S	1,0 / .040 V	2				
KP4335-045S	1,1 / .045 V	2				
KP4335-047S	1,2 / .047 V	2				
KP4335-035C	0,9 / .035 VR	2				
KP4335-040C	1,0 / .040 VR	2				
KP4335-045C	1,1 / .045 VR	2				
KP4335-047C	1,2 / .047 VR	2				

OPTIONAL KITS & ACCESSORIES	
KP42-3035-15	LINER, .030 - .035
KP42-4045-15	LINER, .035 - .045
9SM25261	CABLE REMOVAL TOOL

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.
- Stop engine before servicing.
- Keep away from moving parts.



Have qualified personnel do all maintenance and troubleshooting work.

Calibration Specifications

Calibration of the AutoDrive® S 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

TROUBLESHOOTING

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.

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.

Observe all Safety Guidelines detailed throughout this manual

PROBLEM	POSSIBLE CAUSE	RECOMMENDED COURSE OF ACTION
The wire feeder does not feed wire and the drive rolls do not spin.	1. Verify the power source is turned on.	If all recommended possible areas of misadjustment have been checked and the problem persists, Contact your local Lincoln Authorized Field Service Facility.
	2. Verify all cables are properly connected.	
	3. Verify power is being supplied to the wire feeder.	
The wire feeds erratically.	1. Verify the correct drive rolls 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.	
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 system is not leaking from an o-ring seal.	
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. The universal cable tightly mounted to the wire drive.	
	7. Verify the electrode lead is connected to the proper connection block on the feed head.	

 **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.

Observe all Safety Guidelines detailed throughout this manual

PROBLEM	POSSIBLE CAUSE	RECOMMENDED COURSE OF ACTION
The motor overload errors occur.	1. Check for sharp bends in the gun liner and conduit.	If all recommended possible areas of misadjustment have been checked and the problem persists, Contact your local Lincoln Authorized Field Service Facility.
	2. Examine the contact tip for wear and proper size. Replace as necessary.	
	3. Check the gun liner and conduit. The welding electrode should slide easily through both.	
	4. Verify the proper gun liner is installed.	
	5. Reduce the pressure arm setting.	

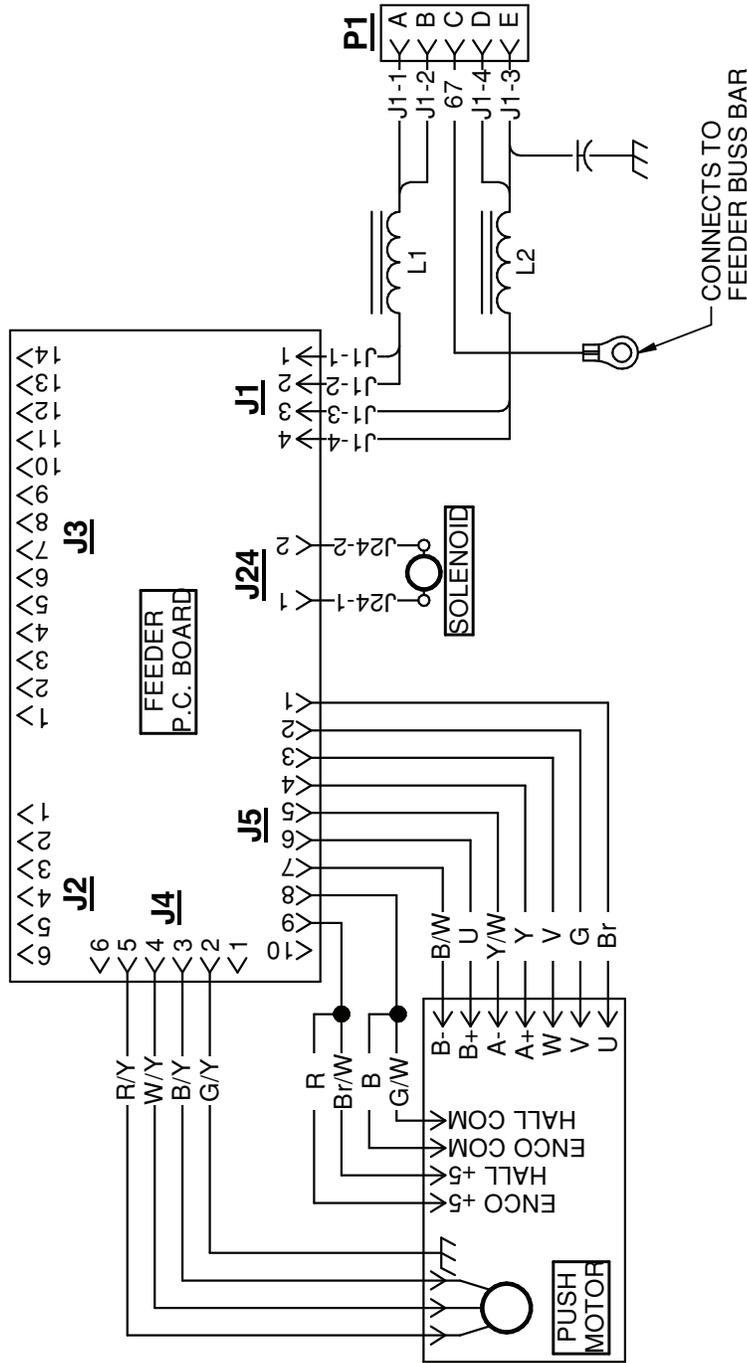
 **CAUTION**

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.

COLOR CODE	COLOR
B	BLACK
Br	BROWN
G	GREEN
L	BLUE
R	RED
V	VIOLET
W	WHITE
Y	YELLOW

1	2	3	4
○	○	○	○
○	○	○	○
○	○	○	○
5	6	7	8

CONNECTOR VIEWED FROM INSERTION END



A
M25369-1PRINT

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.

			
WARNING	<ul style="list-style-type: none"> Do not touch electrically live parts or electrode with skin or wet clothing. Insulate yourself from work and ground. 	<ul style="list-style-type: none"> Keep flammable materials away. 	<ul style="list-style-type: none"> Wear eye, ear and body protection.
Spanish AVISO DE PRECAUCION	<ul style="list-style-type: none"> No toque las partes o los electrodos bajo carga con la piel o ropa mojada. Aíslese del trabajo y de la tierra. 	<ul style="list-style-type: none"> Mantenga el material combustible fuera del área de trabajo. 	<ul style="list-style-type: none"> Protéjase los ojos, los oídos y el cuerpo.
French ATTENTION	<ul style="list-style-type: none"> Ne laissez ni la peau ni des vêtements mouillés entrer en contact avec des pièces sous tension. Isolez-vous du travail et de la terre. 	<ul style="list-style-type: none"> Gardez à l'écart de tout matériel inflammable. 	<ul style="list-style-type: none"> Protégez vos yeux, vos oreilles et votre corps.
German WARNUNG	<ul style="list-style-type: none"> Berühren Sie keine stromführenden Teile oder Elektroden mit Ihrem Körper oder feuchter Kleidung! Isolieren Sie sich von den Elektroden und dem Erdboden! 	<ul style="list-style-type: none"> Entfernen Sie brennbares Material! 	<ul style="list-style-type: none"> Tragen Sie Augen-, Ohren- und Körperschutz!
Portuguese ATENÇÃO	<ul style="list-style-type: none"> Não toque partes elétricas e electrodos com a pele ou roupa molhada. Isole-se da peça e terra. 	<ul style="list-style-type: none"> Mantenha inflamáveis bem guardados. 	<ul style="list-style-type: none"> Use proteção para a vista, ouvido e corpo.
Japanese 注意事項	<ul style="list-style-type: none"> 通電中の電気部品、又は溶材にヒフやぬれた布で触れないこと。 施工物やアースから身体が絶縁されている様にして下さい。 	<ul style="list-style-type: none"> 燃えやすいものの側での溶接作業は絶対にしてはなりません。 	<ul style="list-style-type: none"> 目、耳及び身体に保護具をして下さい。
Chinese 警告	<ul style="list-style-type: none"> 皮肤或湿衣物切勿接触带电部件及焊条。 使你自已与地面和工件绝缘。 	<ul style="list-style-type: none"> 把一切易燃物品移离工作场所。 	<ul style="list-style-type: none"> 佩戴眼、耳及身体劳动保护用具。
Korean 위험	<ul style="list-style-type: none"> 전도체나 용접봉을 젖은 형갑 또는 피부로 절대 접촉치 마십시오. 모재와 접지를 접촉치 마십시오. 	<ul style="list-style-type: none"> 인화성 물질을 접근시키지 마십시오. 	<ul style="list-style-type: none"> 눈, 귀와 몸에 보호장구를 착용하십시오.
Arabic تحذير	<ul style="list-style-type: none"> لا تلمس الاجزاء التي يسري فيها التيار الكهربائي أو الالكترود بجسدك أو بالملابس المبللة بالماء. ضع عازلا على جسمك خلال العمل. 	<ul style="list-style-type: none"> ضع المواد القابلة للاشتعال في مكان بعيد. 	<ul style="list-style-type: none"> ضع أدوات وملابس واقية على عينيك وأذنيك وجسمك.

READ AND UNDERSTAND THE MANUFACTURER'S INSTRUCTION FOR THIS EQUIPMENT AND THE CONSUMABLES TO BE USED AND FOLLOW YOUR EMPLOYER'S SAFETY PRACTICES.

SE RECOMIENDA LEER Y ENTENDER LAS INSTRUCCIONES DEL FABRICANTE PARA EL USO DE ESTE EQUIPO Y LOS CONSUMIBLES QUE VA A UTILIZAR, SIGA LAS MEDIDAS DE SEGURIDAD DE SU SUPERVISOR.

LISEZ ET COMPRENEZ LES INSTRUCTIONS DU FABRICANT EN CE QUI REGARDE CET EQUIPMENT ET LES PRODUITS A ETRE EMPLOYES ET SUIVEZ LES PROCEDURES DE SECURITE DE VOTRE EMPLOYEUR.

LESEN SIE UND BEFOLGEN SIE DIE BETRIEBSANLEITUNG DER ANLAGE UND DEN ELEKTRODENEINSATZ DES HERSTELLERS. DIE UNFALLVERHÜTUNGSVORSCHRIFTEN DES ARBEITGEBERS SIND EBENFALLS ZU BEACHTEN.

			
<ul style="list-style-type: none"> ● Keep your head out of fumes. ● Use ventilation or exhaust to remove fumes from breathing zone. 	<ul style="list-style-type: none"> ● Turn power off before servicing. 	<ul style="list-style-type: none"> ● Do not operate with panel open or guards off. 	WARNING
<ul style="list-style-type: none"> ● Los humos fuera de la zona de respiración. ● Mantenga la cabeza fuera de los humos. Utilice ventilación o aspiración para gases. 	<ul style="list-style-type: none"> ● Desconectar el cable de alimentación de poder de la máquina antes de iniciar cualquier servicio. 	<ul style="list-style-type: none"> ● No operar con panel abierto o guardas quitadas. 	Spanish AVISO DE PRECAUCION
<ul style="list-style-type: none"> ● Gardez la tête à l'écart des fumées. ● Utilisez un ventilateur ou un aspirateur pour ôter les fumées des zones de travail. 	<ul style="list-style-type: none"> ● Débranchez le courant avant l'entretien. 	<ul style="list-style-type: none"> ● N'opérez pas avec les panneaux ouverts ou avec les dispositifs de protection enlevés. 	French ATTENTION
<ul style="list-style-type: none"> ● Vermeiden Sie das Einatmen von Schweißrauch! ● Sorgen Sie für gute Be- und Entlüftung des Arbeitsplatzes! 	<ul style="list-style-type: none"> ● Strom vor Wartungsarbeiten abschalten! (Netzstrom völlig öffnen; Maschine anhalten!) 	<ul style="list-style-type: none"> ● Anlage nie ohne Schutzgehäuse oder Innenschutzverkleidung in Betrieb setzen! 	German WARNUNG
<ul style="list-style-type: none"> ● Mantenha seu rosto da fumaça. ● Use ventilação e exaustão para remover fumo da zona respiratória. 	<ul style="list-style-type: none"> ● Não opere com as tampas removidas. ● Desligue a corrente antes de fazer serviço. ● Não toque as partes elétricas nuas. 	<ul style="list-style-type: none"> ● Mantenha-se afastado das partes moventes. ● Não opere com os painéis abertos ou guardas removidas. 	Portuguese ATENÇÃO
<ul style="list-style-type: none"> ● ヒュームから頭を離すようにして下さい。 ● 換気や排煙に十分留意して下さい。 	<ul style="list-style-type: none"> ● メンテナンス・サービスに取りかかる際には、まず電源スイッチを必ず切して下さい。 	<ul style="list-style-type: none"> ● パネルやカバーを取り外したままで機械操作をしないで下さい。 	Japanese 注意事項
<ul style="list-style-type: none"> ● 頭部遠離煙霧。 ● 在呼吸區使用通風或排風器除煙。 	<ul style="list-style-type: none"> ● 維修前切斷電源。 	<ul style="list-style-type: none"> ● 儀表板打開或沒有安全罩時不準作業。 	Chinese 警告
<ul style="list-style-type: none"> ● 얼굴로부터 용접가스를 멀리하십시오. ● 호흡지역으로부터 용접가스를 제거하기 위해 가스제거기나 통풍기를 사용하십시오. 	<ul style="list-style-type: none"> ● 보수전에 전원을 차단하십시오. 	<ul style="list-style-type: none"> ● 판넬이 열린 상태로 작동치 마십시오. 	Korean 위험
<ul style="list-style-type: none"> ● ابعد رأسك بعيداً عن الدخان. ● استعمل التهوية أو جهاز ضغط الدخان للخارج لكي تبعد الدخان عن المنطقة التي تتنفس فيها. 	<ul style="list-style-type: none"> ● أقطع التيار الكهربائي قبل القيام بأية صيانة. 	<ul style="list-style-type: none"> ● لا تشغيل هذا الجهاز اذا كانت الاغطية الحديدية الواقية ليست عليه. 	Arabic تحذير

LEIA E COMPREENDA AS INSTRUÇÕES DO FABRICANTE PARA ESTE EQUIPAMENTO E AS PARTES DE USO, E SIGA AS PRÁTICAS DE SEGURANÇA DO EMPREGADOR.

使う機械や溶材のメーカーの指示書をよく読み、まず理解して下さい。そして貴社の安全規定に従って下さい。

請詳細閱讀並理解製造廠提供的說明以及應該使用的銀焊材料，並請遵守貴方的有關勞動保護規定。

이 제품에 동봉된 작업지침서를 숙지하시고 귀사의 작업자 안전수칙을 준수하시기 바랍니다.

اقرأ بتمعن وافهم تعليمات المصنع المنتج لهذه المعدات والمواد قبل استعمالها واتبع تعليمات الوقاية لصاحب العمل.

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