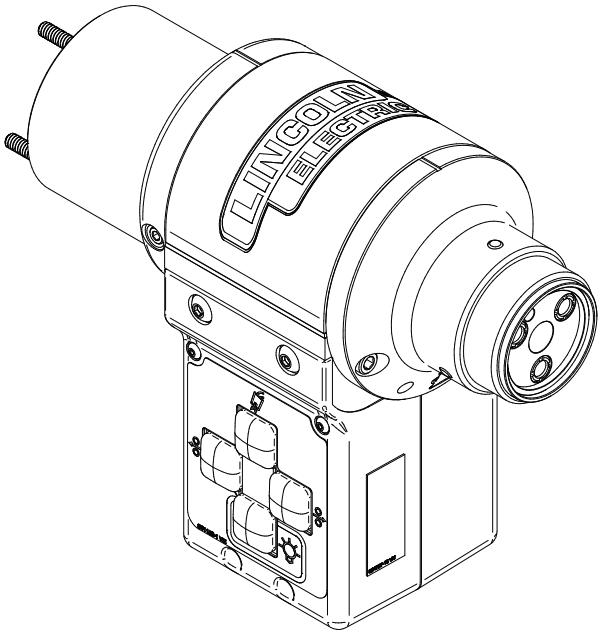
LINCOLN ELECTRIC

Operator's Manual

AutoDrive® SA Pull Wire Feeder



For use with machines having Code Numbers:

12766 (K4445-1)

Note: Code 12766 (SA Pull Feeder) MUST be used with code 12767 (SA Push Feeder)

GENUINE LINCOLN PARTS™

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)

IM10538 | Issue Date Apr-19

THE LINCOLN ELECTRIC COMPANY
22801 St. Clair Avenue • Cleveland, OH • 44117-1199 • U.S.A.
Phone: +1.216.481.8100 • www.lincolnelectric.com

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.P65 warnings.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. I 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.

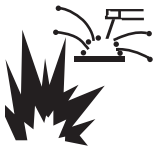
5.c. Do not weld in locations near chlorinated hydrocarbon vapors coming from degreasing, cleaning or spraying operations. The heat and rays of the arc can react with solvent vapors to form phosgene, a highly toxic gas, and other irritating products.

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-I, "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.

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

PRODUCT OVERVIEW

General Physical Description

The AutoDrive® SA Pull Feeder is one component in an advanced robotic welding system, part of Lincoln Electric's Aluminum Solutions product line.

The AutoDrive® SA Pull Feeder is a highly advanced welding Pull Feeder 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. Steel wire up to 0.045" can also be welded.

The AutoDrive® SA Pull Feeder is to be used only in conjunction with the AutoDrive® SA Push Feeder. The AutoDrive® SA Push Feeder 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 Pull Feeder 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

- Aluminum GMAW (0.035", 3/64" and 1/16" wires)
- Steel GMAW (0.035", 0.040" and 0.045" wires)

PROCESS LIMITATIONS

- Maximum wire size = 1/16 (1.6mm) aluminum wire
- Maximum wire size = 0.045 (1.2mm) steel 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.

RECOMMENDED ACCESSORIES

Cable Bundle K Numbers

K4130-1 FANUC® 100iC
K4130-2 FANUC® 100iC/6L, FANUC® 100iC/7L & KAWASAKI BA006N
K4130-3 FANUC® 120iC
K4130-4 FANUC® 120iC/10L & FANUC® 120iC/12L
K4130-5 Motoman® MA1440
K4130-6 Motoman® MA2010 & FANUC® 100iC/8L
K4130-8 ABB® IRB 1520ID
K4130-9 ABB® IRB 1600ID & KUKA® KR6-R1820HW
K4130-10 ABB® IRB 2600ID-8/2.00
K4130-11 KUKA® KR5-HW-2
K4130-12 KUKA® KR16-L8-HW
K4130-13 KUKA® KR16-HW
K4130-14 ABB® IRB 2600ID-15/1.85
K4130-15 FANUC® M710iC/12L
K4130-16 ABB® IRB 1660 ID
K4130-17 KUKA® KR8-R1620-HW & KUKA® KR8-R1620-HW
K4130-18 FANUC® 100iD
K4130-19 KAWASAKI BA006L
K4130-20 FANUC® 100iD/10L
K4130-21 KUKA® KR8-R2100-HW

Control Cable K Numbers

K3390-1 FANUC® 100iC & Motoman MA1440 Control Bundle
K3390-2 FANUC® 100iC/6L, FANUC® 100iC/7L, FANUC® 120iC & KAWASAKI BA006N Control Bundle
K3390-3 FANUC® 100iC/8L, Motoman MA2010, & KUKA® KR8-R2100HW Control Bundle
K3390-4 KUKA® KR8-R1620-HW Control Bundle
K3390-5 ABB® IRB 1600ID & KUKA® KR6-R1820-HW Control Bundle
K3390-6 ABB® IRB 2600ID-8/2.00 Control Bundle
K3390-7 KUKA® KR5-HW-2 Control Bundle
K3390-8 KUKA® KR16-HW-L8 Control Bundle
K3390-9 FANUC® M-710iC/12L Control Bundle
K3390-10 FANUC® 100iD Control Bundle
K3390-11 ABB® IRB 1660ID & KUKA KR16-HW Control Bundle
K3390-12 ABB® IRB 1520ID Control Bundle
K3390-13 FANUC® 120iC/10L, FANUC® 120iC/12L & ABB® IRB 2600ID-15/1.85 Control Bundle
K3390-14 KAWASAKI BA006L Control Bundle
K3390-15 FANUC® 100iD/10L Control Bundle

Gun Tube KP Numbers

KP4403-22

KP4403-45

KP4403-180

Breakaway Disk KP Numbers

KP2920-4	FANUC® iC and Motoman®
KP2920-5	KUKA® KR5-HW-2 and KR16-L8-HW
KP2920-6	KUKA® KR16-HW
KP2920-7	ABB® IRB 1520ID and 1600ID
KP2920-8	ABB® IRB 2600ID
KP2920-9	FANUC® ID
KP2920-10	KAWASAKI® BA006L and KAWASAKI BA006N

- The AutoDrive® SA Pull Feeder is compatible with FANUC 100iC, 120iC, 100iC/6L, 100iC/8L, 120iC/10L, M710iC/12L, 100iD and 100iD/10L Fanuc® robot arms. It is also compatible with select Yaskawa/Motoman, ABB, KUKA and Kawasaki robot arms. See product literature for complete compatibility list.
- The AutoDrive® SA Pull Feeder is only to be used in conjunction with the AutoDrive® SA Push Feeder
- The AutoDrive® SA system is only compatible with Lincoln Electric PowerWave technology
- The AutoDrive® SA Pull Feeder does not come with a gooseneck, this is a separate K Number
- The AutoDrive® SA Pull Feeder does not come with a Thru The Arm cable bundle, this is a separate K Number
- AutoDrive® SA Pull Feeder comes installed with a 3/64" U-Groove drive roll. Other drive roll kits, including steel can be purchased as a KP number
- Robot and power source software will need to be updated to function with the AutoDrive® SA Pull Feeder.
- Numerous gooseneck and nozzle combinations exist
- The AutoDrive® SA has a 100% Duty Cycle at 350Amps for both Aluminum and steel
- The AutoDrive® SA is a water cooled welding system. 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

DRIVE ROLL SELECTION ASSISTANT

When changing drive roll size or type 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. 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 SA 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 SA compatible weld modes with a defined wire type and size. (EX: 0.035" STEEL GMAW PULSE or 1/16" ALUMINUM 4XXX GMAW CV). 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 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.

TECHNICAL SPECIFICATIONS - PULL FEEDER K4445-1

AUTODRIVE SA PULL FEEDER	
CABLE BUNDLE	K4130-1 FANUC® 100iC K4130-2 FANUC® 100iC/6L, FANUC® 100iC/7L & KAWASAKI BA006N K4130-3 FANUC® 120iC K4130-4 FANUC® 120iC/10L & FANUC 120iC/12L K4130-5 Motoman® MA1440 K4130-6 Motoman® MA2010 & FANUC® 100iC/8L K4130-8 ABB® IRB 1520ID K4130-9 ABB® IRB 1600ID & KUKA® KR6-R1820HW K4130-10 ABB® IRB 2600ID-8/2.00 K4130-11 KUKA® KR5-HW-2 K4130-12 KUKA® KR16-L8-HW K4130-13 KUKA® KR16-HW K4130-14 ABB® IRB 2600ID-15/1.85 K4130-15 FANUC® M710iC/12L K4130-16 ABB® IRB 1660 ID K4130-17 KUKA® KR8-R1620-HW & KUKA® KR8-R1620-HW K4130-18 FANUC® 100iD K4130-19 KAWASAKI BA006L K4130-20 FANUC® 100iD/10L K4130-21 KUKA® KR8-R2100-HW
CONTROL CABLE BUNDLE	K3390-1 FANUC® 100iC & Motoman MA1440 K3390-2 FANUC® 100iC/6L, FANUC® 100iC/7L, FANUC® 120iC & KAWASAKI BA006N K3390-3 FANUC® 100iC/8L, Motoman MA2010, & KUKA® KR8-R2100HW K3390-4 KUKA® KR8-R1620-HW K3390-5 ABB® IRB 1600ID & KUKA® KR6-R1820-HW K3390-6 ABB® IRB 2600ID-8/2.00 K3390-7 KUKA® KR5-HW-2 K3390-8 KUKA® KR16-HW-L8 K3390-9 FANUC® M-710iC/12L K3390-10 FANUC® 100iD K3390-11 ABB® IRB 1660ID & KUKA KR16-HW K3390-12 ABB® IRB 1520ID K3390-13 FANUC® 120iC/10L, FANUC® 120iC/12L & ABB® IRB 2600ID-15/1.85 K3390-14 KAWASAKI BA006L K3390-15 FANUC® 100iD/10L
GOOSENECK	KP4403-22 22 Degree Gooseneck KP4403-45 45 Degree Gooseneck KP4403-180 180 Degree Gooseneck
BREAKAWAY DISK	KP2920-4 FANUC® iC and Motoman® KP2920-5 KUKA® KR5-HW-2 and KR16-L8-HW KP2920-6 KUKA® KR16-HW KP2920-7 ABB® IRB 1520ID and 1600ID KP2920-8 ABB® IRB 2600ID KP2920-9 FANUC® ID KP2920-10 KAWASAKI® BA006L and KAWASAKI BA006N

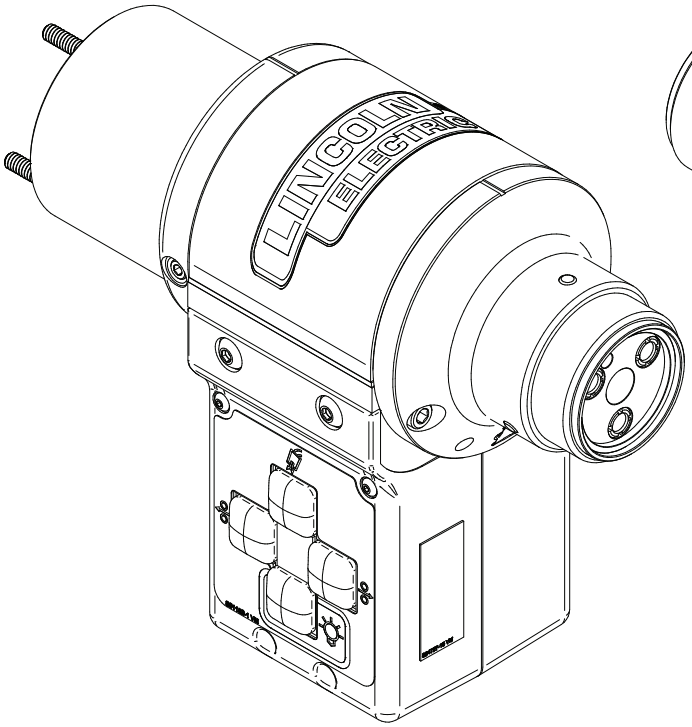
RATINGS	
WIREFEED SPEED	30 - 800 IPM (0.8 - 30.5M/MIN.)
WIRES SIZES, SOLID ALUMINUM	.035 - 1/16” (0.9 - 1.6mm)
WIRES SIZES, SOLID STEEL	.035 - .045” (0.9 - 1.2mm)
WELDING CURRENT	350 AMPS @ 100%
WELDING SHIELDING GAS	100% ARGON (ALUMINUM) MIXED AR/CO_2 (STEEL)
INPUT VOLTAGE	40 VDC
INPUT CURRENT	10 A MAX
MOTOR POWER	220 WATT
CABLE CONNECTION	14 PIN, 6 PIN AMPHENOL NOTE: ALL INPUTS COME THROUGH ARCLINK CABLE FROM WIRE FEEDER

PHYSICAL DIMENSIONS	
LENGTH (WITH GOOSENECK)	17.5 IN. (445mm)
WIDTH (B)	3.27 IN. (83mm)
HEIGHT (C)	6.50 IN. (165mm)
WEIGHT	7 LBS. (3.18 KGS)
COMPATIBLE ROBOTS	FANUC 100iC, 100iC/6L, 100iC/8L FANUC 120iC, 120iC/6L, 120iC/10L FANUC M710IC/12L SELECT YASKAWA/MOTOMAN SELECT ABB SELECT KUKA
REPLACEABLE MOTOR	YES

COOLING REQUIREMENTS	
MINIMUM FLOW RATE	GOOD .32 GAL / MIN (1.2L / MIN) (WITH GOOSENECK INSTALLED)
MINIMUM INLET PRESSURE	50 PSI (345KPA)
MAXIMUM INLET PRESSURE	70 PSI (483KPA)
MINIMUM COOLING POWER	0.30KW (1023 BTU/HR) @ 1.2L / MIN

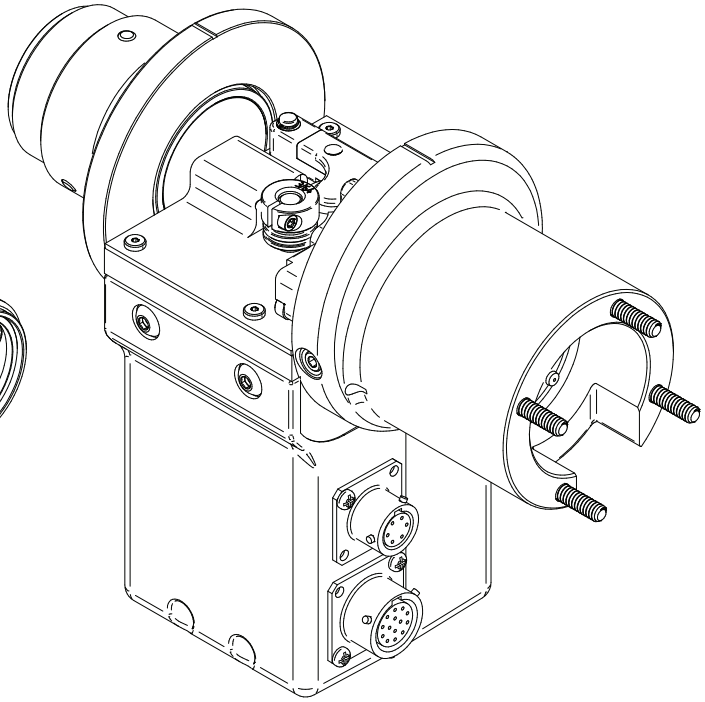
APPROVALS AND MARKINGS	
CSAC/US	CAN/CSA-E60974-7, ANSI/IEC60974-7
CE	EN 60974-7, EN60974-10
IP RATING	NA

FRONT



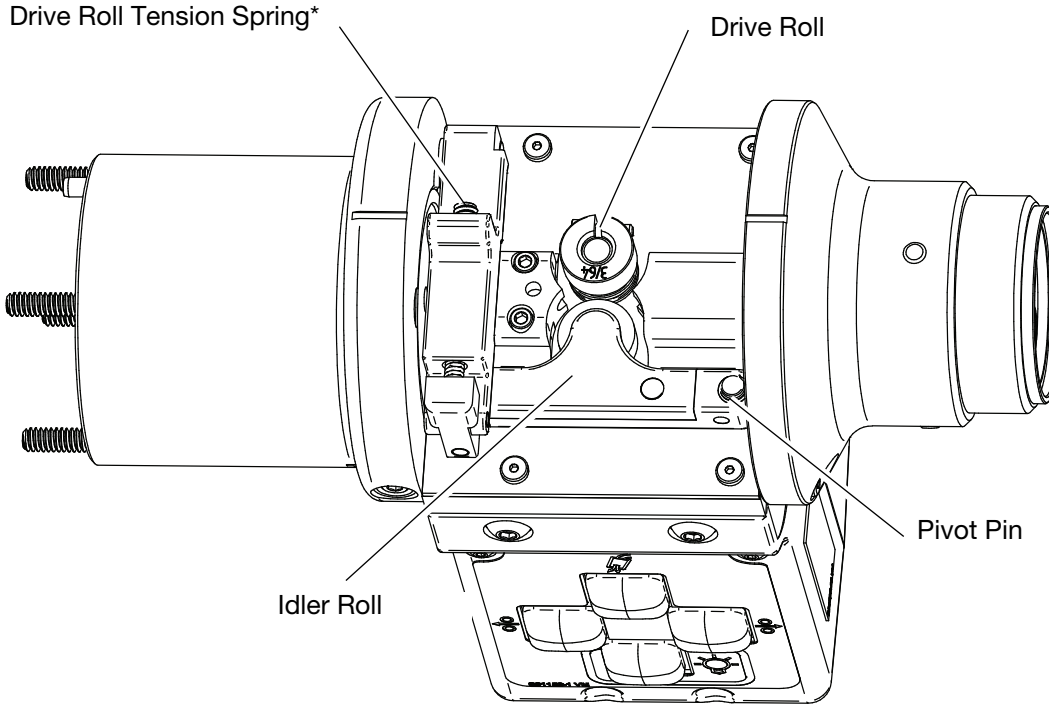
BACK

Wire drive cover not shown



COMPONENTS

Wire drive cover not shown



*Drive roll tension set at the factory. There should be no reason for the user to change this setting.

Figure 1: Three pins on the gooseneck plug into the front of the Pull Feeder. Two of these pins open small valves inside the Pull Feeder to allow water to flow when the gooseneck is installed and prohibit the flow of water when the gooseneck is removed.

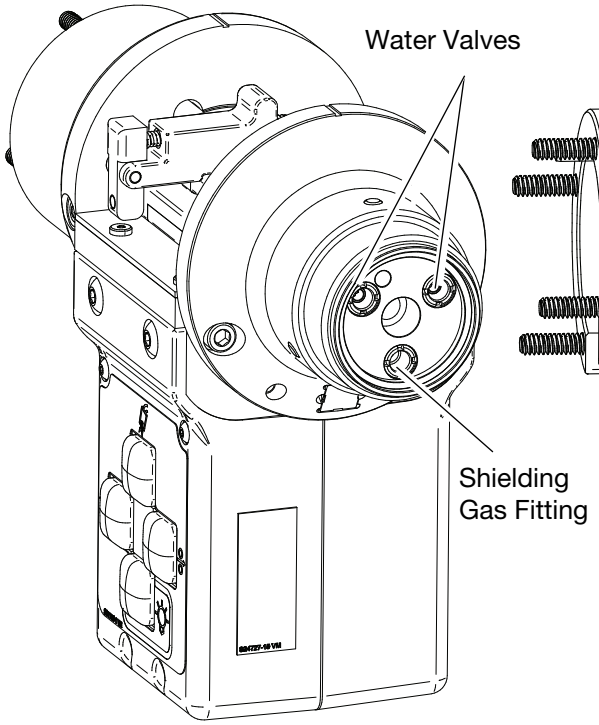
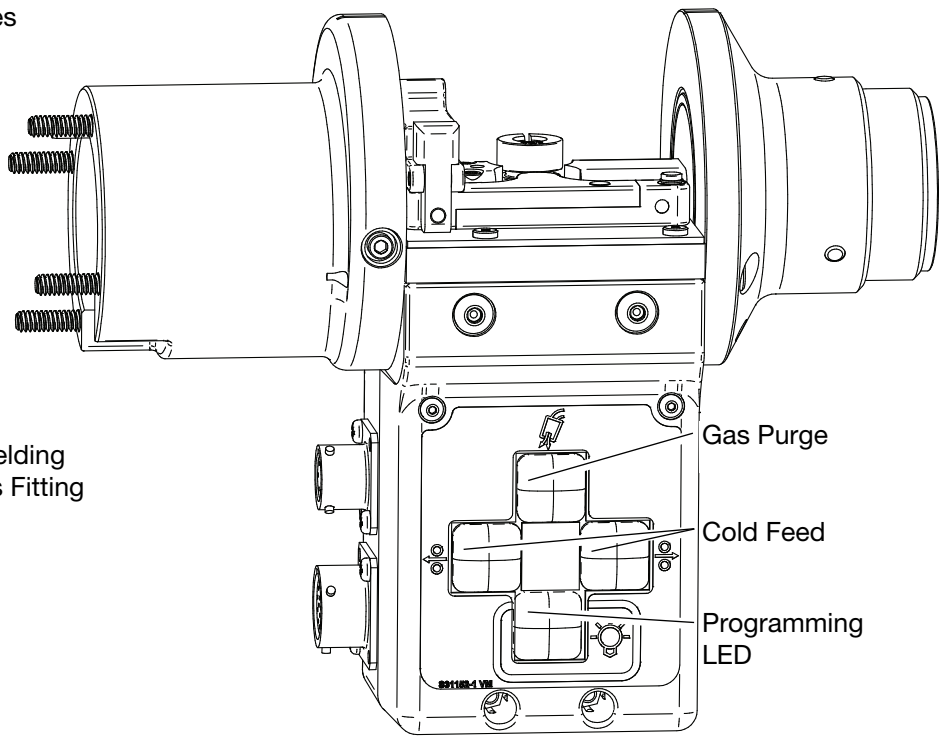


Figure 2: Four buttons are installed on the side of the Pull Feeder. These buttons are used when the operator is programming the robot. The buttons can cold feed wire in the + or – direction, gas purge, and toggle the programming LED on/off.



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.
- Four Pull Feeder mounted buttons to control cold inch +/-, gas purge, and LED light
- LED light to illuminate welding area for programming

INSTALLATION

PRE-INSTALLATION NOTE:

The AutoDrive® SA Pull Feeder comes completely assembled with hardware included in the assembly. The scope of the Pull Feeder install is to un-assemble parts of the Pull Feeder and then re-assemble the Pull Feeder on the robot arm. The Pull Feeder 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.

PULL FEEDER DISASSEMBLY (PREPARATION FOR ROBOT ASSEMBLY)

1.) To get the Pull Feeder in a state where it can be mounted on the robot the rear Aluminum Housing must be removed from the Pull Feeder. Start by removing the two radial screws as seen in the Figure A.2.

2.) After those are removed then remove the two long bolts that hold the Pull Feeder together, as seen in the Figure A.3.

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, Figure A.4, A.5.

4.) This completes the Pull Feeder disassembly, the Pull Feeder is now ready to be mounted to a robot arm.

FIGURE A.1 Pull Feeder assembly as it comes shipped

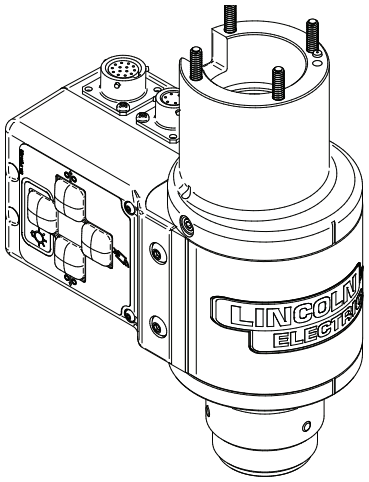


FIGURE A.2 Remove radial screws.

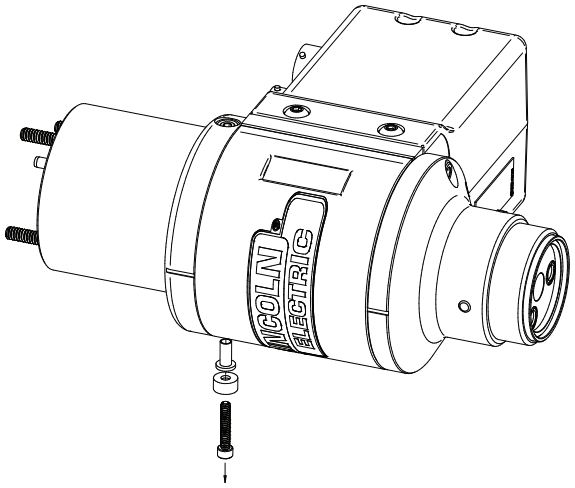


FIGURE A.3 Remove 2 long bolts.

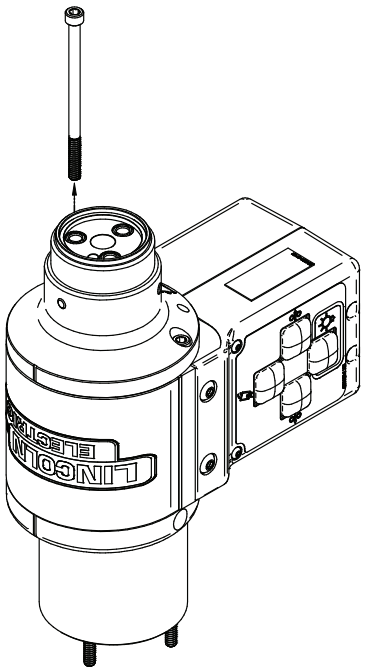


FIGURE A.4 Pivot up the tension lever arm.

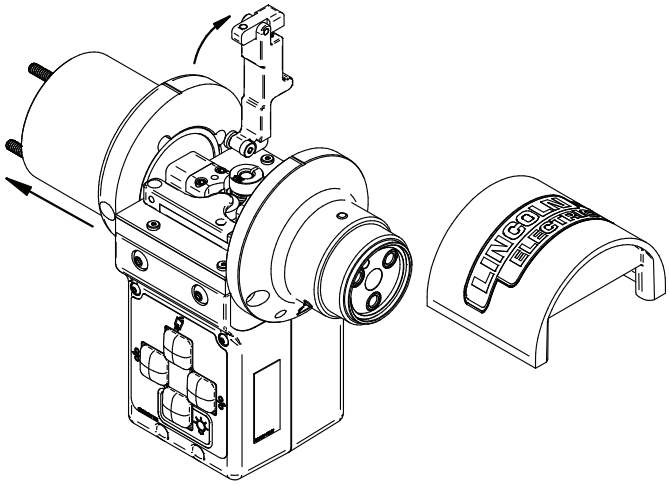
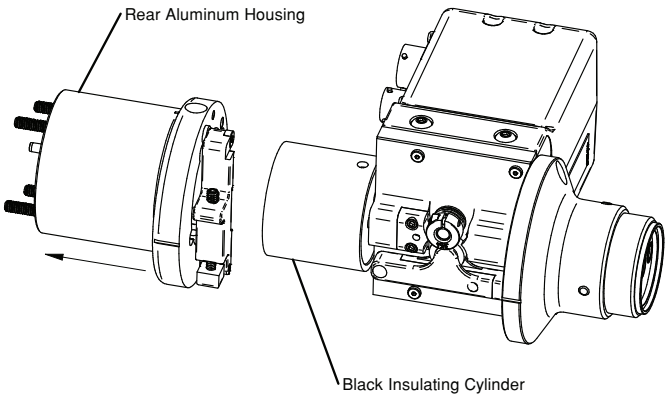


FIGURE A.5 The Pull Feeder with the aluminum housing removed.



PULL FEEDER ASSEMBLY

1.) Install breakaway disk (sold separately)

a.) Use screws provided with breakaway disk to assemble onto mounting face of the robot arm by aligning the locating pin on the disk with the locating hole on the robot arm mounting face. The disk will only install one way. See figure A.8.

FIGURE A.7 Breakaway Disk and rear housing prior to installation.

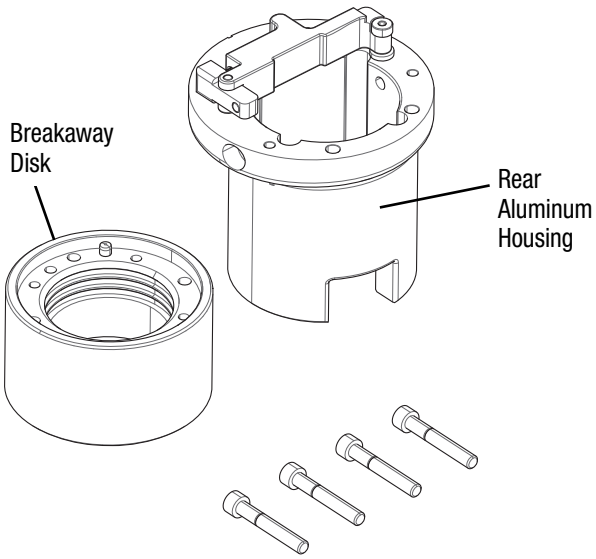
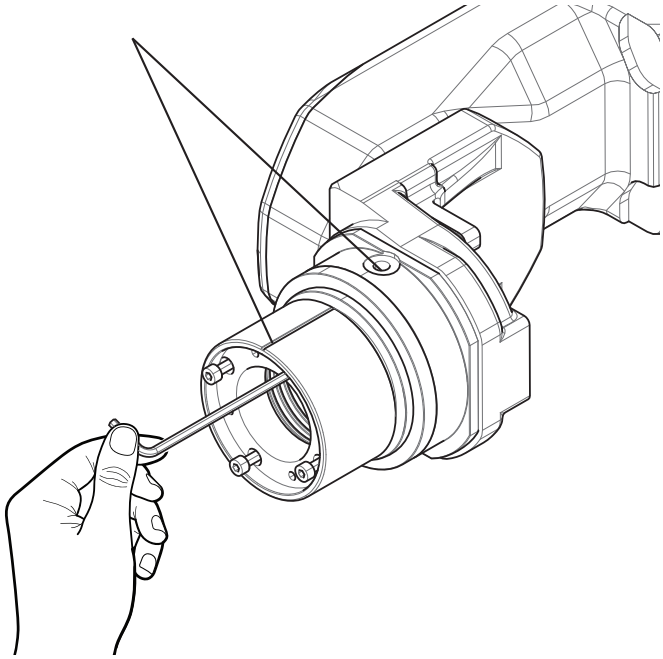


FIGURE A.8 Install breakaway disk (sold separately) with provided screws onto mounting face of robot arm. Line up locating dowel on breakaway disk with locating hole on mounting face.

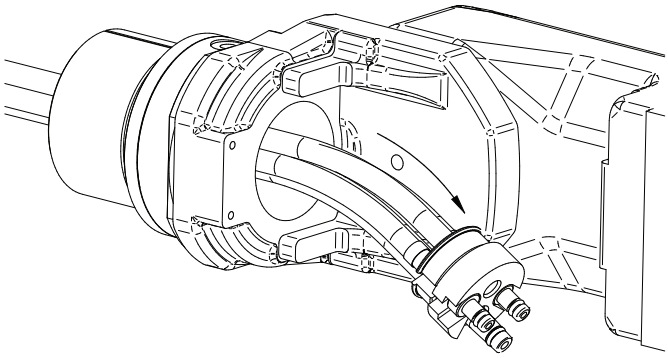


2.) Feed Cable Bundles back thru Breakaway Disk

a) Position the robot so that the arm is horizontal.

b) Feed the cable bundle halfway through the breakaway disk/robot mounting face.

FIGURE A.9



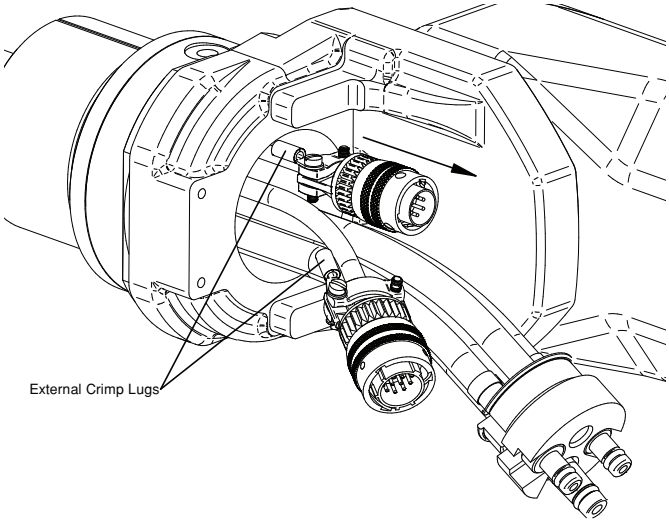
3.) Feed control cables through breakaway disk/robot mounting face.

a) The 2 control cables are NOT reversible. One end has external crimp lugs; this is the back end. The other end has rubber sheathing over the cable.

b) Gently press the individual cables of the cable bundle to the side of the inner diameter of the breakaway disk/robot mounting face. This is in order to make room to pass the control cables through the breakaway disk.

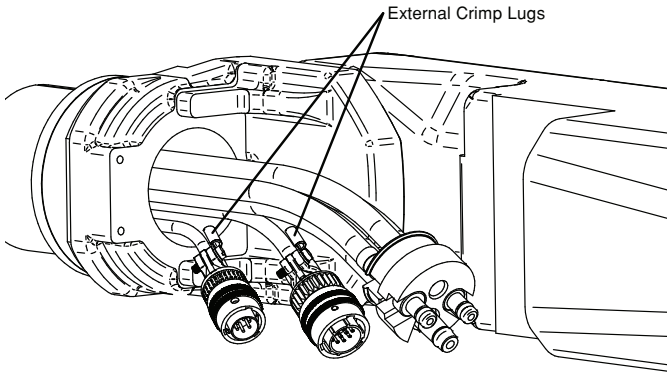
c) Feed the back end of each control cable through (sold as a set for each specific robot arm) through the breakaway disk one at a time. The larger cable/connector should be fed through the breakaway disk first. DO NOT CROSS the control cables; they should be positioned so that they are straight through the arm without being crossed, kinked, or knotted.

FIGURE A.10



d) If necessary reposition the control cables so that they are underneath the cable bundle and are not twisted or crossed with the cable bundle.

FIGURE A.12

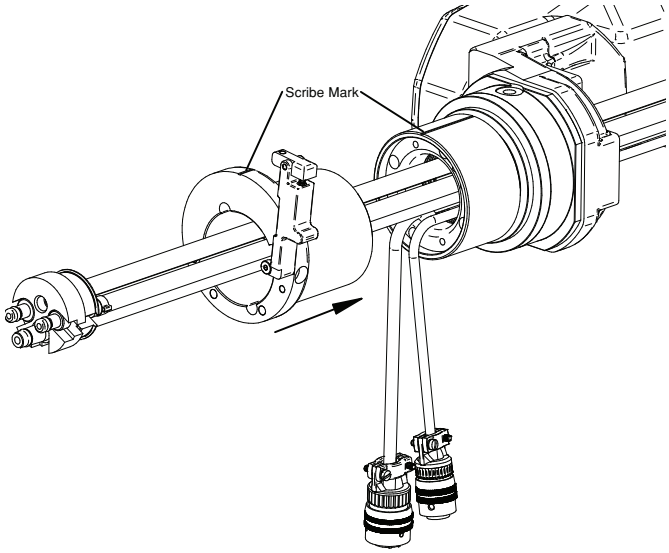


4.) Install the rear aluminum housing

a) Pass the cable bundle through the rear aluminum housing and position the housing so that the 2 control cables will be sitting in the cutout at the bottom. Line up the scribe mark on the housing (on large face) with the scribe mark on the breakaway disk.

b) With the 2 control cables positioned within the cutout on the bottom of the rear aluminum housing, press the housing into the breakaways disk. DO NOT PINCH OR CROSS THE CONTROL CABLES.

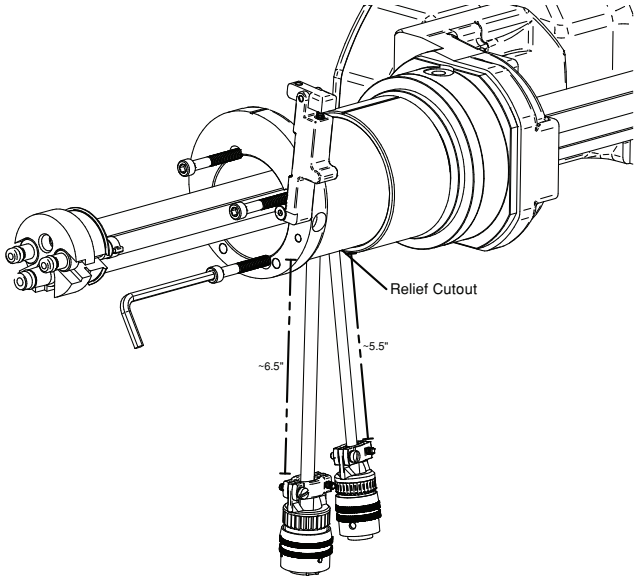
FIGURE A.13



c) Adjust the control cable lengths through the cutout. The smaller cable should be approximately 5.5” from the cutout in the housing, and the larger cable should be approximately 6.5”.

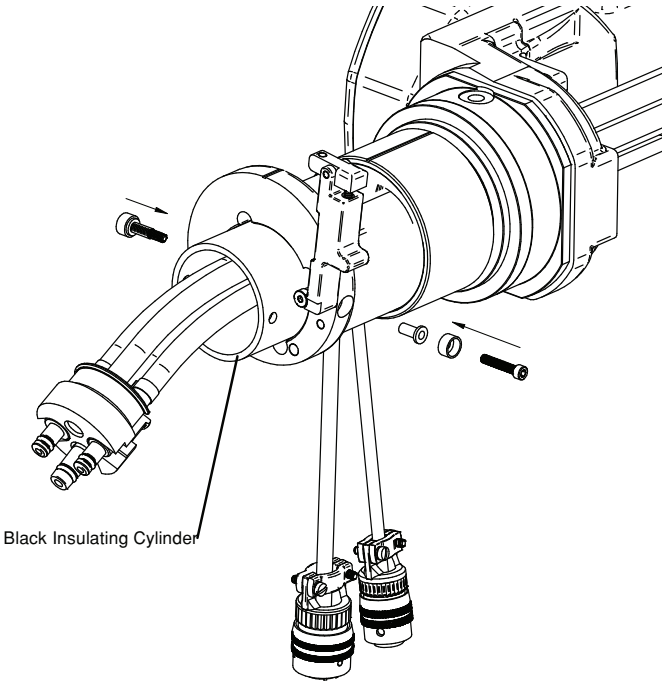
d) Insert the supplied socket head cap screws and secure the rear aluminum housing to the breakaway disk.

FIGURE A.14



e) Insert the black insulating cylinder back into the rear aluminum housing. The two side holes are closest to the front of the rear aluminum housing. Once seated, insert the 2 radial screws and insulators removed from the pull feeder (shown in Figure A.2) so that they are engaging the black insulating cylinder but not protruding past the inside face.

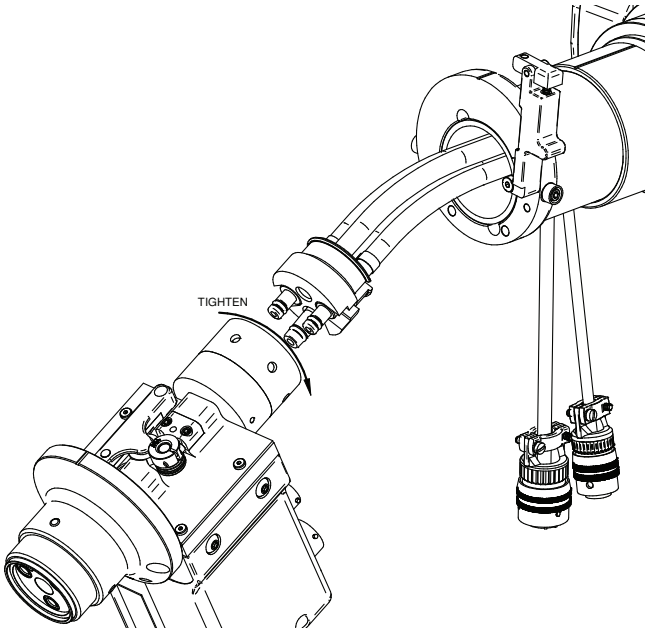
FIGURE A.15



5) Couple the Pull Feeder to the Cable Assembly

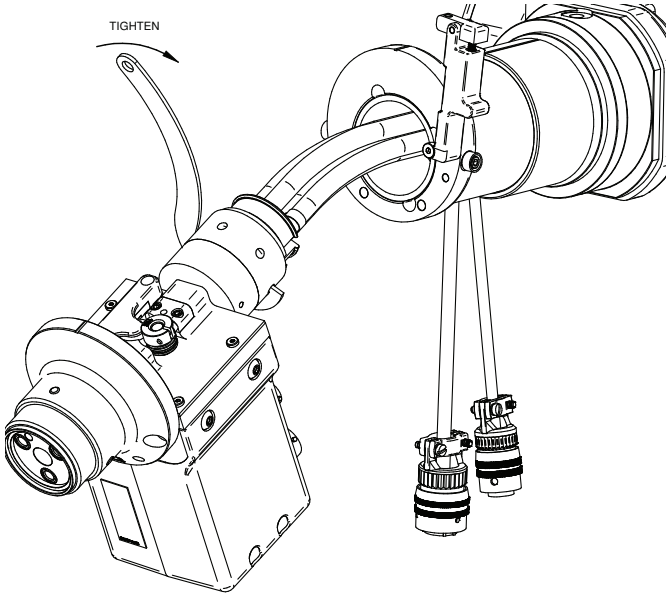
a) Position the pull feeder in front and in line with the cable bundle, which will only mate one way. Line up the 3 fittings on the cable bundle with their respective holes in the pull feeder and press them together while rotating the locking collar on the pull feeder, engaging the threads.

FIGURE A.16



b) Continue to thread the locking collar. Use the spanner wrench included with the AutoDrive SA Push Feeder (9SM25621) to draw the components together. Use the spanner wrench to further tighten the locking collar until tight. The water/power cable and its mating port on the pull feeder have a tapered fit. DO NOT use any additional tools or lengthening arms to force additional torque.

FIGURE A.17

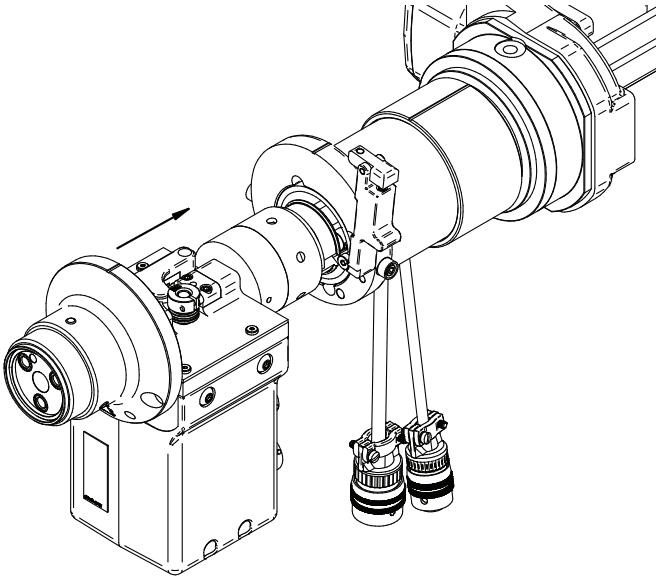


NOTE: Even though threads may be visible, the locking collar will be threaded down completely when the spanner wrench cannot move from further hand force. Also, the water/power cable will be locked so that it cannot be rotated. This can be checked by grasping the water/power cable and attempting to rotate it. If it does rotate, apply additional tightening until it does not rotate.

6) Final Pull Feeder Installation

a) Carefully push the pull feeder into the rear aluminum housing without disturbing the control cables until the pull feeder is fully seated. Do not allow the control cables to become crossed, pinched, or kinked. Any visible gaps between the pull feeder and rear aluminum housing will be closed when the 2 long socket head cap screws are reinstalled and tightened (see next step).

FIGURE A.18



b) Install and tighten the 2 long socket head cap screws alternately until tight. Finish installing the 2 side screws installed through the rear aluminum housing previously.

FIGURE A.19

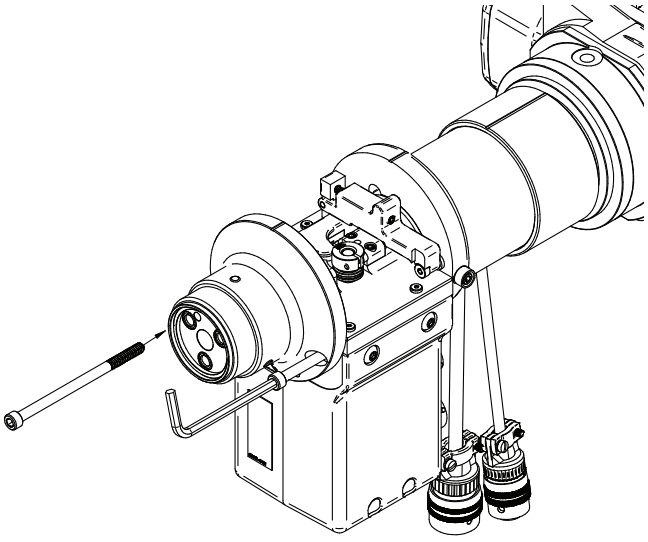
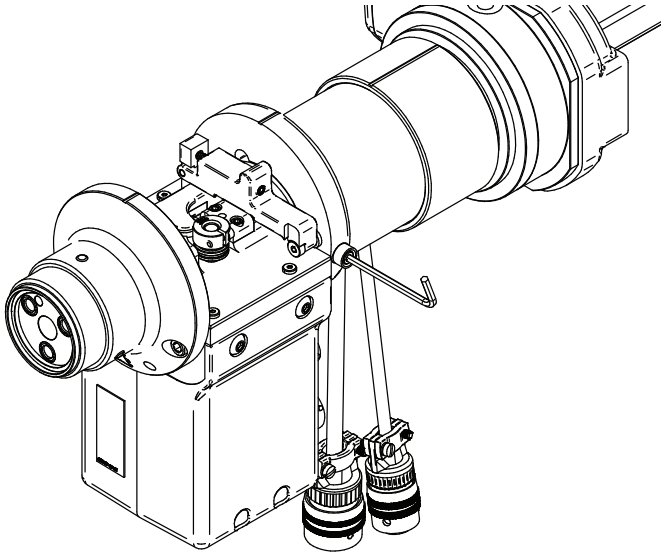
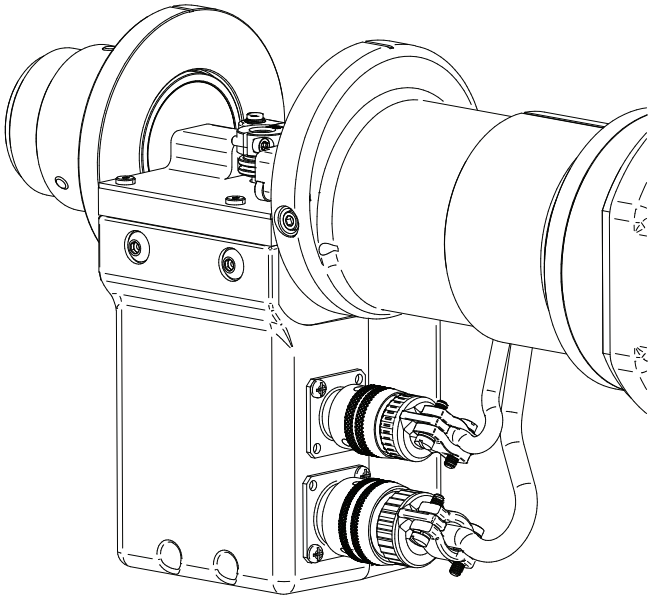


FIGURE A.20



c) Install both connectors on the control cables to their respective connections on the pull feeder. Adjust the remaining cable lengths passing into the housing to remove as much slack as needed to have a smooth curve into the housing. This can be accomplished by slightly lifting on the cable bundle hoses where they pass out of the wrist area on the robot arm and adjusting each cable separately. This minimizes cable overhang between the pull feeder housing and robot arm.

FIGURE A.21



d) Install the drive roll cover

7) Finish routing cables through arm

a) Feed the back end of the cable bundle all the way through the rear of the arm. Ensure that the cable bundle is not twisted or kinked as it passes through the arm.

b) Feed the back end of each control cable through the rear of the arm. The larger cable/connector should be fed through the rear of the arm first. Ensure that the control cables are not twisted or crossed with each other or the cable bundle and pass straight through the arm.

Gooseneck Installation

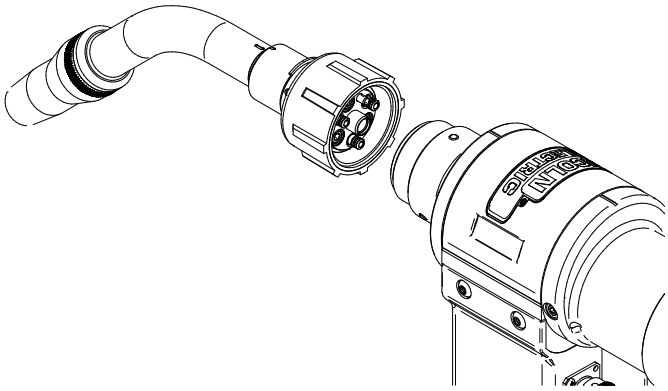
a. Be sure to rub a film of silicone grease on all the o-rings on the mating end of the gooseneck. This will ensure a proper seal of the o-rings and prevent water leaks.

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

c. Simply press the gooseneck onto the Pull Feeder 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 gooseneck and Pull Feeder.

FIGURE A.22



CABLES

Push Feeder to Pull Feeder Cables (supplied separately, see cable list)

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

FIGURE A.23
PULL FEEDER POWER

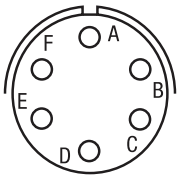


TABLE A.3 PULL FEEDER POWER

POWER SOURCE/ CONTROL BOX	
PIN	FUNCTION
A	MOTOR PHASE 1
B	MOTOR PHASE 2
C	MOTOR PHASE 3
D	LED
E	LED
F	RESERVED

FIGURE A.24
PULL FEEDER FEEDBACK

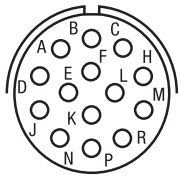


TABLE A.4 PULL FEEDER FEEDBACK

WIRE FEEDER	
PIN	FUNCTION
A	BUTTON FEED FWD
B	BUTTON FEED REV
C	BUTTON TOGGLE LIGHT
D	BUTTON GAS PURGE
E	+24 VDC
F	+5 VDC
H	COMMON
J	ENCODER B-
K	ENCODER B+
L	ENCODER A-
M	ENCODER A+
N	HALL U
P	HALL V
R	HALL W

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

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.

The Drive Rolls supplied with the AutoDrive® SA Pull Feeder are specially designed stainless steel rolls to optimize the feeding of aluminum welding wire. These rolls have a "U" Groove profile to hug the wire while not deforming the wire (See Section on Drive Roll Tension). The Pull Feeder 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.

Drive Rolls for welding steel, 0.035 - 0.045 are available separately.

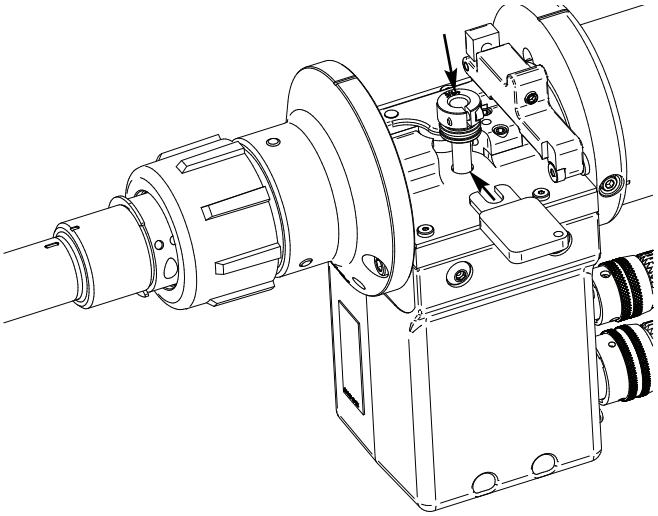
To remove drive roll:

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 Pull Feeder
4. Slide drive roll on to motor shaft and allow the drive 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.25 Removal and installation of the Pull Feeder drive roll. See M21544-1 for customer supplied instruction sheet.



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

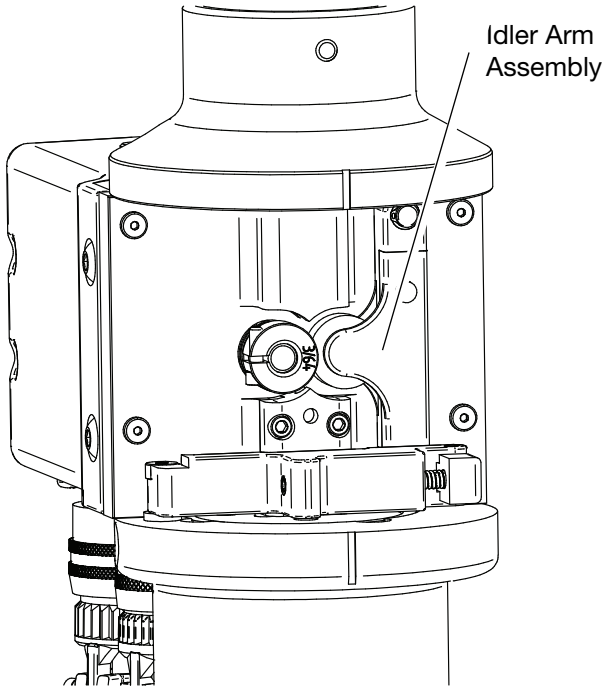
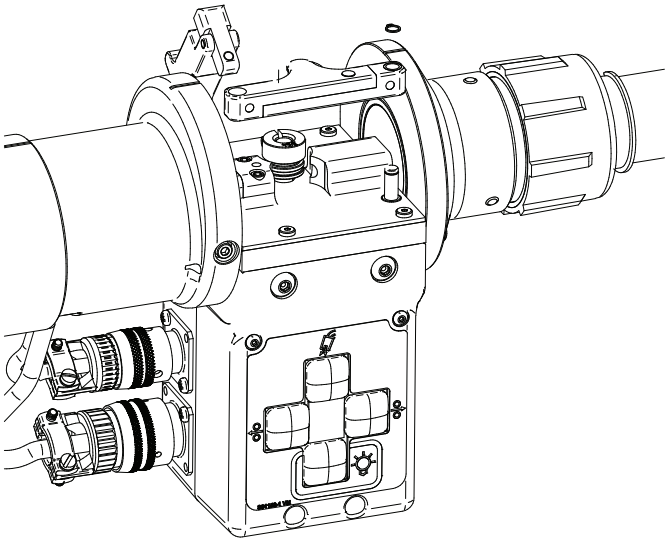


FIGURE A.27 The Idler Arm Assembly is pictured here with the retaining ring. See M21544-2 for full instructions.



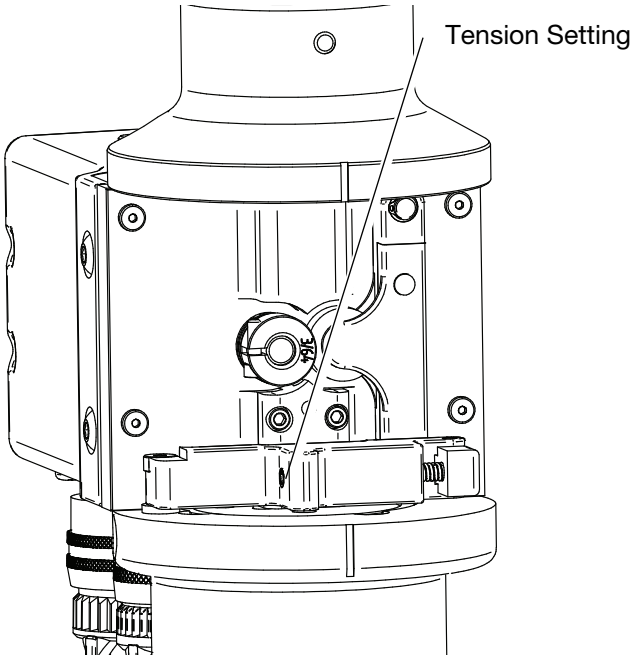
PROPER PULL FEEDER DRIVE ROLL TENSION

Significant time has been spent determining an ideal tension setting for the AutoDrive® SA Pull Feeder. 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 Pull Feeder 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 Pull Feeder is only to be used in conjunction with an AutoDrive® SA Push Feeder the amount of wire the Pull Feeder will be feeding is always known. Therefore the amount of tension that is needed to feed wire from the Push Feeder to the Pull Feeder is always known. This is why the Pull Feeder Drive Roll Tension is set at the factory and ideally does not need to be adjusted.

FIGURE A.28 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.



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 Pull Feeder from water cooler to prevent water flow during valve replacement.

3.) Remove gooseneck assembly by loosening lock nut and pulling gooseneck from Pull Feeder.

4.) Remove SA Pull Feeder 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 Pull Feeder on body on flat work surface so that front face / gooseneck mating surface is vertical.

Valve removal:

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 Pull Feeder. 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.

Valve Installation:

1.) Install Spring into SA Pull Feeder, seating into spring seat on Spring Plug.

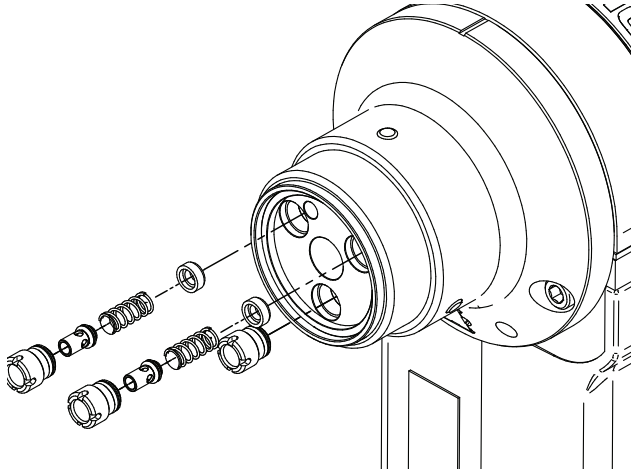
2.) Install small o-ring onto Water Pin, pushed up against front face so that o-ring is not blocking water holes.

3.) Insert Water Pin with o-ring installed onto Spring.

4.) Install large o-ring onto Slotted Hollow Set Screw. Apply a thin film of silicone based o-ring lubricant onto o-ring.

5.) Install Slotted Hollow Set Screw into SA Pull Feeder. Use K4214 Valve Fitting Tool to tighten Slotted Hollow Set Screw until snug. DO NOT OVERTIGHTEN.

FIGURE A.29 Water Valve removal and replacement.

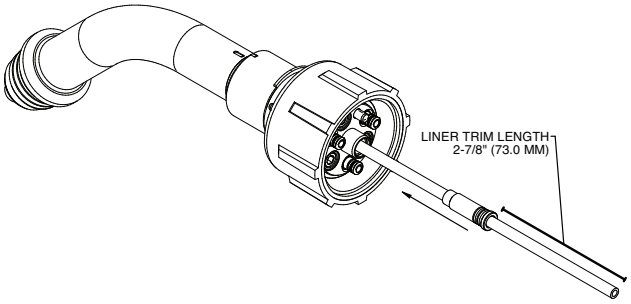


GOOSENECK JUMP LINER INSTALLATION

One size replacement liners will be available and the customer will need to trim the liner to the specific length required for their application.

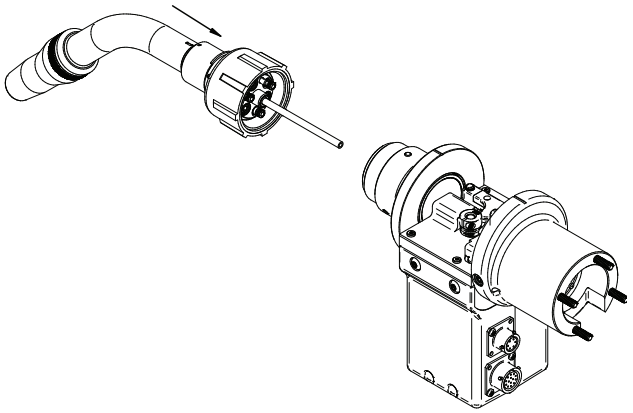
Trim the short section of liner behind the ferrule to the correct length. The rough trim length is 2-7/8" (73.0 MM). With the diffuser, contact tip, and nozzle removed insert the liner into the rear of the gooseneck. The ferrule should fully seat into the gooseneck.

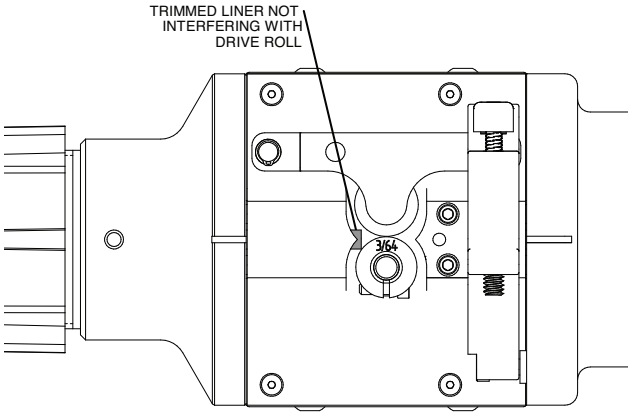
FIGURE A.30



Install the gooseneck on the pull feeder and check that the liner does not interfere with the drive roll in the pull feeder. Make any adjustments to the liner length at this time. The liner should be trimmed to within 1/8" (3 MM) of the pull feeder drive roll. The goal is to support the wire along as much of its length as possible without interfering with the drive roll.

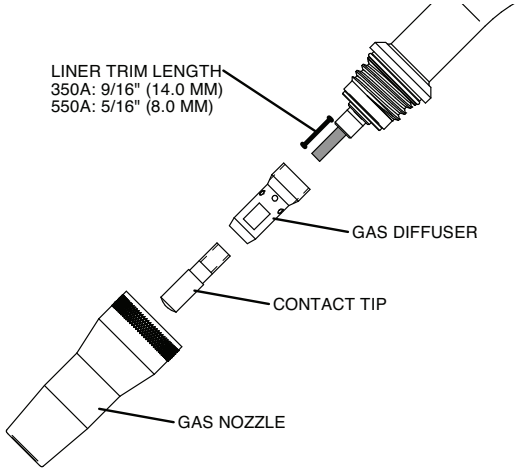
FIGURE A.31





With the gooseneck installed, the front portion of the liner can be trimmed to the correct length. Due to geometrical differences the length for this portion of the liner will be different if 350 amp or 550 amp consumables are being used. The rough trim length for 350 amp consumables is 9/16" (14.0 MM) past the threads on front of the gooseneck. The rough trim length for 550 amp consumables is 5/16" (8.0 MM) past the threads on front of the gooseneck. Install the gas diffuser and contact tip to verify that the liner is the correct length. Make any adjustments to the liner length at this time. Install the gas nozzle.

FIGURE A.32



An alternative way to install the liner would be to cut the front portion to the rough trim length and then install the gas diffuser and contact tip. If installing the contact tip forces the ferrule out of the rear of the gooseneck then the front portion of the liner needs to be trimmed down more. Repeat this process until the installation of the contact tip does not affect the position of the ferrule at the rear of the gooseneck. The rear portion of the liner can then be cut to the rough trim length and the gooseneck can be installed on the SA pull feeder. If the liner contacts and interferes with the drive roll then the rear portion of the liner will need to be trimmed down more. Repeat this process until the liner does not interfere with the drive roll when the gooseneck is fully installed.

ALUMINUM LINER REPLACEMENT

Procedure:

1) Position arm to be straight from feeder to torch
2) Unlatch feeder idler arm and flip up out of the way. Remove drive roll cover and front drive roll.
3) Loosen and remove liner lock nut. (See Figure A.33) Grip and pull on exposed portion of ALUMINUM liner to free collet inside liner guide. Remove liner and collet from feeder, saving both parts for reuse.

FIGURE A.33

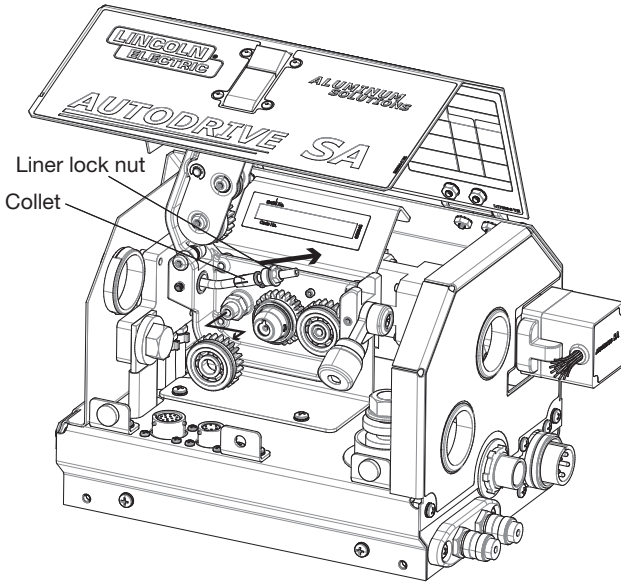
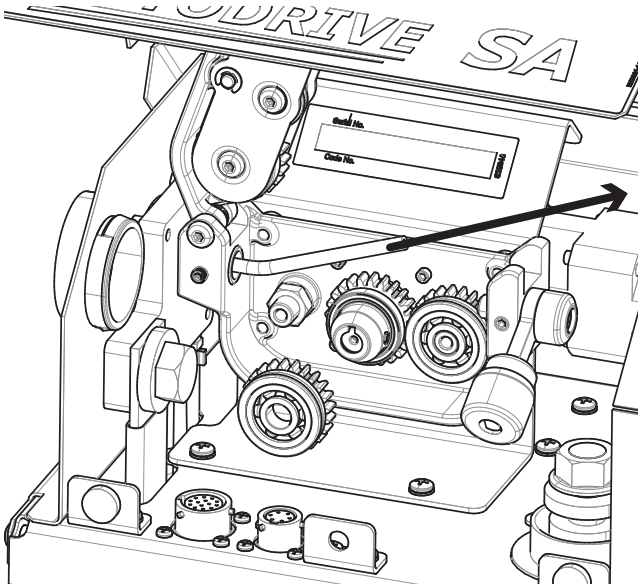
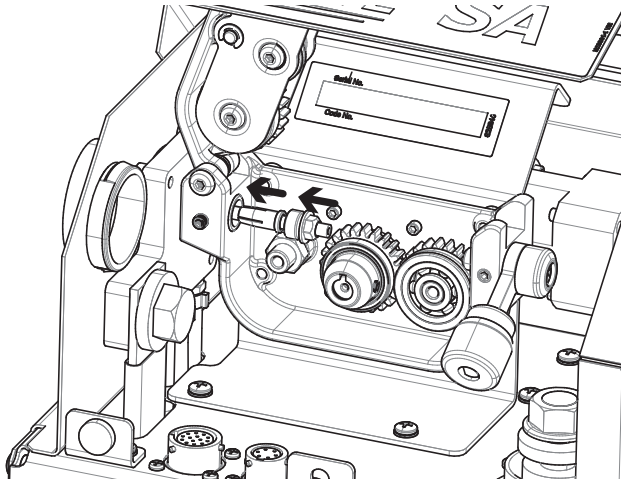


FIGURE A.34



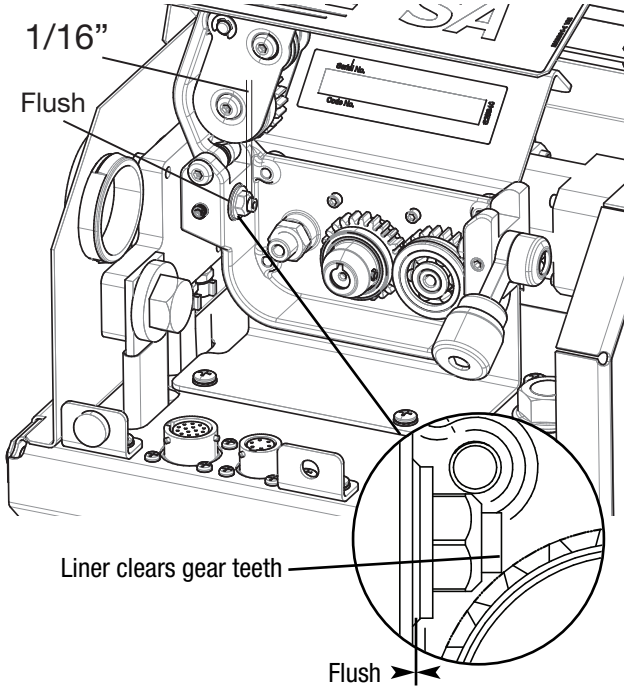
4) Slide new liner into and through liner guide until liner stops at torch end. This can be confirmed by viewing new liner through small hole in front liner guide in torch.
5) Slide collet and liner lock nut over exposed liner at feeder, as shown. (See Figure A.35)

FIGURE A.35



6) Thread liner lock nut FULLY into liner guide; collet will close and grip liner as liner lock nut is tightened.
7) Trim excess liner flush to 1/16” protruding from liner lock nut (See Figure A.36). Ensure that liner does not prevent drive roll installation and removal. Liner MUST clear the path of the gears on the front drive roll.

FIGURE A.36



8) Reinstall front drive roll and drive roll cover (label facing out). Close and latch idler arm after feeding wire.

STEEL LINER REPLACEMENT

Procedure

1) Position arm to be straight from feeder to torch
2) Unlatch feeder idler arm and flip up out of the way. Remove drive roll cover and front drive roll.
3) Loosen and remove liner lock nut. (See Figure A.37) Grip and pull on exposed portion of STEEL liner to free collet inside liner guide. Remove liner and collet from feeder, saving both parts for reuse.

FIGURE A.37

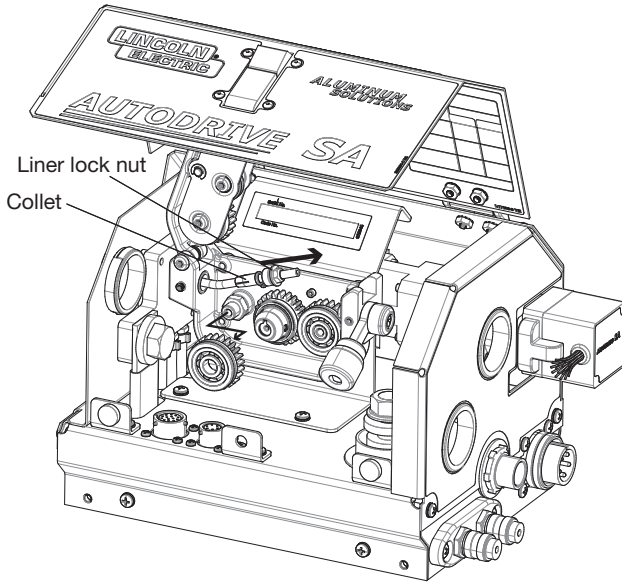
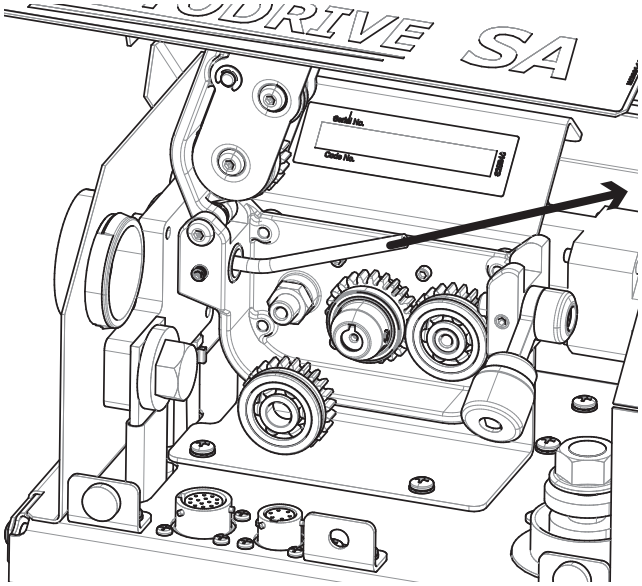
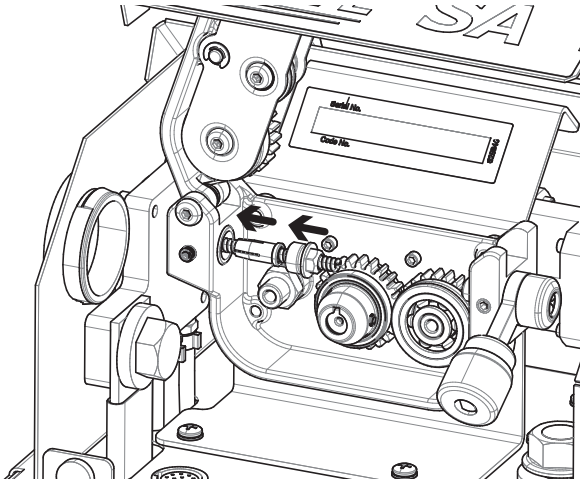


FIGURE A.38



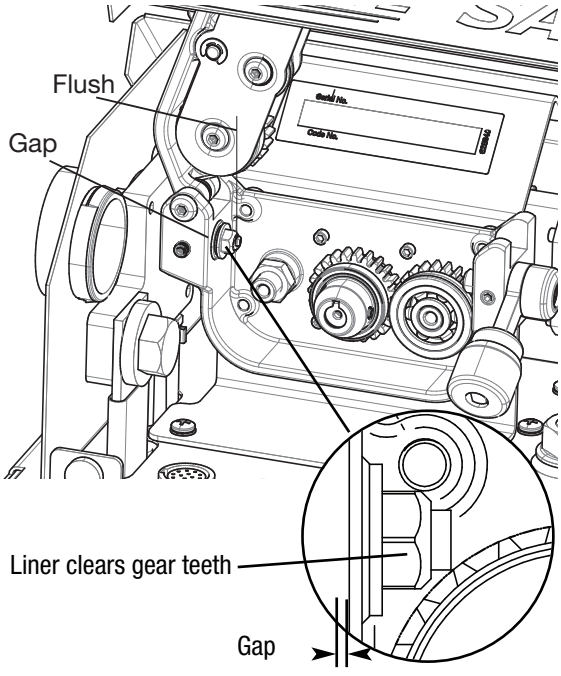
4) Slide new liner into and through liner guide until liner stops at torch end. This can be confirmed by viewing new liner through small hole in front liner guide in torch.
5) Slide collet and liner lock nut over exposed liner at feeder, as shown. (See Figure A.39)

FIGURE A.39



6) Thread liner lock nut into liner guide until snug. A small gap between liner lock nut and liner guide will be present. **DO NOT OVERTIGHTEN OR BOTTOM OUT LINER LOCK NUT AGAINST LINER GUIDE. THIS WILL MAKE STEEL LINER REMOVAL VERY DIFFICULT!**
7) Trim excess liner flush to slightly protruding from liner lock nut. (See Figure A.40). Ensure that liner does not prevent drive roll installation and removal. Liner and liner lock nut MUST clear the path of the gears on the front drive roll.

FIGURE A.40



8) Reinstall front drive roll and drive roll cover (label facing out). Close and latch idler arm after feeding wire.

SYSTEM SET-UP

New Arms

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

STEEL LINER INSTALLATION

Cut off brass ferrule and liner section that is covered with heat shrink. Remove any heat shrink on liner section. Pre-cut liner section being used in robot arm per following chart:

ROBOT ARM	CUSTOMER PRE CUT LENGTH
ABB IRB 1520ID	51”
ABB IRB 1600ID	49”
ABB IRB 1660ID	48”
ABB IRB 2600ID-15/1.85	52”
ABB IRB 2600ID-8/2.00	61”
FANUC 100iC	37”
FANUC 100iC/6L	46”
FANUC 100iC/7L	46”
FANUC 100iC/8L	55”
FANUC 100iD	40”
FANUC 100iD/10L	48”
FANUC 120iC	45”
FANUC 120iC/10L	53”
FANUC 120iC/12L	53”
FANUC M710IC/12L	88”
KAWASAKI BA006L	59”
KAWASAKI BA006N	46”
KUKA KR16-HW	49”
KUKA KR16-L8-HW	64”
KUKA KR5-HW-2	48”
KUKA KR6-R1820-HW	50”
KUKA KR8-R1420-HW	41”
KUKA KR8-R1620-HW	41”
MOTOMAN MA1440	37”
MOTOMAN MA2010	54”

DO NOT USE THIS END

OPERATION

The AutoDrive® SA Push Feeder and Pull Feeder 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 Pull Feeder. These four buttons are only functional when the robot is not welding.

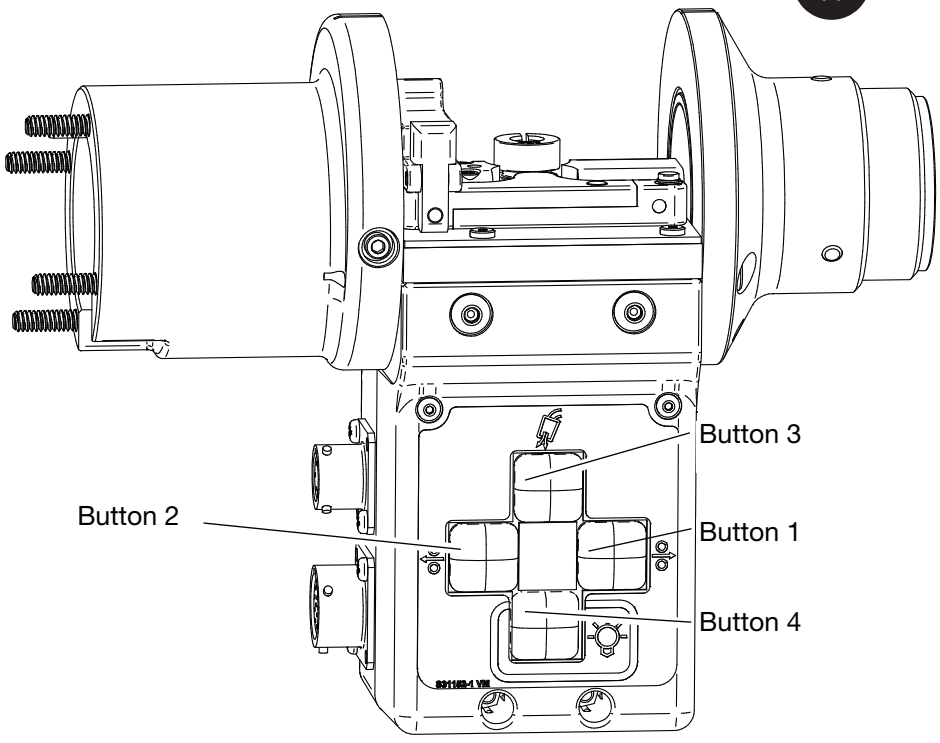
BUTTON 1	COLD INCH FORWARD
BUTTON 2	COLD INCH REVERSE
BUTTON 3	GAS PURGE
BUTTON 4	LED LIGHT ON/ OFF

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 Pull Feeder. 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 Pull Feeder 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.



GRAPHIC SYMBOLS THAT APPEAR ON THE AUTODRIVE® SA PULL FEEDER OR PUSH FEEDER OR IN THIS MANUAL


WARNING OR CAUTION


WIRE FEEDER


COLD FEED + & -


GAS PURGE


SHIELDING GAS INLET

I_1 **INPUT CURRENT**

I_2 **OUTPUT CURRENT**


LIQUID INLET


LIQUID OUTLET

OPTIONAL KITS AND ACCESSORIES

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.

PUSH FEEDER ALUMINUM DRIVE ROLL KITS						
KIT NUMBER	GROOVED DRIVE ROLL	QTY.	MAIN DRIVE GEAR	QTY.	SMOOTH DRIVE ROLLS	QTY.
KP4335-035A	0,9 / .035 U	2	INCLUDED IN KIT	1	INCLUDED IN KIT	2
KP4335-040A	1,0 / .040 U	2				
KP4335-364A	1,2 / 3/64 U	2				
KP4335-116A	1,6 / 1/16 U	2				

PUSH FEEDER STEEL 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				

PULL FEEDER ALUMINUM DRIVE ROLL KITS						
KIT NUMBER	GROOVED DRIVE ROLL	QTY.	MAIN DRIVE GEAR	QTY.	SMOOTH DRIVE ROLLS	QTY.
KP4413-035A	0,9 / .035 U	2	INCLUDED IN KIT	1	INCLUDED IN KIT	2
KP4413-040A	1,0 / .040 U	2				
KP4413-364A	1,2 / 3/64 U	2				
KP4413-116A	1,6 / 1/16 U	2				

PULL FEEDER STEEL DRIVE ROLL KITS						
KIT NUMBER	GROOVED DRIVE ROLL	QTY.	MAIN DRIVE GEAR	QTY.	SMOOTH DRIVE ROLLS	QTY.
KP4413-035S	0,9 / .035 V	2	INCLUDED IN KIT	1	INCLUDED IN KIT	2
KP4413-040S	1,0 / .040 V	2				
KP4413-045S	1,1 / .045 V	2				

LINERS		
KP3364-5	GOOSENECK LINER, .035 / .045 STEEL	INCLUDES: 1 STEEL GOOSENECK LINER ASSEMBLY (CUSTOMER TO CUT TO LENGTH)
KP3364-10	GOOSENECK LINER, .035 / 1/16" ALUMINUM	INCLUDES: 1 COMPOSITE GOOSENECK LINER ASSEMBLY (CUSTOMER TO CUT TO LENGTH)
KP44-3545-15	CONDUIT LINER, .035 / .045 STEEL	INCLUDES: 1 X 15' LONG STEEL CONDUIT LINER (CUSTOMER TO CUT TO LENGTH)
KP3807-6	CONDUIT LINER, .035 / 1/16" ALUMINUM	INCLUDES: 1 X 6' LONG COMPOSITE CONDUIT LINER (CUSTOMER TO CUT TO LENGTH)
KP3807-50	CONDUIT LINER, .035 / 1/16" ALUMINUM	INCLUDES: 1 X 50' LONG COMPOSITE CONDUIT LINER (CUSTOMER TO CUT TO LENGTH)

DIFFUSERS		
KP4379-1	DIFFUSER - 350A	INCLUDES: 1 DIFFUSER
KP4379-1-B25	DIFFUSER - 350A (25X BULK PACK)	INCLUDES: 25 DIFFUSERS
KP4380-1	DIFFUSER - 550A	INCLUDES: 1 DIFFUSER
KP4380-1-B25	DIFFUSER -550A (25X BULK PACK)	INCLUDES: 25 DIFFUSERS

GOOSENECKS		
KP4403-22	22 DEGREE GOOSENECK	INCLUDES: 1 GOOSENECK
KP4403-45	45 DEGREE GOOSENECK	INCLUDES: 1 GOOSENECK
KP4403-180	180 DEGREE GOOSENECK	INCLUDES: 1 GOOSENECK

OPTIONAL KITS & ACCESSORIES		
9SM25261	CABLE REMOVAL TOOL (SPANNER WRENCH)	INCLUDES: 1 TOOL
K4214-1	WATER FITTING TOOL	INCLUDES: 1 TOOL
KP4215-2	WATER FITTING REPAIR KIT (K4214-1 TOOL REQUIRED) (KIT ONLY COMPATIBLE WITH K4445-1 PULL FEEDER)	INCLUDES : FITTINGS, O-RINGS, AND SPRINGS
KP4216-1	GOOSENECK O-RING KIT	INCLUDES: 6 WATER FITTING O-RINGS AND 2 NOZZLE O-RINGS
KP4415-1	PULL FEEDER IDLER ROLL KIT	INCLUDES: 1 IDLER ROLL ASSEMBLY AND RETAINING RING
KP4597-1	GOOSENECK WATER FITTING KIT	INCLUDES: 3 GOOSENECK WATER FITTINGS AND 12 O-RINGS
KP4641-1	LINER COLLET/LOCK NUT KIT	INCLUDES: 1 LINER COLLET AND LOCK NUT

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.

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.

ALUMINUM WIRE	
DRIVE ROLLS	The custom drive rolls manufactured for use on the AutoDrive® SA are designed to last around 7000lbs of wire. Please see the table on page C-1 with replacement drive rolls.
CONDUIT LINERS	The composite 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-2 with replacement liners.
ALUMINUM OXIDE SHAVINGS	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.

STEEL WIRE	
GOOSENECK AND CONDUIT LINERS	Gooseneck Liner: Replace as necessary. Conduit Liner: Clean cable liner after using approximately 300 lbs (136kg) of wire. Remove liner from system and lay it out straight on a table. Using an air hose supply in low pressure, gently blow out from the pull feeder end.

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.

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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

- **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.

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.

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Observe all Safety Guidelines detailed throughout this manual

PROBLEMS (SYMPTOMS)	POSSIBLE CAUSE	RECOMMENDED COURSE OF ACTION
The Pull Feeder 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 Pull Feeder to the Push 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.	If all recommended possible areas of misadjustment have been checked and the problem persists, **Contact your local Lincoln Authorized Field Service Facility.**
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 Pull Feeder and Push Feeder. 7. Verify the electrode lead is connected to the proper connection block on the feed head.	

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.

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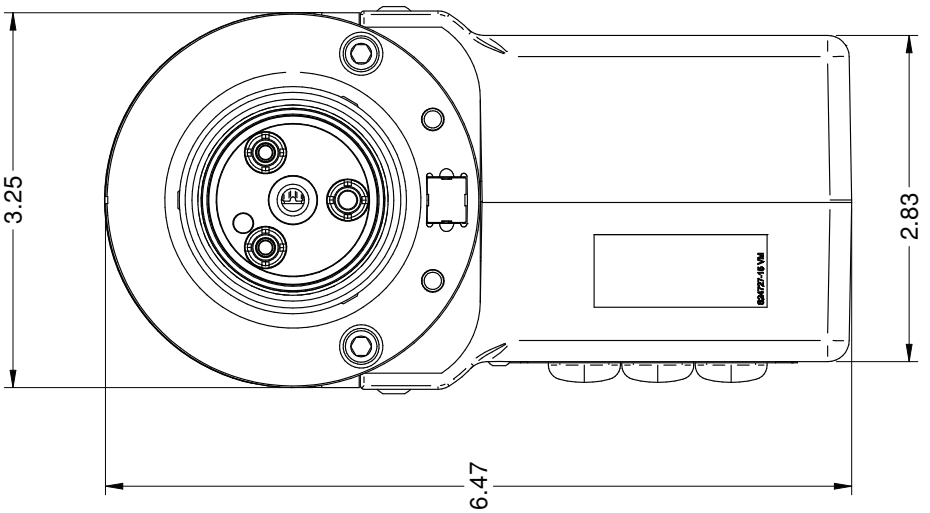
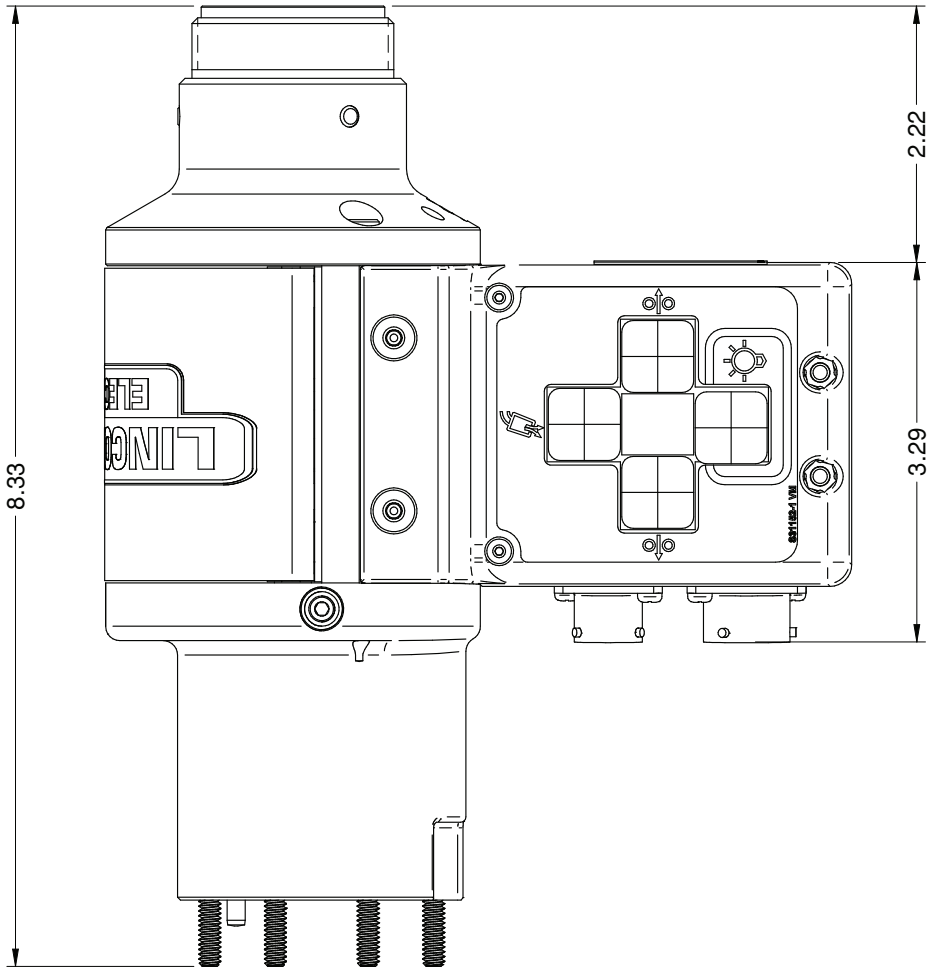
Observe all Safety Guidelines detailed throughout this manual

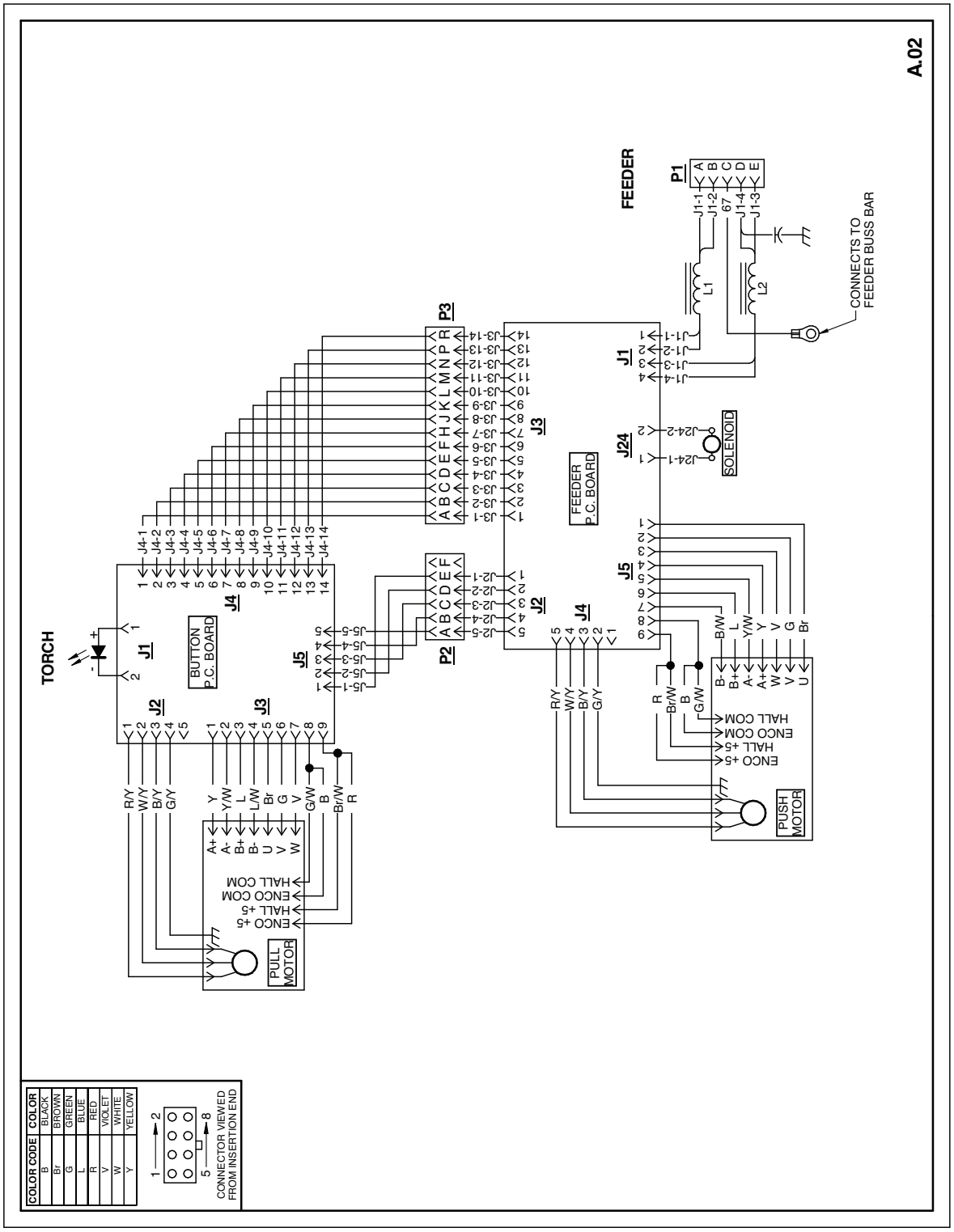
PROBLEMS (SYMPTOMS)	POSSIBLE CAUSE	RECOMMENDED COURSE OF ACTION
The motor overload errors occur.	1. Check for sharp bends in the gun liner and conduit. 2. Examine the contact tip for wear and proper size. Replace as necessary. 3. Check the gun liner and conduit. The welding electrode should slide easily through both. 4. Verify the proper gun liner is installed. 5. Reduce the pressure arm setting at wire feeder.	If all recommended possible areas of mis-adjustment have been checked and the problem persists, **Contact your local Lincoln Authorized Field Service Facility.**
Leaking Water or Shielding Gas.	1. O-rings at Pull Feeder/gooseneck interface. 2. O-rings at Pull Feeder/cable interface.	1. Buy Gooseneck O-Ring Kit (KP4216-1). 2. Buy as parts from Parts Pages.





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.

SCHEMATIC



M25369PRINT

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	● Do not touch electrically live parts or electrode with skin or wet clothing. ● Insulate yourself from work and ground.	● Keep flammable materials away.	● Wear eye, ear and body protection.
Spanish **AVISO DE PRECAUCION**	● No toque las partes o los electrodos bajo carga con la piel o ropa mojada. ● Aislese del trabajo y de la tierra.	● Mantenga el material combustible fuera del área de trabajo.	● Protéjase los ojos, los oídos y el cuerpo.
French **ATTENTION**	● 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.	● Gardez à l'écart de tout matériel inflammable.	● Protégez vos yeux, vos oreilles et votre corps.
German **WARNUNG**	● Berühren Sie keine stromführenden Teile oder Elektroden mit Ihrem Körper oder feuchter Kleidung! ● Isolieren Sie sich von den Elektroden und dem Erdboden!	● Entfernen Sie brennbarres Material!	● Tragen Sie Augen-, Ohren- und Körperschutz!
Portuguese **ATENÇÃO**	● Não toque partes elétricas e electrodos com a pele ou roupa molhada. ● Isole-se da peça e terra.	● Mantenha inflamáveis bem guardados.	● Use proteção para a vista, ouvido e corpo.
Japanese **注意事項**	● 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。	● 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。	● 目、耳及び身体に保護具をして下さい。
Chinese **警 告**	● 皮肤或濕衣物切勿接觸帶電部件及銲條。 ● 使你自己與地面和工件絕緣。	● 把一切易燃物品移離工作場所。	● 佩戴眼、耳及身體勞動保護用具。
Korean **위 험**	● 전도체나 용접봉을 젖은 헝겁 또는 피부로 절대 접촉치 마십시요. ● 모재와 접지를 접촉치 마십시요.	● 인화성 물질을 접근 시키지 마시요.	● 눈, 귀와 몸에 보호장구를 착용하십시요.
Arabic **تحذير**	● لا تلمس الاجزاء التي يسري فيها التيار الكهربائي أو الالكترود بجلد الجسم أو بالملابس المبللة بالماء. ● ضع عازلا على جسمك خلال العمل.	● ضع المواد القابلة للاشتعال في مكان بعيد.	● 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.

			
● Keep your head out of fumes. ● Use ventilation or exhaust to remove fumes from breathing zone.	● Turn power off before servicing.	● Do not operate with panel open or guards off.	**WARNING**
● Los humos fuera de la zona de respiración. ● Mantenga la cabeza fuera de los humos. Utilice ventilación o aspiración para gases.	● Desconectar el cable de alimentación de poder de la máquina antes de iniciar cualquier servicio.	● No operar con panel abierto o guardas quitadas.	Spanish **AVISO DE PRECAUCION**
● Gardez la tête à l'écart des fumées. ● Utilisez un ventilateur ou un aspirateur pour ôter les fumées des zones de travail.	● Débranchez le courant avant l'entretien.	● N'opérez pas avec les panneaux ouverts ou avec les dispositifs de protection enlevés.	French **ATTENTION**
● Vermeiden Sie das Einatmen von Schweibrauch! ● Sorgen Sie für gute Be- und Entlüftung des Arbeitsplatzes!	● Strom vor Wartungsarbeiten abschalten! (Netzstrom völlig öffnen; Maschine anhalten!)	● Anlage nie ohne Schutzgehäuse oder Innenschutzverkleidung in Betrieb setzen!	German **WARNUNG**
● Mantenha seu rosto da fumaça. ● Use ventilação e exhaustão para remover fumo da zona respiratória.	● Não opere com as tampas removidas. ● Desligue a corrente antes de fazer serviço. ● Não toque as partes elétricas nuas.	● Mantenha-se afastado das partes moventes. ● Não opere com os paineis abertos ou guardas removidas.	Portuguese **ATENÇÃO**
● 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。	● 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って下さい。	● 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**
●頭部遠離煙霧。 ●在呼吸區使用通風或排風器除煙。	●維修前切斷電源。	●儀表板打開或沒有安全罩時不準作業。	Chinese **警 告**
● 얼굴로부터 용접가스를 멀리하십시요. ● 호흡지역으로부터 용접가스를 제거하기 위해 가스제거기나 통풍기를 사용하십시요.	● 보수전에 전원을 차단하십시요.	● 판넬이 열린 상태로 작동치 마십시요.	Korean **위 험**
● ابعد رأسك بعيداً عن الدخان. ● استعمل التهوية أو جهاز ضغط الدخان للخارج لكي تبعد الدخان عن المنطقة التي تتنفس فيها.	● اقطع التيار الكهربائي قبل القيام بأية صيانة.	● لا تشغل 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説明以及應該使用的銀焊材料，並請遵守貴方的有関勞動保護規定。

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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