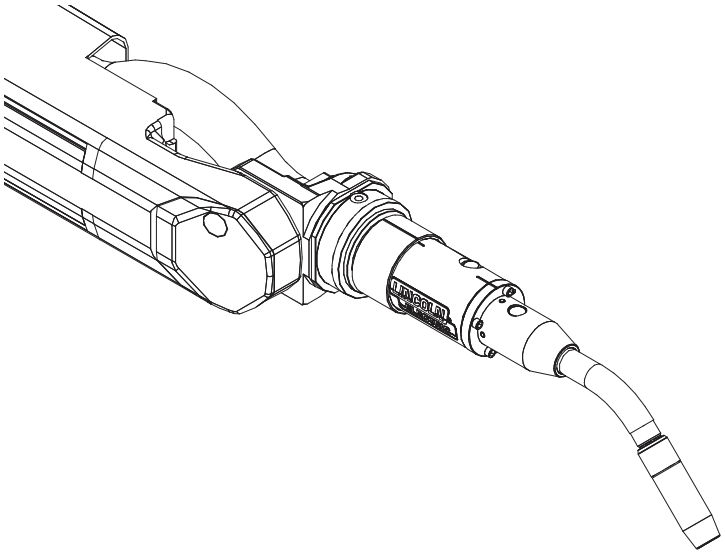
LINCOLN ELECTRIC

Operator's Manual

Magnum® PRO Thru the Arm Robotic Torch - for AutoDrive® S



For use with machines having Code Numbers:

FANUC

K4306-100iC, K4306-100iCA, K4306-100iCW, K4306-100iC/6L, K4306-100iC/6LA, K4306-100iC/6LW, K4306-100iC/8L, K4306-100iC/8LA, K4306-100iC/8LW, K4306-120iC, K4306-120iCA, K4306-120iCW, K4306-120iC/10L, K4306-120iC/10LA, K4306-120iC/10LW, M710iC/12L, M710iC/12LA, M710iC/12LW, K4306-100iD, K4306-100iDA, K4306-100iDW, K4306-100iD/10L, K4306-100iD/10LA, K4306-100iD/10LW

ABB

K4306-1520ID, K4306-1520IDA, K4306-1520IDW, K4306-1600ID, K4306-1600IDA, K4306-1600IDW, K4306-1660ID, K4306-1660IDA, K4306-1660IDW, K4306-2600ID-20, K4306-2600ID-20A, K4306-1200ID-20W, K4306-2600ID-185, K4306-2600ID-185A, K4306-1200ID-185W

KUKA

K4306-KR5-HW-2, K4306-KR5-HW-2A, K4306-KR5-HW-2W, K4306-KR16-HW, K4306-KR16-HWA, K4306-KR16-HWW, K4306-KR16-8L-HW, K4306-KR16-8L-HWA, K4306-KR16-8L-HWW, K4306-KR6R1820HW, K4306-KR6R1820HWA, K4306-KR6R1820HWW, K4306-KR8R1420HW, K4306-KR8R1420HWA, K4306-KR8R1420HWW, K4306-KR8R2100HW, K4306-KR8R2100HWA, K4306-KR82100HWW

MOTOMAN

K4306-MA1440, K4306-MA1440A, K4306-MA1440W, K4306-MA2010, K4306-MA2010A, K4306-MA2010W

GENUINE LINCOLN PARTS™

Register your machine:
www.lincolnelectric.com/registration

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

Save for future reference

Date Purchased

Code: (ex: 10859)

Serial: (ex: U1060512345)

IM10316-C | Issue Date May-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.

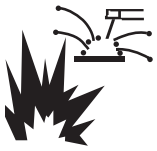
5.c. Do not weld in locations near chlorinated hydrocarbon vapors coming from degreasing, cleaning or spraying operations. The heat and rays of the arc can react with solvent vapors to form phosgene, a highly toxic gas, and other irritating products.

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.

GENERAL DESCRIPTION

The Magnum Pro Thru the Arm GMA welding torch and cable assemblies have been designed to meet IEC 60974-7 specification for welding with steel electrode using the GMAW (gas metal arc welding) processes. The Magnum Pro product line is designed for heavy duty applications possessing market leading ratings and simplicity in maintenance.

GENERAL FUNCTIONAL DESCRIPTION

The Magnum Pro Thru the Arm Robotic Torch has been designed to meet specifications for welding with steel electrode using the GMAW (gas metal arc welding) processes.

The Magnum Pro Thru the Arm Robotic Torch is rated at 385 amps at 100% duty cycle with mixed gas.

The Thru Arm Torch is designed for use with the FANUC ArcMate 100iC / 120iC / 100iD series, ABB "ID" series, KUKA "HW" series, and MOTOMAN MA1440 & MA2010. Models are factory equipped with a feeder connector that mates ONLY to the AutoDrive S robot-mounted feeder. It is not compatible with any other Lincoln Feeders, including the AutoDrive SA Aluminum System feeder.

⚠ WARNING

• Do not touch electrically live parts such as output terminals or internal wiring.

RECOMMENDED PROCESSES

- GMAW, GMAW-P

PROCESS LIMITATIONS

- This product is not recommended for submerged arc welding or flux core / Innershield arc welding..

Breakaway Disk KP Numbers:

- **KP2920-4:** FANUC and Motoman
- **KP2920-5:** KR-5-HW-2, KR6-R1820-HW, KR8-R1420-HW, KR16-L8-HW
- **KP2920-6:** KUKA KR16-HW
- **KP2920-7:** ABB IRB 1520ID and IRB 1600ID
- **KP2920-8:** ABB IRB 1660ID, IRB 2600ID-8/20, IRB 2600ID-15/1.85
- **KP2920-9:** FANUC 100iD, 100iD/10L

Nose Cone K Numbers

K4307-1 Nose Cone Assembly, Wire Brake

K4307-2 Nose Cone Assembly, Standard/Air Blast

- Must use correct housing for proper functionality and TCP retention

Housing K Numbers

K4308-1 Housing, Standard/Air Blast

K4308-2 Housing, Wire Brake

K4308-3 Housing (SHORT), Standard/Air Blast

K4308-4 Housing (SHORT), Wire Brake

K4308-7 Housing, Standard/Air Blast (Short) 15 Degree

K4308-8 Housing, Wire Brake (Short) 15 Degree

K4308-11 Housing, Standard/Air Blast (Short) 7.5 Degree

K4308-12 Housing, Wire Brake (Short) 7.5 Drgree

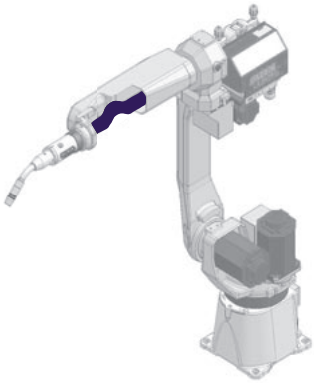
- Must use correct nose cone for proper functionality and TCP retention

Wirefeeders:

- Torches are designed only to work with AutoDrive S Feeder.
- It is not recommended that the torches be used with any non robot-mounted wirefeeder.

RECOMMENDED ROBOT ACTIVATION LIMITS*

ROBOT	AXIS	LIMITS
ABB IRB ID (ALL)	AXIS 5	± 90°
FANUC (ALL)	J5	± 90°
KUKA (ALL)	A5	± 90°
MOTOMAN (ALL)	B	± 90°
ABB IRB ID (ALL)	AXIS 6	± 200°
FANUC (ALL)	J6	± 205°
KUKA (ALL)	A6	± 205°
MOTOMAN (ALL)	T	± 205°



* On FANUC, J6 AXIS can be rotated to +/- 270°,but will accelerate torch cable wear.

On Motoman, T AXIS can be rotated to +/- 210°, but will accelerate torch cable wear.

On ABB IRB2600ID, Axis 6 can be rotated to +/- 270°, but will accelerate torch cable wear.

On KUKA, A6 can be rotated to +/- 270°, but will accelerate torch cable wear.

⚠ CAUTION

DO NOT rotate this axis past 270º!

On all arms, rotation of the 5th axis (J5, B, A5, Axis 5) beyond ± 90° is not recommended; any rotation beyond these limits, especially when the 6th axis (J6, A6, Axis 6) is rotated near and beyond recommended limits will greatly accelerate cable wear.

COMMON EQUIPMENT PACKAGES

The available replacement parts for the Thru-arm are shown in Table A.1.

TABLE A.1

MAGNUM® PRO THRU THE ARM REPLACEMENT EQUIPMENT	
PRODUCT #	DESCRIPTION
KP3354-22	TREGASKISS® 22° TCP GOOSENECK
KP3354-45	TREGASKISS® 45° TCP GOOSENECK
KP3355-22	BINZEL® 22° TCP GOOSENECK
KP3355-45	BINZEL® 45° TCP GOOSENECK
KP3355-180	BINZEL® 180° TCP GOOSENECK
KP2920-4	BREAKAWAY DISK, FANUC® & MOTOMAN®, THICK
KP2920-5	BREAKAWAY DISK, KUKA® KR5-HW-2 & KR16-L8-HW
KP2920-6	BREAKAWAY DISK, KUKA® KR16-HW
KP2920-7	BREAKAWAY DISK, ABB® IRB 1520ID & IRB 1600ID
KP2920-8	BREAKAWAY DISK, ABB® IRB 2600ID
KP2920-9	BREAKAWAY DISK, FANUC 100ID, 100ID/10L
KP4305-100IC	AUTODRIVE S CABLE, FANUC® 100IC
KP4305-100IC/6L	AUTODRIVE S CABLE, FANUC® 100IC/6L
KP4305-100IC/8L	AUTODRIVE S CABLE, FANUC® 100iC/8L
KP4305-120IC	AUTODRIVE S CABLE, FANUC® 120IC
KP4305-120IC/10L	AUTODRIVE S CABLE, FANUC® 120IC/10L
KP4305-M710IC/12L	AUTODRIVE S CABLE, FANUC® M710iC/12L
KP4305-100ID	AUTODRIVE S CABLE, FANUC 100ID
KP4305-100ID/10L	AUTODRIVE S CABLE, FANUC 100ID/10L
KP4305-1520ID	AUTODRIVE S CABLE, ABB® IRB 1520ID
KP4305-1600ID	AUTODRIVE S CABLE, ABB® IRB 1600ID
KP4305-1660ID	AUTODRIVE S CABLE, ABB® IRB 1660ID
KP4305-2600ID-20	AUTODRIVE S CABLE, ABB® IRB 2600ID-8/2.0
KP4305-2600ID-185	AUTODRIVE S CABLE, ABB® IRB 2600ID-15/1.85
KP4305-KR5-HW-2	AUTODRIVE S CABLE, KUKA® KR5-HW-2
KP4305-KR6R1820HW	AUTODRIVE S CABLE, KUKA® KR6-R1820-HW
KP4305-KR8R1620HW	AUTODRIVE S CABLE, KUKA® KR8-R1620-HW
KP4305-KR8R2100HW	AUTODRIVE S CABLE, KUKA KR8-R2100-HW
KP4305-KR16-HW	AUTODRIVE S CABLE, KUKA® KR16-HW
KP4305-KR16-L8-HW	AUTODRIVE S CABLE, KUKA® KR16-L8-HW
KP4305-MA1440	AUTODRIVE S CABLE, MOTOMAN® MA1440
KP4305-MA2010	AUTODRIVE S CABLE, MOTOMAN® MA2010
K4307-1	NOSE CONE ASSEMBLY, WIRE BRAKE
K4307-2	NOSE CONE ASSEMBLY, STANDARD / AIR BLAST
K4308-3	HOUSING (SHORT), STANDARD / AIR BLAST
K4308-4	HOUSING (SHORT), WIRE BRAKE
K4308-7	HOUSING, STANDARD/AIR BLAST (SHORT) 15 DEGREE
K4308-8	HOUSING, WIRE BRAKE (SHORT) 15 DEGREE
K4308-11	HOUSING, STANDARD/AIR BLAST (SHORT) 7.5 DEGREE
K4308-12	HOUSING, WIRE BRAKE (SHORT) 7.5 DEGREE

TECHNICAL SPECIFICATIONS

MAGNUM PRO THRU THE ARM SERIES - 500 RATED OUTPUT IEC 60974-7	
DUTY CYCLE	**AMPERES – MIXED GAS**
60%	460
100%	385

* This is not an IEC rating.

TEMPERATURE RANGES	
OPERATING TEMPERATURE	-4°F TO 104°F (-20°C TO 40°C)
STORAGE TEMPERATURE	-40°F TO 185°F (-40°C TO 85°C)

CABLE PHYSICAL DIMENSIONS		
MODEL	**CABLE LENGTH**	**WEIGHT**
KP4305-100IC	32.7 IN (830mm)	4.5 LBS (2 KG)
KP4305-100IC/6L	41.3 IN (1050mm)	5.5 LBS (2.5 KG)
KP4305-100IC/8L	50.0 IN (1271MM)	5.5 LBS (2.5 KG)
KP4305-120IC	39.9 IN (1013mm)	5.5 LBS (2.5 KG)
KP4305-120IC/10L	48.2 IN (1224mm)	5.5 LBS (2.5 KG)
KP4305-M710IC/12L	83.4 IN (2121MM)	7.5 LBS (3.4 KG)
KP4305-100ID	35.4 IN (899 MM)	5 LBS (2.3 KG)
KP4305-100ID/10L	43.4 IN (1102 MM)	5.5 LBS (2.5 KG)
KP4305-MA1440	32.7 IN (830mm)	4.5 LBS (2 KG)
KP4305-MA2010	50.0 IN (1271mm)	5.5 LBS (2.5 KG)
KP4305-1520ID	46.0 IN (1170mm)	5.5 LBS (2.5 KG)
KP4305-1600ID	45.2 IN (1148mm)	5.5 LBS (2.5 KG)
KP4305-1660ID	43.8 IN (1113MM)	5.5 LBS (2.5 KG)
KP4305-2600ID-20	56.4 IN (1434MM)	6 LBS (3 KG)
KP4305-2600ID-185	47.8 IN (1214MM)	5.5 LBS (2.5 KG)
KP4305-KR5-HW-2	42.9 IN (1090mm)	5.5 LBS (2.5 KG)
KP4305-KR6R1820HW	45.2 IN (1434MM)	5.5 LBS (2.5 KG)
KP4305-KR8R1620HW	36.3 IN (922MM)	5 LBS (2.3 KG)
KP4305-KR8R2100HW	49.4 IN (1255 MM)	5.5 LBS (2.5 KG)
KP4305-KR16-HW	44.2 IN (1123mm)	5.5 LBS (2.5 KG)
KP4305-KR16-L8-HW	59.5 IN (1510mm)	6.0 LBS (3 KG)

WELDING PROCESSES			
PROCESS	**ELECTRODE DIAMETER RANGE**	**OUTPUT RANGE (AMPERES)**	**WIRE FEED SPEED RANGE**
GMAW-PULSED	.035” – .045" (0.8 – 1.2 MM)	385A @ 100% 460A @ 60%	SEE WIRE FEEDER LITERATURE
GMAW-STT	.035” – .045" (0.8 – 1.2 MM)	385A @ 100% 460A @ 60%	SEE WIRE FEEDER LITERATURE

EXPENDABLE

385 AMPS AT 100% DUTY CYCLE WITH MIXED GAS

FANUC 100IC ROBOT AND AUTODRIVE S

PRODUCT # / DESC.	TORCH CABLE LENGTH FT. (M)	WIRE SIZE RANGE IN. (MM)	CONTACT TIPS STANDARD DUTY	GAS DIFFUSER ASSEMBLY	GAS NOZZLE	INSULATOR	CABLE LINER	GUN TUBE	NOSE CONE ASSEMBLY	TORCH HOUSING ASSEMBLY	BREAKAWAY DISK	JUMP LINER	AIR BLAST KIT
K4306-100iC	3 (0.9)	.035 (0.9) .045 (1.2)	KP2745-045	KP2747-1	KP2743-1-62R	KP2773-1	KP42-4045-6	KP3355-45	K4307-1	K4308-3	KP2920-4	KP3364-1 "W" ONLY	KP3352-1 "A" ONLY
K4306-100iCA									K4307-1	K4308-3			
K4306-100iCW									K4307-2	K4308-4			

FANUC 100IC/6L ROBOT AND AUTODRIVE S

PRODUCT # / DESC.	TORCH CABLE LENGTH FT. (M)	WIRE SIZE RANGE IN. (MM)	CONTACT TIPS STANDARD DUTY	GAS DIFFUSER ASSEMBLY	GAS NOZZLE	INSULATOR	CABLE LINER	GUN TUBE	NOSE CONE ASSEMBLY	TORCH HOUSING ASSEMBLY	BREAKAWAY DISK	JUMP LINER	AIR BLAST KIT
K4306-100iC/6L	3.5 (1.1)	.035 (0.9) .045 (1.2)	KP2745-045	KP2747-1	KP2743-1-62R	KP2773-1	KP42-4045-6	KP3355-45	K4307-1	K4308-3	KP2920-4	KP3364-1 "W" ONLY	KP3352-1 "A" ONLY
K4306-100iCA/6LA									K4307-1	K4308-3			
K4306-100iC/6LW									K4307-2	K4308-4			

MAGNUM PRO THRU THE ARM FOR FANUC 100IC/8L ROBOT AND AUTODRIVE S

DESCRIPTION / PRODUCT NUMBER	GUN CABLE LENGTH FT. (M)	WIRE SIZE RANGE IN. (MM)	CONTACT TIPS STANDARD DUTY	GAS DIFFUSER ASSEMBLY	GAS NOZZLE	INSULATOR	CABLE LINER	GUN TUBE	NOSE CONE ASSEMBLY	TORCH HOUSING ASSEMBLY	BREAKAWAY DISK	JUMP LINER	AIR BLAST KIT
K4306-100iC/8L	4.0 (1.2)	.035 (0.9) .045 (1.2)	KP2745-040	KP2747-1	KP2743-1-62R	KP2773-1	KP42-4045-6	KP3355-45	K4307-1	K4308-3	KP2920-4	KP3364-1 "W" ONLY	KP3352-1 "A" ONLY
K4306-100iC/8LA									K4307-1	K4308-3			
K4306-100iC/8LW									K4307-2	K4308-4			

FANUC 120IC ROBOT AND AUTODRIVE S

PRODUCT # / DESC.	TORCH CABLE LENGTH FT. (M)	WIRE SIZE RANGE IN. (MM)	CONTACT TIPS STANDARD DUTY	GAS DIFFUSER ASSEMBLY	GAS NOZZLE	INSULATOR	CABLE LINER	GUN TUBE	NOSE CONE ASSEMBLY	TORCH HOUSING ASSEMBLY	BREAKAWAY DISK	JUMP LINER	AIR BLAST KIT
K4306-120iC	3.5 (1.1)	.035 (0.9) .045 (1.2)	KP2745-045	KP2747-1	KP2743-1-62R	KP2773-1	KP42-4045-6	KP3355-45	K4307-1	K4308-3	KP2920-4	KP3364-1 "W" ONLY	KP3352-1 "A" ONLY
K4306-120iCA									K4307-1	K4308-3			
K4306-120iCW									K4307-2	K4308-4			

MAGNUM PRO THRU THE ARM FOR FANUC M710IC/12L ROBOT AND AUTODRIVE S

DESCRIPTION / PRODUCT NUMBER	GUN CABLE LENGTH FT. (M)	WIRE SIZE RANGE IN. (MM)	CONTACT TIPS STANDARD DUTY	GAS DIFFUSER ASSEMBLY	GAS NOZZLE	INSULATOR	CABLE LINER	GUN TUBE 45 DEG	NOSE CONE ASSEMBLY	TORCH HOUSING ASSEMBLY	BREAKAWAY DISK	JUMP LINER	AIR BLAST KIT
K4306-M710iC/12L	10.0 (3.0)	.035 (0.9) .045 (1.2)	KP2745-040	KP2747-1	KP2743-1-62R	KP2773-1	KP42-4045-15	KP3355-45	K4307-1	K4308-3	KP2920-4	KP3364-1 "W" ONLY	KP3352-1 "A" ONLY
K4306-M710iC/12LA									K4307-1	K4308-3			
K4306-M710iC/12LW									K4307-2	K4308-4			

FANUC 120IC/10L ROBOT AND AUTODRIVE S

PRODUCT # / DESC.	TORCH CABLE LENGTH FT. (M)	WIRE SIZE RANGE IN. (MM)	CONTACT TIPS STANDARD DUTY	GAS DIFFUSER ASSEMBLY	GAS NOZZLE	INSULATOR	CABLE LINER	GUN TUBE	NOSE CONE ASSEMBLY	TORCH HOUSING ASSEMBLY	BREAKAWAY DISK	JUMP LINER	AIR BLAST KIT
K4306-120iC/10L	3.5 (1.1)	.035 (0.9) .045 (1.2)	KP2745-045	KP2747-1	KP2743-1-62R	KP2773-1	KP42-4045-6	KP3355-45	K4307-1	K4308-3	KP2920-4	KP3364-1 "W" ONLY	KP3352-1 "A" ONLY
K4306-120iC/10LA									K4307-1	K4308-3			
K4306-120iC/10LW									K4307-2	K4308-4			

FANUC 100ID ROBOT AND AUTODRIVE S

PRODUCT # / DESC.	TORCH CABLE LENGTH FT. (M)	WIRE SIZE RANGE IN. (MM)	CONTACT TIPS STANDARD DUTY	GAS DIFFUSER ASSEMBLY	GAS NOZZLE	INSULATOR	CABLE LINER	GUN TUBE	NOSE CONE ASSEMBLY	TORCH HOUSING ASSEMBLY	BREAKAWAY DISK	JUMP LINER	AIR BLAST KIT
K4306-100iD	3.0 (0.9)	.035 (0.9) .045 (1.2)	KP2745-045	KP2747-1	KP2743-1-62R	KP2773-1	KP42-4045-6	KP3355-45	K4307-1	KP4308-3	KP2920-9	KP3364-1 "W" ONLY	KP3352-1 "A" ONLY
K4306-100iDA									K4307-1	KP4308-3			
K4306-100iDW									K4307-2	KP4308-4			

FANUC 100ID/10L AND 120ID ROBOTS AND AUTODRIVE S

PRODUCT # / DESC.	TORCH CABLE LENGTH FT. (M)	WIRE SIZE RANGE IN. (MM)	CONTACT TIPS STANDARD DUTY	GAS DIFFUSER ASSEMBLY	GAS NOZZLE	INSULATOR	CABLE LINER	GUN TUBE	NOSE CONE ASSEMBLY	TORCH HOUSING ASSEMBLY	BREAKAWAY DISK	JUMP LINER	AIR BLAST KIT
K4306-100iD/10L	3.5 (1.0)	.035 (0.9) .045 (1.2)	KP2745-045	KP2747-1	KP2743-1-62R	KP2773-1	KP42-4045-6	KP3355-45	K4307-1	KP4308-3	KP2920-9	KP3364-1 "W" ONLY	KP3352-1 "A" ONLY
K4306-100iD/10LA									K4307-1	KP4308-3			
K4306-100iD/10LW									K4307-2	KP4308-4			

ABB IRB 1520ID ROBOT AND AUTODRIVE S

PRODUCT # / DESC.	TORCH CABLE LENGTH FT. (M)	WIRE SIZE RANGE IN. (MM)	CONTACT TIPS STANDARD DUTY	GAS DIFFUSER ASSEMBLY	GAS NOZZLE	INSULATOR	CABLE LINER	GUN TUBE	NOSE CONE ASSEMBLY	TORCH HOUSING ASSEMBLY	BREAKAWAY DISK	JUMP LINER	AIR BLAST KIT
K4306-1520ID	4 (1.2)	.035 (0.9) .045 (1.2)	KP2745-045	KP2747-1	KP2743-1-62R	KP2773-1	KP42-4045-6	KP3355-45	K4307-1	KP4308-3	KP2920-7	KP3364-1 "W" ONLY	KP3352-1 "A" ONLY
K4306-1520IDA									K4307-1	KP4308-3			
K4306-1520IDW									K4307-2	KP4308-4			

ABB IRB 1600ID ROBOT AND AUTODRIVE S

PRODUCT # / DESC.	TORCH CABLE LENGTH FT. (M)	WIRE SIZE RANGE IN. (MM)	CONTACT TIPS STANDARD DUTY	GAS DIFFUSER ASSEMBLY	GAS NOZZLE	INSULATOR	CABLE LINER	GUN TUBE	NOSE CONE ASSEMBLY	TORCH HOUSING ASSEMBLY	BREAKAWAY DISK	JUMP LINER	AIR BLAST KIT
K4306-1600ID	4 (1.2)	.035 (0.9) .045 (1.2)	KP2745-045	KP2747-1	KP2743-1-62R	KP2773-1	KP42-4045-6	KP3355-45	K4307-1	KP4308-3	KP2920-7	KP3364-1 "W" ONLY	KP3352-1 "A" ONLY
K4306-1600IDA									K4307-1	KP4308-3			
K4306-1600IDW									K4307-2	KP4308-4			

MAGNUM PRO THRU THE ARM FOR ABB IRB 1660ID ROBOT AND AUTODRIVE S

DESCRIPTION / PRODUCT NUMBER	GUN CABLE LENGTH FT. (M)	WIRE SIZE RANGE IN. (MM)	CONTACT TIPS STANDARD DUTY	GAS DIFFUSER ASSEMBLY	GAS NOZZLE	INSULATOR	CABLE LINER	GUN TUBE 45 DEG	NOSE CONE ASSEMBLY	TORCH HOUSING ASSEMBLY	BREAKAWAY DISK	JUMP LINER	AIR BLAST KIT
K4306-1660ID	4.0 (1.2)	.035 (0.9) .045 (1.2)	KP2745-040	KP2747-1	KP2743-1-62R	KP2773-1	KP42-4045-6	KP3355-45	K4307-1	K4308-3	KP2920-8	KP3364-1 "W" ONLY	KP3352-1 "A" ONLY
K4306-1660IDA									K4307-1	K4308-3			
K4306-1660IDW									K4307-2	K4308-4			

MAGNUM PRO THRU THE ARM FOR ABB IRB 2600ID-8/2.0 ROBOT AND AUTODRIVE S

DESCRIPTION / PRODUCT NUMBER	GUN CABLE LENGTH FT. (M)	WIRE SIZE RANGE IN. (MM)	CONTACT TIPS STANDARD DUTY	GAS DIFFUSER ASSEMBLY	GAS NOZZLE	INSULATOR	CABLE LINER	GUN TUBE 45 DEG	NOSE CONE ASSEMBLY	TORCH HOUSING ASSEMBLY	BREAKAWAY DISK	JUMP LINER	AIR BLAST KIT
K4306-2600ID-20	6.0 (1.8)	.035 (0.9) .045 (1.2)	KP2745-040	KP2747-1	KP2743-1-62R	KP2773-1	KP42-4045-15	KP3355-45	K4307-1	K4308-3	KP2920-8	KP3364-1 "W" ONLY	KP3352-1 "A" ONLY
K4306-2600ID-20A									K4307-1	K4308-3			
K4306-2600ID-20W									K4307-2	K4308-4			

MAGNUM PRO THRU THE ARM FOR ABB IRB 2600ID-15/1.85 ROBOT AND AUTODRIVE S

DESCRIPTION / PRODUCT NUMBER	GUN CABLE LENGTH FT. (M)	WIRE SIZE RANGE IN. (MM)	CONTACT TIPS STANDARD DUTY	GAS DIFFUSER ASSEMBLY	GAS NOZZLE	INSULATOR	CABLE LINER	GUN TUBE 45 DEG	NOSE CONE ASSEMBLY	TORCH HOUSING ASSEMBLY	BREAKAWAY DISK	JUMP LINER	AIR BLAST KIT
K4306-2600ID-185	4.0 (1.2)	.035 (0.9) .045 (1.2)	KP2745-040	KP2747-1	KP2743-1-62R	KP2773-1	KP42-4045-6	KP3355-45	K4307-1	K4308-3	KP2920-8	KP3364-1 "W" ONLY	KP3352-1 "A" ONLY
K4306-2600ID-185A									K4307-1	K4308-3			
K4306-2600ID-185W									K4307-2	K4308-4			

KUKA KR5-HW-2 ROBOT

PRODUCT # / DESC.	TORCH CABLE LENGTH FT. (M)	WIRE SIZE RANGE IN. (MM)	CONTACT TIPS STANDARD DUTY	GAS DIFFUSER ASSEMBLY	GAS NOZZLE	INSULATOR	CABLE LINER	GUN TUBE	NOSE CONE ASSEMBLY	TORCH HOUSING ASSEMBLY	BREAKAWAY DISK	JUMP LINER	AIR BLAST KIT
K4306-KR5-HW-2	4.5 (1.4)	.035 (0.9) .045 (1.2)	KP2745-045	KP2747-1	KP2743-1-62R	KP2773-1	KP42-4045-6	KP3355-45	K4307-1	KP4308-3	KP2920-5	KP3364-1 "W" ONLY	KP3352-1 "A" ONLY
K4306-KR5-HW-2A									K4307-1	KP4308-3			
K4306-KR5-HW-2W									K4307-2	KP4308-4			

MAGNUM PRO THRU THE ARM FOR KUKA KR6R1820HW ROBOT AND AUTODRIVE S

DESCRIPTION / PRODUCT NUMBER	GUN CABLE LENGTH FT. (M)	WIRE SIZE RANGE IN. (MM)	CONTACT TIPS STANDARD DUTY	GAS DIFFUSER ASSEMBLY	GAS NOZZLE	INSULATOR	CABLE LINER	GUN TUBE 45 DEG	NOSE CONE ASSEMBLY	TORCH HOUSING ASSEMBLY	BREAKAWAY DISK	JUMP LINER	AIR BLAST KIT
K4306-KR6R1820HW	4.0 (1.2)	.035 (0.9) .045 (1.2)	KP2745-040	KP2747-1	KP2743-1-62R	KP2773-1	KP42-4045-6	KP3355-45	K4307-1	K4308-3	KP2920-5	KP3364-1 "W" ONLY	KP3352-1 "A" ONLY
K4306-KR6R1820HWA									K4307-1	K4308-3			
K4306-KR6R1820HWW									K4307-2	K4308-4			

MAGNUM PRO THRU THE ARM FOR KUKA KR8R1420HW ROBOT AND AUTODRIVE S

DESCRIPTION / PRODUCT NUMBER	GUN CABLE LENGTH FT. (M)	WIRE SIZE RANGE IN. (MM)	CONTACT TIPS STANDARD DUTY	GAS DIFFUSER ASSEMBLY	GAS NOZZLE	INSULATOR	CABLE LINER	GUN TUBE 45 DEG	NOSE CONE ASSEMBLY	TORCH HOUSING ASSEMBLY	BREAKAWAY DISK	JUMP LINER	AIR BLAST KIT
K4306-KR8R1420HW	3.0 (0.9)	.035 (0.9) .045 (1.2)	KP2745-040	KP2747-1	KP2743-1-62R	KP2773-1	KP42-4045-6	KP3355-45	K4307-1	K4308-3	KP2920-5	KP3364-1 "W" ONLY	KP3352-1 "A" ONLY
K4306-KR8R1420HWA									K4307-1	K4308-3			
K4306-KR8R1420HWW									K4307-2	K4308-4			

KUKA KR8R21000HW ROBOT AND AUTODRIVE S

PRODUCT # / DESC.	TORCH CABLE LENGTH FT. (M)	WIRE SIZE RANGE IN. (MM)	CONTACT TIPS STANDARD DUTY	GAS DIFFUSER ASSEMBLY	GAS NOZZLE	INSULATOR	CABLE LINER	GUN TUBE	NOSE CONE ASSEMBLY	TORCH HOUSING ASSEMBLY	BREAKAWAY DISK	JUMP LINER	AIR BLAST KIT
K4306-KR8R2100HW	4.5 (1.4)	.035 (0.9) .045 (1.2)	KP2745-045	KP2747-1	KP2743-1-62R	KP2773-1	KP42-4045-6	KP3355-45	K4307-1	KP4308-3	KP2920-5	KP3364-1 "W" ONLY	KP3352-1 "A" ONLY
K4306-KR8R2100HWA									K4307-1	KP4308-3			
K4306-KR8R2100HWW									K4307-2	KP4308-4			

KUKA KR16-HW ROBOT

PRODUCT # / DESC.	TORCH CABLE LENGTH FT. (M)	WIRE SIZE RANGE IN. (MM)	CONTACT TIPS STANDARD DUTY	GAS DIFFUSER ASSEMBLY	GAS NOZZLE	INSULATOR	CABLE LINER	GUN TUBE	NOSE CONE ASSEMBLY	TORCH HOUSING ASSEMBLY	BREAKAWAY DISK	JUMP LINER	AIR BLAST KIT
K4306-KR16-HW	4.5 (1.4)	.035 (0.9) .045 (1.2)	KP2745-045	KP2747-1	KP2743-1-62R	KP2773-1	KP42-4045-6	KP3355-45	K4307-1	K4308-11	KP2920-6	KP3364-1 "W" ONLY	KP3352-1 "A" ONLY
K4306-KR16A-HWA									K4307-1	K4308-11			
K4306-KR16W-HWW									K4307-2	K4308-12			

KUKA KR16-L8-HW ROBOT

PRODUCT # / DESC.	TORCH CABLE LENGTH FT. (M)	WIRE SIZE RANGE IN. (MM)	CONTACT TIPS STANDARD DUTY	GAS DIFFUSER ASSEMBLY	GAS NOZZLE	INSULATOR	CABLE LINER	GUN TUBE	NOSE CONE ASSEMBLY	TORCH HOUSING ASSEMBLY	BREAKAWAY DISK	JUMP LINER	AIR BLAST KIT
K4306-KR16-L8-HW	5 (1.5)	.035 (0.9) .045 (1.2)	KP2745-045	KP2747-1	KP2743-1-62R	KP2773-1	KP42-4045-15	KP3355-45	K4307-1	KP4308-3	KP2920-5	KP3364-1 "W" ONLY	KP3352-1 "A" ONLY
K4306-KR16-L8-HWA									K4307-1	KP4308-3			
K4306-KR16-L8-HWW									K4307-2	KP4308-4			

MOTOMAN MA1440													
PRODUCT # / DESC.	TORCH CABLE LENGTH FT. (M)	WIRE SIZE RANGE IN. (MM)	CONTACT TIPS STANDARD DUTY	GAS DIFFUSER ASSEMBLY	GAS NOZZLE	INSULATOR	CABLE LINER	GUN TUBE	NOSE CONE ASSEMBLY	TORCH HOUSING ASSEMBLY	BREAKAWAY DISK	JUMP LINER	AIR BLAST KIT
K4306-MA1440	3 (0.9)	.035 (0.9) .045 (1.2)	KP2745-045	KP2747-1	KP2743-1-62R	KP2773-1	KP42-4045-6	KP3355-45	K4307-1	K4308-3	KP2920-4	KP3364-1 “W” ONLY	KP3352-1 “A” ONLY
K4306-MA1440A									K4307-1	K4308-3			
K4306-MA1440W									K4307-2	K4308-4			

MOTOMAN MA2010													
PRODUCT # / DESC.	TORCH CABLE LENGTH FT. (M)	WIRE SIZE RANGE IN. (MM)	CONTACT TIPS STANDARD DUTY	GAS DIFFUSER ASSEMBLY	GAS NOZZLE	INSULATOR	CABLE LINER	GUN TUBE	NOSE CONE ASSEMBLY	TORCH HOUSING ASSEMBLY	BREAKAWAY DISK	JUMP LINER	AIR BLAST KIT
K4306-MA2010	4 (1.2)	.035 (0.9) .045 (1.2)	KP2745-045	KP2747-1	KP2743-1-62R	KP2773-1	KP42-4045-6	KP3355-45	K4307-1	K4308-3	KP2920-4	KP3364-1 “W” ONLY	KP3352-1 “A” ONLY
K4306-MA2010A									K4307-1	K4308-3			
K4306-MA2010W									K4307-2	K4308-4			

TORCH CONFIGURATIONS

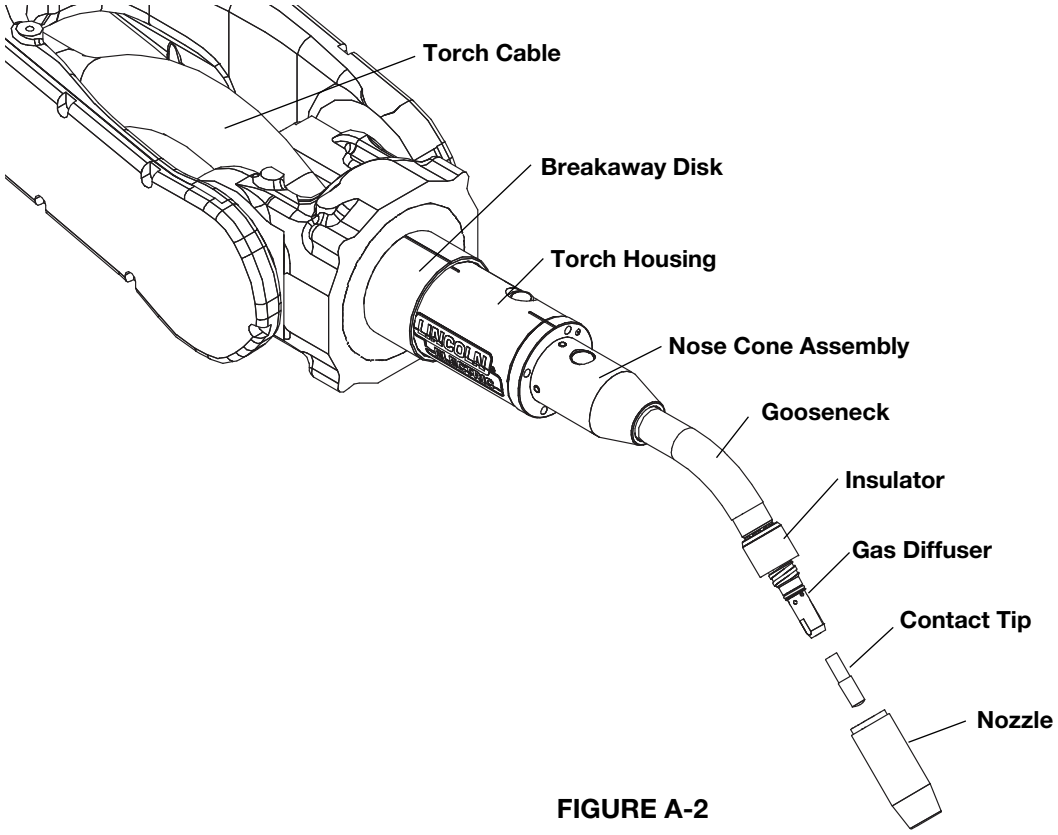


FIGURE A-2

POSSIBLE TORCH CONFIGURATIONS FANUC ONLY

CONFIGURATION	BREAKAWAY DISK	TORCH HOUSING	NOSE CONE	LENGTH - ROBOT ARM FACE TO FRONT OF HOUSING	CUSTOMER SUPPLIED ADD IN PLATE	FINAL LENGTH
STANDARD/ AIR BLAST	KP2920-1	K4308-1	K4307-1	4.55	--	4.55
STANDARD/ AIR BLAST	KP2920-4	K4308-3	K4307-1	4.55	--	4.55
STANDARD/ AIR BLAST	KP2920-1	K4308-3	K4307-1	3.96	0.59 (15 MM)	4.55
WIRE BRAKE	KP2920-1	K4308-2	K4307-2	5.33	--	5.33
WIRE BRAKE	KP2920-4	K4308-4	K4307-2	5.33	--	5.33
WIRE BRAKE	KP2920-1	K4308-4	K4307-2	4.74	0.59 (15 MM)	5.33

- Due to fixed cable lengths intended for specific robot arms, no other torch configurations are possible.
- When using K4308-3 or K4308-4 Torch Housings with breakaway disks other than KP2920-4, the customer must supply and install an accessory (non Lincoln Electric supplied) plate between the breakaway disk and robot face. This will retain the same TCP achieved when using the short housings (K4308-3, K4308-4) with the thick breakaway disk (KP2920-4) , or the long housings (K4308-1, K4308-2) with the thin breakaway disk (KP2920-1).
- ABB and KUKA Robots do not have multiple thickness Breakaway Disks. Refer to chart on previous page for configurations.

INSTALLATION

Read this entire installation section before you start installation.

⚠ WARNING

ELECTRIC SHOCK can kill.

- **Do not touch electrically live parts such as output terminals or internal wiring.**
- **Insulate yourself from the work and ground.**
- **Always wear dry insulating gloves.**

Hardware parts breakdown included with hardware pack.

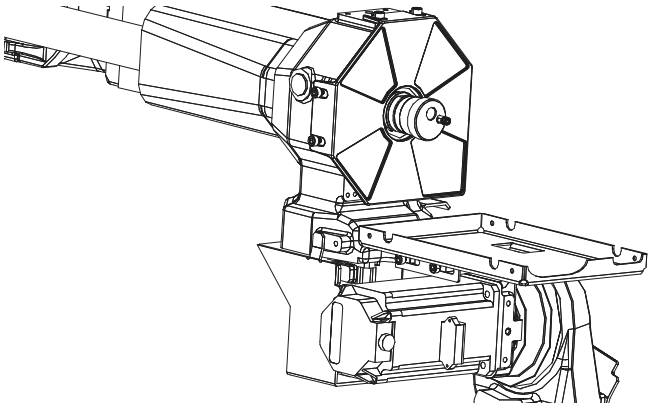
STANDARD ROBOT ASSEMBLY

CONNECTING TORCH AND CABLE ASSEMBLY TO ROBOT ARM, FANUC MODELS 100iC, 100Ic/6L, 120iC, 120iC/10L, MOTOMAN MODELS MA1440, MA2010, ABB MODELS 1521ID, 1600ID, 2600ID AND KUKA MODELS KR5-2, KR26, KR16-L8.

(See Figure B.1)

1. Prepare robot arm by having arm in level position, and wrist and front face at 0°. If feeder is attached, disconnect feeder and remove from feeder bracket.
2. Assemble the Breakaway Disk **Item 5** to the front face of the robot. Make sure that scribe mark is facing up. Secure with the (4) M4 screws **Item 6** provided. Torque to 6-8 in-lbs (.7-.9 N-m).
3. Assemble Torch Housing **Item 4** to Breakaway Disk. Align scribe marks and secure with (4) #10-24 screws **Item 3**. Torque to 6-8 in-lbs (.9-1.1 N-m).

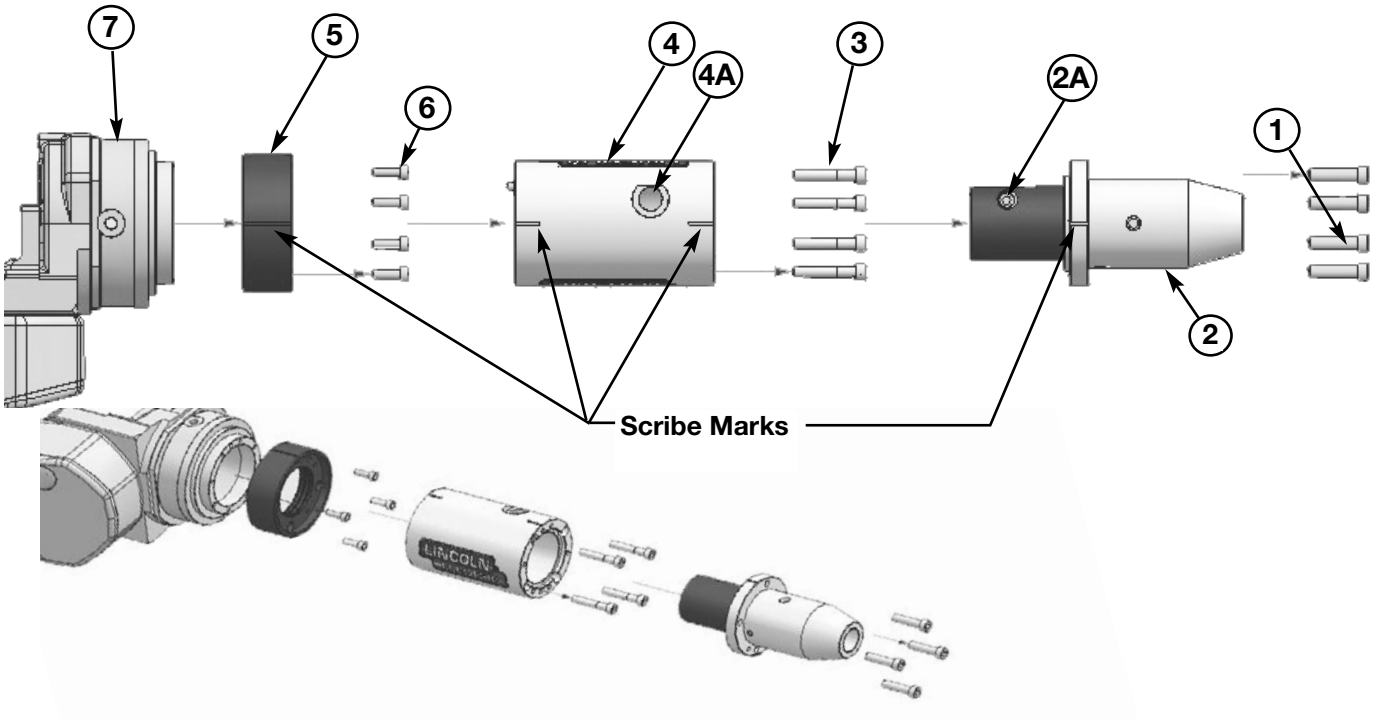
FIGURE B.2



4. Slide torch cable into robot arm. Ensure that rear connector is in approximate orientation as shown. (See Figure B.2)
5. Pull back cable cover; grip cable behind front hex / crimp. With robot wrist at 0°, insert hex on cable into Nose Cone Assembly **Item 2**, keeping scribe marks in line and ensuring that hex is pushed fully into Nose Cone. Ensure that rear connector orientation is approximately the same as before. Secure with socket head cap screw installed **Item 2A** in Nose Cone assembly.
6. Keeping scribe marks aligned, assemble nose cone assembly onto torch housing. Secure with (4) provided #10-24 screws **Item 1**. Torque to 6-8 in-lbs (.9-1.1 N-m).
7. Push cable cover forward until it snaps into breakaway disk.
8. Install plug cover **Item 4A** provided with torch housing into cable set screw port.

Refer to AutoDrive S Feeder literature for feeder installation, torch hook-up to feeder, **liner installation and changes.**

FIGURE B.1

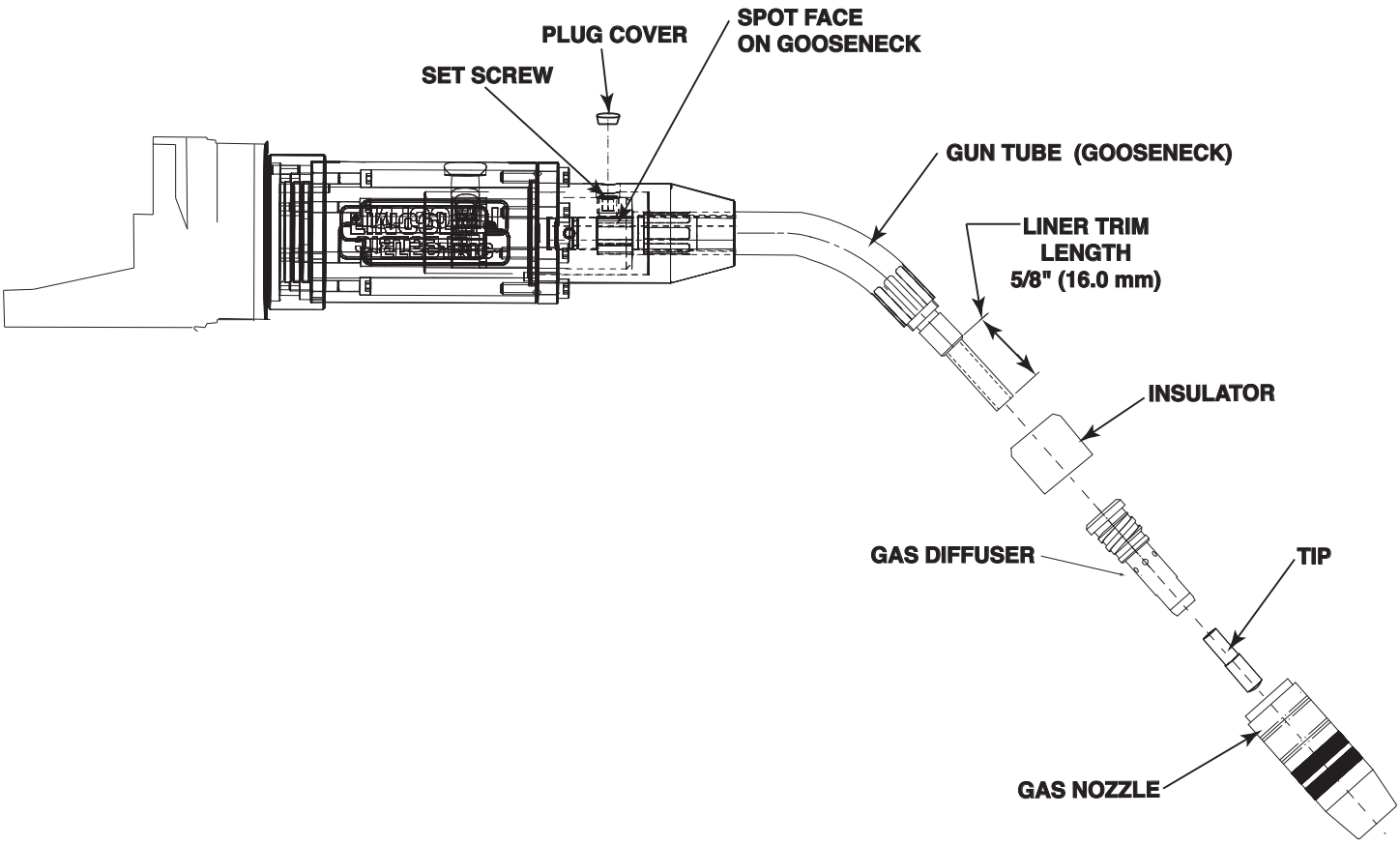


CONNECTING GOOSENECK AND CONSUMABLES

(See Figure B.5)

If installed, remove plug cover from nose cone. Loosen set screw. Insert gooseneck into nose cone (spot-face facing up) and secure with set screw. Replace plug cover. Trim Magnum liner to 5/8”(16.0mm) stick out from end of gooseneck. Attach desired Magnum Pro consumables to gooseneck.

FIGURE B.5



⚠ WARNING

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- **Insulate yourself from the work and ground.**
- **Always wear dry insulating gloves.**

Hardware parts breakdown included with hardware pack.

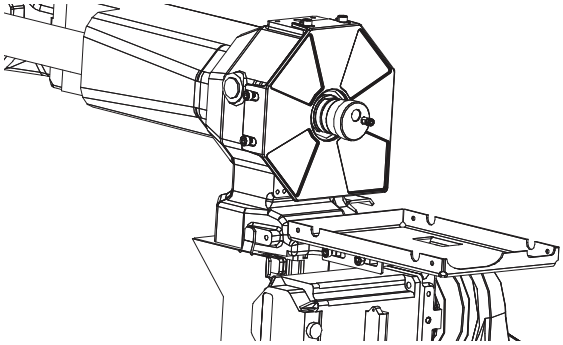
WIRE BRAKE UNIT

CONNECTING TORCH TO ROBOT ARM, FANUC MODELS 100iC, 100Ic/6L, 120iC, 120iC/10L, MOTOMAN MODELS MA1440, MA2010, ABB MODELS 1520ID, 1600ID, 2600ID AND KUKA MODELS KR5-2, KR16, KR16-L8.

(see Figure B.6)

1. Prepare robot arm by having arm in level position, and wrist and front face at 0°. If feeder is attached, disconnect feeder and remove from feeder bracket.
2. Assemble the Breakaway Disk **Item 3** to the front face of the robot. Make sure that scribe mark is facing up. Secure with the (4) M4 screws Item 5 provided. Torque to 6-8 in-lbs (.7-.9 N-m).
3. Assemble Torch Housing **Item 2** to Breakaway Disk. Align scribe marks and secure with (4) #10-24 screws **Item 1**. Torque to 6-8 in-lbs (.9-1.1 N-m).
4. Lay torch cable out straight. Slide liner into rear connector until it stops and bottoms out. Cut liner so that 2-3/32" to 2-5/32" protrudes from torch cable front. **Remove liner from torch cable and reserve.** Liner will be installed during feeder installation (See Figure B.7).
5. Slide air hose thru cable assembly until approximately 4 inches protrudes from front.

FIGURE B.8



6. Slide torch cable into robot arm. Ensure that rear connector is in approximate orientation as shown, and air hose is at bottom. (See Figure B.8)
7. Pull back cable cover; grip cable behind front hex / crimp. With robot wrist at 0°, insert hex on cable into Nose Cone Assembly **Item 1**, keeping scribe marks in line and ensuring that hex is pushed fully into Nose Cone. Ensure that rear connector orientation is approximately the same as before. Secure with socket head cap screw installed **Item 1A** in Nose Cone assembly (See Figure B.9).
8. Press air hose **Item 2** into fitting on wire brake; seat fully.
9. Keeping scribe marks aligned, assemble nose cone assembly onto torch housing. Secure with (4) provided #10-24 screws **Item 3.** Torque to 6-8 in-lbs (.9-1.1 N-m).
10. Push cable cover forward until it snaps into breakaway disk.
11. Install plug cover **Item 4** provided with torch housing into cable set screw port.

Refer to AutoDrive S Feeder literature for feeder installation, torch hook-up to feeder, **and liner installation and changes.**

FIGURE B.6

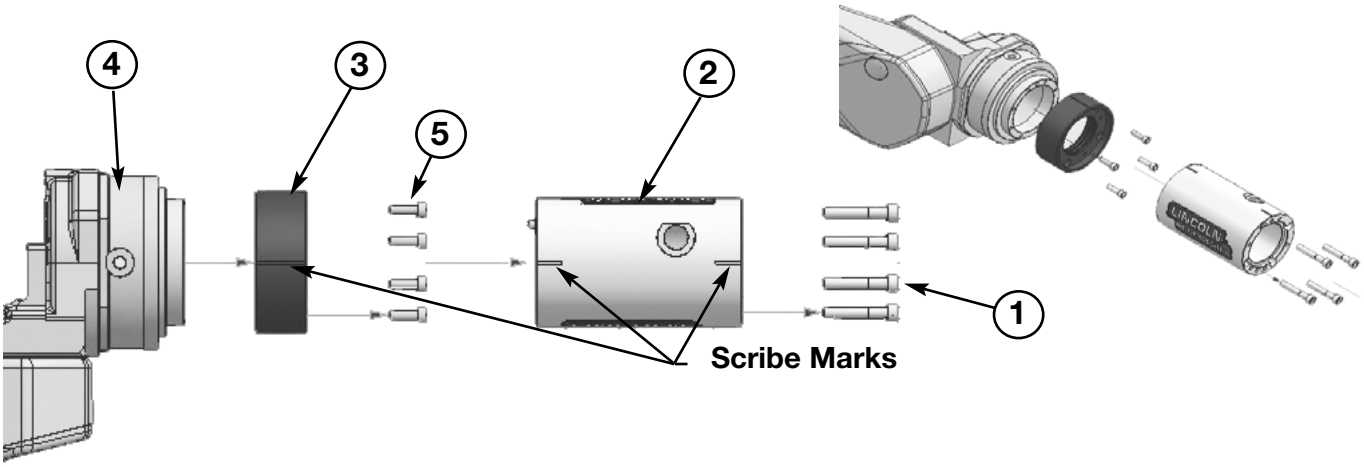


FIGURE B.7

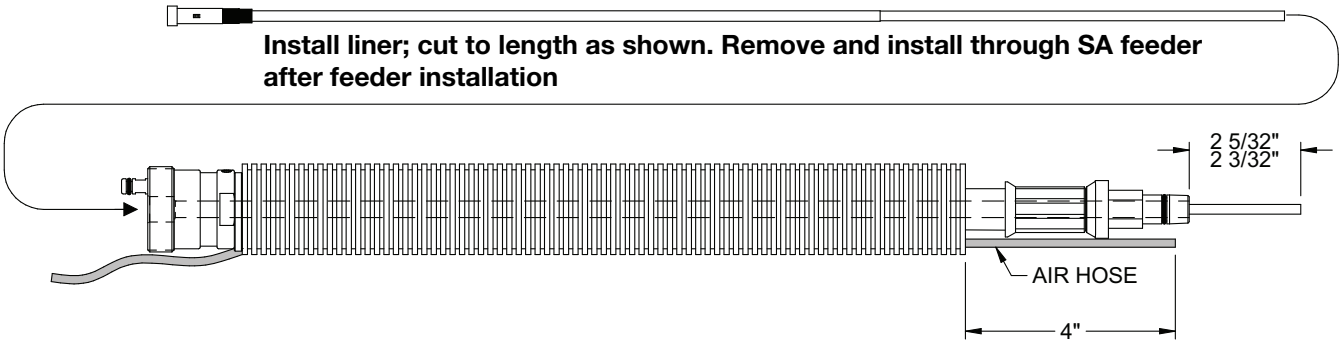
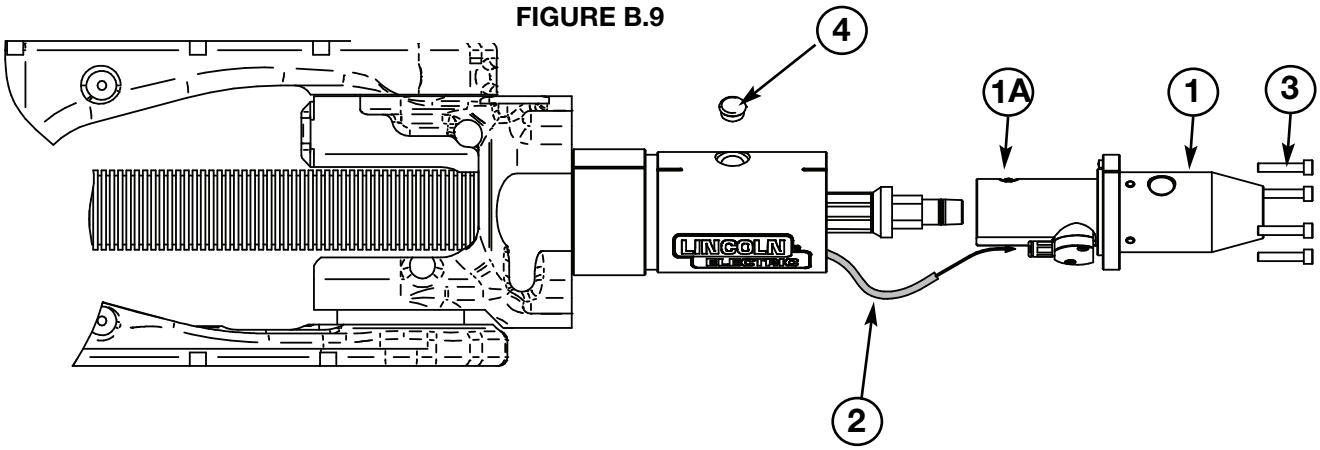


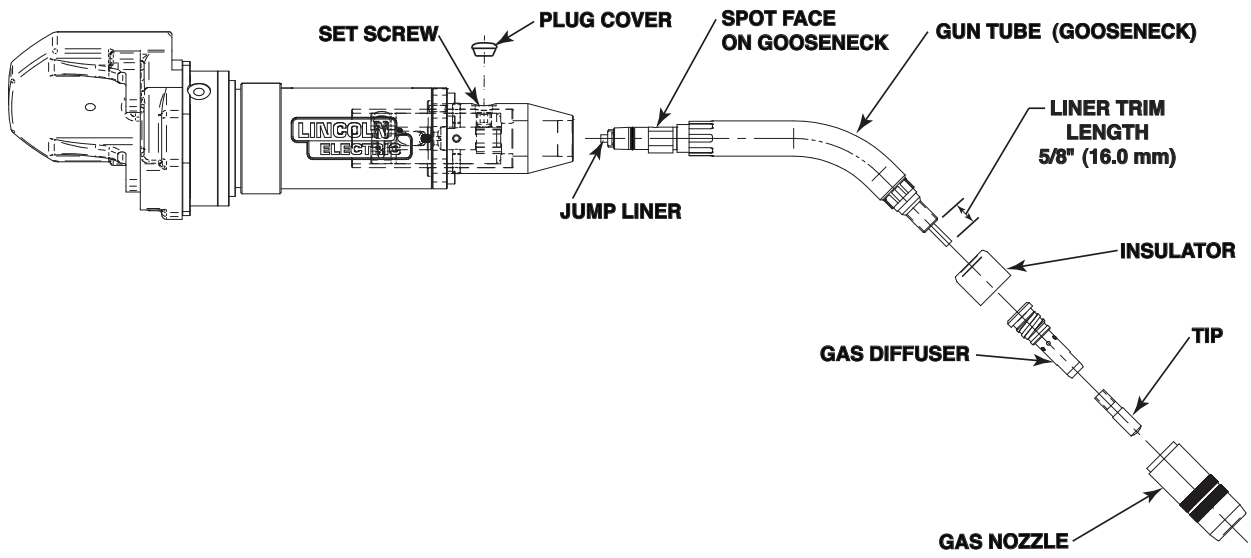
FIGURE B.9



CONNECTING GOOSENECK AND CONSUMABLES (SEE FIGURE B.10)

Slide Jump Liner into desired gooseneck assembly from gooseneck rear. Remove plug cover from nose cone. Loosen set screw. Insert gooseneck into nose cone (spot-face facing up) and secure with set screw. Replace plug cover. Trim jump liner to 5/8" (16.0 mm) stickout from end of gooseneck. Attach desired Magnum Pro consumables to gooseneck.

FIGURE B.10



⚠ WARNING

ELECTRIC SHOCK can kill.

- **Do not touch electrically live parts such as output terminals or internal wiring.**
- **Insulate yourself from the work and ground.**
- **Always wear dry insulating gloves.**

Hardware parts breakdown included with hardware pack.

OPTIONAL AIR BLAST ROBOT ASSEMBLY

NON WIRE BRAKE ONLY

CONNECTING TORCH TO ROBOT ARM, FANUC MODELS 100iC, 100Ic/6L, 120iC, 120iC/10L, AND MOTOMAN MODELS MA1440, MA2010, ABB MODELS 1520ID, 1600ID, 2600ID AND KUKA MODELS KR5-2, KR16, KR16-L8.

(see Figure C.1)

1. Prepare robot arm by having arm in level position, and wrist and front face at 0°. If feeder is attached, disconnect feeder and remove from feeder bracket.
2. Assemble the Breakaway Disk **Item 3** to the front face of the robot. Make sure that scribe mark is facing up. Secure with the (4) M4 screws **Item 5** provided. Torque to 6-8 in-lbs (.7-.9 N-m).
3. Assemble Torch Housing **Item 2** to Breakaway Disk. Align scribe marks and secure with (4) #10-24 screws **Item 1**. Torque to 6-8 in-lbs (.9-1.1 N-m).
4. Slide Air Blast hose thru cable assembly until approximately 5 inches protrudes from front (See Figure C.2).

FIGURE C.2

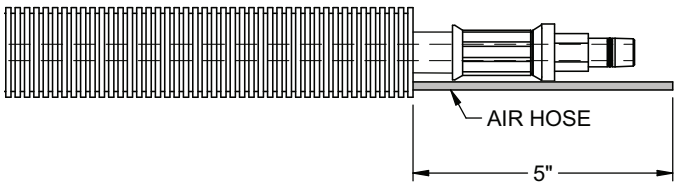
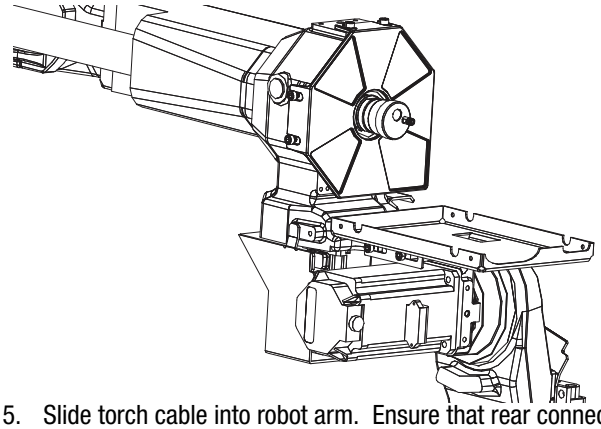


FIGURE C.3



5. Slide torch cable into robot arm. Ensure that rear connector is in approximate orientation as shown, and air blast hose is at bottom. (See Figure C.3)
6. Remove 5 mm set screw from Nose Cone air blast port **Item 1** and discard. Install air blast fitting **Item 2**; tighten until snug with 2.5 mm hex key (See Figure C.4)
7. Pull back cable cover; grip cable behind front hex / crimp. With robot wrist at 0°, insert hex on cable into Nose Cone Assembly, keeping scribe marks in line and ensuring that hex is pushed fully into Nose Cone. Ensure that rear connector is approximately the same orientation as before. Secure with socket head cap screw installed **Item 1A** in Nose Cone assembly.
8. Press air blast hose into air blast fitting; seat fully.
9. Keeping scribe marks aligned, assemble nose cone assembly onto torch housing. Secure with (4) provided #10-24 screws **Item 3.** Torque to 6-8 in-lbs (.9-1.1 N-m).
10. Push cable cover forward until it snaps into breakaway disk.
11. Install plug cover **Item 4** provided with torch housing into cable set screw port.

Refer to AutoDrive S Feeder literature for feeder installation, torch hook-up to feeder, **liner installation and changes.**

FIGURE C.1

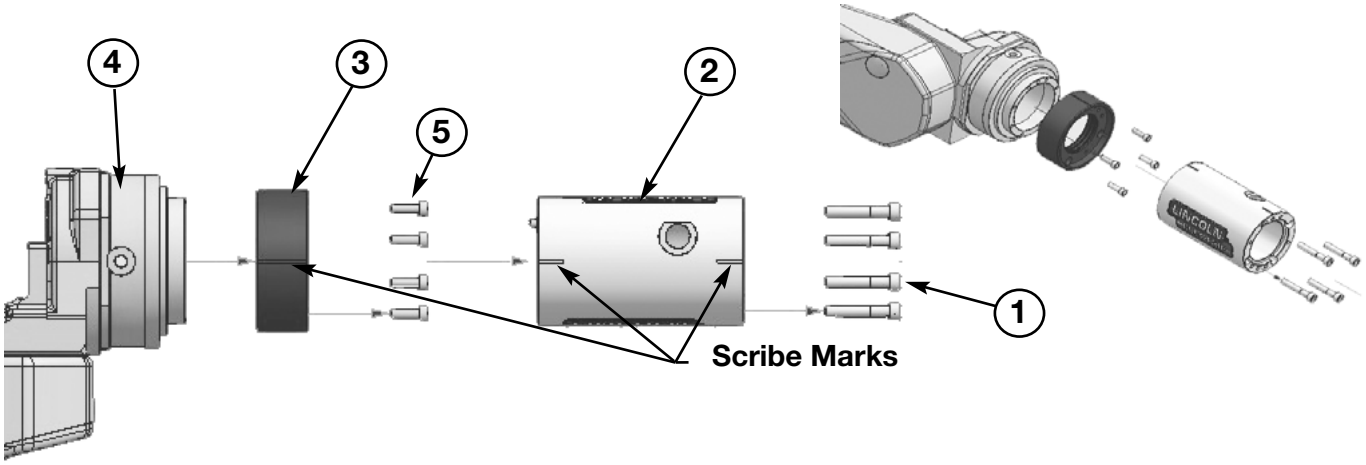
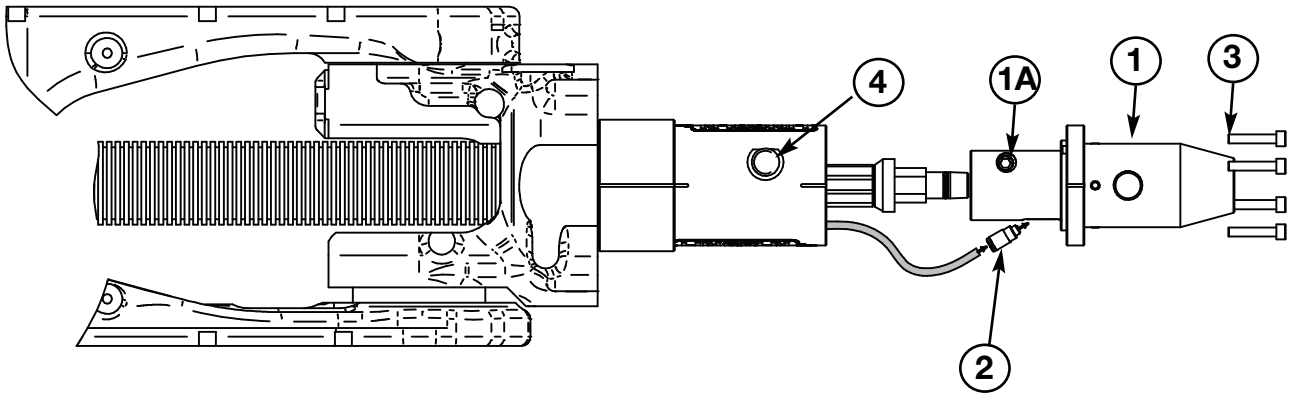


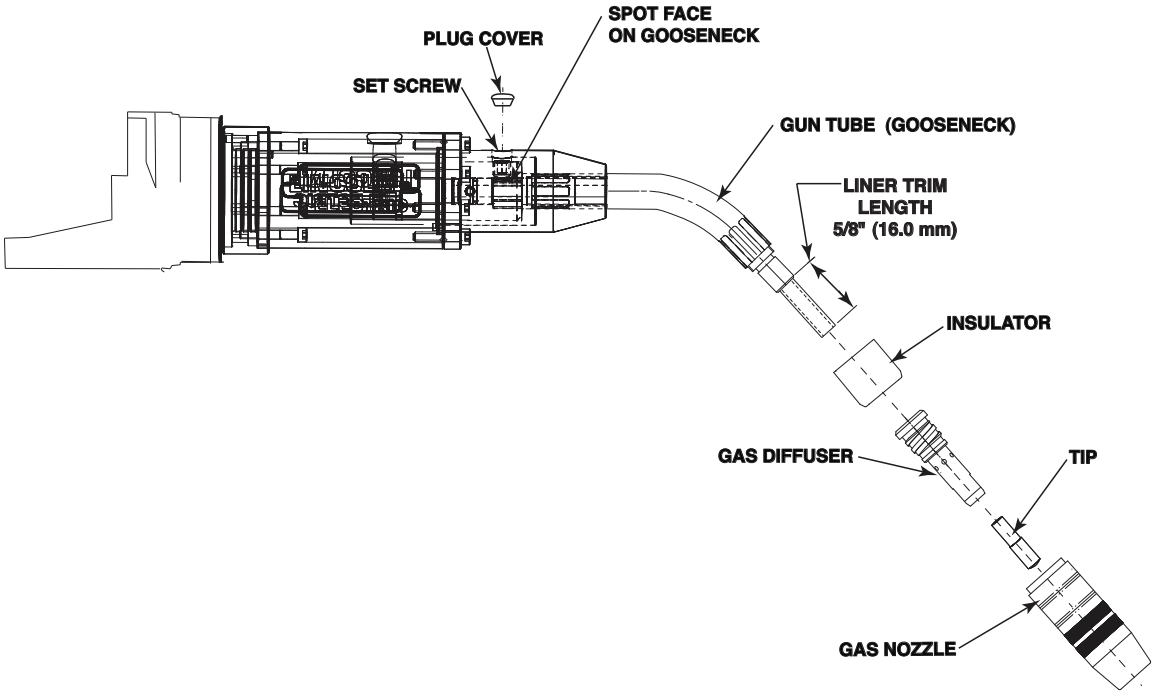
FIGURE C.4



CONNECTING GOOSENECK AND CONSUMABLES (SEE FIGURE C.5)

Remove plug cover from nose cone. Loosen set screw. Insert gooseneck into the nose cone (spot-face facing up) and secure with set screw. Replace plug cover. Trim Magnum liner to 5/8”(16.0mm) stick out from end of gooseneck. Attach desired Magnum Pro consumables to gooseneck.

FIGURE C.5



ACCESSORIES

KP2920-1 BREAKAWAY DISK - THIN FANUC MOTOMAN
KP2920-3 BREAKAWAY DISK - MEDIUM FANUC MOTOMAN
K4308-1 TORCH HOUSING, STANDARD/AIR BLAST
K4308-2 TORCH HOUSING, AIR BRAKE
K5363-1 WIRE BRAKE PLUG

PLEASE REFER TO A-2 FOR POSSIBLE TORCH CONFIGURATIONS

ELECTRODES AND EQUIPMENT

The (Thru the Arm Robotic Torch) has been designed for use with Lincoln Electric GMAW wire electrodes. Refer to the appropriate Lincoln Electric Process and Procedure Guidelines for the electrode used for information on recommended electrical and visible stickouts.

MAINTENANCE

REMOVAL, INSTALLATION AND TRIMMING INSTRUCTIONS FOR MAGNUM PRO LINERS

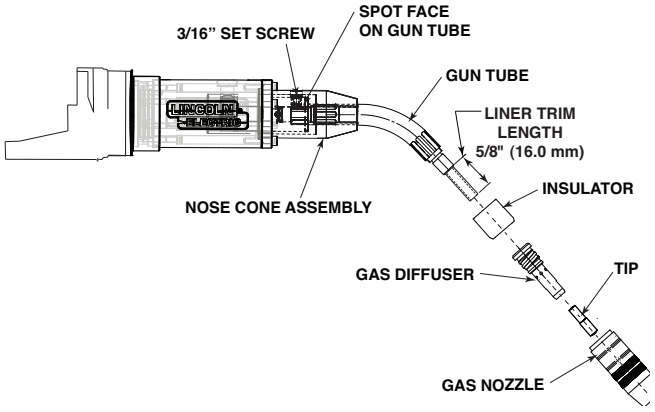
Refer to AutoDrive S Feeder literature for liner replacement. For Wire Brake refer to Wire Brake Installation Section

GUN TUBES AND NOZZLES

(See Figure D-3)

1. Replace worn contact tips as required.
2. Remove spatter from from contact tip, gas diffuser, insulator and gun tube after each 10 minutes of arc time or as required.
3. To remove gun tube from gun, loosen set screw in nose cone assembly with 3/16" (4.8 mm) Allen wrench.
4. Pull gun tube out from nose cone assembly. To reinstall, insert the gun tube, push in as far as possible, and line up spot face of gun tube retighten Set Screw.

Figure D.3



CABLE CLEANING

Clean cable liner after using approximately 150 (68 kg) pounds of electrode. Remove the cable from the wire feeder. Remove the contact tip from the gun. Using an air hose and only partial pressure, gently blow out the cable liner from the diffuser end.

⚠ CAUTION

- **Excessive pressure at the start may cause the dirt to form a plug.**

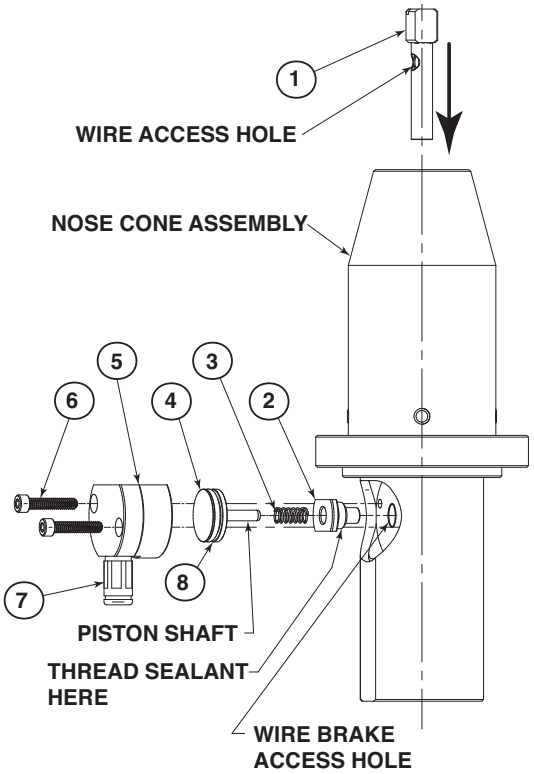
WIRE BRAKE COMPONENT REPLACEMENT

(See Section B-4 thru B-6 to help follow these steps also see Figure D.4)

1. Remove plug cover on nose cone. Loosen set screw and remove gooseneck.
2. Remove plug cover from Housing. Loosen socket head cap screw. Remove 4 socket head cap screws from front of Nose Cone Assembly Disconnect air hose and remove nose cone assembly from torch assembly.
3. Loosen 2 socket head cap screws ITEM 6 and remove wire brake cap ITEM 5 from nose cone assembly. Remove spring ITEM 3 from piston guide ITEM 2 and reserve. Remove piston guide ITEM 2. Remove wire guide ITEM 1 from within nose cone assembly.
4. Install new wire guide ITEM 1 by inserting thru front of nose cone. Align wire access hole with wire brake access port in nose cone.
5. Apply a small amount of thread sealant to threads on piston guide ITEM 2. Install and tighten piston guide ITEM 2 thru nose cone access port until threads are no longer visible and piston guide ITEM 2 is firmly seated. Carefully torque piston guide ITEM 2 to 14-17 in.-lbs.(1.6-1.9Nm). Do not damage edges of piston guide, as this may cause edge burrs on the piston guide ITEM 2 and damage Item 5 brake cap cylinder bore. The shaft on piston ITEM 4 can help align the piston guide when threading into wire guide ITEM 1.
6. Install the air fitting ITEM 7 in the air brake cap ITEM 5 with 2.5mm hex key to 3.5-4.0 in.-lbs.(.40-.46Nm).
7. Apply a liberal amount of silicone lubricant to the o-ring ITEM 8 on the wire brake piston ITEM 4. Reinstall the wire brake spring ITEM 3 into the pocket on the piston guide ITEM 2. Install the air brake piston ITEM 4 thru the spring ITEM 3.
8. Push the air brake cap ITEM 5 over the piston ITEM 4 and secure with the 2 socket head cap screws ITEM 6. Torque screws to 2.5 to 3.5in-lbs.(.28-.40Nm)

Reinstall air hose, nose cone assembly in the reverse order from above.

FIGURE D.4



INSTALLING K5363-1 WIRE BRAKE PLUG KIT

A plug kit can be purchased, that can allow removal of the entire wire brake unit, while plugging the wire brake access hole.

Installation Procedure

1) Remove cable assembly from robot arm as described in the MAINTENANCE section.
2) Remove liner from cable assembly and discard.
3) Remove gooseneck, jump liner, wire brake, and wire guide from nose cone assembly as described above,; don't reinstall jump liner.
4) Install supplied o-ring and wire brake plug and tighten.
5) Follow standard procedure for installing new liner into standard robot cable assembly.

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.

⚠ 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 test procedures or are unable to perform the tests/repairs safely, contact your Lincoln Authorized Service Facility for technical troubleshooting assistance before you proceed.
WWW.LINCOLNELECTRIC.COM/LOCATOR

Observe all Safety Guidelines detailed throughout this manual

PROBLEM	POSSIBLE CAUSE	RECOMMENDED COURSE OF ACTION
NO WIRE FEED OCCURS.	OUT OF WIRE	INSTALL FULL SPOOL OF SPECIFIED WIRE.
	CONTACT TIP BURN BACK.	REPLACE CONTACT TIP.
	FULLY OR PARTIALLY BLOCKED GUN LINER.	REMOVE AND CLEAN OR REPLACE GUN LINER.
	BIRD NEST.	CUT OUT BIRD NEST, RELOAD WIRE, AND CHECK FOR PROPER WIRE ALIGNMENT.
	NO MOTOR VOLTAGE OR CURRENT FROM MACHINE	SEE TROUBLESHOOTING SECTION IN WELDING MACHINE'S OR WIRE FEEDER'S INSTRUCTION MANUAL.
	CONTACT TIP SIZE TOO SMALL FOR WIRE DIAMETER USED.	REPLACE CONTACT TIP WITH ONE THAT IS THE CORRECT SIZE.
SLUGGISH WIRE FEED.	DRIVE ROLL IS WORN OR GALLED	CLEAN DRIVE ROLL OR REPLACE DRIVE ROLL.
	MACHINE'S WIRE FEED SPEED SETTING IS TOO LOW.	INCREASE WIRE FEED SPEED.
	WIRE IS OBSTRUCTED SOMEWHERE ALONG THE WIRE FEED PATH IN THE GUN.	CHECK FOR OBSTRUCTIONS: REMOVE ANY WIRE SHAVINGS; REMOVE KINKED WIRE; REMOVE AND CLEAN OR REPLACE GUN LINER.
	LOW MOTOR VOLTAGE.	SEE TROUBLESHOOTING SECTION IN WELDING MACHINE'S INSTRUCTION MANUAL.
	GUN CABLE IS TWISTED.	REMOVE CABLE AND REINSTALL PER INSTALLATION INSTRUCTIONS.
	MECHANICAL RESISTANCE TO WIRE FEEDING IS TOO LARGE	REPOSITION ROBOT SO THAT CABLE IS LESS TWISTED OR BENT.
INTERMITTENT WIRE FEED.	DRIVE ROLL HAS BECOME GALLED.	REMOVE AND THEN CLEAN OR REPLACE DRIVE ROLL
	WIRE HAS BECOME KINKED ALONG ITS FEED PATH.	MANUALLY PULL WIRE SLOWLY THRU GUN UNTIL UNKINKED WIRE EMERGES
FREQUENT BIRDNESTING OR KINKING OF WIRE IN THE GUN CABLE.	WIRE SHAVINGS/LUBRICANT IS BUILDING UP IN THE CABLE.	CLEAN CABLE OR REPLACE CABLE LINER.
	CABLE LINER IS TOO LARGE FOR WIRE SIZE.	INSTALL THE SMALLEST POSSIBLE LINER WHICH IS SPECIFIED FOR THE WIRE BEING USED (I.E. USE A .052-1/16 LINER INSTEAD OF A 1/16-5/64 LINER WHEN WELDING WITH 1/16" DIAMETER WIRE.
WIRE BRAKE NOT FUNCTIONING.	AIR NOT BEING SUPPLIED.	ENSURE PROPER AIR SUPPLY
	WIRE BRAKE STUCK CLOSED.	REPAIR / REPLACE AS NEEDED

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

WWW.LINCOLNELECTRIC.COM/LOCATOR

Observe all Safety Guidelines detailed throughout this manual

PROBLEM	POSSIBLE CAUSE	RECOMMENDED COURSE OF ACTION
FREQUENT OCCURRENCE OF CONTACT TIP BURNBACK.	IMPROPER WELDING PARAMETERS OR TECHNIQUE (EXAMPLE: ESO "ELECTRICAL STICK OUT" IS TOO SHORT).	SEE WELDING WIRE LITERATURE FOR PROPER SETTINGS.
	WIRE MAY BE FEEDING INTER-MITTENTLY.	SEE SYMPTOMS ON INTERMITTENT OR SLUGGISH WIRE FEED.
POOR WELD BEAD APPEARANCE.	IMPROPER ELECTRODE POLARITY.	RECONNECT MACHINE'S WELDING OUTPUT TO PROPER ELECTRODE POLARITY.
	IMPROPER WELDING PARAMETERS OR TECHNIQUE.	SEE WELDING WIRE LITERATURE FOR PROPER SETTINGS.

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

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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捍材料，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.

CUSTOMER ASSISTANCE POLICY

The business of The Lincoln Electric Company is manufacturing and selling high quality welding equipment, consumables, and cutting equipment. Our challenge is to meet the needs of our customers and to exceed their expectations. On occasion, purchasers may ask Lincoln Electric for advice or information about their use of our products. We respond to our customers based on the best information in our possession at that time. Lincoln Electric is not in a position to warrant or guarantee such advice, and assumes no liability, with respect to such information or advice. We expressly disclaim any warranty of any kind, including any warranty of fitness for any customer's particular purpose, with respect to such information or advice. As a matter of practical consideration, we also cannot assume any responsibility for updating or correcting any such information or advice once it has been given, nor does the provision of information or advice create, expand or alter any warranty with respect to the sale of our products.

Lincoln Electric is a responsive manufacturer, but the selection and use of specific products sold by Lincoln Electric is solely within the control of, and remains the sole responsibility of the customer. Many variables beyond the control of Lincoln Electric affect the results obtained in applying these types of fabrication methods and service requirements.

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

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