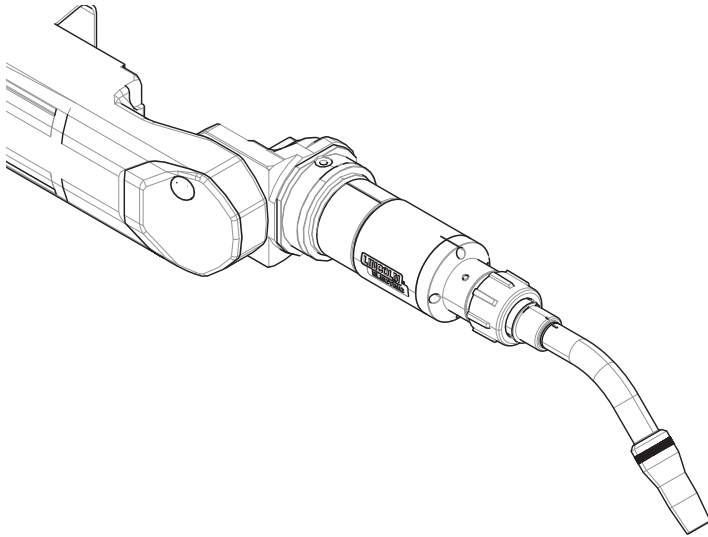


## Operator's Manual

# Magnum<sup>®</sup> PRO Water Cooled Thru the Arm Robotic Torch



For use with machines having Code Numbers:

**FANUC**

K3593-1, K3593-2, K3593-3, K3593-4, K3593-5, K3593-6, K3593-7,  
K3593-8, K3593-9, K3593-10, K3593-29

**ABB**

K3593-12, K3593-14, K3593-15, K3593-16

**KUKA**

K3593-20, K3593-21, K3593-22

**MOTOMAN**

K3593-23, K3593-24, K3593-28



**Register your machine:**  
[www.lincolnelectric.com/registration](http://www.lincolnelectric.com/registration)

**Authorized Service and Distributor Locator:**  
[www.lincolnelectric.com/locator](http://www.lincolnelectric.com/locator)

**Save for future reference**

Date Purchased

Code: (ex: 10859)

Serial: (ex: U1060512345)

# THANK YOU FOR SELECTING A QUALITY PRODUCT BY LINCOLN ELECTRIC.

## PLEASE EXAMINE CARTON AND EQUIPMENT FOR DAMAGE IMMEDIATELY

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

## SAFETY DEPENDS ON YOU

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



## WARNING

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



## CAUTION

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



## KEEP YOUR HEAD OUT OF THE FUMES.

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

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

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

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

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

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



## WEAR CORRECT EYE, EAR & BODY PROTECTION

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

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

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

**IN SOME AREAS**, protection from noise may be appropriate.

**BE SURE** protective equipment is in good condition.

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



## SPECIAL SITUATIONS

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

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

## Additional precautionary measures

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

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

**REMOVE** all potential fire hazards from welding area.

**ALWAYS HAVE FIRE FIGHTING EQUIPMENT READY FOR IMMEDIATE USE AND KNOW HOW TO USE IT.**



## SECTION A: WARNINGS



### CALIFORNIA PROPOSITION 65 WARNINGS



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

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

For more information go to [www.P65warnings.ca.gov/diesel](http://www.P65warnings.ca.gov/diesel)

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



**WARNING:** Cancer and Reproductive Harm  
[www.P65warnings.ca.gov](http://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. 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. 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.c. 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.d. 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.e. 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.f. 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.g. To avoid scalding, do not remove the radiator pressure cap when the engine is hot.
- 1.h. Using a generator indoors CAN KILL YOU IN MINUTES.
- 1.i. Generator exhaust contains carbon monoxide. This is a poison you cannot see or smell.
- 1.j. NEVER use inside a home or garage, EVEN IF doors and windows are open.
- 1.k. Only use OUTSIDE and far away from windows, doors and vents.
- 1.l. Avoid other generator hazards. READ MANUAL BEFORE USE.



### ELECTRIC AND MAGNETIC FIELDS MAY BE DANGEROUS



- 2.a. Electric current flowing through any conductor causes localized Electric and Magnetic Fields (EMF). Welding current creates EMF fields around welding cables and welding machines
- 2.b. EMF fields may interfere with some pacemakers, and welders having a pacemaker should consult their physician before welding.
- 2.c. Exposure to EMF fields in welding may have other health effects which are now not known.
- 2.d. All welders should use the following procedures in order to minimize exposure to EMF fields from the welding circuit:
- 2.d.1. Route the electrode and work cables together - Secure them with tape when possible.
- 2.d.2. Never coil the electrode lead around your body.
- 2.d.3. Do not place your body between the electrode and work cables. If the electrode cable is on your right side, the work cable should also be on your right side.
- 2.d.4. Connect the work cable to the workpiece as close as possible to the area being welded.
- 2.d.5. Do not work next to welding power source.



## ELECTRIC SHOCK CAN KILL.



- 3.a. The electrode and work (or ground) circuits are electrically “hot” when the welder is on. Do not touch these “hot” parts with your bare skin or wet clothing. Wear dry, hole-free gloves to insulate hands.
- 3.b. Insulate yourself from work and ground using dry insulation. Make certain the insulation is large enough to cover your full area of physical contact with work and ground.

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

- Semiautomatic DC Constant Voltage (Wire) Welder.
  - DC Manual (Stick) Welder.
  - AC Welder with Reduced Voltage Control.
- 3.c. In semiautomatic or automatic wire welding, the electrode, electrode reel, welding head, nozzle or semiautomatic welding gun are also electrically “hot”.
  - 3.d. Always be sure the work cable makes a good electrical connection with the metal being welded. The connection should be as close as possible to the area being welded.
  - 3.e. Ground the work or metal to be welded to a good electrical (earth) ground.
  - 3.f. Maintain the electrode holder, work clamp, welding cable and welding machine in good, safe operating condition. Replace damaged insulation.
  - 3.g. Never dip the electrode in water for cooling.
  - 3.h. Never simultaneously touch electrically “hot” parts of electrode holders connected to two welders because voltage between the two can be the total of the open circuit voltage of both welders.
  - 3.i. When working above floor level, use a safety belt to protect yourself from a fall should you get a shock.
  - 3.j. Also see Items 6.c. and 8.



## ARC RAYS CAN BURN.



- 4.a. Use a shield with the proper filter and cover plates to protect your eyes from sparks and the rays of the arc when welding or observing open arc welding. Headshield and filter lens should conform to ANSI Z87.1 standards.
- 4.b. Use suitable clothing made from durable flame-resistant material to protect your skin and that of your helpers from the arc rays.
- 4.c. Protect other nearby personnel with suitable, non-flammable screening and/or warn them not to watch the arc nor expose themselves to the arc rays or to hot spatter or metal.



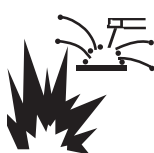
## FUMES AND GASES CAN BE DANGEROUS.



- 5.a. Welding may produce fumes and gases hazardous to health. Avoid breathing these fumes and gases. When welding, keep your head out of the fume. Use enough ventilation and/or exhaust at the arc to keep fumes and gases away from the breathing zone. **When welding hardfacing (see instructions on container or SDS) or on lead or cadmium plated steel and other metals or coatings which produce highly toxic fumes, keep exposure as low as possible and within applicable OSHA PEL and ACGIH TLV limits using local exhaust or mechanical ventilation unless exposure assessments indicate otherwise. In confined spaces or in some circumstances, outdoors, a respirator may also be required. Additional precautions are also required when welding on galvanized steel.**
5. b. The operation of welding fume control equipment is affected by various factors including proper use and positioning of the equipment, maintenance of the equipment and the specific welding procedure and application involved. Worker exposure level should be checked upon installation and periodically thereafter to be certain it is within applicable OSHA PEL and ACGIH TLV limits.
- 5.c. Do not weld in locations near chlorinated hydrocarbon vapors coming from degreasing, cleaning or spraying operations. The heat and rays of the arc can react with solvent vapors to form phosgene, a highly toxic gas, and other irritating products.
- 5.d. Shielding gases used for arc welding can displace air and cause injury or death. Always use enough ventilation, especially in confined areas, to insure breathing air is safe.
- 5.e. Read and understand the manufacturer’s instructions for this equipment and the consumables to be used, including the Safety Data Sheet (SDS) and follow your employer’s safety practices. SDS forms are available from your welding distributor or from the manufacturer.
- 5.f. Also see item 1.j.




## 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.b.
- 6.i. Read and follow NFPA 51B "Standard for Fire Prevention During Welding, Cutting and Other Hot Work", available from NFPA, 1 Batterymarch Park, PO box 9101, Quincy, MA 022690-9101.
- 6.j. Do not use a welding power source for pipe thawing.



## CYLINDER MAY EXPLODE IF DAMAGED.

- 7.a. Use only compressed gas cylinders containing the correct shielding gas for the process used and properly operating regulators designed for the gas and pressure used. All hoses, fittings, etc. should be suitable for the application and maintained in good condition. 
- 7.b. Always keep cylinders in an upright position securely chained to an undercarriage or fixed support.
- 7.c. Cylinders should be located:
  - Away from areas where they may be struck or subjected to physical damage.
  - A safe distance from arc welding or cutting operations and any other source of heat, sparks, or flame.
- 7.d. Never allow the electrode, electrode holder or any other electrically "hot" parts to touch a cylinder.
- 7.e. Keep your head and face away from the cylinder valve outlet when opening the cylinder valve.
- 7.f. Valve protection caps should always be in place and hand tight except when the cylinder is in use or connected for use.
- 7.g. Read and follow the instructions on compressed gas cylinders, associated equipment, and CGA publication P-1, "Precautions for Safe Handling of Compressed Gases in Cylinders," available from the Compressed Gas Association, 14501 George Carter Way Chantilly, VA 20151.



## FOR ELECTRICALLY POWERED EQUIPMENT.



- 8.a. Turn off input power using the disconnect switch at the fuse box before working on the equipment.
- 8.b. Install equipment in accordance with the U.S. National Electrical Code, all local codes and the manufacturer's recommendations.
- 8.c. Ground the equipment in accordance with the U.S. National Electrical Code and the manufacturer's recommendations.

**Refer to**  
<http://www.lincolnelectric.com/safety>  
**for additional safety information.**

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Content/details may be changed or updated without notice. For most current Instruction Manuals, go to [parts.lincolnelectric.com](http://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 525 amps at 100% duty cycle with mixed gas.

The Thru-arm Torch is designed for use with both the FANUC ARC Mate 100iC / 120iC series and MOTOMAN MA2010 and others. Models are factory equipped with a feeder connector that mates ONLY to the 4R100 and 4R220 robot-mounted 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:

#### Nose Cone K Numbers

K4397-1 Nose Cone Assembly, Standard/Air Blast

K4397-3 Nose Cone Assembly, Wire Brake and Nozzle sense

#### Housing K Numbers

K4398-1 Housing, Standard/Air Blast

K4398-2 Housing, KUKA, Standard/Air Blast

K4398-3 Housing, ABB IRB 1520ID, Standard/Air Blast

K4398-5 Housing, Standard (Short)

### Wirefeeders:

- Torches are designed only to work with 4R100 & 4R220 Feeders.
- It is not recommended that the torches be used with any non robot-mounted wirefeeder.

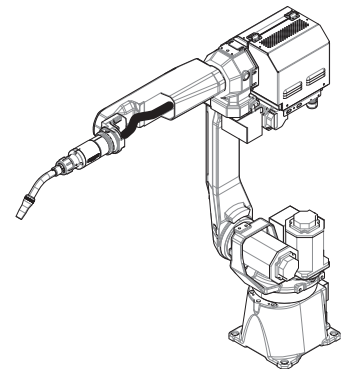
## RECOMMENDED ROBOT ACTIVATION LIMITS\*

- \* 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.

Activation limits are as follows:

- **KP2920-4:** FANUC iC and Motoman MA2010
- **KP2920-8:** ABB IRB 1660ID, IRB 2600ID-8/20, IRB 2600ID-15/1.85
- **KP2920-9:** FANUC iD
- **KP2920-11:** ABB IRB 1520ID (water)

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°



### CAUTION

## DO NOT rotate this axis past 270°!

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**

<b>MAGNUM® PRO THRU THE ARM REPLACEMENT EQUIPMENT</b>	
<b>PRODUCT #</b>	<b>DESCRIPTION</b>
K4397-1	WATER-COOLED ROBOTIC TORCH NOSE CONE ASSEMBLY
K4397-3	WC NOSE CONE WITH WIRE BRAKE AND NOZZLE SENSE
K4398-1	HOUSING, STANDARD / AIRBLAST
K4398-2	HOUSING, STANDARD / AIRBLAST FOR KUKA® KR6 AND KR8 SERIES
K4398-3	HOUSING, STANDARD / AIRBLAST FOR ABB® IRB 1520ID (WATER)
K4398-5	HOUSING, STANDARD (SHORT)
KP2920-4	BREAKAWAY DISK, FANUC® & MOTOMAN®, THICK
KP2920-5	BREAKAWAY DISK, KUKA ®
KP2920-8	BREAKAWAY DISK, ABB® IRB 2600ID
KP2920-9	BREAKAWAY DISC, FANUC® ID SERIES (WATER)
KP2920-10	BREAKAWAY DISK, KAWASAKI® BA006
KP2920-11	BREAKAWAY DISK, ABB® 1520ID (WATER)
KP4403-22	WATER COOLED GOOSENECK 22° TCP GOOSENECK
KP4403-45	WATER COOLED GOOSENECK 45° TCP GOOSENECK
KP4403-180	WATER COOLED GOOSENECK 180° TCP GOOSENECK
KP4403-22-6L	EXTENDED LENGTH WATER COOLED GOOSENECK 22° TCP GOOSENECK
KP4403-45-6L	EXTENDED LENGTH WATER COOLED GOOSENECK 45° TCP GOOSENECK
KP4403-60-6L	EXTENDED LENGTH WATER COOLED GOOSENECK 60° TCP GOOSENECK
KP4403-180-6L	EXTENDED LENGTH WATER COOLED GOOSENECK 180° TCP GOOSENECK
KP4399-1	WATER COOLED THRU ARM CABLE, FANUC® 100IC/6L
KP4399-2	WATER COOLED THRU ARM CABLE, FANUC® 120IC/10L
KP4399-3	WATER COOLED THRU ARM CABLE, FANUC® 100IC
KP4399-4	WATER COOLED THRU ARM CABLE, FANUC® 100IC/8L
KP4399-5	WATER COOLED THRU ARM CABLE, FANUC® 120IC
KP4399-6	WATER COOLED THRU ARM CABLE, FANUC® M710IC/12L SIDE FEEDER MOUNT
KP4399-7	WATER COOLED THRU ARM CABLE, FANUC® 100ID
KP4399-8	WATER COOLED THRU ARM CABLE, FANUC® 100ID/10L & 120ID
KP4399-10	WATER COOLED THRU ARM CABLE, M710IC/12L TOP MOUNTED FEEDER
KP4399-12	WATER COOLED THRU ARM CABLE, ABB® IRB 1520ID
KP4399-14	WATER COOLED THRU ARM CABLE, ABB® IRB 1660ID
KP4399-15	WATER COOLED THRU ARM CABLE, ABB® IRB 2600ID-15/1.85
KP4399-16	WATER COOLED THRU ARM CABLE, ABB® IRB 2600ID-8/2.0
KP4399-20	WATER COOLED THRU ARM CABLE, KUKA® KR6-R1820-HW
KP4399-21	WATER COOLED THRU ARM CABLE, KUKA® KR8-R1420-HW & KR8-R1620-HW
KP3299-22	WATER COOLED THRU ARM CABLE, KUKA® KR8-R2100-HW
KP4399-23	WATER COOLED THRU ARM CABLE, MOTOMAN® MA1440 W/ K2695-1 FEEDER
KP4399-24	WATER COOLED THRU ARM CABLE, MOTOMAN® MA2010
KP4399-28	WATER COOLED THRU ARM CABLE, MOTOMAN® MA1440 W/ K3561-1 FEEDER
KP4399-29	WATER COOLED THRU ARM CABLE, FANUC® 120ID/12L
KP3979-1	WIRE GUIDE .035 - .045"
KP3979-2	WIRE GUIDE .052 - 1/16"
KP3979-3	WIRE GUIDE 1/16 - 5/64"
KP3979-4	WIRE GUIDE 3/32"
KP3364-1	JUMP LINER .035 - .045"
KP3364-2	JUMP LINER .052 - 1/16"
KP3364-3	JUMP LINER 1/16 - 5/64"
KP3364-11	JUMP LINER 3/32"
K55715-15	NOZZLE AND VOLTAGE SENSE CABLE (15 FT)



**TECHNICAL SPECIFICATIONS**

<b>MAGNUM PRO THRU THE ARM SERIES - 500 RATED OUTPUT IEC 60974-7</b>	
<b>DUTY CYCLE</b>	<b>AMPERES – MIXED GAS</b>
100%	525

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

\* This is not an IEC rating.

<b>CABLE PHYSICAL DIMENSIONS</b>		
<b>MODEL</b>	<b>CABLE LENGTH</b>	<b>WEIGHT</b>
KP4399-1	42.7 IN (1084 MM)	3.7 LBS (31.6 KG)
KP4399-2	49.9 IN (1268 MM)	4.0 LBS (1.6 KG)
KP4399-3	34.1 IN (866 MM)	3.4 LBS (1.6 KG)
KP4399-4	50.9 IN (1293 MM)	4.0 LBS (1.8 KG)
KP4399-5	42.0 IN (1066 MM)	3.7 LBS (1.7 KG)
KP4399-6	125.3 IN (3183 MM)	10.4 LBS (3.2 KG)
KP4399-7	36.5 IN (927 MM)	3.5 LBS (1.6 KG)
KP4399-8	44.45 IN (1129 MM)	3.8 LBS (1.7 KG)
KP4399-10	91.9 IN (2333 MM)	10.4 LBS (3.2 KG)
KP4399-12	47.1 IN (1198 MM)	3.9 LBS (1.8 KG)
KP4399-14	46.0 IN (1168 MM)	4.1 LBS (1.8 KG)
KP4399-15	50.7 IN (1288 MM)	4.8LBS (1.8 KG)
KP4399-16	59.2 IN (1505 MM)	4.3 LBS (2.0 KG)
KP4399-20	48.1 IN (1221 MM)	3.9 LBS (1.8 KG)
KP4399-21	38.9 IN (988 MM)	3.6 LBS (1.6 KG)
KP4399-22	52.5 IN (1334 MM)	4.1 LBS (1.6 KG)
KP4399-23	38.9 IN (988 MM)	3.6 LBS (1.6 KG)
KP4399-24	56.1 IN (1424 MM)	4.2 LBS (1.2 KG)
KP4399-28	40.7 IN (1033 MM)	3.7 LBS (1.7 KG)
KP4399-29	61.5 IN (1562 MM)	5.1 LBS (1.6 KG)

<b>WELDING PROCESSES</b>			
<b>PROCESS</b>	<b>ELECTRODE DIAMETER RANGE</b>	<b>OUTPUT RANGE (AMPERES)</b>	<b>WIRE FEED SPEED RANGE</b>
GMAW-PULSED	.035" – 5/64" (0.8 – 2.0 MM)	525A @ 100%	SEE WIRE FEEDER LITERATURE
GMAW-STT	.035" – 5/64" (0.8 – 2.0 MM)	525A @ 100%	SEE WIRE FEEDER LITERATURE

**EXPENDABLE**

525 AMPS AT 100% DUTY CYCLE WITH MIXED GAS

**MAGNUM PRO WATER COOLED THRU THE ARM FOR FANUC® 100IC/6L ROBOT**

PRODUCT / DESCR.	GUN CABLE LENGTH FT. (M)	WIRE SIZE RANGE IN (MM)	TORCH CABLE	CONTACT TIPS STANDARD DUTY	GAS DIFFUSER ASSEMBLY	GAS NOZZLE	CABLE LINER	GUN TUBE	NOSE CONE ASSEMBLY	TORCH HOUSING ASSEMBLY	BREAKAWAY DISK	AIR BLAST KIT
K3593-1	3.6 (1.1)	.035 (0.9) 3/32" (2.4)	KP4399-1	KP2745-045	KP4380-1	KP4120-1-62R	KP44-3545-15	KP4403-45	K4397-1	K4398-1	KP2920-4	K3352-1 "A" ONLY
K3593-1A									K4397-3			
K3593-1W												

**MAGNUM PRO WATER COOLED THRU THE ARM FOR FANUC® 120IC/10L ROBOT**

PRODUCT / DESCR.	GUN CABLE LENGTH FT. (M)	WIRE SIZE RANGE IN (MM)	TORCH CABLE	CONTACT TIPS STANDARD DUTY	GAS DIFFUSER ASSEMBLY	GAS NOZZLE	CABLE LINER	GUN TUBE	NOSE CONE ASSEMBLY	TORCH HOUSING ASSEMBLY	BREAKAWAY DISK	AIR BLAST KIT
K3593-2	4.2 (1.3)	.035 (0.9) 3/32" (2.4)	KP4399-2	KP2745-045	KP4380-1	KP4120-1-62R	KP44-3545-15	KP4403-45	K4397-1	K4398-1	KP2920-4	K3352-1 "A" ONLY
K3593-2A									K4397-3			
K3593-2W												

**MAGNUM PRO WATER COOLED THRU THE ARM FOR FANUC® 100IC ROBOT**

PRODUCT / DESCR.	GUN CABLE LENGTH FT. (M)	WIRE SIZE RANGE IN (MM)	TORCH CABLE	CONTACT TIPS STANDARD DUTY	GAS DIFFUSER ASSEMBLY	GAS NOZZLE	CABLE LINER	GUN TUBE	NOSE CONE ASSEMBLY	TORCH HOUSING ASSEMBLY	BREAKAWAY DISK	AIR BLAST KIT
K3593-3	2.8 (0.9)	.035 (0.9) 3/32" (2.4)	KP4399-3	KP2745-045	KP4380-1	KP4120-1-62R	KP44-3545-15	KP4403-45	K4397-1	K4398-1	KP2920-4	K3352-1 "A" ONLY
K3593-3A									K4397-3			
K3593-3W												

**MAGNUM PRO WATER COOLED THRU THE ARM FOR FANUC® 100IC/8L ROBOT**

PRODUCT / DESCR.	GUN CABLE LENGTH FT. (M)	WIRE SIZE RANGE IN (MM)	TORCH CABLE	CONTACT TIPS STANDARD DUTY	GAS DIFFUSER ASSEMBLY	GAS NOZZLE	CABLE LINER	GUN TUBE	NOSE CONE ASSEMBLY	TORCH HOUSING ASSEMBLY	BREAKAWAY DISK	AIR BLAST KIT
K3593-4	4.2 (1.3)	.035 (0.9) 3/32" (2.4)	KP4399-4	KP2745-045	KP4380-1	KP4120-1-62R	KP44-3545-15	KP4403-45	K4397-1	K4398-1	KP2920-4	K3352-1 "A" ONLY
K3593-4A									K4397-3			
K3593-4W												

**MAGNUM PRO WATER COOLED THRU THE ARM FOR FANUC® 120IC ROBOT**

PRODUCT / DESCR.	GUN CABLE LENGTH FT. (M)	WIRE SIZE RANGE IN (MM)	TORCH CABLE	CONTACT TIPS STANDARD DUTY	GAS DIFFUSER ASSEMBLY	GAS NOZZLE	CABLE LINER	GUN TUBE	NOSE CONE ASSEMBLY	TORCH HOUSING ASSEMBLY	BREAKAWAY DISK	AIR BLAST KIT
K3593-5	3.5 (1.1)	.035 (0.9) 3/32" (2.4)	KP4399-5	KP2745-045	KP4380-1	KP4120-1-62R	KP44-3545-15	KP4403-45	K4397-1	K4398-1	KP2920-4	K3352-1 "A" ONLY
K3593-5A									K4397-3			
K3593-5W												

**MAGNUM PRO WATER COOLED THRU THE ARM FOR FANUC® M710iC/12L WITH SIDE MOUNT FEEDER**

PRODUCT / DESCR.	GUN CABLE LENGTH FT. (M)	WIRE SIZE RANGE IN (MM)	TORCH CABLE	CONTACT TIPS STANDARD DUTY	GAS DIFFUSER ASSEMBLY	GAS NOZZLE	CABLE LINER	GUN TUBE	NOSE CONE ASSEMBLY	TORCH HOUSING ASSEMBLY	BREAKAWAY DISK	AIR BLAST KIT
K3593-6	10.5 (3.2)	.035 (0.9) 3/32" (2.4)	KP4399-6	KP2745-045	KP4380-1	KP4120-1-62R	KP44-3545-15	KP4403-45	K4397-1	K4398-1	KP2920-4	K3352-1 "A" ONLY
K3593-6A									K4397-3			
K3593-6W												

**MAGNUM PRO WATER COOLED THRU THE ARM FOR FANUC® 100ID ROBOT**

PRODUCT / DESCR.	GUN CABLE LENGTH FT. (M)	WIRE SIZE RANGE IN (MM)	TORCH CABLE	CONTACT TIPS STANDARD DUTY	GAS DIFFUSER ASSEMBLY	GAS NOZZLE	CABLE LINER	GUN TUBE	NOSE CONE ASSEMBLY	TORCH HOUSING ASSEMBLY	BREAKAWAY DISK	AIR BLAST KIT
K3593-7	3.0 (0.9)	.035 (0.9) 3/32" (2.4)	KP4399-7	KP2745-045	KP4380-1	KP4120-1-62R	KP44-3545-15	KP4403-45	K4397-1	K4398-1	KP2920-9	K3352-1 "A" ONLY
K3593-7A									K4397-3			
K3593-7W												

**MAGNUM PRO WATER COOLED THRU THE ARM FOR FANUC® 100ID/10L & 120ID ROBOT**

PRODUCT / DESCR.	GUN CABLE LENGTH FT. (M)	WIRE SIZE RANGE IN (MM)	TORCH CABLE	CONTACT TIPS STANDARD DUTY	GAS DIFFUSER ASSEMBLY	GAS NOZZLE	CABLE LINER	GUN TUBE	NOSE CONE ASSEMBLY	TORCH HOUSING ASSEMBLY	BREAKAWAY DISK	AIR BLAST KIT
K3593-8	3.6 (1.1)	.035 (0.9) 3/32" (2.4)	KP4399-8	KP2745-045	KP4380-1	KP4120-1-62R	KP44-3545-15	KP4403-45	K4397-1	K4398-1	KP2920-9	K3352-1 "A" ONLY
K3593-8A									K4397-3			
K3593-8W												

**MAGNUM PRO WATER COOLED THRU THE ARM FOR FANUC® 100ID/8L**

PRODUCT / DESCR.	GUN CABLE LENGTH FT. (M)	WIRE SIZE RANGE IN (MM)	TORCH CABLE	CONTACT TIPS STANDARD DUTY	GAS DIFFUSER ASSEMBLY	GAS NOZZLE	CABLE LINER	GUN TUBE	NOSE CONE ASSEMBLY	TORCH HOUSING ASSEMBLY	BREAKAWAY DISK	AIR BLAST KIT
K3593-9	4.4 (1.3)	.035 (0.9) 3/32" (2.4)	KP4399-22	KP2745-045	KP4380-1	KP4120-1-62R	KP44-3545-15	KP4403-45	K4397-1	K4398-1	KP2920-9	K3352-1 "A" ONLY
K3593-9A									K4397-3			
K3593-9W									K4397-3			

**MAGNUM PRO WATER COOLED THRU THE ARM FOR FANUC® M710iC/12L WITH TOP MOUNT FEEDER**

PRODUCT / DESCR.	GUN CABLE LENGTH FT. (M)	WIRE SIZE RANGE IN (MM)	TORCH CABLE	CONTACT TIPS STANDARD DUTY	GAS DIFFUSER ASSEMBLY	GAS NOZZLE	CABLE LINER	GUN TUBE	NOSE CONE ASSEMBLY	TORCH HOUSING ASSEMBLY	BREAKAWAY DISK	AIR BLAST KIT
K3593-10	7.7 (2.3)	.035 (0.9) 3/32" (2.4)	KP4399-10	KP2745-045	KP4380-1	KP4120-1-62R	KP44-3545-15	KP4403-45	K4397-1	K4398-1	KP2920-4	K3352-1 "A" ONLY
K3593-10A									K4397-3			
K3593-10W									K4397-3			

**MAGNUM PRO WATER COOLED THRU THE ARM FOR ABB® IRB 1520iD ROBOT**

PRODUCT / DESCR.	GUN CABLE LENGTH FT. (M)	WIRE SIZE RANGE IN (MM)	TORCH CABLE	CONTACT TIPS STANDARD DUTY	GAS DIFFUSER ASSEMBLY	GAS NOZZLE	CABLE LINER	GUN TUBE	NOSE CONE ASSEMBLY	TORCH HOUSING ASSEMBLY	BREAKAWAY DISK	AIR BLAST KIT
K3593-12	3.9 (1.2)	.035 (0.9) 3/32" (2.4)	KP4399-12	KP2745-045	KP4380-1	KP4120-1-62R	KP44-3545-15	KP4403-45	K4397-1	K4398-3	KP2920-11	K3352-1 "A" ONLY
K3593-12A									K4397-3			
K3593-12W									K4397-3			

**MAGNUM PRO WATER COOLED THRU THE ARM FOR ABB® IRB 1660iD ROBOT**

PRODUCT / DESCR.	GUN CABLE LENGTH FT. (M)	WIRE SIZE RANGE IN (MM)	TORCH CABLE	CONTACT TIPS STANDARD DUTY	GAS DIFFUSER ASSEMBLY	GAS NOZZLE	CABLE LINER	GUN TUBE	NOSE CONE ASSEMBLY	TORCH HOUSING ASSEMBLY	BREAKAWAY DISK	AIR BLAST KIT
K3593-14	3.8 (1.1)	.035 (0.9) 3/32" (2.4)	KP4399-14	KP2745-045	KP4380-1	KP4120-1-62R	KP44-3545-15	KP4403-45	K4397-1	K4398-1	KP2920-8	K3352-1 "A" ONLY
K3593-14A									K4397-3			
K3593-14W									K4397-3			

**MAGNUM PRO WATER COOLED THRU THE ARM FOR ABB® IRB 2600iD 15/1.85 ROBOT**

PRODUCT / DESCR.	GUN CABLE LENGTH FT. (M)	WIRE SIZE RANGE IN (MM)	TORCH CABLE	CONTACT TIPS STANDARD DUTY	GAS DIFFUSER ASSEMBLY	GAS NOZZLE	CABLE LINER	GUN TUBE	NOSE CONE ASSEMBLY	TORCH HOUSING ASSEMBLY	BREAKAWAY DISK	AIR BLAST KIT
K3593-15	4.2 (1.3)	.035 (0.9) 3/32" (2.4)	KP4399-17	KP2745-045	KP4380-1	KP4120-1-62R	KP44-3545-15	KP4403-45	K4397-1	K4398-1	KP2920-8	K3352-1 "A" ONLY
K3593-15A									K4397-3			
K3593-15W									K4397-3			

**MAGNUM PRO WATER COOLED THRU THE ARM FOR ABB® IRB 2600iD 8/2.0 ROBOT**

PRODUCT / DESCR.	GUN CABLE LENGTH FT. (M)	WIRE SIZE RANGE IN (MM)	TORCH CABLE	CONTACT TIPS STANDARD DUTY	GAS DIFFUSER ASSEMBLY	GAS NOZZLE	CABLE LINER	GUN TUBE	NOSE CONE ASSEMBLY	TORCH HOUSING ASSEMBLY	BREAKAWAY DISK	AIR BLAST KIT
K3593-16	4.9 (1.5)	.035 (0.9) 3/32" (2.4)	KP4399-16	KP2745-045	KP4380-1	KP4120-1-62R	KP44-3545-15	KP4403-45	K4397-1	K4398-1	KP2920-8	K3352-1 "A" ONLY
K3593-16A									K4397-3			
K3593-16W									K4397-3			

**MAGNUM PRO WATER COOLED THRU THE ARM FOR KUKA® KR6-R1820-HW ROBOT**

PRODUCT / DESCR.	GUN CABLE LENGTH FT. (M)	WIRE SIZE RANGE IN (MM)	TORCH CABLE	CONTACT TIPS STANDARD DUTY	GAS DIFFUSER ASSEMBLY	GAS NOZZLE	CABLE LINER	GUN TUBE	NOSE CONE ASSEMBLY	TORCH HOUSING ASSEMBLY	BREAKAWAY DISK	AIR BLAST KIT
K3593-20	4.0 (1.2)	.035 (0.9) 3/32" (2.4)	KP4399-20	KP2745-045	KP4380-1	KP4120-1-62R	KP44-3545-15	KP4403-45	K4397-1	K4398-2	KP2920-5	K3352-1 "A" ONLY
K3593-20A									K4397-3			
K3593-20W									K4397-3			

**MAGNUM PRO WATER COOLED THRU THE ARM FOR KUKA® KR8-R1420-HW AND KR8-R1620-HW ROBOT**

PRODUCT / DESCR.	GUN CABLE LENGTH FT. (M)	WIRE SIZE RANGE IN (MM)	TORCH CABLE	CONTACT TIPS STANDARD DUTY	GAS DIFFUSER ASSEMBLY	GAS NOZZLE	CABLE LINER	GUN TUBE	NOSE CONE ASSEMBLY	TORCH HOUSING ASSEMBLY	BREAKAWAY DISK	AIR BLAST KIT
K3593-21	3.2 (1.0)	.035 (0.9) 3/32" (2.4)	KP4399-21	KP2745-045	KP4380-1	KP4120-1-62R	KP44-3545-15	KP4403-45	K4397-1	K4398-2	KP2920-5	K3352-1 "A" ONLY
K3593-21A									K4397-3			
K3593-21W									K4397-3			

MAGNUM PRO WATER COOLED THRU THE ARM FOR KUKA® KR8-R2100-HW ROBOT												
PRODUCT / DESCR.	GUN CABLE LENGTH FT. (M)	WIRE SIZE RANGE IN (MM)	TORCH CABLE	CONTACT TIPS STANDARD DUTY	GAS DIFFUSER ASSEMBLY	GAS NOZZLE	CABLE LINER	GUN TUBE	NOSE CONE ASSEMBLY	TORCH HOUSING ASSEMBLY	BREAKAWAY DISK	AIR BLAST KIT
K3593-22	4.4 (1.3)	.035 (0.9) 3/32" (2.4)	KP4399-22	KP2745-045	KP4380-1	KP4120-1-62R	KP44-3545-15	KP4403-45	K4397-1	K4398-2	KP2920-5	K3352-1 "A" ONLY
K3593-22A									K4397-3			
K3593-22W												

MAGNUM PRO WATER COOLED THRU THE ARM FOR MOTOMAN® MA1440 ROBOT WITH K2685-1 FEEDER												
PRODUCT / DESCR.	GUN CABLE LENGTH FT. (M)	WIRE SIZE RANGE IN (MM)	TORCH CABLE	CONTACT TIPS STANDARD DUTY	GAS DIFFUSER ASSEMBLY	GAS NOZZLE	CABLE LINER	GUN TUBE	NOSE CONE ASSEMBLY	TORCH HOUSING ASSEMBLY	BREAKAWAY DISK	AIR BLAST KIT
K3593-23	3.2 (1.0)	.035 (0.9) 3/32" (2.4)	KP4399-23	KP2745-045	KP4380-1	KP4120-1-62R	KP44-3545-15	KP4403-45	K4397-1	K4398-1	KP2920-4	K3352-1 "A" ONLY
K3593-23A									K4397-3			
K3593-23W												

MAGNUM PRO WATER COOLED THRU THE ARM FOR MOTOMAN® MA2010 ROBOT												
PRODUCT / DESCR.	GUN CABLE LENGTH FT. (M)	WIRE SIZE RANGE IN (MM)	TORCH CABLE	CONTACT TIPS STANDARD DUTY	GAS DIFFUSER ASSEMBLY	GAS NOZZLE	CABLE LINER	GUN TUBE	NOSE CONE ASSEMBLY	TORCH HOUSING ASSEMBLY	BREAKAWAY DISK	AIR BLAST KIT
K3593-24	4.7 (1.4)	.035 (0.9) 3/32" (2.4)	KP4399-24	KP2745-045	KP4380-1	KP4120-1-62R	KP44-3545-15	KP4403-45	K4397-1	K4398-1	KP2920-4	K3352-1 "A" ONLY
K3593-24A									K4397-3			
K3593-24W												

MAGNUM PRO WATER COOLED THRU THE ARM FOR MOTOMAN® MA1440 ROBOT WITH K3561-1 FEEDER												
PRODUCT / DESCR.	GUN CABLE LENGTH FT. (M)	WIRE SIZE RANGE IN (MM)	TORCH CABLE	CONTACT TIPS STANDARD DUTY	GAS DIFFUSER ASSEMBLY	GAS NOZZLE	CABLE LINER	GUN TUBE	NOSE CONE ASSEMBLY	TORCH HOUSING ASSEMBLY	BREAKAWAY DISK	AIR BLAST KIT
K3593-28	3.4 (1.0)	.035 (0.9) 3/32" (2.4)	KP4399-28	KP2745-045	KP4380-1	KP4120-1-62R	KP44-3545-15	KP4403-45	K4397-1	K4398-1	KP2920-4	K3352-1 "A" ONLY
K3593-28A									K4397-3			
K3593-28W												

MAGNUM PRO WATER COOLED THRU THE ARM FOR FANUC® 120ID/12L												
PRODUCT / DESCR.	GUN CABLE LENGTH FT. (M)	WIRE SIZE RANGE IN (MM)	TORCH CABLE	CONTACT TIPS STANDARD DUTY	GAS DIFFUSER ASSEMBLY	GAS NOZZLE	CABLE LINER	GUN TUBE	NOSE CONE ASSEMBLY	TORCH HOUSING ASSEMBLY	BREAKAWAY DISK	AIR BLAST KIT
K3593-29	5.1 (1.6)	.035 (0.9) 3/32" (2.4)	KP4399-29	KP2745-045	KP4380-1	KP4120-1-62R	KP44-3545-15	KP4403-45	K4397-1	K4398-1	KP2920-9	K3352-1 "A" ONLY
K3593-29A									K4397-3			
K3593-29W												

TORCH CONFIGURATIONS

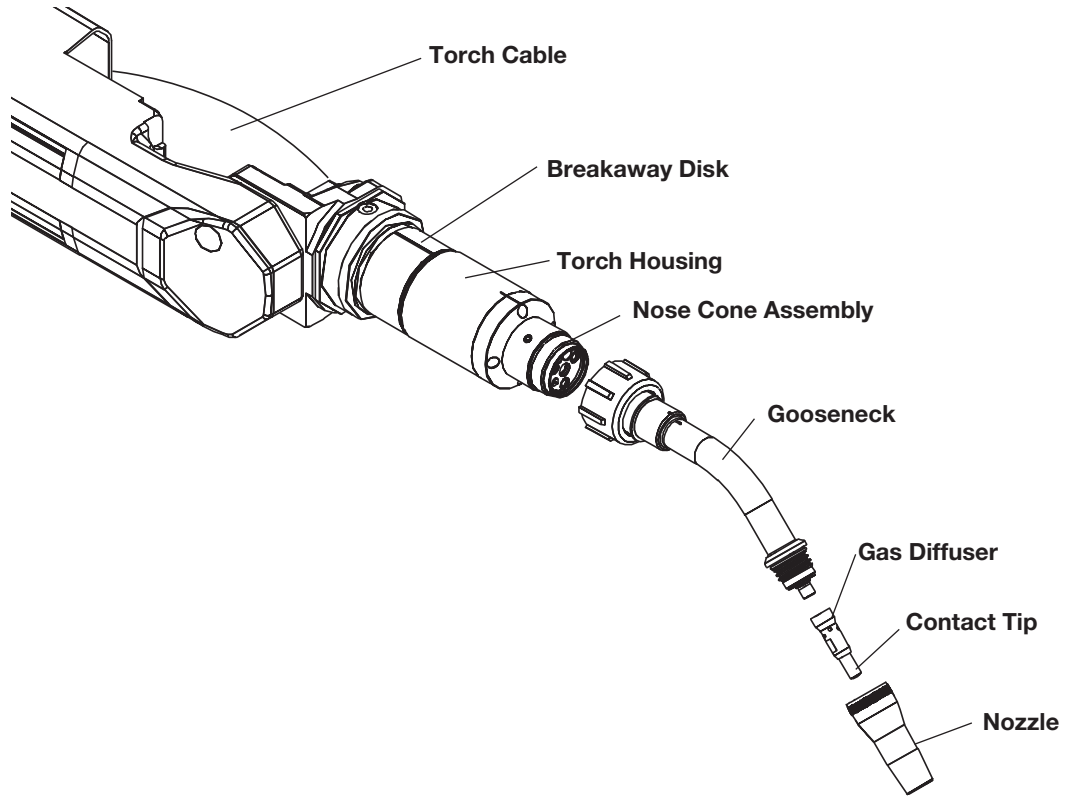


FIGURE A-2

# 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.

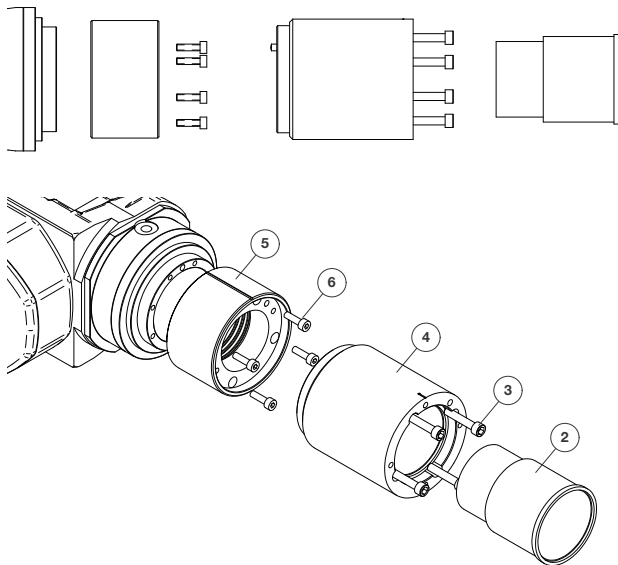


Hardware parts breakdown included with hardware pack.

## STANDARD ROBOT ASSEMBLY

(See Figure B.1)

FIGURE B.1



1. Install liner into Feeder Power Pin prior to installing torch cable into robot arm. It is advisable to trim excess liner protruding from front liner conduit pin, leaving approximately 2 feet extending from front liner conduit pin. If any liner heatshrink sheathing is visible, remove liner from cable and trim off approximately 6 inches of the sheathing.
2. Prepare robot arm by having arm in level position, and wrist and front face at 0°.
3. 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 (0.7-0.9 N-m).
4. Remove insulator (item 2) inside torch housing to gain access to mounting holes in base. Assemble Torch Housing Item 4 to Breakaway Disk. Align scribe marks and secure with (4) #10-24 screws Item 3. Torque to 8-10 in-lbs (0.9-1.1 N-m).
5. Slide torch cable into robot arm. It may be necessary to

remove gas fitting in feeder power connector to allow torch cable to pass thru arm.

6. Slide insulator back into torch housing.
7. With the 3 cable hose fittings on the torch cable passing through torch housing, install Power Cable Clamp (Item 7) onto the three hose fittings. The dimple on the power cable clamp will be facing the o-ring side of the 3 cables. The 2 power cables are on the outside, with the liner cable in the center.
8. Press the 3 cables into the Nose Cone Assembly. Secure the cables by installing the Retaining Screw (Item 1) through the nose cone assembly. Tighten retaining screw and torque to 40-50 in-lb (4.5-5.6 N-m).
9. If screw does not engage power cable clamp due to misalignment, remove clamp and flip around, as it is installed backwards.
10. Align the dowel pin on the nose cone assembly with the corresponding hole in the torch housing. Install and secure with (4) #10-24 screws Item 9. Torque to 8-10 in-lbs (0.9-1.1 N-m). (See Figure B.4)
11. If gas fitting has been removed from power pin, reinstall at this time, and torque to 20-24 in-lb (2.3-2.7 N-m). Push torch into feeder connector and secure. Ensure that feeder power pin is rotated to allow access to gas fitting.

FIGURE B.2

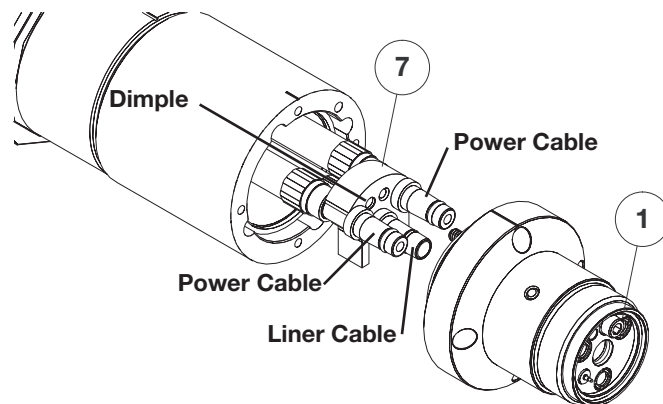


FIGURE B.3

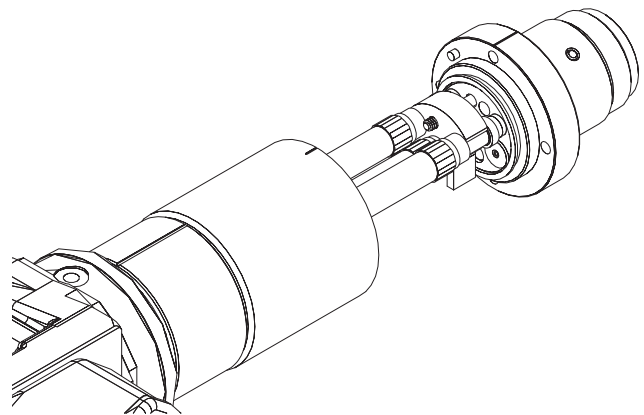
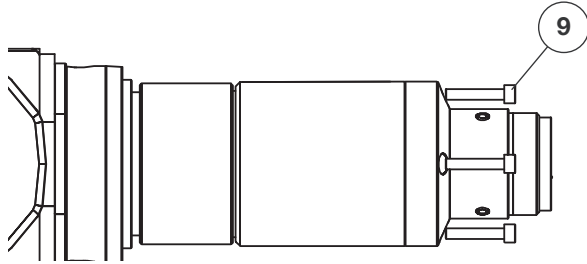


FIGURE B.4



**CONNECTING GOOSENECK AND CONSUMABLES**

(See Figure B.5)

Align 3 fittings and dowel pin on gooseneck with corresponding points on nose cone assembly.

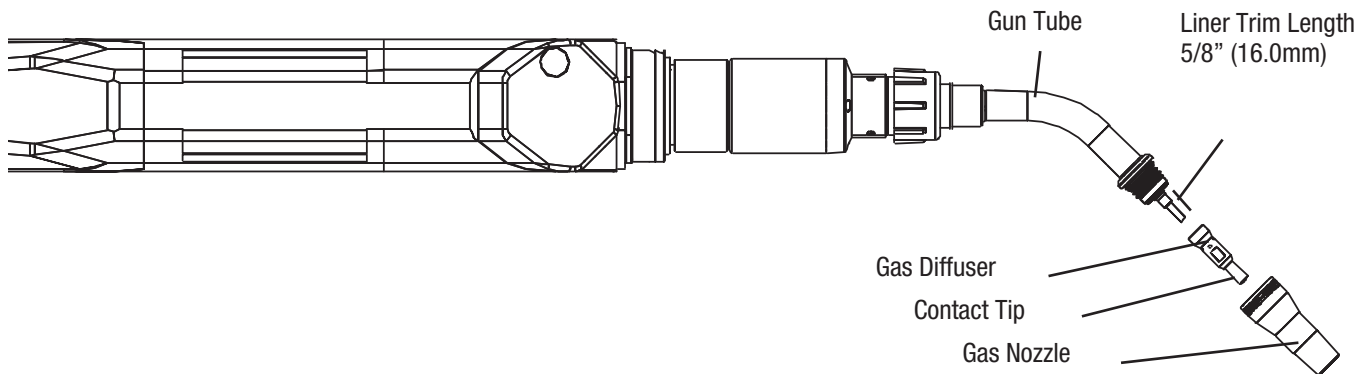
Push gooseneck into nose cone; torque to 35-40 ft. lb with KP4714-1 Gooseneck Nut Wrench (sold separately)

Trim liner to 5/8" stickout from front of gooseneck.

Install gas diffuser onto threads on gooseneck, and torque to 50-60 in-lb (5.6-6.8 N-m.).

Install contact tip and tighten. Install gas nozzle handtight onto gooseneck until o-ring is engaged and nozzle is seated fully.

FIGURE B.5



**⚠ WARNING**

**ELECTRIC SHOCK can kill.**

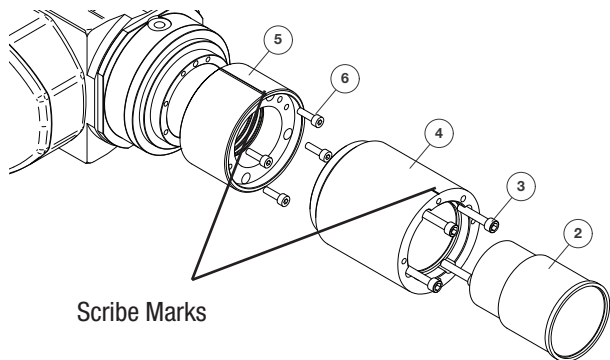
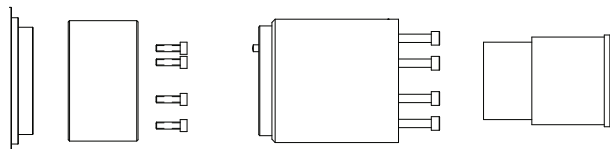
- Do not touch electrically live parts such as output terminals or internal wiring.
- Insulate yourself from the work and ground.
- Always wear dry insulating gloves.



Hardware parts breakdown included with hardware pack.

**OPTIONAL WIRE BRAKE / AIR BLAST ROBOT ASSEMBLY**

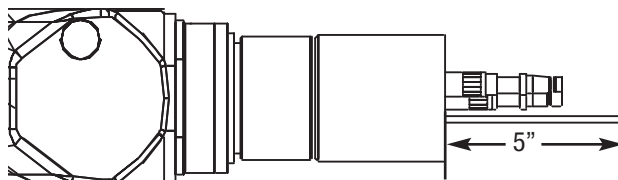
**FIGURE B.6**



1. Install liner into Feeder Power Pin prior to installing torch cable into robot arm. It is advisable to trim excess liner protruding from front liner conduit pin, leaving approximately 2 feet extending from front liner conduit pin. If any liner heat shrink sheathing is visible, remove liner from cable and trim off approximately 6 inches of the sheathing.
2. Prepare robot arm by having arm in level position, and wrist and front face at 0°.
3. 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 (0.7-0.9 N-m).
4. Remove insulator (Item 2) inside torch housing to gain access to mounting holes in base. Assemble Torch Housing Item 4 to Breakaway Disk. Align scribe marks and secure with (4) #10-24 screws Item 3. Torque to 8-10 in-lbs (0.9-1.1 N-m).
5. Slide Air Blast hose through cable assembly until approximately 5 inches protrudes from front (See Figure B.6).
6. Slide torch cable into robot arm. It may be necessary to remove gas fitting in feeder power connector to allow torch cable to pass thru arm.

7. Slide insulator back into torch housing.
8. Remove 5mm angled set screw from Nose Cone air blast port Item 1 and discard. Install air blast fitting Item 2 and secure with 2.5mm hex key (See Figure B.9).
9. With the 3 cable hose fittings on the torch cable passing through torch housing, install Power Cable Clamp onto the three hose fittings. The dimple on the power cable clamp will be facing the o-ring side of the 3 cables. The 2 power cables are on the outside, with the liner cable in the center. (see Figure B.7 and B.8).
10. If screw does not engage power cable clamp due to misalignment, remove clamp and flip around, as it is installed backwards.
11. For air blast setup press air blast hose into air blast fitting; seat fully (see Figure B.9). For wire brake setup press air hose into wire brake fitting, seat fully (see Figure B.8).
12. Align the dowel pin on the nose cone assembly with the corresponding hole in the torch housing. Install and secure with (4) #10-24 screws Item 9. Torque to 8-10 in-lbs (0.9-1.1 N-m). Ensure that air blast hose is not pinched.
13. If gas fitting has been removed, reinstall at this time, and torque to 20-24 in-lb (2.3-2.7 N-m). Push torch into feeder connector and secure. Ensure that feeder power pin is rotated to allow access to gas fitting.

**FIGURE B.7**



**FIGURE B.8**

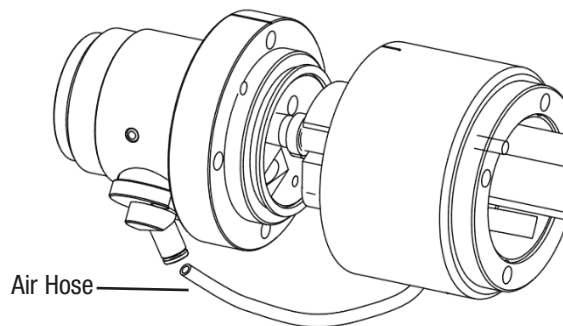




FIGURE B.9

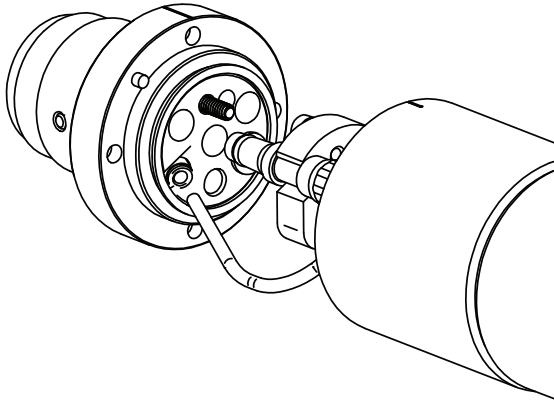


FIGURE B.10

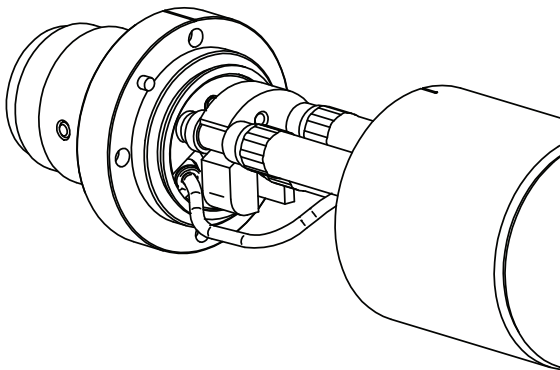
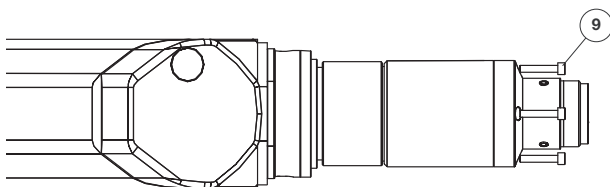
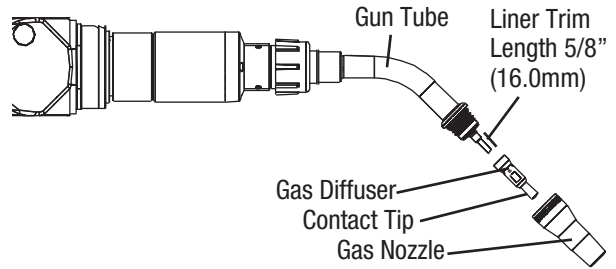


FIGURE B.11



**CONNECTING GOOSENECK AND CONSUMABLES  
(SEE FIGURE B.12)**

FIGURE B.12



Align 3 fittings and dowel pin on gooseneck with corresponding points on nose cone assembly.

Push gooseneck into nose cone; torque to 35-40 ft. lb with KP4714-1 Gooseneck Nut Wrench (sold separately).

Trim liner to 5/8" stickout from front of gooseneck.

Install gas diffuser onto threads on gooseneck, and torque to 50-60 in-lb (5.6-6.8 N-m.).

Install contact tip and tighten. Install gas nozzle handtight onto gooseneck until o-ring is engaged and nozzle is seated fully.

**⚠ WARNING**

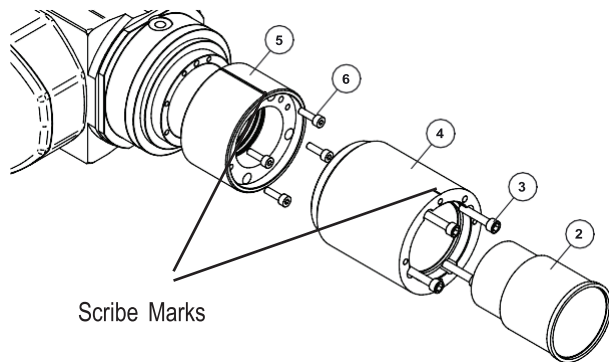
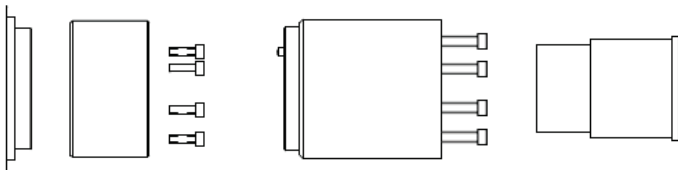
**ELECTRIC SHOCK can kill.**

- 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 NOZZLE AND VOLTAGE SENSE CABLE  
FIGURE B.13**

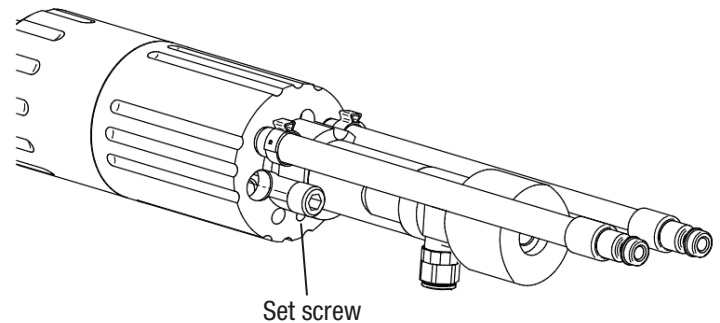


1. Install liner into Feeder Power Pin prior to installing torch cable into robot arm. It is advisable to trim excess liner protruding from front liner conduit pin, leaving approximately 2 feet extending from front liner conduit pin. If any liner heatshrink sheathing is visible, remove liner from cable and trim off approximately 6 inches of the sheathing.
2. Prepare robot arm by having arm in level position, and wrist and front face at 0°.
3. 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 (0.7 - N-m).
4. Remove insulator (Item 2) inside torch housing to gain access to mounting holes in base. Assemble Torch Housing Item 4 to Breakaway Disk. Align scribe marks and secure with (4) #10 - 24 screws Item 3. Torque to 8-10 in-lbs (0.9-1.1 N-m).
5. Remove set screw in the feeder end of torch (See Figure B.14) and slide sense cable thru this hole along the torch.
6. Slide torch cable into robot arm. It may be necessary to remove gas fitting in feeder power connector to allow torch cable to pass thru arm.

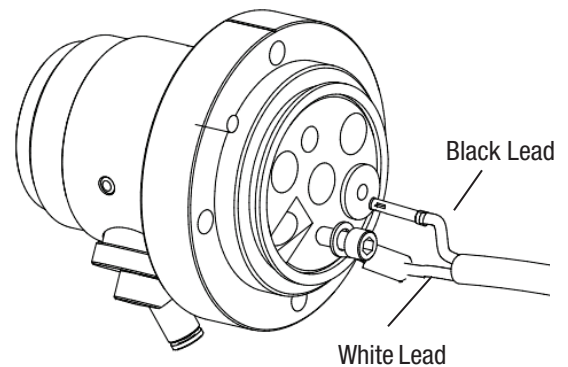
7. Slide insulator back into torch housing.
8. With the 3 cable hose fittings on the torch cable passing through torch housing, install Power Cable Clamp onto the three hose fittings. The dimple on the power cable clamp will be facing the o-ring side of the 3 cables. The 2 power cables are on the outside, with the liner cable in the center (see Figure B.2 and B.3).
9. If screw does not engage power cable clamp due to misalignment, remove clamp and flip around, as it is installed backwards.
10. For Nozzle Sense plug black lead terminal until fully seat into nosecone as shown (Figure D.3)\*. For Voltage Sense lead pass #8-32 screw thru white lead terminal. Torque to 8-10 in-lb (1.9-1.1 N-m) (Figure B.15).
11. Align the dowel pin on the nose cone assembly with the corresponding hole in the torch housing. Install and secure with (4) #10-24 screws Item 9. Torque to 8-10 in-lbs (0.9-1.1 N-m).
12. If gas fitting has been removed, reinstall at this time, and torque to 20-24 in-lb (2.3-2.7 N-m). Push torch into feeder connector and secure. Ensure that feeder power pin is rotated to allow access to gas fitting.

\*Nozzle Sense only applicable when using a KP4403 series WC Guntube.

**FIGURE B.14**

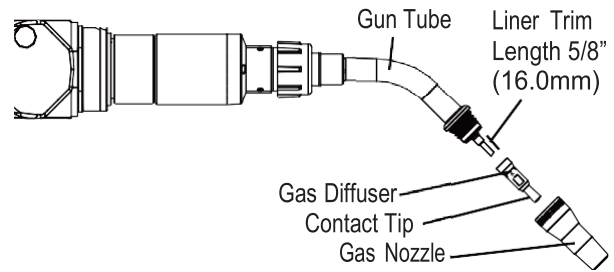


**FIGURE B.15**



### CONNECTING GOOSENECK AND CONSUMABLES (SEE FIGURE B.17)

FIGURE B.17



Align 3 fittings and dowel pin on gooseneck with corresponding points on nose cone assembly.

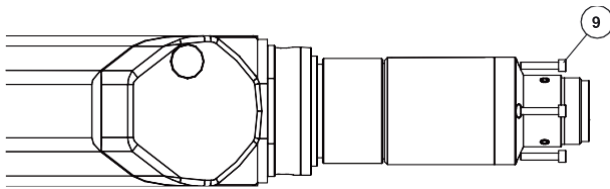
Push gooseneck into nose cone; torque to 35 -40 ft. lb with KP4714-1 Gooseneck Nut Wrench (sold separately)

Trim liner to 5/8" stickout from front of gooseneck.

Install gas diffuser onto threads on gooseneck, and torque to 50 - 60 in-lb (5.6-6.8 N-m.).

Install contact tip and tighten. Install gas nozzle handtight onto gooseneck until o-ring is engaged and nozzle is seated fully.

FIGURE B.16



# ACCESSORIES

KP4379-1 GAS DIFFUSER MAGNUM PRO 350A

KP4714-1 GOOSENECK NUT WRENCH

## 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.

OPTIONAL KITS AND ACCESSORIES		
K4214-1	WATER FITTING TOOL	INCLUDES: 1 TOOL
KP4215-1	WATER FITTING REPAIR (K4214-1 TOOL REQUIRED)	INCLUDES: FITTINGS, O-RINGS, SPRINGS
KP4216-1	GOOSENECK O-RING KIT	INCLUDES: 2 SETS OF GOOSENECK O-RINGS

# MAINTENANCE

## REMOVAL, INSTALLATION AND TRIMMING INSTRUCTIONS FOR MAGNUM PRO LINERS

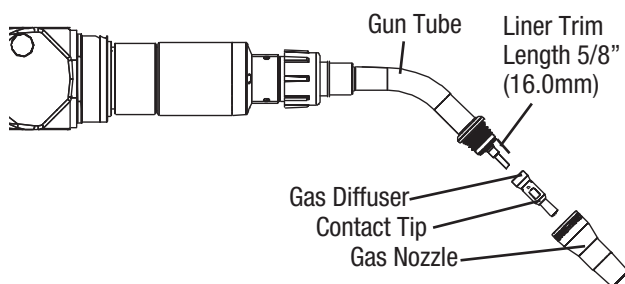
Refer to AutoDrive S Feeder literature for liner replacement. For Wire Brake refer to Wire Brake Installation Section

### GUN TUBES AND NOZZLES

(See Figure D-3)

1. Replace worn contact tips as required.
2. Remove spatter from 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.

# 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](http://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](http://WWW.LINCOLNELECTRIC.COM/LOCATOR)

Observe all Safety Guidelines detailed throughout this manual

<b>PROBLEM</b>	<b>POSSIBLE CAUSE</b>	<b>RECOMMENDED COURSE OF ACTION</b>
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 INTERMITTENTLY.	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.

**[WWW.LINCOLNELECTRIC.COM/LOCATOR](http://WWW.LINCOLNELECTRIC.COM/LOCATOR)**





			
<b>WARNING</b>	<ul style="list-style-type: none"> <li>● Do not touch electrically live parts or electrode with skin or wet clothing.</li> <li>● Insulate yourself from work and ground.</li> </ul>	<ul style="list-style-type: none"> <li>● Keep flammable materials away.</li> </ul>	<ul style="list-style-type: none"> <li>● Wear eye, ear and body protection.</li> </ul>
Spanish <b>AVISO DE PRECAUCION</b>	<ul style="list-style-type: none"> <li>● No toque las partes o los electrodos bajo carga con la piel o ropa mojada.</li> <li>● Aíslese del trabajo y de la tierra.</li> </ul>	<ul style="list-style-type: none"> <li>● Mantenga el material combustible fuera del área de trabajo.</li> </ul>	<ul style="list-style-type: none"> <li>● Protéjase los ojos, los oídos y el cuerpo.</li> </ul>
French <b>ATTENTION</b>	<ul style="list-style-type: none"> <li>● Ne laissez ni la peau ni des vêtements mouillés entrer en contact avec des pièces sous tension.</li> <li>● Isolez-vous du travail et de la terre.</li> </ul>	<ul style="list-style-type: none"> <li>● Gardez à l'écart de tout matériel inflammable.</li> </ul>	<ul style="list-style-type: none"> <li>● Protégez vos yeux, vos oreilles et votre corps.</li> </ul>
German <b>WARNUNG</b>	<ul style="list-style-type: none"> <li>● Berühren Sie keine stromführenden Teile oder Elektroden mit Ihrem Körper oder feuchter Kleidung!</li> <li>● Isolieren Sie sich von den Elektroden und dem Erdboden!</li> </ul>	<ul style="list-style-type: none"> <li>● Entfernen Sie brennbares Material!</li> </ul>	<ul style="list-style-type: none"> <li>● Tragen Sie Augen-, Ohren- und Körperschutz!</li> </ul>
Portuguese <b>ATENÇÃO</b>	<ul style="list-style-type: none"> <li>● Não toque partes elétricas e electrodos com a pele ou roupa molhada.</li> <li>● Isole-se da peça e terra.</li> </ul>	<ul style="list-style-type: none"> <li>● Mantenha inflamáveis bem guardados.</li> </ul>	<ul style="list-style-type: none"> <li>● Use proteção para a vista, ouvido e corpo.</li> </ul>
Japanese <b>注意事項</b>	<ul style="list-style-type: none"> <li>● 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。</li> <li>● 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。</li> </ul>	<ul style="list-style-type: none"> <li>● 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。</li> </ul>	<ul style="list-style-type: none"> <li>● 目、耳及び身体に保護具をして下さい。</li> </ul>
Chinese <b>警告</b>	<ul style="list-style-type: none"> <li>● 皮肤或湿衣物切勿接触带电部件及焊条。</li> <li>● 使你自已与地面和工件绝缘。</li> </ul>	<ul style="list-style-type: none"> <li>● 把一切易燃物品移离工作场所。</li> </ul>	<ul style="list-style-type: none"> <li>● 佩戴眼、耳及身体劳动保护用具。</li> </ul>
Korean <b>위험</b>	<ul style="list-style-type: none"> <li>● 전도체나 용접봉을 젖은 헝겍 또는 피부로 절대 접촉치 마십시오.</li> <li>● 모재와 접지를 접촉치 마십시오.</li> </ul>	<ul style="list-style-type: none"> <li>● 인화성 물질을 접근시키지 마십시오.</li> </ul>	<ul style="list-style-type: none"> <li>● 눈, 귀와 몸에 보호장구를 착용하십시오.</li> </ul>
Arabic <b>تحذير</b>	<ul style="list-style-type: none"> <li>● لا تلمس الاجزاء التي يسري فيها التيار الكهربائي أو الألكترود بجند الجسم أو بالملابس المبللة بالماء.</li> <li>● ضع عازلا على جسمك خلال العمل.</li> </ul>	<ul style="list-style-type: none"> <li>● ضع المواد القابلة للاشتعال في مكان بعيد.</li> </ul>	<ul style="list-style-type: none"> <li>● ضع أدوات وملابس واقية على عينيك وأذنيك وجسمك.</li> </ul>

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

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

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

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

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

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

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

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

이 제품에 동봉된 작업지침서를 숙지하시고 귀사의 작업자 안전수칙을 준수하시기 바랍니다.

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

## **CUSTOMER ASSISTANCE POLICY**

The business of Lincoln Electric is manufacturing and selling high quality welding equipment, automated welding systems, consumables, and cutting equipment. Our challenge is to meet the needs of our customers, who are experts in their fields, and to exceed their expectations. On occasion, purchasers may ask Lincoln Electric for information or technical information about their use of our products. Our employees respond to inquiries to the best of their ability based on information and specifications provided to them by the customers and the knowledge they may have concerning the application. Our employees, however, are not in a position to verify the information provided or to evaluate the engineering requirements for the particular weldment, or to provide engineering advice in relation to a specific situation or application. Accordingly, Lincoln Electric does not warrant or guarantee or assume any liability with respect to such information or communications. Moreover, the provision of such information or technical information does not create, expand, or alter any warranty on our products. Any express or implied warranty that might arise from the information or technical information, including any implied warranty of merchantability or any warranty of fitness for any customers' particular purpose or any other equivalent or similar warranty is specifically disclaimed.

Lincoln Electric is a responsive manufacturer, but the definition of specifications, and 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.

## **WELD FUME CONTROL EQUIPMENT**

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.



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