



ArcSafe™ Advantage Robotic System
For Models
300 Amp, 500 Amp Air-Cooled & 550 Amp
Water-Cooled and Xtra-Guard



This Product is
MADE IN THE U.S.A.

INSTALLATION, OPERATIONS, AND REPLACEMENT PARTS MANUAL

SERVICE QUALITY SOLUTIONS

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INTRODUCTION

Thank you for purchasing an American Weldquip product. The American Weldquip product you have purchased has been carefully manufactured, assembled, and fully tested. This manual contains information on the installation, operation, maintenance, and replacement part breakdown. Please read, understand, and follow all safety instructions, warnings, and procedures. Keep this manual handy for referencing installation, operation, maintenance, and part ordering information. While every precaution has been taken as to the accuracy in this manual, American Weldquip assumes no responsibility for errors or omissions. American Weldquip assumes no liability for damages resulting from the use of the information contained in this manual. American Weldquip shall have no liability to the buyer for consequential damages or expenses by any defect whatsoever.

WARRANTY

AMERICAN WELDQUIP MIG guns and parts are warranted to be free of defects in material and/or workmanship for the period listed below. For any product found to be defective under normal use, AMERICAN WELDQUIP at our option, will repair, replace, or issue a credit for the value of the defective product. All warranty claims must be submitted by the original purchaser. Use of non-genuine AMERICAN WELDQUIP parts and/or consumables may damage and/or severely limit the performance of the equipment which may limit or void any warranties. AMERICAN WELDQUIP will not assume responsibility for incidental damages or expenses related to any defect. This warranty does not cover damage caused by misuse or abuse, accident, alteration of product, improper installation, misapplication, lack of reasonable care and maintenance, unauthorized repairs or modifications, loss of use while at a repair facility or other conditions that are beyond the control of American Weldquip.

A Return Merchandise Authorization Number (RMA#) must be attained from the factory for any product being returned for Warranty Repair or Replacement. All returned products must be shipped freight prepaid by the sender. No-charge replacements, repaired products, or credit will be issued once the returned product has been evaluated and warranty condition has been verified. If an immediate replacement is required before proper warranty evaluation, a purchase order number is required, and the goods will be invoiced. A credit will be issued once it is determined that a warranty condition exists.

STANDARD WARRANTY

All Semi-Automatic, Automatic, Robotic MIG Torches and Components.....= 120 Days
MIG Torch Trigger Switches (Contacts only) - Excludes Smoke Extraction = LIFETIME
Robotic Nozzle Cleaning Stations..... = 6 Months
Robotic Peripherals, ArcSafe, Gun Mounts..... = 90 Days
TIG POINT Tungsten Electrode Grinders..... = 90 Days

LIMITED EXTENDED WARRANTY PROTECTION

This limited extended warranty protection expands coverage to loyal customers who use all GENUINE American Weldquip consumables. Customers filing a claim under the extended warranty will need to prove, by providing past invoices, that they have been purchasing and using Genuine American Weldquip consumables.

All Semi-Automatic, Automatic, Robotic MIG Torches and Components.....= 1 YEAR
MIG Torch Trigger Switches (Contacts only) -Excludes Smoke Extraction.....= LIFETIME
MIG Torch Handles.....= LIFETIME

Robotic Nozzle Cleaning Stations.....= 1 Year w/Exclusive Quip-Mist Use
 Robotic Peripherals, ArcSafe, Gun Mounts..... = 90 Days
 TIG POINT Tungsten Electrode Grinders.....= 90 Days

ROHS COMPLIANT

RoHS (Restriction of Hazardous Substances) is an environmental law which addresses the European Union directive 2002/95/EC known as the RoHS Directive. The RoHS directive restricts the use of hazardous substances listed below in electrical and electronic equipment. While it is not a requirement to meet the directive in the United States, currently, American Weldquip Inc. feels this is an important part of our “Go Green initiative. We have taken all reasonable steps to try to ensure the supporting evidence regarding the absence of the restricted substances to support RoHS compliance.

For reference, the maximum concentration values of the restricted substances by weight in homogenous materials are:

- Lead/Lead Components.....-0.1%
- Mercury.....-0.1%
- Hexavalent Chromium.....-0.1%
- Polybrominated Biphenyls (PBBs).....-0.1%
- Polybrominated Diphenyl Ethers (PBDEs).....-0.1%
- Cadmium.....-0.01%

For RoHS Certification of Compliance Letter on a particular product please visit our website – www.weldquip.com or email us at technical@weldquip.com or call 330-239-0317.



SAFETY PRECAUTIONS – READ BEFORE USING

Before installing, operating, or performing maintenance please read the safety precautions below. Failure to observe safety precautions can result in injury or death.

Read and follow the Owner's Manual carefully before installing, operating, or servicing equipment. Read and understand all safety information.

CALIFORNIA PROPOSITION 65 WARNINGS

This product, when used for welding and cutting, can produce fumes or gases which contain chemicals known to cause birth defects and cancer. (California Health & Safety Code Section 25249.5 et seq.) **WASH HANDS AFTER HANDLING**

EMF – ELECTRICAL AND MAGNETIC FIELDS MAY BE DANGEROUS

Electrical current flowing through any conductor causes localized Electric and Magnetic Fields (EMF). Welding current creates an EMF field around welding cables and welding machines.

WARNING - EMF fields may interfere with some pacemakers and other medical implants. Implanted medical device wearers should consult their doctor before operating or going near any arc welding applications. In addition, exposure to EMF fields in welding may have other unknown health effects.

- Welders should use the below procedures to minimize the exposure to EMF fields from the welding circuit.
- Route the cables close together. Secure by twisting, taping, or using a cable cover to keep together.
- Never coil, wrap, or drape welding cables around your body.
- Do not place your body between welding cables. Arrange so that cables are on one side and away from the operator.
- Connect the work clamp(ground) to the workpiece as close as possible to the area to be welded.
- Do not sit, lean, and stand next to the welding power source.
- Do not breathe the fumes and gases as they can cause asphyxiation.

FUMES AND GASES CAN BE DANGEROUS



WARNING - WELDING AND CUTTING PRODUCE FUMES AND GASES THAT ARE HAZARDOUS TO YOUR HEALTH

Fumes and gases generated from welding can cause severe injury to respiratory system and even death. In poorly vented areas it is required to properly ventilate the area and/or use local forced ventilation or other fume control equipment at the arc to remove welding and cutting fumes and gases.

The recommended way to determine adequate ventilation is to sample for the composition and quantity of fumes and gases to which personnel are exposed. The worker exposure level should be checked initially and periodically thereafter to maintain applicable OSHA PEL and ACGIH TVL limits.

- In a poorly ventilated area, it is necessary to wear an approved air-supplied respirator.

- Always read and understand the Safety Data Sheets (SDSs) and the manufacturer's instructions for adhesives, coatings, cleaners, consumables, coolants, degreasers, fluxes, and metals.
- Always have a trained watchperson nearby. Welding and cutting fumes and gases can displace air and lower the oxygen level causing injury or death. Be sure the breathing air is safe.
- Do not weld or cut in locations near degreasing, cleaning, or spraying operations. The heat and rays of the arc can react with vapors to form highly toxic and irritating gases.
- Do not weld or cut on coated metals, such as galvanized, lead, or cadmium plated steel, unless the coating is removed from the weld area, the area is well ventilated, and while wearing an air-supplied respirator. The coatings and any metals containing these elements can give off toxic fumes if welded.

ELECTRIC SHOCK CAN KILL



WARNING - ELECTRICAL SHOCK CAN KILL. DO NOT TOUCH LIVE ELECTRICAL PARTS AND/OR USE IN DAMP LOCATIONS.

The electrode and work (ground) circuit are electrically “HOT” whenever welding equipment is on. Do not touch these electrically live parts with your bare skin or wet/damp clothing. Wear dry, hole-free gloves. Incorrectly installed or improperly grounded equipment is a hazard.

Insulate yourself from work and ground using dry insulating mats or covers big enough to prevent any physical contact with the work or ground.

Additional safety precautions are required when any of the following electrically hazardous conditions are present: 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; or when there is a high risk of unavoidable or accidental contact with the workpiece or ground. For these conditions, use the following equipment in order presented: 1) a semi-automatic DC constant voltage, 2) a DC manual (stick) welder or 3) an AC welder with reduced open-circuit voltage. In most situations, use of a DC, constant voltage wire welder is recommended and do not work alone!

- Disconnect input power or stop engine before installing or servicing this equipment.
Lockout/tag out input power according to OSHA 29 CFR 1910.147 (see Safety Standards).
- Properly install ground and operate this equipment according to its Owner's Manual and national, state/provincial, and local codes.
- Always verify the supply ground. Make sure that input power cord ground wire is properly connected to ground terminal in disconnect box or that cord plug is connected to a properly grounded receptacle outlet.
- Keep cords dry, free of oil and grease and protected from hot metal and sparks.
- Frequently inspect input power cord for damage or bare wiring. Replace cord immediately if damaged. Bare wiring can kill.
- Turn off all equipment when not in use.
- Do not use worn, damaged, undersized, or poorly spliced cables. It is illegal to use electrical tape to repair torch power cable or ground cable that has damaged outer insulation. The cable must be replaced.

- Do not drape cables over your body.
- Do not touch electrode if you are in contact with the work, ground, or another electrode from a different machine.
- Do not touch electrode holders connected to two welding machines at the same time since double open circuit voltage will be present.
- Use only well-maintained equipment. Repair or replace damaged parts at once. Maintain unit according to manual.
- Wear a safety harness if working above floor level.
- Keep all panels and covers securely in place.
- Clamp work cable with good metal-to-metal contact to workpiece or worktable as near the weld as practical.
- Do not connect more than one electrode or work cable to any single weld output terminal. Disconnect cable for process when not in use.

ARC RAYS HAZARDS



WARNING – A WELDING ARC EMITS ULTRAVIOLET (UV) AND OTHER RADIATION AND CAN CAUSE SERIOUS INJURY TO UNPROTECTED SKIN AND EYES.

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.

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

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.

WELDING AND CUTTING CAN CAUSE FIRE OR EXPLOSION



WARNING – Welding and cutting produces sparks that fly off from the arc and can cause fires and/or explosions.

- Welding or cutting on closed containers, such as tanks, drums or pipes can cause them to blow up. Sparks can fly off from the welding or cutting arc. The flying sparks, hot work piece and hot equipment can cause fires and burns.
- Accidental contact of electrode to metal objects can cause sparks, explosion, overheating or fire. Check and be sure the area is safe before doing any welding or cutting.
- Do not weld or cut where flying sparks can strike flammable material.
- Remove all flammables and fire hazards from the welding area. If this is not possible, tightly cover them with approved covers to prevent the welding sparks from starting a fire.
- 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.

- Be alert that welding sparks and hot materials from welding and cutting can easily go through small cracks and openings and cause a fire in the adjacent areas.

Follow requirements in OSHA 1910.252 (a) (2) (iv) and NFPA 51B for hot work and have a fire watcher and extinguisher nearby.

- Do not heat, cut, or weld tanks, drums or containers that have held combustibles until the proper steps have been taken to ensure 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.
- Do not weld or cut where the atmosphere may contain flammable dust, gas, or liquid vapors (such as gasoline).
- Sparks and spatter are thrown from the welding arc. Wear oil free protective garments such as leather gloves, heavy shirt, cuff-less 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.
- Connect work cable to the work as close to the welding or cutting area as practical to prevent welding or cutting current from traveling long, possibly unknown paths and causing electric shock, sparks, and fire hazards.
- Do not use welder to thaw frozen pipes.
- Remove any combustibles, such as a butane lighter or matches, from your person before doing any welding or cutting.
- Inspect area to ensure it is free of sparks, glowing embers, and flames after work is complete.

CYLINDERS CAN EXPLODE IF DAMAGED



WARNING – Compressed gas cylinders contain gas under high pressure and/or flammable gas. If damaged, the cylinder can explode.

- 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.
- Always keep cylinders in an upright position securely chained to an undercarriage or fixed support.
- Cylinders should be located away from areas where they may be struck or subjected to physical damage and a safe distance from arc welding or cutting operations and any other source of heat, sparks, or flame.
- Never allow the electrode, electrode holder or any other electrically “hot” parts to touch a cylinder.
- Keep your head and face away from the cylinder valve outlet when opening the cylinder valve.
- Valve protection caps should always be in place and hand tight except when the cylinder is in use or connected for use.

- 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.

PRINCIPAL SAFETY STANDARDS

Safety in Welding, Cutting and Allied Processes, ANSI Standard Z49.1 – available for download from the American Welding Society website at www.aws.org.

CSA Standard W117.2 – available from Canadian Standards Association, Standards Sales, 5060 Spectrum Way, Suite 100, Ontario, Canada L4W 5NS or website – www.csa-international.org.

Nation Electric Code, NFPA Standard 70 – available from National Fire Protection Association, Quincy, MA 02269, or website – www.nfpa.org.

Safe Practices For Occupational And Educational Eye and Face Protection, ANSI Standard Z87.1 – available from the American National Standards Institute, 25 West 43rd Street, New York, NY 10036. Website – www.ansi.org.

OSHA, Occupational Safety and Health Standard for General Industry, Title 29, Code of Federal Regulations, Part 1910, Subpart Q and Part 1926, Subpart J available from U.S. Government Printing Office, Superintendent of Documents, P.O. Box 371954, Pittsburg, PA 15250. Website – www.osha.gov.

FEATURES

The ArcSafe™ Advantage Robotic System has been designed with advanced features and benefits. These advanced features include:

Design - Rugged and simple design offers low maintenance with increased productivity.

Continuous Rotation - The unique rotary joint design allows for continuous 360° revolutions without putting stress on the power cable.

Quick Change Gooseneck - Two lock down screws allow quick removal while securely clamping the neck.

Locating Flat - Unique locating flat allows for quick assembly and repeatable TCP.

Collision Guard – Optional attachment allows for 15° of deflection protecting the torch, robot, and equipment.

Easily Adaptable - The insulating adaptor disk adapts the ArcSafe main unit to various robot models.

Water-Cooled - The ArcSafe system is available in both air-cooled and water-cooled.

Air Blast - Air blast option clears gas ports of spatter allowing for greater flow and better welds.

Consumables - Common consumables across torches allow for reduced inventory requirements.

Adaptation - Adaptable to most wire feeders.

Location - Manufactured in Sharon Center, Ohio allowing for quick turnaround.

*Minimum of 0.5gpm flow in water-cooled options.

TORCH SPECIFICATIONS

MODEL	AMPERAGE	60% Duty Cycle		100% Duty Cycle	
		CO2	MIXED GAS (AR/CO2)	CO2	MIXED GAS (AR/CO2)
300R	300	400A	350A	350A	300A
500R	500	550A	500A	500A	400A
550R	550	625A	550A	550A	425A

Duty Cycle is based on a complete cycle time of 10 minutes. (60% Duty Cycle = 6 minutes weld time, 4 minutes off time).

INSTALLATION

The ArcSafe™ Advantage System has been engineered to be used on most robot manufacturer's hollow wrist (Thru Arm) model systems. The main rotating/electrical connection of the ArcSafe is designed so it can be installed on any make and model thru arm robot. What differentiates each model of ArcSafe Advantage system for the different robot models are the insulating adaptor disk, the appropriate power cable length and feeder connection.

Positioning

For ease of installation, position the robotic arm and wrist extended out straight in relation to the wire feeder.



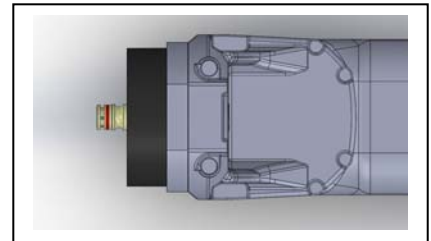
Adaptor Insulating Disk Installation

- 1) Install the proper insulating disk with correct mount screws to the robot wrist.
- 2) Torque screws to 45 in-lbs. (5 Nm).

Verify Correct Power Cable Length

IMPORTANT: HAVING A CABLE THAT IS TOO SHORT OR TOO LONG CAN SIGNIFICANTLY REDUCE CABLE LIFE. In all “Thru Arm” Robotic systems it is EXTREMELY important that the cable is the proper length. In most situations, at the time the order is placed, when the robot manufacturer, model number and feeder type is provided, we can manufacture and provide the correct cable length. Unfortunately, there are other variables that might be involved that are beyond our control, such as a different feeder placement which may result in a cable assembly that is too short or too long. To verify that you have received the correct power cable length see the instructions below. If your cable length is not correct, please contact the factory.

- 1) If not complete already, install the proper insulating disk with correct mount screws. If using the Xtra-Guard Collision Dampener (AST-2000) install to the insulating disk with AST-160 SHCS and AST-127 lock washers.
- 2) Feed the cable assembly through the robot arm and make the connection to the wire feeder assembly. You do not need to install the liner at this point.
- 3) Feed the other end of the power cable through the robot wrist, insulating disk, and if necessary, the Xtra-Guard.
- 4) Measure the brass cable fitting protruding out the insulating disk/Xtra-Guard. The ideal stick out is .750” (19mm) +/- .250” (6.5mm)
- 5) To adjust to the proper length, you might be able to do this by moving the wire feeder forward or rearward. In some cases, there might not be enough adjustment to ensure the proper length.



Contact American Weldquip IF YOU CANNOT attain the proper cable length adjustment.

- 6) If correct, remove the power cable from the wire feeder and install the liner. Insert the liner into power cable and secure with set screw or liner retaining cap. **Do not trim liner currently.**
- 7) Proceed with the rest of the installation.

ArcSafe Advantage Main Unit (Xtra-Guard) Installation

- 1) Make sure the gooseneck is not installed in the main unit.
- 2) Feed the power cable assembly with the feeder pin side through the robotic arm toward the wire feeder. **DO NOT CONNECT TO THE FEEDER AT THIS TIME.**
- 3) Insert the other end of the cable with the AST main unit power connection fitting, **with the liner installed**, through the robotic arm and feed all the way through the insulating disc.

- 4) Insert the power cable end with the liner exposed through the center of ArcSafe main unit.
- 5) Make sure to fully seat the power cable end fitting into the power cable rotary block on the back of the ArcSafe main unit and secure the two (2) set screws with a 3mm hex wrench.

WARNING: MAKE SURE THE POWER CABLE IS FULLY SEATED INTO THE ROTARY BLOCK ASSEMBLY AND THAT THE TWO SET SCREWS ARE TIGHT. FAILURE TO DO THIS WILL RESULT IN DAMAGE TO THE CABLE AND HEAD ASSEMBLY.

- 6) If air blast is installed, unwrap air blast hose and slide along power cable through robot arm. Connect to fitting using provided clamp or directly into PTOC fitting.
- 7) Mount ArcSafe Unit to the insulating disk or the Xtra-Guard unit using AST-160 SHCS and AST-127 lock washers provided.
- 8) Torque screws to 45 in-lbs. (5 nm).
- 9) If installing a water-cooled unit feed the water lines through the two access holes in the insulating disk. Continue to feed through the robotic wrist, through the arm and out to the water circulator.
- 10) Slide hose covers over water lines and up to insulating disk.
- 11) Push the hose into the push-to-connect elbows on the main unit.

Feeder Connection Installation

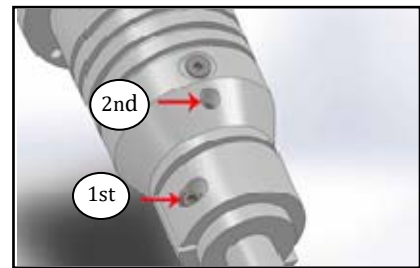
Depending on how your American Weldquip torch was ordered it was supplied with either a EURO type feeder connection or a DIRECT wire feeder connection. The torch is supplied (depending on the torch configuration ordered) with a feeder connection plug (Euro or other type) at the rear of the torch and, if required, a gas connection.

- 1) For ease of installation loosen the bolts securing the wire feed unit to the bracket on the robot and move rearward.
- 2) If not already done, insert the liner into power cable and secure with set screw or liner retaining cap. **Do not trim liner at this time.**
- 3) Feed the power cable, feeder pin first, rearward through the arm of the robot. **NOTE:** If your feeder pin required a gas hose you must feed the power cable from the rear of the arm by the feeder through the hole and push forward towards the wrist. Make sure that the cable connection to at ArcSafe main unit is fed though first.
 - a. If you are unable to feed cable in from the rear of the arm, remove the air fitting and slide through the robot arm. Reinstall air fitting once cable is through
- 4) Fully insert the feeder pin into wire feeder and secure.
- 5) If required, connect power supply cable to power lug (i.e., OTC/Daihen).
- 6) If required, connect the gas hose from the feeder plug to the gas connection on the feeder or other supply means.
- 7) A voltage sensing wire (BLUE) is integrated into the cable design which exits the rear support. If your system requires make your voltage sensing connection here.
- 8) Slide the wire feeder forward or rearward so there is a slight arc in the cable assembly towards the front of the robot arm and tighten the bolts to secure to the bracket.

WARNING: WHEN FEEDING WELD WIRE THROUGH THE TORCH, KEEP THE FRONT END OF THE TORCH POINTED AWAY FROM ANY PERSON OR OBJECT. DO NOT POINT AT FACE, HANDS ETC. FAILURE TO DO SO WILL RESULT IN BODILY INJURY AND POSSIBLY DEATH.

Gooseneck Installation

- 1) Remove dust boot from ArcSafe main unit.
- 2) Remove all consumables from gooseneck.
- 3) Feed the liner through the gooseneck.
- 4) Align torch and aluminum housing flats and make sure to insert the gooseneck completely into ArcSafe main unit.
- 5) **Tighten first the front gooseneck securing screw with a 3mm hex wrench to secure neck.**
- 6) **Tighten the rear gooseneck securing screw with a 3mm hex wrench.**



WARNING: MAKE SURE THE GOOSENECK IS FULLY SEATED INTO THE ARCSAFE MAIN UNIT AND THAT THE TWO SET SCREWS ARE TIGHT. FAILURE TO DO THIS WILL RESULT IN DAMAGE TO THE GOOSENECK AND HEAD ASSEMBLY.

- 7) Trim liner to proper length (approx. 3/4" outside end of gooseneck) and reinstall all consumables.
- 8) Reinstall dust boot.

DAILY MAINTENANCE

A few minutes per day performing a quick check of your ArcSafe Advantage System will help to decrease weld problems, minimize downtime, and help increase consumable life.

- **At Beginning of Shift**
 - Inspect the cable for cuts, nicks, or tears. If you can see bare copper return for maintenance.
 - Inspect the front-end consumables. Clean weld spatter and inspect the nozzle insulator. If nozzle insulation is damaged it should be replaced.
 - Check that the gas diffuser is tight on the gooseneck.
 - Check the gas holes on the diffuser and clean if necessary.
 - Check and tighten the contact tip.
 - Check all electrical connections including the power cable from the power supply, torch/feeder connections, and control cables for loose connections. Tighten if necessary. Loose connections can cause overheating of cables and/or loss of electrical power.

MAINTENANCE

Complete Liner Replacement

Warnings – To avoid accidental injury ensure power supply and wire feed unit is turned OFF.

The ArcSafe Advantage System is supplied standard with a cable liner.

- 1) Trim the end of the weld wire at contact tip.
- 2) Retract or completely remove weld wire so torch can be removed from the wire feeder.
- 3) Remove nozzle, contact tip, and diffuser from the gooseneck and gooseneck from the main unit.

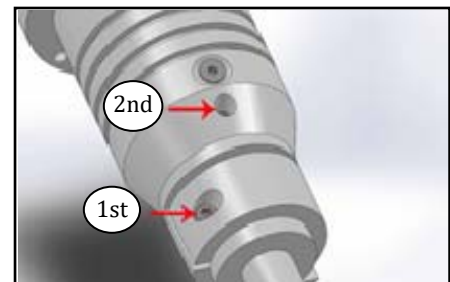
- 4) Remove the torch cable from the wire feed unit.
- 5) ArcSafe main unit is removed by the four (4) screws with lock washers holding it to the insulating disk.
- 6) Pull main unit with power cable away from robot. This will give access to (2) retaining screws holding power cable in place. Loosen, DO NOT REMOVE, these screws.
- 7) If present, loosen, DO NOT REMOVE, the set screw at the torch feeder connection using a 5/64" Allen wrench. If retaining nut, remove and set aside.
- 8) Making sure the torch cable is straight, grasp the liner at the rear of the torch with a pair of pliers and pull to remove.
- 9) Carefully feed the new liner into the torch cable using short strokes to avoid kinking, fully seating the liner at the rear of the cable.
- 10) Tighten the set screw using the 5/64" Allen wrench or reattach retaining nut.
- 11) Leave the liner loose out the end of the cable.
- 12) Reinstall the torch cable to the wire feed unit.
- 13) Insert the cable assembly into the rear of the ArcSafe main unit and secure in place by tightening **both** the 3mm setscrew.
- 14) Reinstall ArcSafe main unit to insulating disk using (4) retaining screws and lock washers.
- 15) Reinstall the gooseneck while sliding the liner through. Secure gooseneck in place.
- 16) Trim the liner to 3/4" stick out from the end of the gooseneck.
- 17) Replace the diffuser, contact tip and nozzle (verify insulating washer is still on gooseneck).
- 18) Feed welding wire into the torch and tighten drive rolls.



WARNING: WHEN FEEDING WELD WIRE THROUGH THE TORCH KEEP THE FRONT END OF THE TORCH POINTED AWAY FROM ANY PERSON OR OBJECT. DO NOT POINT AT FACE, HANDS ETC. FAILURE TO DO SO WILL RESULT IN BODILY INJURY AND POSSIBLY DEATH.

Gooseneck Replacement

- 1) Remove dust boot from ArcSafe main unit.
- 2) Trim the end of the weld wire and/or remove all consumables from gooseneck.
- 3) Loosen both the 3mm hex screws securing the gooseneck in the ArcSafe main unit.
- 4) Remove the old gooseneck.
- 5) Align new gooseneck and aluminum housing flats and make sure to insert the gooseneck completely into ArcSafe main unit.
- 6) First tighten the front gooseneck securing screw (1st) with a 3mm hex wrench to secure neck.
- 7) Tighten the rear gooseneck securing screw (2nd) with a 3mm hex wrench.



WARNING: MAKE SURE THE GOOSENECK IS FULLY SEATED INTO THE ARCSAFE MAIN UNIT AND THAT THE TWO SET SCREWS ARE TIGHT. FAILURE TO DO THIS WILL RESULT IN DAMAGE TO THE GOOSENECK AND HEAD ASSEMBLY.

- 8) Reinstall dust boot.
- 9) Reinstall the diffuser, contact tip and nozzle.

Power Cable Replacement

Please see the Appendix, A-2, on how to take proper cable measurements. It is important when ordering a replacement cable to calculate the proper length.

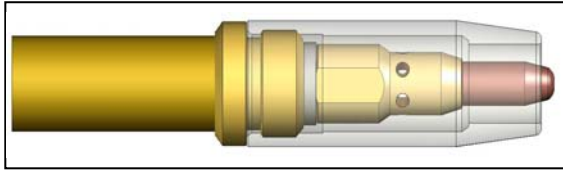
It is necessary to remove the ArcSafe main unit to remove the cable. To change the power cable, process as follows:

- 1) Trim the end of the weld wire at contact tip.
- 2) Retract or completely remove weld wire so torch can be removed from the wire feeder.
- 3) Remove nozzle, contact tip, and diffuser from the gooseneck and gooseneck from the main unit.
- 4) Remove the torch cable from the wire feed unit.
- 5) ArcSafe main unit is removed by the four (4) screws with lock washers holding it to the insulating disk.
- 6) Pull main unit with power cable away from robot. This will give access to (2) retaining screws holding power cable in place. Loosen, DO NOT REMOVE, the screws.
- 7) Pull ArcSafe main unit away from power cable and set aside with the (4) mounting screws and lock washers.
- 8) When replacing the cable assembly, you may be required to swap the feeder connection plug to the new cable.
- 9) To install new cable assembly, first install liner – See COMPLETE LINER REPLACEMENT.
- 10) Feed the power cable, feeder pin first, rearward through the arm of the robot. **NOTE:** If your feeder pin required a gas hose you must feed the power cable from the rear of the arm, by the feeder, through the hole and push forward towards the wrist. Make sure that the cable connection for the ArcSafe main unit is fed through first.
- 11) Insert and fully seat the power cable end fitting into the power cable rotary block on the back of the ArcSafe main unit and secure **both** set screws with a 3mm hex wrench.
- 12) Reinstall ArcSafe main unit with (4) retaining screws and lock washers.
- 13) Fully insert the feeder pin into wire feeder and secure.
 - a. If required, connect power supply cable to power lug (i.e., OTC/Daihen).
 - b. If required, connect the gas hose from the feeder plug to the gas connection on the feeder or other supply means.
- 14) A voltage sensing wire (BLUE) is integrated into the cable design which exits the rear support. If your system requires, make your voltage sensing connection here.
- 15) Slide the wire feeder forward and tighten the bolts to secure to the bracket.
- 16) Reinstall the gooseneck and trim the liner so $\frac{3}{4}$ " is sticking out the end of the gooseneck.
- 17) Reinstall the consumables.

WARNING: WHEN FEEDING WELD WIRE THROUGH THE TORCH KEEP THE FRONT END OF THE TORCH POINTED AWAY FROM ANY PERSON OR OBJECT. DO NOT POINT AT FACE, HANDS ETC. FAILURE TO DO SO WILL RESULT IN BODILY INJURY AND POSSIBLY DEATH.

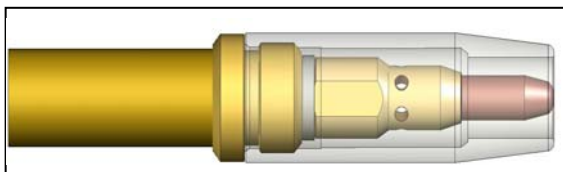
NOZZLE/TIP RELATIONSHIPS

Shown below are typical relationship between the contact tip and nozzle in GMAW Semi-Automatic applications. Nozzles to tip relationships are usually dictated by the process and application but not necessarily the standard. Keep in mind that decreased tip life, increased spatter cleaning cycles may be required if the tip relationship is changed to achieve other objectives.



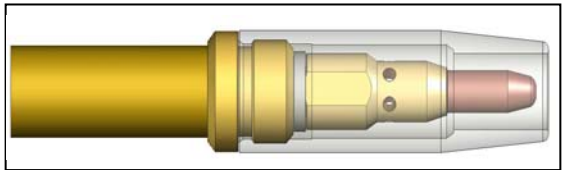
Extended Tip – Short Circuit (Short Arc, Dip Transfer) Welding Applications

The tip stick out is usually 1/8” or 1/4” from the nozzle. Keep in mind that the further the stick out the more susceptible to gas porosity issues. Typically, is used in short circuit, lower amperage applications, and/or where you may need to reach into a corner.



Flush Tip – Higher current Short Circuit (Short Arc, Dip Transfer) Welding Applications

The tip is flush with the end of the nozzle. Typically used in higher current and voltage short circuit applications.



Recessed Tip – Spray Arc, Pulsed, Flux Core Welding Applications

The tip is usually recessed in the nozzle 1/8” or 1/4”. Usually, the higher the heat and/or current the further the recess. However, this is also dependent on the wire used and the arc length requirement.

GOOSENECK SELECTION	DESCRIPTION	TIP SIZE	TIP PART #	DIFFUSER	NOZZLE SIZE	NOZZLE PART #	GOOSENECK ANGLE
300 Series	300A Air-Cooled	.035” (1.2mm) M6	75035511	75002007	9/16” (15.1mm)	75135601-I	22° or 45°
500 Series	500A Air-Cooled	.045” (1.2mm) M8	75045014	75004033	5/8” (15.9mm)	75146202-I	22° or 45°
550 Series	550A Air-Cooled	.045” (1.2mm) M8	75045014	75004033	5/8” (15.9mm)	75146202-I	22° or 45°

NOZZLE SELECTION CHART

300 Series Nozzles

<u>Part Number</u>	<u>Description</u>	<u>Bore Size</u>	<u>Material</u>	<u>O.A.L</u>	<u>Insulator Req</u>
75133801	CONICAL	3/8" (9.5mm)	NI PLATED BRASS	2.820" (71.6mm)	NONE REQ
75133802	BOTTLE NOSE	3/8" (9.5mm)	NI PLATED BRASS	2.820" (71.6mm)	NONE REQ
75133803	BOTTLE NOSE	3/8" (9.5mm)	NI PLATED BRASS	3.62" (91.9mm)	NONE REQ
75135601-I	CONICAL	9/16" (14.2mm)	NI PLATED BRASS	2.820" (71.6mm)	INSTALLED
75135002-I	TAPERED	1/2" (12.7mm)	NI PLATED BRASS	2.820" (71.6mm)	INSTALLED
75135003-I	TAPERED	1/2" (12.7mm)	NI PLATED BRASS	2.672" (67.96mm)	INSTALLED
75135602-I	CONICAL	9/16" (14.2mm)	NI PLATED BRASS	2.545" (64.6mm)	INSTALLED
75135004	CONICAL (SHORT)	1/2" (12.7mm)	NI PLATED BRASS	1.937" (49.2mm)	NONE REQ

400 Series Nozzles

<u>Part Number</u>	<u>Description</u>	<u>Bore Size</u>	<u>Material</u>	<u>O.A.L</u>	<u>Insulator Req</u>
75146202-I	BOTTLE NOSE	5/8" (15.9mm)	NI PLATED BRASS	3.125" (79.4mm)	INSTALLED
75145001	BOTTLE NOSE	1/2" (12.7mm)	NI PLATED BRASS	3.031" (77.0mm)	75001733
75146202	CONICAL	5/8" (15.9mm)	NI PLATED BRASS	3.125" (79.4mm)	75001738
75146202C	CONICAL	5/8" (15.9mm)	NI PLATED COPPER	3.125" (79.4mm)	75001738
75146202CU	CONICAL	5/8" (15.9mm)	BARE COPPER	3.125" (79.4mm)	75001738
75145601-I	TAPERED	9/16" (14.2mm)	NI PLATED BRASS	3.125" (79.4mm)	INSTALLED
75145002C	TAPERED	1/2" (12.7mm)	NI BARE COPPER	3.125" (79.4mm)	75001738
75145002CU	TAPERED	1/2" (12.7mm)	BARE COPPER	3.125" (79.4mm)	75001738
75145003	TAPERED (LONG)	1/2" (12.7mm)	NI PLATED BRASS	3.915" (99.4mm)	NONE REQ.
75146501S	SPOT	5/8" (15.9mm)	NI PLATED BRASS	3.437" (87.3mm)	75001738
75146204-I	CONICAL	5/8" (15.9mm)	NI PLATED BRASS	2.820" (71.6mm)	INSTALLED
75146204CU	CONICAL	5/8" (15.9mm)	BARE COPPER	2.820" (71.6mm)	75001738
75145602-I	SMALL CONICAL	9/16" (14.2mm)	NI PLATED BRASS	2.820" (71.6mm)	INSTALLED
75144301-I	TAPERED	7/16" (11.1mm)	NI PLATED BRASS	2.820" (71.6mm)	INSTALLED
75145004	BOTTLE NOSE	1/2" (12.7mm)	NI PLATED BRASS	3.125" (79.4mm)	75001733
75146205-I	CONICAL	5/8" (15.9mm)	NI PLATED BRASS	3.031" (77.0mm)	INSTALLED
75146205CU	TAPERED	5/8" (15.9mm)	BARE COPPER	3.031" (77.0mm)	75001738
75146206-I	SHORT CONICAL	5/8" (15.9mm)	NI PLATED BRASS	1.875" (47.6mm)	INSTALLED

75146207-I	SHORT CONICAL	5/8" (15.9mm)	NI PLATED BRASS	2.187" (55.6mm)	INSTALLED
75147501	CYLINDRICAL	3/4" (19.0mm)	NI PLATED BRASS	3.125" (79.4mm)	75001738
7514501CU	CYLINDRICAL	3/4" (19.0mm)	BARE COPPER	3.125" (79.4mm)	75001738
75145603-I	SHORT TAPERED	9/16" (14.2mm)	NI PLATED BRASS	2.375" (60.3mm)	INSTALLED
75145005	BOTTLE NOSE	1/2" (12.7mm)	NI PLATED BRASS	2.820" (71.6mm)	75001733
75144302-I	TAPERED	7/16" (11.1mm)	NI PLATED BRASS	3.125" (79.4mm)	INSTALLED

500 Series Nozzles

<u>Part Number</u>	<u>Description</u>	<u>Bore Size</u>	<u>Material</u>	<u>O.A.L</u>	<u>Insulator Req</u>
75157501	CONICAL	3/4" (19.0mm)	NI PLATED BRASS	3.187" (81.0mm)	75001740
75156201	TAPERED	9/16" (14.2mm)	NI PLATED BRASS	2.670" (67.8mm)	75001740
75157001CU-I	CONICAL	11/16" (17.46mm)	BARE COPPER	3.187" (81.0mm)	INSTALLED

CONTACT TIP SELECTION CHART

M6 Contact Tips

<u>Part Number</u>	<u>Wire Size</u>	<u>Nominal I.D</u>	<u>Description</u>
Copper (CU)			
75023511	0.023" (0.6mm)	0.034"	Contact Tip (Standard)
75030511	0.030" (0.8mm)	0.038"	Contact Tip (Standard)
7535511	0.035" (0.9mm)	0.044"	Contact Tip (Standard)
75035512	0.040" (1.0mm)	0.048"	Contact Tip (Standard)
75045511	0.045" (1.2mm)	0.053"	Contact Tip (Standard)
75045512	0.045" (1.2mm)	0.059"	Contact Tip (Standard)

M8 Contact Tips

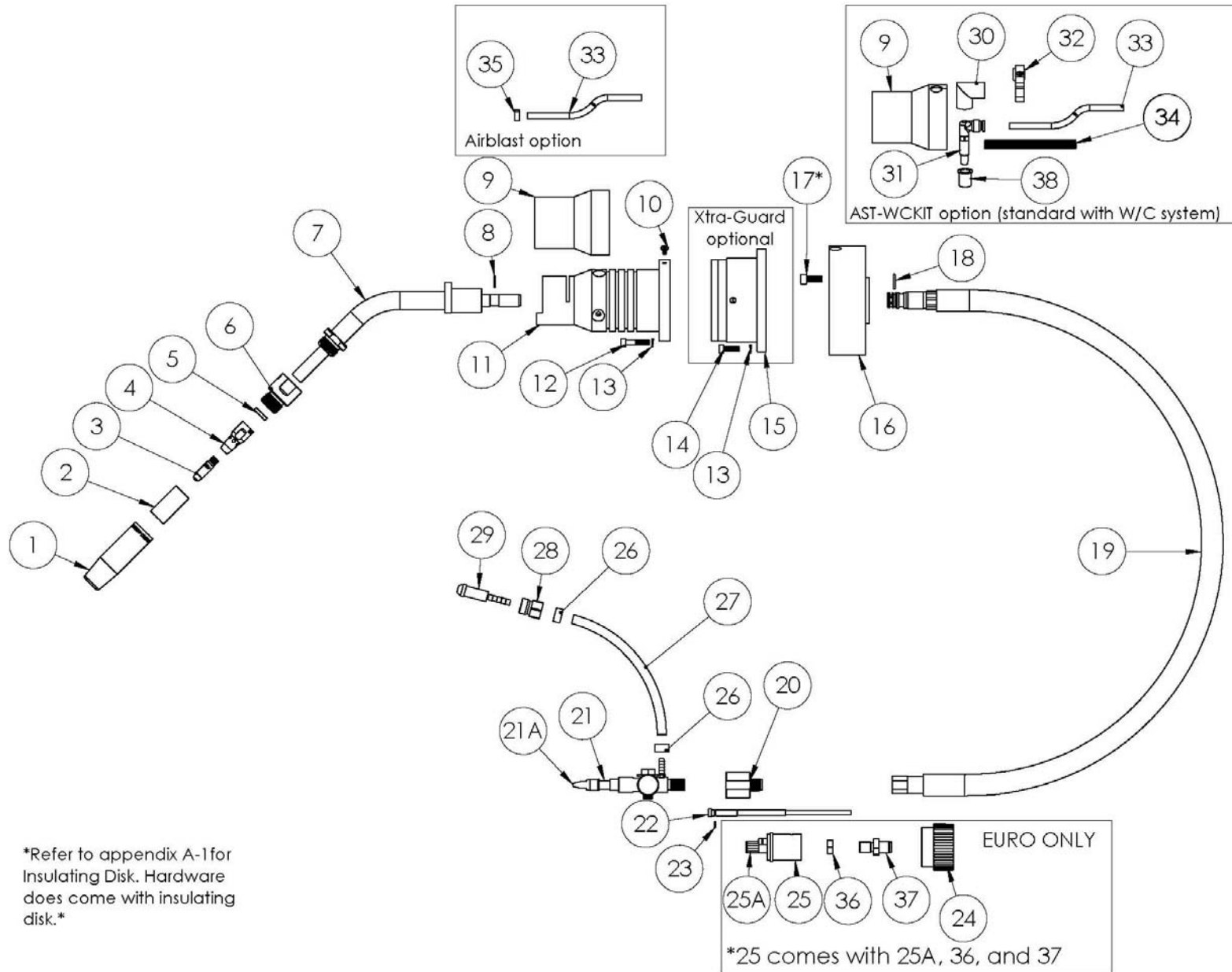
<u>Part Number</u>	<u>Wire Size</u>	<u>Nominal I.D</u>	<u>Description</u>
Copper (CU)			
75030014	0.030" (.8mm)	0.038"	Contact Tip (Standard)
75035014	0.035" (.9mm)	0.044"	Contact Tip (Standard)
75040014	0.040" (1.0mm)	0.048"	Contact Tip (Standard)
75045014	0.045" (1.2mm)	0.054"	Contact Tip (Standard)
75052014	0.052" (1.3mm)	0.061"	Contact Tip (Standard)
75062014	0.062" (1.6mm)	0.073"	Contact Tip (Standard)
75062015	0.062" (1.6mm)	0.076"	Contact Tip (Standard)
75078014	0.078" (2.0mm)	0.087"	Contact Tip (Standard)
75093014	0.093" (2.4mm)	0.106"	Contact Tip (Standard)
Heat Resistant Technology (HRT)			
20030400	0.030" (.8mm)	0.039"	HRT Contact Tip
20035400	0.035" (.9mm)	0.041"	HRT Contact Tip
20040400	0.040" (1.0mm)	0.050"	HRT Contact Tip

20045400	0.045" (1.2mm)	0.054"	HRT Contact Tip
20030500	0.030" (.8mm)	0.039"	HRT Contact Tip
20035500	0.035" (.9mm)	0.041"	HRT Contact Tip
20040500	0.040" (1.0mm)	0.050"	HRT Contact Tip
20045500	0.045" (1.2mm)	0.054"	HRT Contact Tip
20052500	0.052" (1.3mm)	0.061"	HRT Contact Tip
20062500	0.062" (1.6mm)	0.069"	HRT Contact Tip

LINER SELECTION CHART

Part Number	Description
75005215T	.023-.030 LINER, 5FT – T STYLE
75010215T	.023-.030 LINER, 10FT – T STYLE
75015215T	.023-.030 LINER, 15FT – T STYLE
75001222T	.035-.045 LINER, 1FT – T STYLE
75005222T	.035-.045 LINER, 5FT – T STYLE
75010222T	.035-.045 LINER, 10FT – T STYLE
75015222T	.035-.045 LINER, 15FT – T STYLE
75025222T	.035-.045 LINER, 25FT – T STYLE
75001228T	.045-1/16 LINER, 1FT – T STYLE
75005228T	.045-1/16 LINER, 5FT – T STYLE
75010228T	.045-1/16 LINER, 10FT – T STYLE
75015228T	.045-1/16 LINER, 15FT – T STYLE
75025228T	.045-1/16 LINER, 25FT – T STYLE
75001229T	5/64-3/32 LINER, 1FT – T STYLE
75005229T	5/64-3/32 LINER, 5FT – T STYLE
75010229T	5/64-3/32 LINER, 10FT – T STYLE
75015229T	5/64-3/32 LINER, 15FT – T STYLE
75025229T	5/64-3/32 LINER, 25FT – T STYLE

PARTS BREAKDOWN



No.	Description	300A	500A	600A	No.	Description	300A	500A	600A
1	Nozzle	See Nozzle Selection Chart				Panasonic Feeder Pin	37577999		
2	Nozzle Insulator	See Nozzle Selection Chart				Tweco #4 Feeder Pin	37577699		
3	Contact Tip	See Tip Selection Chart				Tweco #5 Feeder Pin	37577930		
4	Gas Diffuser, Standard	75002007	75004033		NS	Gas Hose Kit (LU only)	37677902		
	Gas Diffuser, Short	75002007S	75004033S		NS	O-ring – Miller Pin	37577102		
	Gas Diffuser, Long	75002007L	75004033L		NS	O-ring Euro Adaptor Block	28500002		
	Gas Diffuser, X-Long	75002007XL	75004033XL		NS	O-ring Tweco #4 Pin	37677102		
5	Insulating Washer	75001003	75001004		NS	O-ring Tweco #5 Pin	75000021		
6	Replaceable Nozzle Seat	75077800	75077850		21A	Miller Retaining Nut	37577705-N		
7	Gooseneck, 22°	AST-322-H	AST-522-H	AST-622-H		OTC Retaining Nut	38277001-N078		
	Gooseneck, 45°	AST-345-H	AST-545-H	AST-645-H		Euro Retaining Nut	37077005		
8	O-Ring - Gooseneck	75000026			22	Liner	See Liner Selection Chart		
9	Dust Boot	AST-100		AST-100WC	23	Liner O-Ring	75000001		
10	Touch Sensing Screw	75077011			24	Euro Adaptor Nut	75077014		
11	ArcSafe Rotary Unit	AST-1500			25	Euro Adaptor Block	75001148		
12	AST-1500 Mounting Screw	AST-160			25A	Euro Retaining Nut	37077005		
13	Lock Washer	AST-127			26	7/16" Clamp	38577108		
14	Xtra-Guard Mounting Screw	AST-159			27	Gas Hose (per foot)	38577087		
15	Optional Xtra-Guard	AST-2000			28	5/8"-18 RH Nut (Gas; Type A)	38677141		
16	Adaptor Insulating Disc	SEE APPENDIX A-1			NS	9/16-18 RH Nut (Gas; Type B)	38677145		
17*	Insulating Disc Hardware	CONTACT MANUFACTURER			29	7/32" Nipple (Type A)	38677142		
18	O-Ring - Cable	37677102			NS	9/16" Nipple (Type B)	38677144		
19	Cable Assembly	CONTACT MANUFACTURER			30	Elbow Cover	AST-132		
NS	Cable Guard (per foot)	AST-108			31	Elbow Connection Kit	AST-130A		
NS	Adaptor Support Screw	75077011			32	Water Line Support	AST-200		
20	Dir Connect Block	37077003			33	Water Hose	38577088		
21	Miller Feeder Pin	37577705			34	Metal Hose Cover	75002011		
	OTC / Daihen Feeder Pin	37577700			35	8mm Clamp	38577104		
	OTC DP Series Feeder Pin	37577701			36	M11-1 Lock Nut	75001029		
	Lincoln LN7 Feeder Pin	37577832			37	M11-1 X 1/20-20 Adaptor	75001151		
					38	Elbow Insulator	AST-133		

- Type A = Lincoln
- Type B = OTC / Panasonic

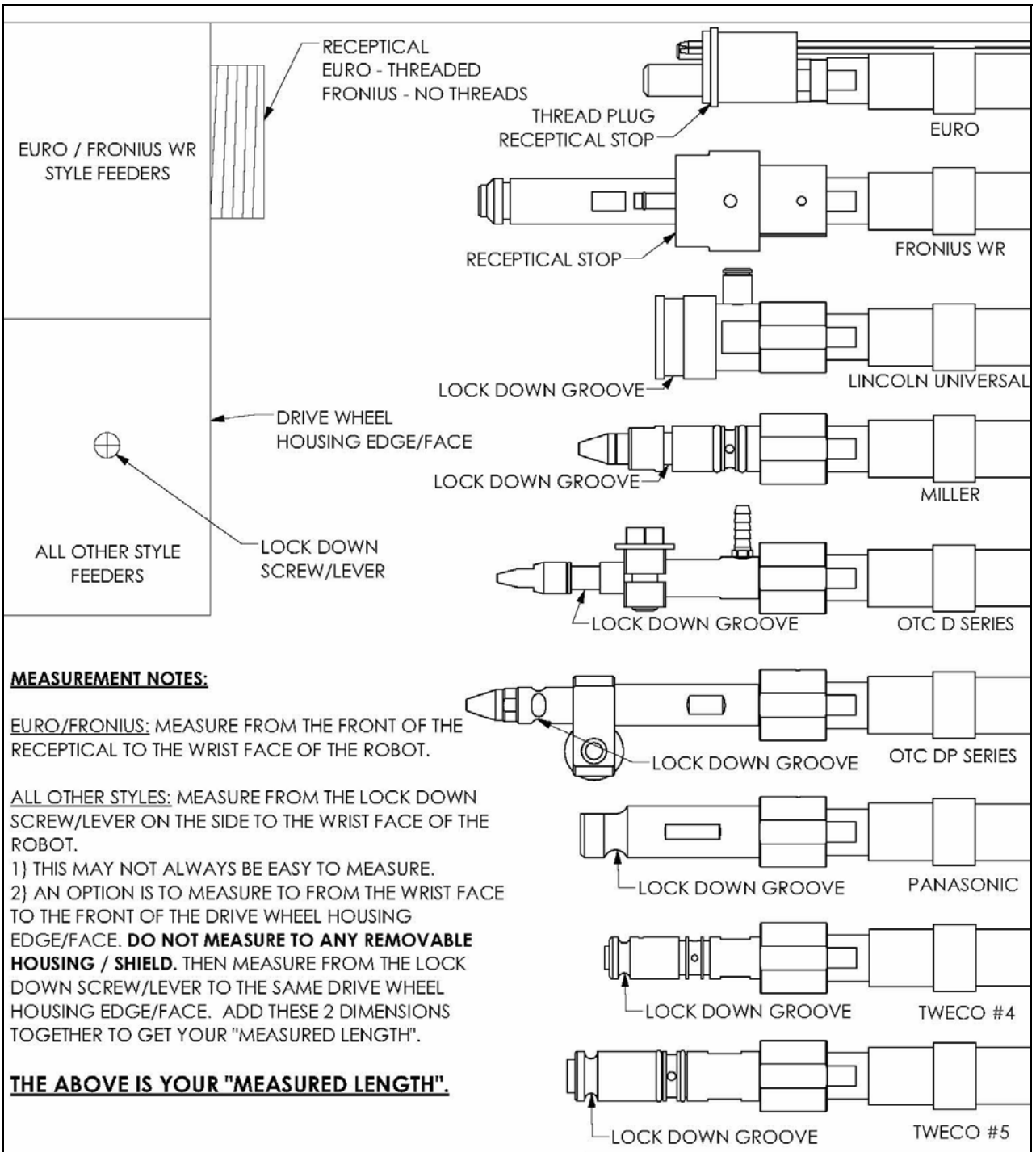
APPENDIX

A-1 Insulating disk chart

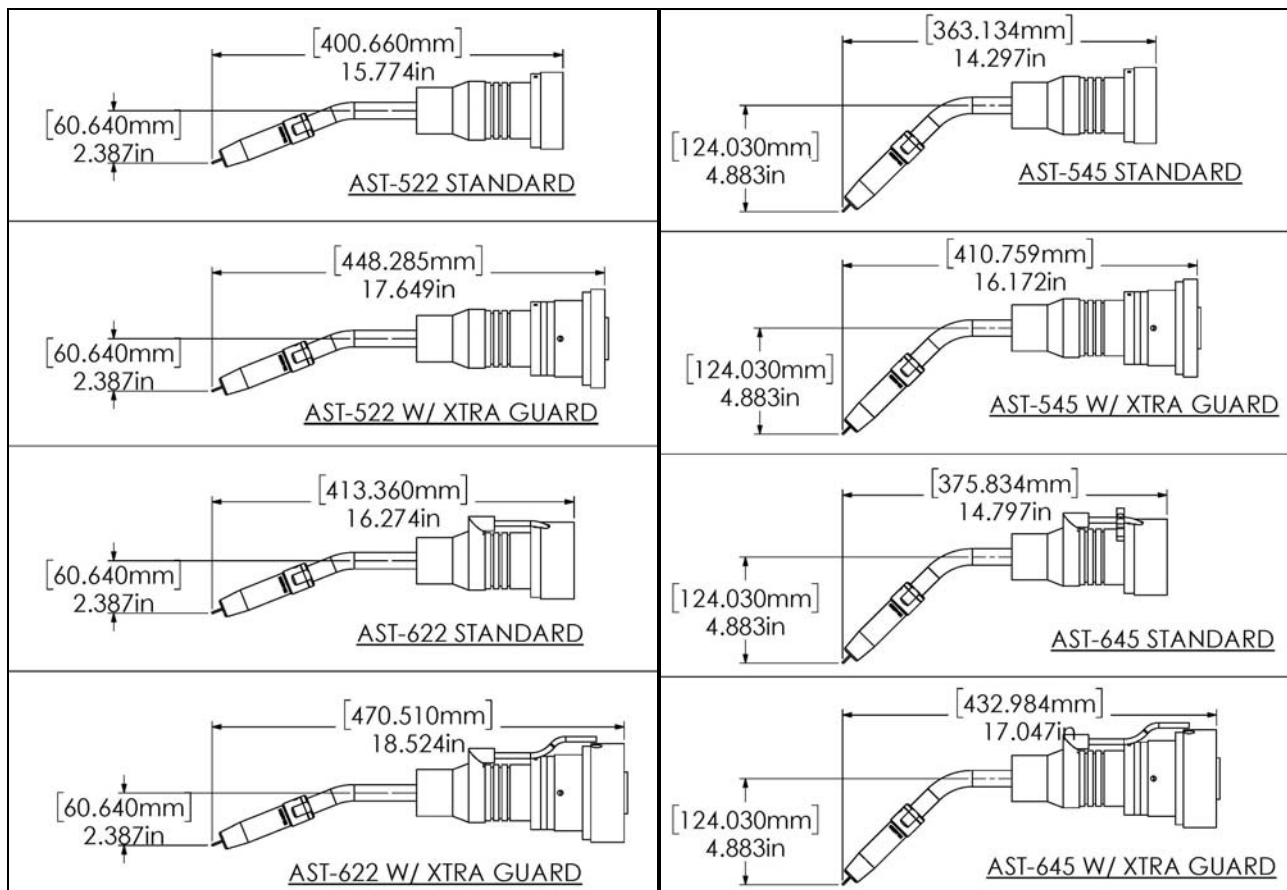
				w/ Xtra-Guard	
<u>Robot Make</u>	<u>Model</u>	<u>Air-Cooled</u>	<u>Water-Cooled</u>	<u>Air-Cooled</u>	<u>Water-Cooled</u>
ABB	IRB1660ID, IRB2600ID	AST-A101	AST-A101WC	AST-A101-SD	AST-A101SDWC
ABB	IRB1520ID, IRB1600ID	AST-A102	AST-A102WC	AST-A102-SD	AST-A102SDWC
Estun	ER6	AST-E101	AST-E101WC	AST-E101-SD	AST-E101SDWC
Fanuc	Arcmate 100ic, Arcmate 100ic/6L, Arcmate 120ic, Arcmate 120ic/10L, M-710iC/12L, M-20iA, Arcmate 100ic/12	AST-F101	AST-F101WC	AST-F101-SD	AST-F101SDWC
Fanuc	Arcmate 100iD, Arcmate 100iD/10L, Arcmate 120iD, Arcmate 120iD/12L	AST-F102	AST-F102WC	AST-F102-SD	AST-F102SDWC
Kawasaki	BA006N	AST-K101	AST-K101WC	AST-K101-SD	AST-K101SDWC
Kuka	KR6 R1820, HR 8 R1420, KR20 R1810	AST-K200	AST-K200WC	AST-K200-SD	AST-K200SDWC
Motoman	EA1400, EA1900, MA1400, MA1900, MA3100, VA1400, VA1900	AST-M101	AST-M101WC	AST-M101-SD	AST-M101SDWC
Motoman	AR1440, AR1440E, AR1730, AR2010, AR3120, MA1440, MA2010, VA1400II	AST-M102	AST-M102WC	AST-M102-SD	AST-M102SDWC
Daihen/OTC	FD-B4L, NB4, NBL4L	AST-O101	AST-O101WC	AST-O101-SD	AST-O101SDWC
Daihen/OTC	AX-V4AP	AST-O102	AST-O102WC	AST-O102-SD	AST-O102SDWC
Daihen/OTC	FD-B6, FD-B6L	AST-O103	AST-O103WC	AST-O103-SD	AST-O103SDWC
Panasonic	TM-1100, TM-1400, TM-1600, TM-1800	AST-P101	AST-P101	AST-P101-SD	AST-P101SDWC
Yaskawa	GP25	AST-F101	AST-F101WC	AST-F101-SD	AST-F101SDWC

*For additional insulating disks, please contact the manufacturer.

A-2 Unicable measuring



A-3 TCP Measurements





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