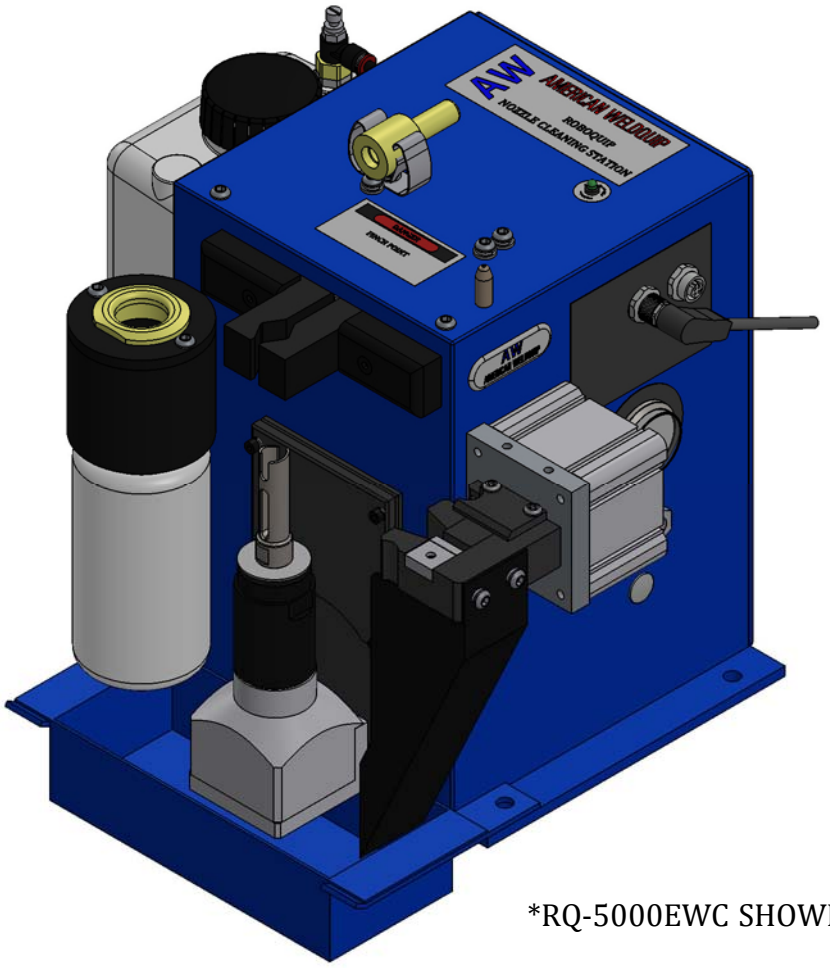
AMERICAN WELDQUIP

SERVICE QUALITY SOLUTIONS

ROBO-QUIP
RQ-5000E & RQ-5000EWC
ROBOTIC NOZZLE CLEANING STATION



*RQ-5000EWC SHOWN.

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

INSTALLATION, OPERATIONS AND REPLACEMENT PARTS

TABLE OF CONTENTS

INTRODUCTION 3
WARRANTY 3
ROHS COMPLIANT 4
SAFETY PRECAUTIONS – READ BEFORE USING 5
FEATURES 9
SPECIFICATIONS 9
INSTALLATION AND SETUP 10
ELECTRICAL 11
  ELECTRICAL SCHEMATIC 12
NOZZLE ALIGNMENT/NOZZLE CLAMP ADJUSTMENT 13
REAMER BLADE SELECTION CHART 15
ANTI-SPATTER 16
OPERATION/PROGRAMMING 17
SETUP AND CONFIGURATION 18
ETHERNET IP SETUP AND CONFIGURATION 19
WIRE CUTTER INSTALLATION 24
PNEUMATIC DIAGRAM 25
PARTS BREAKDOWN 26
MAINTENANCE 31
TROUBLESHOOTING 33
APPENDIX 36
  A-1 SPRAYER VARIATIONS 36
  A-2 CLAMP CYLINDER VARIATIONS 37
  A-3 LIFT BRACKET VARIATIONS 38
  A-4 MANIFOLD VARIATIONS 39
  A-5 WIRE CUTTER KIT 40
  A-6 SPRAYER ROUTING 41
  A-7 PRESSURE GAUGE 42
NOTES 43

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, Wire Cutter……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, Wire Cutter……1 Year w/Exclusive Quip-Mist Use
Robotic Peripherals, ArcSafe™, Gun Mounts……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 it 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, or 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 the composition and quantity of fumes and gases to which personnel are exposed. The worker exposer 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 the 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 the 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 suppl 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 the 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 the 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 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. The headshield and filter lens should conform to ANSI Z87. I 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, explosions, 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 the 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 the 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-l, "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.

ROBO-QUIP ROBOTIC NOZZLE CLEANING STATION

FEATURES

The Robo-Quip Nozzle Cleaning Station has been designed with advanced features and benefits. These advanced features include:

Easier Initial Setup - A setup switch allows the activation of the lift cylinder for easier setup positioning of the robot and nozzle over the reamer blade and nozzle clamp.
Self-Adjusting Nozzle V-Block – The Robo-Quip incorporates a self-adjusting nozzle clamping assembly. There is NO NEED to readjust when switching from one size OD nozzle to another.
Supports Different Communication Protocols – Options to support Standard I/O, ETHERNET IP, MODBUS/TCP, and PROFINET are available.
Input Air Pressure Gauge – Quickly confirm that there is the required air supply to the reamer.
Larger Anti-Spatter Tank – Increased size of the Anti-Spatter Container to 1½ Quarts.
Cycle Complete Signal – A "Cycle Complete" signal is sent when the nozzle clamp is open, and the lift cylinder has completely retracted. A "GREEN" indicator light on the top of the reamer will be lit when the Cycle Complete is active. This provides a quick visual indication.
Easily Serviced – All pneumatic lines are color coded to their specific operation for easier identification and service.
Reamer Blade Operation – Reamer blade continues to rotate when retracting from the nozzle.
Interior Air Lines – The Robo-Quip was designed to have most airlines inside the unit. This helps to protect lines from physical and UV damage throughout the day-to-day operations of your unit.
Designed For a Cleaner Environment – The Robo-Quip is supplied standard with a debris tray to capture nozzle spatter. In addition, the enclosed anti-spatter spray chamber helps to contain any overspray and capture any excess in a bottle for easy disposal.

SPECIFICATIONS

Air Requirements -	80-120 PSI (5.0 – 8.25 BAR) @ 8 S.C.F.M (Min) Clean Shop Air
Reamer Stroke -	2" (50.8mm)
Air Motor RPM -	500RPM
Dimensions -	8½" (215.9mm) L x 10" (254mm) W x 13" (330.2mm) H
Weight -	Robo-Quip Station – 29.65 lbs. (13.449Kg)
Electrical -	Input: +24V DC Continuous Supply
	Power consumption w/ wire cutter: 1.4W
	w/o wire cutter: 1.1W

INSTALLATION AND SETUP

Mounting

Mount the nozzle cleaning station in a convenient location within easy access of the robot. Make sure to take into consideration movable fixtures and other confines within the robotic cell. For proper operation, the reamer must be mounted on a solid, vibration free stand or mount. Mounting dimensions are shown below (FIG 1).

Mounting hardware is NOT included

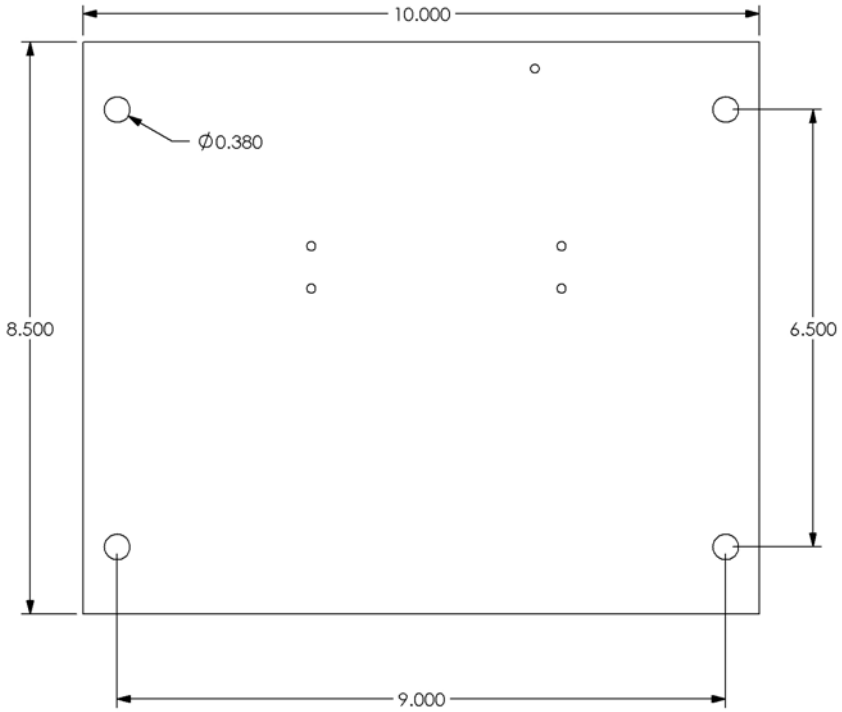


Fig. 1

The debris tray mounting tabs are held in place by the front two mounting bolts of the reamer. Once in place, set the debris tray between the tabs. (FIG 2). The positioning of the tray is to catch all debris cleared out by the reamer helping to keep floors clean.

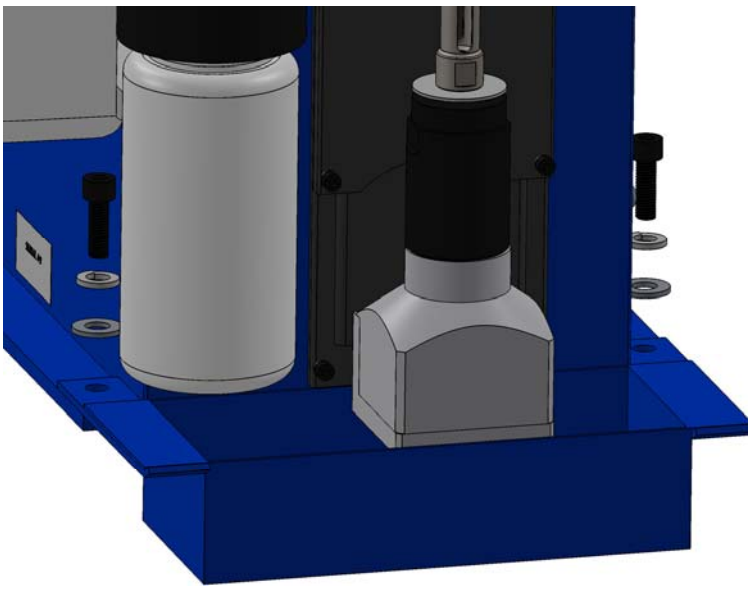


Fig. 2

ELECTRICAL

WARNING: The following electrical connections should only be performed by a qualified technician. Damage to equipment will occur if connections are incorrect.

The complete operation on the Ethernet Robo-Quip Nozzle Cleaning Station is started and controlled by the robot controller or PLC. Six (6) power/electrical and four (4) network communication connections are required for the interface between the Robo-Quip and the robot (See FIG 3). The +24V power cable is supplied standard with the Robo-Quip. The Ethernet communication protocol network standard is Ethernet IP.

Wiring Interface Connections

24V DC POWER CONNECTOR/CABLE DESIGNATION

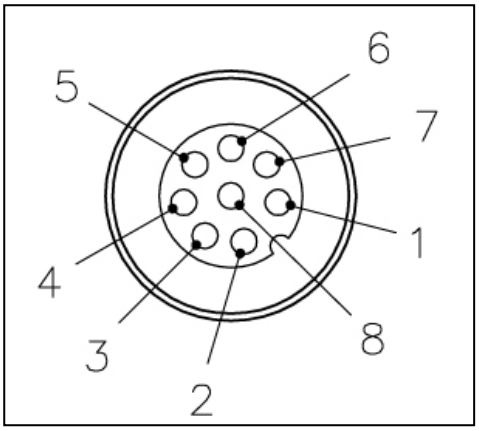


FIG 3

1 – WHITE, +24V DC CONTINOUS (FOR SOLENOID VALVES)

2 – BROWN, +24V DC CONTINOUS (FOR DEVICE OPERATION)

3 – GREEN, NOT USED

4 – YELLOW, NOT USED

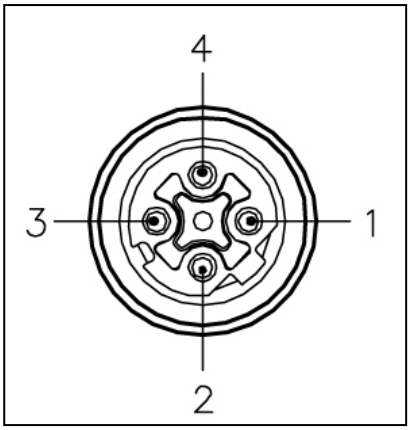
5 – GRAY, 0V DC (FOR SOLENOID VALVES)

6 – PINK, NOT USED

7 – BLUE, 0V DC (FOR DEVICE OPERATION)

8 – RED – CYCLE COMPLETE +24V DC RETURN SIGNAL

ETHERNET IP NETWORK ED1 CONNECTION (M12 4-PIN SOCKET, MALE D-CODED [NOT SUPPLIED])



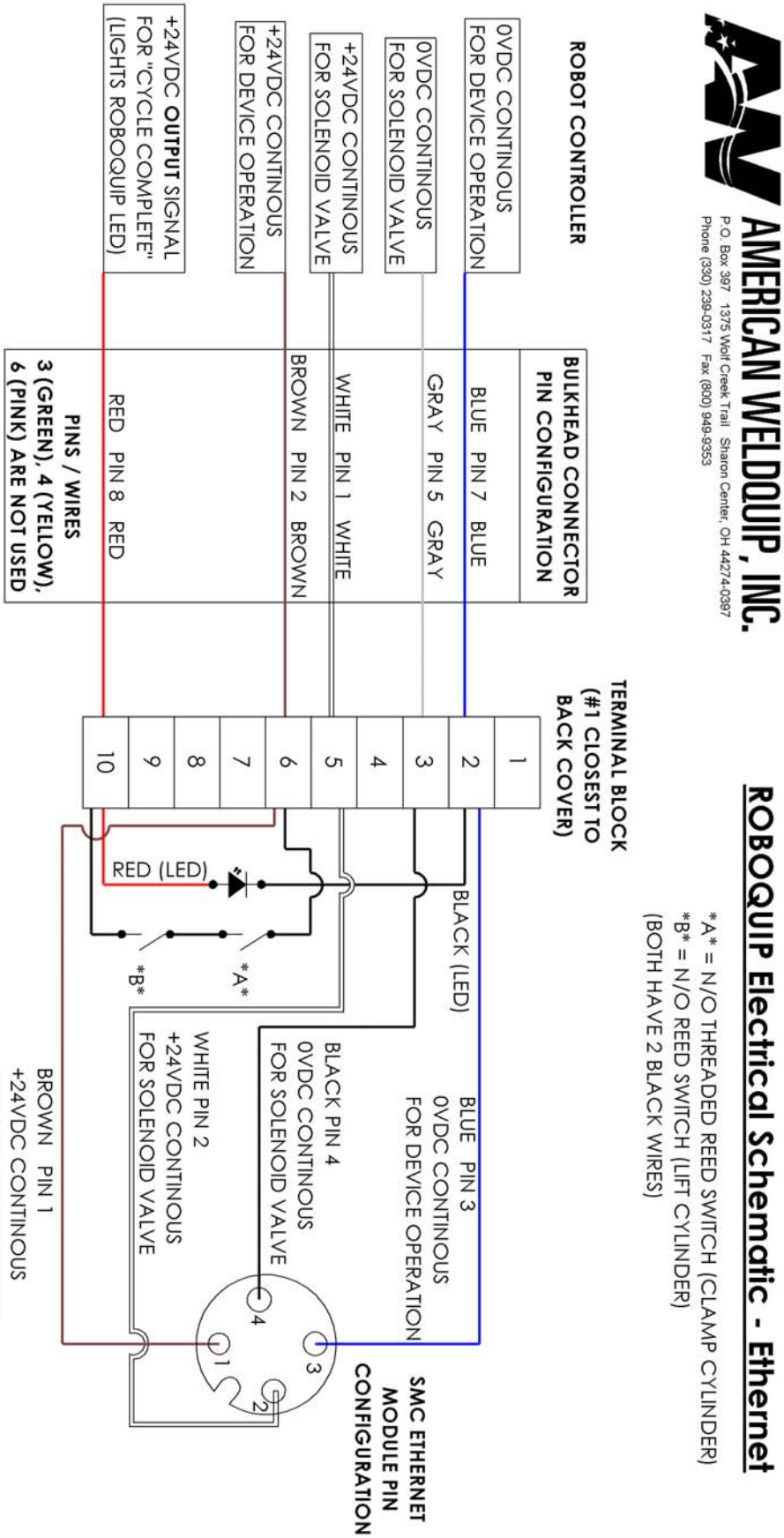
1 – TRANSMIT DATA (+TD)

2 – RECEIVE DATA (+RD)

3 – TRANSMIT DATA (-TD)

4 – RECEIVE DATA (-RD)

Electrical Schematic



Air Supply

The Robo-Quip nozzle cleaning station requires 80-120 psi @ 8 S.C.F.M (5.0-8.25 BAR @ 450 LPM) of clean, dry shop air minimum for proper operation. The unit is equipped with a ¼" NPT female fitting for the air supply connection. We recommend the "Quick Disconnect" style fittings for easy removal. It is important to use a supply line with at least 3/8" ID to ensure proper air volume to the reamer.

***Clean, dry shop air is required for all units. ***

NOZZLE ALIGNMENT/NOZZLE CLAMP ADJUSTMENT

DANGER: Be aware and use extreme caution to avoid interference with the reamer to the robot or torch components when making this adjustment or when in operation. Avoid any pinch/crush points between the robot and the reamer and/or clamping mechanism and the reamer blade. Failure to do so will result in serious bodily harm.

The nozzle clamping system is self-adjusting and is designed to center and align any outside diameter nozzle in relation to the reaming blade. This feature eliminates the need to change v-blocks or make any adjustment to center the nozzle. The only adjustment required is to make sure the robot/nozzle is straight in the reaming blade and to set the required inserting depth.

NOTE: The nozzle clamping system is not intended to center the nozzle in relation to the cutter blade. The straight alignment of the welding nozzle and insertion depth is critical to the proper operation of the Robo-Quip. See preferred method below for programming the proper position of the nozzle to the cutter blade.

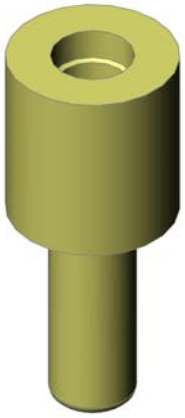
CAUTION: KEEP HANDS CLEAR OF NOZZLE CLAMP AND REAMER MOTOR/BLADE AS THIS IS A PINCH POINT AND WILL CAUSE INJURY.

1) For adjustment procedures of the feed rate for advancement and retraction of the reaming blade – see Feed Rate Adjustment under Operation/Programming.
2) Setup – Use the robot controller to place the nozzle cleaning station in SETUP mode. This will position the lift cylinder/air motor in the "UP" position. The air motor will **NOT** rotate, and the nozzle clamp will remain **OPEN**.
3) Determine Insertion Depth – Insertion depth of the nozzle in relation to the reamer blade is controlled by robot placement. Depth adjustment should be made by the robot torch operator/programmer. It may be possible on 5/8 bore nozzles and larger to ream past the gas holes on the diffuser. This will depend on the ID of the reamer blade, OD of the diffuser and length of the reamer blade. Normally it is recommended to only ream the nozzle the length of the contact tip. Use caution when trying to ream past the length of the contact tip on larger bore nozzles.
4) Recommended Nozzle to Reaming Blade Alignment Using an AWQ Alignment Tool – **Note: RG-RB625 alignment tool is currently attached to the top of the unit in a spring clip for use with the RB625 Reamer Blade (standard). Other Alignment tools are available for use with other reamer blade sizes.**

It is critical that the nozzle/tip and diffuser is aligned straight and perpendicular to the reaming blade. An improperly positioned torch in cleaning station could result in damage to consumables and unnecessary stress on Robo-Quip. Use the Alignment Tool when teaching / programming the robot to the nozzle cleaning position.

Programming with the Reamer Blade Alignment Tool (preferred method)

1) Remove nozzle, contact tip & gas diffuser, then replace with the Reamer Blade Alignment Tool.
2) Place the Robot Controller in the **SETUP** Mode. This will lift the air motor/reamer blade without rotating the reamer blade.



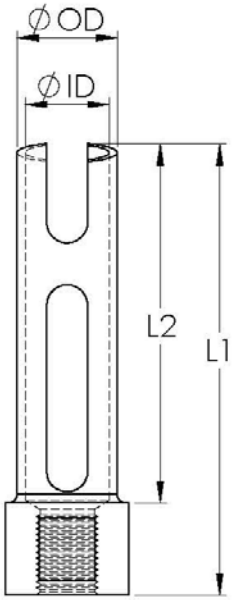
3) Move the Reamer Blade Alignment Tool attached to the Robot above the Reamer Blade and slowly guide it straight down and into the center of the Reamer Blade until the larger outer portion touches the Reamer Blade.
4) Move the Reamer Blade Alignment Tool back up 1/8" (3mm) so the larger diameter of the Reamer Blade Alignment Tool does not touch the Reamer Blade. Inspect that the Reamer Blade Alignment Tool is centered into the Reamer Blade. Save this as the Cleaning Position.
5) Move the Reaming Blade Alignment Tool/Robot straight up from the Reamer Blade to a point approximately 3" (76mm) to 6" (150mm) above the Reamer blade. Save this point as the Approach Point and Retrieve Point for the nozzle cleaning subprogram.
6) Return the Reaming Blade Alignment Tool to the Cleaning Position and run a cycle test. This will ensure that the Clamps are also in line with the Reamer Blade. If the Clamps push the Reaming Blade Alignment Tool out of alignment, refer to the **MAINTENANCE section - RE-ALIGN CLAMP CYLINDER/JAWS TO REAMING CUTTER BLADE** to realign the Clamps to the Reamer Blade.
7) Stop the cycle test and place the Robot Controller in **RUN** Mode. The Clamps will release the Reamer Alignment Tool and the Reamer Blade will retract.
8) Move the Robot back to the Approach Point and replace the Remer Blade Alignment Tool with the as diffuser, contact tip and nozzle. Then return the Robot to the Cleaning Position.
9) Run another cycle test on the Robot Controller. This will activate the Clamp, start the Reamer Blade and raise the Motor. If set correctly there will be no interference between the Reamer Blade and the Nozzle. If not correct, reposition the Nozzle to ensure it is centered over the Reamer Blade.

Programming with nozzle (not preferred)

1) Place the Robot Controller in the **SETUP** Mode. This will lift the air motor/reamer blade without rotating the reamer blade.
2) Position the Nozzle over the Reaming Blade, making sure it is straight front and back and side to side.
3) SLOWLY bring the Nozzle down over the Reaming Blade to the proper predetermined insertion depth. Save this position as the Clean Position.
4) Move the Nozzle straight up from the Reamer Blade to a point approximately 3" (76mm) to 6" (150mm) above the Reamer blade. Save this point as the Approach Point and Retrieve Point for the nozzle cleaning subprogram.
5) Return the Nozzle to the Cleaning Position and run a cycle test. This will ensure that the Clamps are also in line with the Reamer Blade. If the Clamps push the Nozzle out of alignment, refer to the **MAINTENANCE section - RE-ALIGN CLAMP CYLINDER/JAWS TO REAMING CUTTER BLADE** to realign the Clamps to the Reamer Blade.
6) Stop the cycle test and place the Robot Controller in **RUN** Mode. The Clamps will release the Reamer Alignment Tool and the Reamer Blade will retract.
7) Run another cycle test on the Robot Controller. This will activate the Clamp, start the Reamer Blade and raise the Motor. If set correctly there will be no interference between the Reamer Blade and the Nozzle. If not correct, reposition the Nozzle to ensure it is centered over the Reamer Blade.

REAMER BLADE SELECTION CHART

PART NUMBER	NOZZLE BORE SIZE	OD	ID	L1	L2
RB500	1/2" (13mm)	.490" (12.5mm)	.374" (9.5mm)	2.56" (65mm)	1.75" (44.7mm)
RB500S	1/2" (13mm)	.490" (12.5mm)	.374" (9.5mm)	2.56" (65mm)	1.77" (45mm)
RB500S-NF	1/2" (13mm)	.497" (12.6mm)	.358" (9mm)	2.63" (66.8mm)	.895" (22.7mm)
RB560	9/16" (15mm)	.555" (14.1mm)	.433" (11mm)	2.56" (65mm)	1.75" (44.7mm)
RB560-01	9/16" (15mm)	.535" (13.5mm)	.393" (10mm)	1.65" (42mm)	1.10" (28mm)
RB625	5/8" (16mm)	.610" (15.5mm)	.511" (13mm)	2.69" (68mm)	2.13" (54mm)
RB625-01	5/8" (16mm)	.610" (15.5mm)	.453" (11.5mm)	2.56" (65mm)	1.75" (44.7mm)
RB625-02	5/8" (16mm)	.610" (15.5mm)	.511" (13mm)	2.95" (75mm)	2.14" (54mm)
RB625-03	5/8" (16mm)	.590" (15mm)	.433" (11mm)	2.56" (65mm)	1.75" (44.7mm)
RB625S	5/8" (16mm)	.610" (15.5mm)	.512" (13mm)	2.56" (65mm)	1.77" (45mm)
RB750	3/4" (19mm)	.704" (17.9mm)	.508" (12.3mm)	2.56" (65mm)	1.75" (44.7mm)



REAMER BLADE INSTALLATION

Choose the appropriate size reamer blade for your welding application and welding nozzle I.D. To remove/install reamer blade use the supplied "flat" 14mm wrench (RQ-0578) to hold the top of the air motor shaft from turning. Using a 17mm wrench turn reamer blade counterclockwise to remove or clockwise to install. Considerable force may be necessary to remove the reamer blade as the blade is designed to self-tighten during operation.

ANTI-SPATTER

Anti-Spatter solution is added to the unit by removing the fill cap on top of the bottle. The bottle capacity is approximately one and one-half (1.5) quarts. Adjustment of the application of anti-spatter liquid is controlled by (1) spray time entered in the robot controller and (2) adjustment of the fluid dispensed by means of the flow control valve mounted on the bottom/top of the anti-spatter bottle. The spray nozzle has a fixed orifice size. For the best performance do not change the orifice size.

Application of too much anti-spatter liquid is just as bad as not enough. If correctly set, all that is required is a .5 second timed spray.

To help contain any overspray of anti-spatter liquid and to provide a cleaner area, the Robo-Quip is supplied with an enclosed spray chamber. There is a bottle incorporated into the chamber to collect any excess fluid. When the bottle becomes full just unscrew from the bottom of the unit and empty.

It is advised not to reuse this excess fluid as it has been contaminated and can contain particles that may clog the spray system.

We recommend, for optimal cleaning and spatter removal performance, the nozzle be sprayed with AMERICAN WELDQUIP's special formulated QUIP-MIST Nozzle Conditioner and Anti-Spatter.

QUIP-MIST is available in:

87008SNC - 8oz. (236.59ML) Spray Bottle

870032NC - 32oz. (946.35ML) Spray Bottle

870001NC - 1 Gallon (3.785L) Jug

870005NC - 5 Gallon (18.927L) Cubetainer

870055NC - 55 Gallon (208.20L) Drum

OPERATION/PROGRAMMING

CYCLE COMPLETE SIGNAL - A constant +24V DC is supplied to the Robo-Quip at Pin #5 Power Cable connection. When the lift cylinder is fully in its down position, and the clamping jaws are fully open, +24V DC is then supplied to the green LED light (RQ-0563) on the top of the Robo-Quip. An output of +24V DC is provided back to the robot controller. This signal tells the robot controller that the lift cylinder is fully down, clamps are completely open, and it is ok for the torch to move.

CYCLE START SIGNAL – This is a timed output that determines the length of the reaming cycle. When the robot controller supplies a timed output to the Robo-Quip nozzle cleaning station, the cleaning cycle will begin. The Nozzle Clamp valve on the manifold will activate supplying air pressure to the clamp cylinder. The clamp (nozzle jaws) cylinder will close, opening the reed switch and dropping the +24V DC CYCLE COMPLETE signal back to the controller. Simultaneously, the lift cylinder valve on the manifold will activate supplying air pressure to the lift cylinder. The lift cylinder will begin its upward movement opening the left side reed switch used for the CYCLE COMPLETE signal. At the same time, the right-side reed switch (Normally Closed) will close activating the air motor valve on the manifold and the air motor will begin to rotate.

After the timed signal has been removed, the lift cylinder and clamp cylinder valves on the manifold are deactivated. This will cause the lift cylinder to move down and the jaws to open. Once these are in their fully open and down position the lift cylinder reed switch and the lift cylinder left side reed switch will close and the +24V DC "CYCLE COMPLETE" signal will be set to the robot controller and the LED on the top of the Robo-Quip will light. At the same time, once the lift cylinder is at its full downward stroke the air motor reed switch on the right side will open and the air motor valve on the manifold will deactivate and the air motor will cease to rotate.

SPRAYER OPERATION - This is a timed output that determines the length of the spray cycle. The robot controller supplies a timed output signal for spraying to the Robo-Quip the anti-spatter spray cycle will begin. The Sprayer valve on the manifold will activate supplying air pressure through a Venturi valve, which will draw anti-spatter compound from the storage tank and proceed onto the enclosed sprayer housing and through the spray tip. Once the timed signal is removed the sprayer valve on the manifold is deactivated and the sprayer function will cease operation.

WIRE CUTTER OPERATION - This is a timed output that determines the length of the wire cutting cycle. When the robot controller supplies a timed output signal for wire cutting to the Robo-Quip the wire cutting cycle will begin. The Wire Cutting valve on the manifold will activate supplying air pressure to the wire cutter air cylinder which will close the cutting blades. Once the timed signal is removed or timed out the wire cutter valve on the manifold is deactivated and the wire cutting blade will open.

FEED RATE ADJUSTMENT - The feed rate, "UP" and/or "DOWN", can be controlled by adjusting the flow control valves located on the lift cylinder inside the unit. Remove the rear cover for access to the valves. The top valve controls the speed in the "DOWN" direction. The bottom valve controls the speed in the "UP" direction.

SETUP AND CONFIGURATION

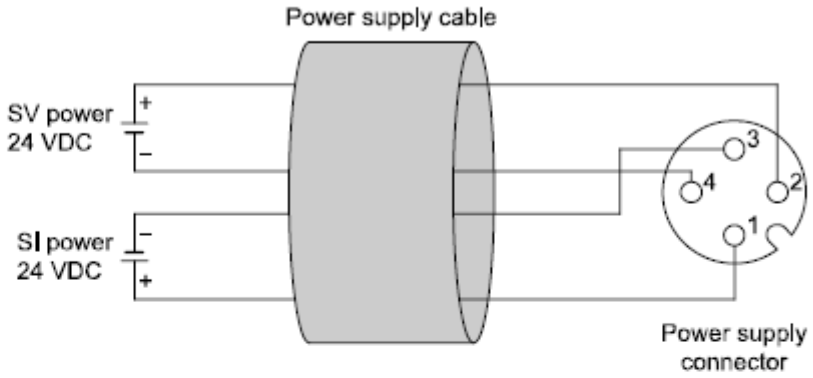
All the Ethernet connections and functions are sent directly to the SMC valve manifold assembly. The valve assembly controls the functions of the nozzle clamp, air motor rotation, lift cylinder, anti-spatter sprayer and optional wire cutter. A "CYCLE COMPLETE" led light on the top of the unit provides a visual indication that the lift cylinder/air motor is in the full down position and that the nozzle clamps are fully open. A +24V DC output signal is supplied through the 8-pin power connector for input to the robot controller that the reaming cycle is complete.

It is recommended to use the Quick Guide for setting up and configuring the SMC EX260-SEN1 Ethernet IP Node. This will lead you step by step on the setup. The SMC EX260-SEN1 module must be configured for the desired IP address. See next for the steps required for setting the IP address.

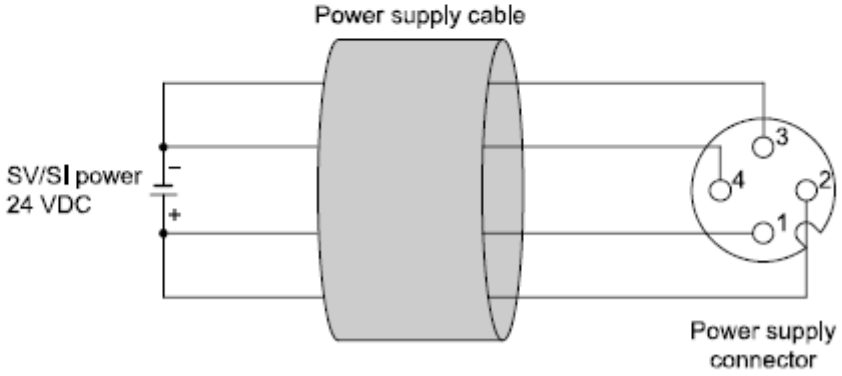
Please contact SMC for questions on establishing or configuring an IP address for your EX260-SEN1 series manifold at SMCworld.com

* If your robot is setup for Modbus/TCP, you will need RQ-5000M or RQ-5000EWC. *

Power-supply line for solenoid valve and power-supply line for SI unit operation are isolated.
Be sure to supply power, respectively.
Either single-source power or two different power supplies can be used.



A. Two different power supply



B. Single-source power supply

*: Pay attention not to exceed the tolerance range of power supply voltage.

ETHERNET IP SETUP AND CONFIGURATION

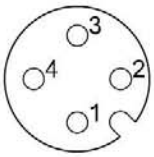
QUICK START FOR EX260-SEN1/2/3/4 Using RSLogix5000

POWER WIRING FOR SMC EX260-SEN*

EX260-SEN* Power Wiring is NOT the same as the EX500-GEN1 or EX250-SEN1.

○Power supply connector layout

PWR: M12 4-pin plug, A-coded



No.	Designation	Description
1	SI24 V	+24 V for SI unit operation
2	SV24 V	+24 V for solenoid valve
3	SI0 V	0 V for SI unit operation
4	SV0 V	0 V for solenoid valve

Typical Cordset color code (M12 female 4 pin A code standard key):

Brown => +24 (Node and Inputs)
White => +24 (Valves)
Blue => 0 (Node and Inputs)
Black => 0 (Valves)

System Wiring:

■Wiring

Select the appropriate cables to mate with the connectors mounted on the SI unit.

○Fieldbus interface connector layout

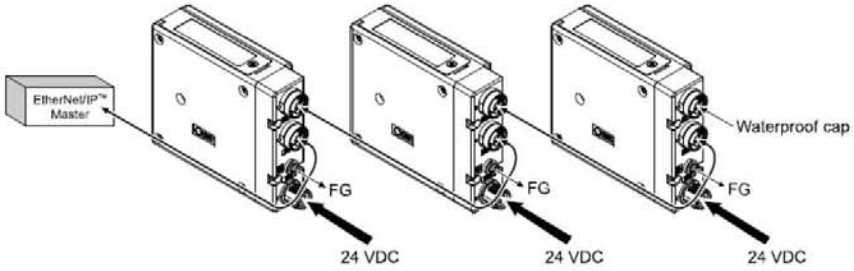
BUS OUT: M12 4-pin socket, D-coded

No.	Designation	Description
1	TD+	Transmit Data +
2	RD+	Receive Data +
3	TD-	Transmit Data -
4	RD-	Receive Data -

BUS IN: M12 4-pin socket, D-coded

No.	Designation	Description
1	TD+	Transmit Data +
2	RD+	Receive Data +
3	TD-	Transmit Data -
4	RD-	Receive Data -

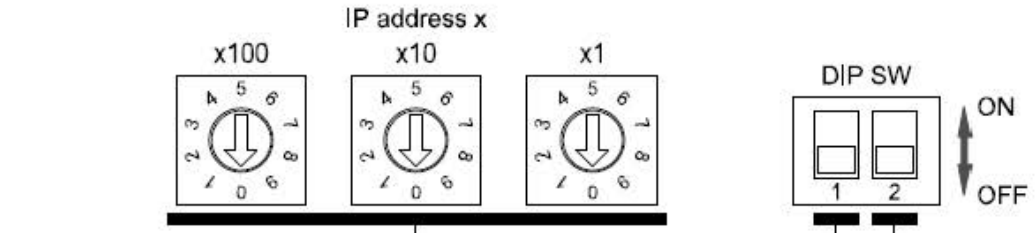
Connect the "BUS IN" connector to the upstream device (PLC etc.) and connect the "BUS OUT" connector to the downstream device.



SETTING UP IP ADDRESS FOR SMC EX260-SEN*

OPTION 1: Through Switches on Unit:

- Remove power.
- Set Dip Switch 1 to **OFF** for 192.168.**0**.X. Set Dip Switch 1 to **ON** for 192.168.**1**.X.
- Set Rotary Switches to select 192.168.X.**1** to 192.168.X.**254**.
- Apply Power.



IP address
192.168. Y .[X]

Setting			X
x100	x10	x1	
0	0	0	Remote control *1
0	0	1	1
0	0	2	2
:	:	:	:
2	5	4	254
2	5	5	DHCP mode *2

Manual set up of IP address *3

*: The values of 256 or more are not used.

IP address
192.168.[Y]. X

Y	No.1	Description
1	ON	The IP address is set to "192.168.1.X".
0	OFF	The IP address is set to "192.168.0.X".

HOLD/CLEAR setting

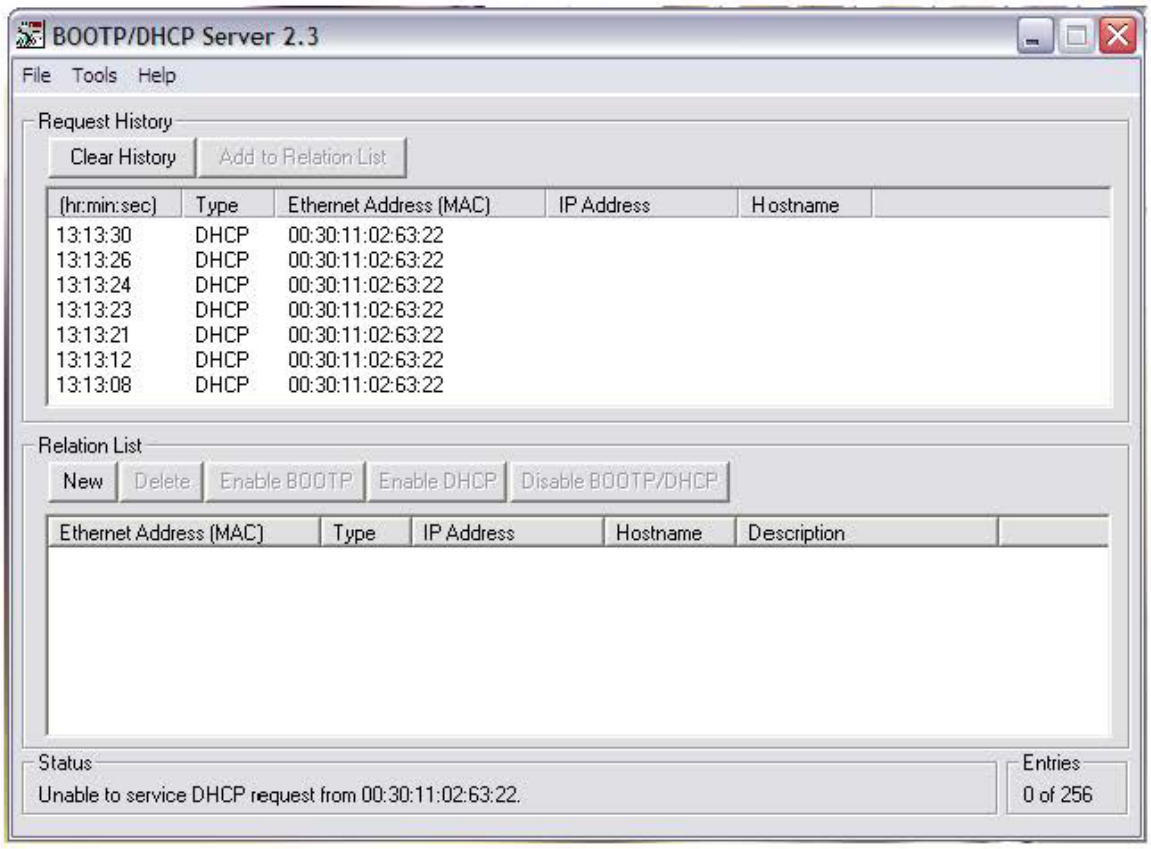
HOLD/CLEAR	No.2	Description
HOLD	ON	Hold the last state before communication error.
CLEAR	OFF	Clear all outputs.

Option 2: Using Rockwell BOOTP/DHCP Server Utility

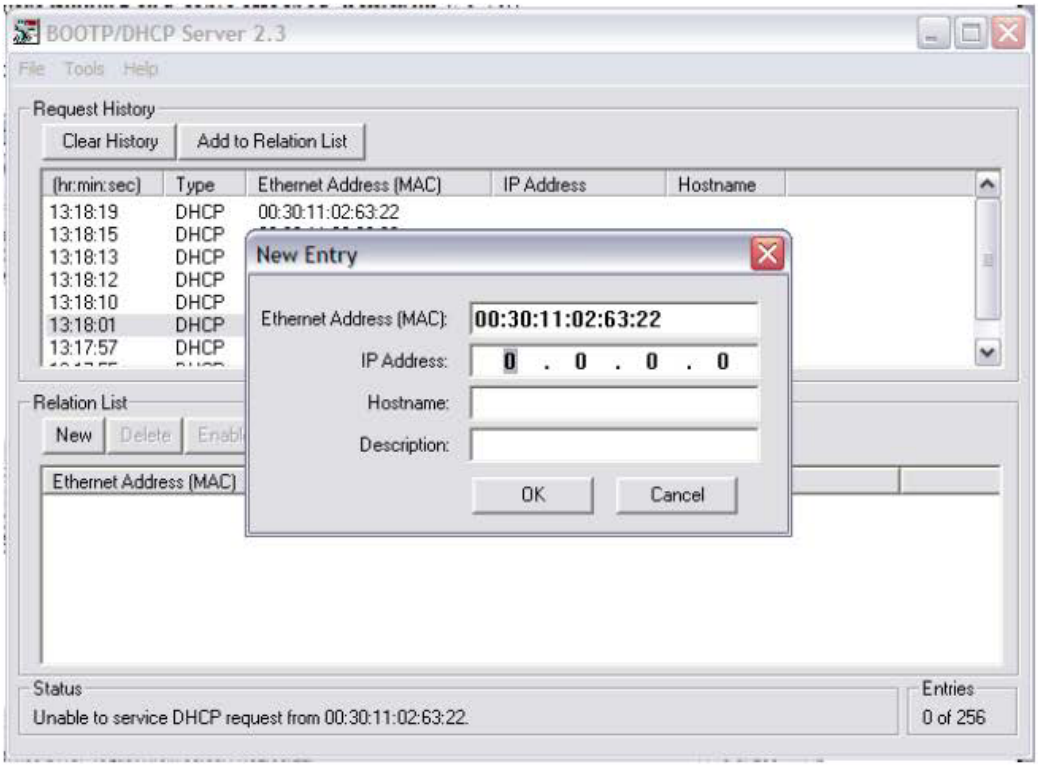
USING ROCKWELL BOOTP/DHCP SERVER UTILITY WITH SMC EX260-SEN*

- Ensure unit is not connected to the PLC through the network.
- To Clear any existing address, Remove Power.
- Set Dip Switch 1 to OFF and Rotary Switches to **255.**
- Apply power for 15 seconds, then remove power.
- Set Rotary Switches to **000**.
- Start Rockwell BOOTP/DHCP software and attach to EX260 via Ethernet port.
- With Software running and cable attached, apply power to EX260. **You must have the BOOTP/DHCP software ready and the Ethernet cable connected, then cycle power to the EX260**. The EX260's MAC address will start to show up on the screen .

You should see following screen:

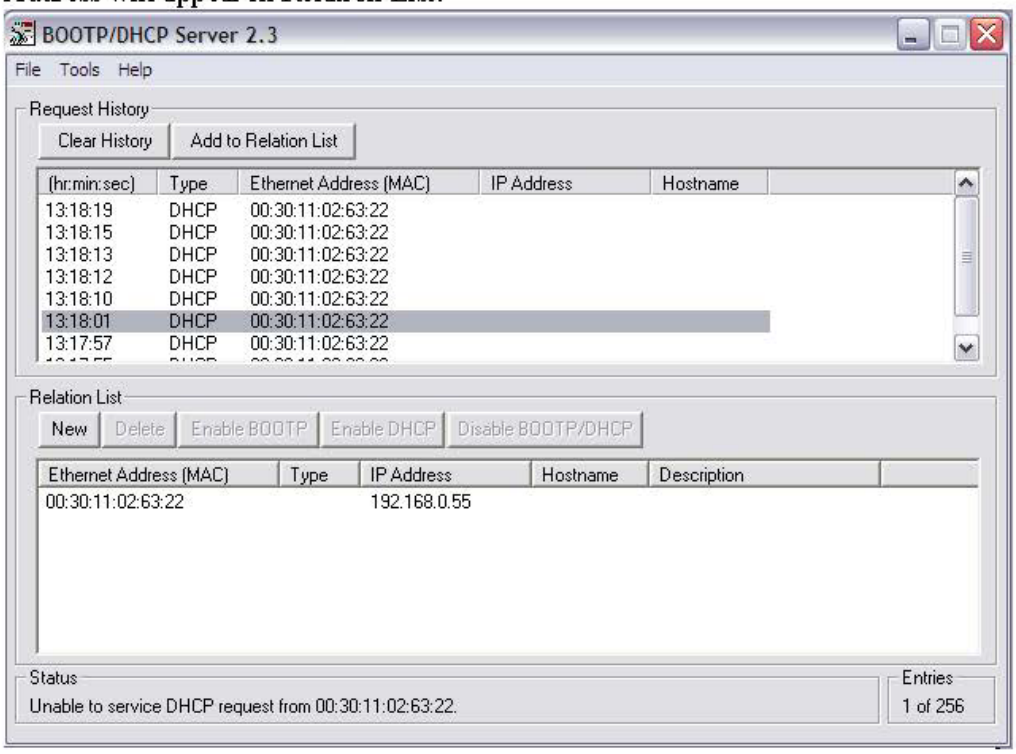


Double Click on MAC address and IP window will pop up.

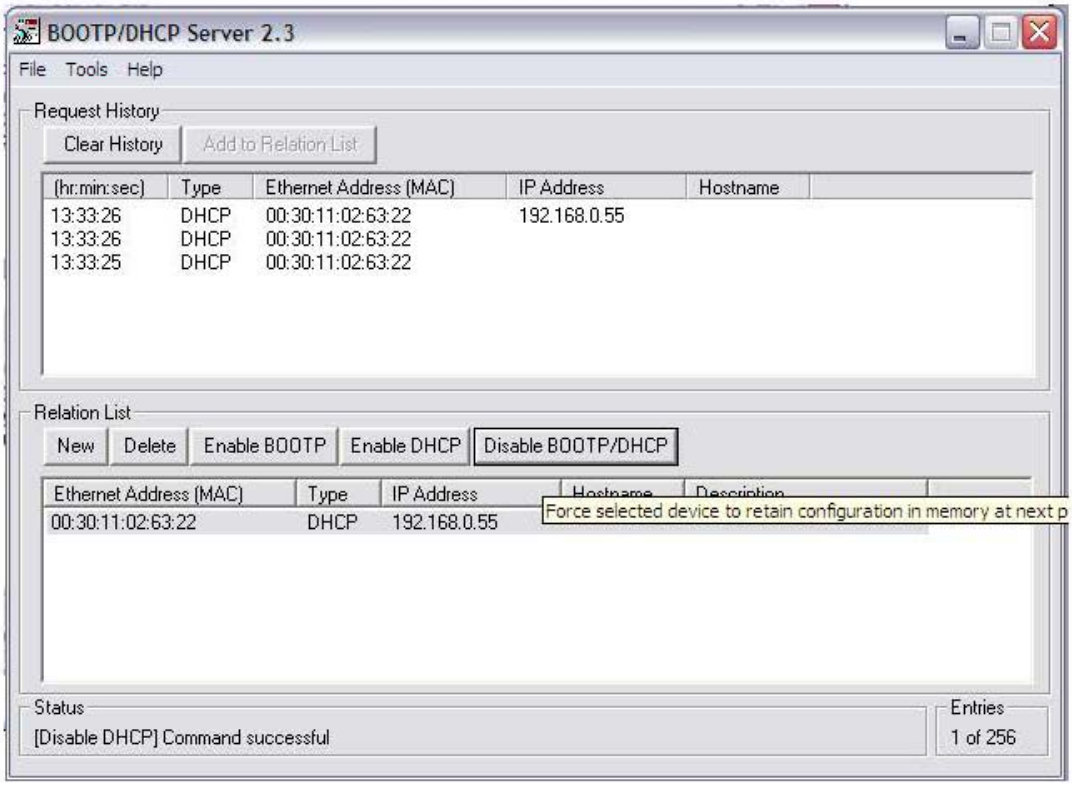


Fill in desired IP address and hit OK.

Address will appear in Relation List.



Click on that IP Address and select "Disable BOOTP/DHCP" to retain that IP address during the next power up. Try to hit the Disable BOOTP/DHCP within 5 seconds of setting address.



If the Disable BOOTP/DHCP Command is NOT successful (see message in lower left hand corner):

- Cycle Power to EX260
- Wait for the **MAC address along with the IP Address** to appear in the REQUEST HISTORY list
- Select the device in the RELATION LIST and click DISABLE BOOTP/DHCP.
- You should see Command Successful
- Use Dos prompt (Run CMD) to ping device.

Once Disable Command is successful, Setup is complete.

WIRE CUTTER INSTALLATION

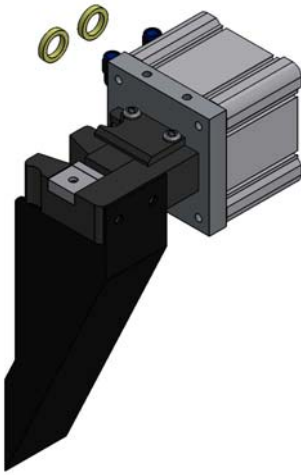
(RQ-1000SMC WIRE CUTTER KIT SMC MANIFOLD)

(See Appendix A-5 for different wire cutter and FESTO kits)

The RQ-1000SMC Wire Cutter Kit includes:

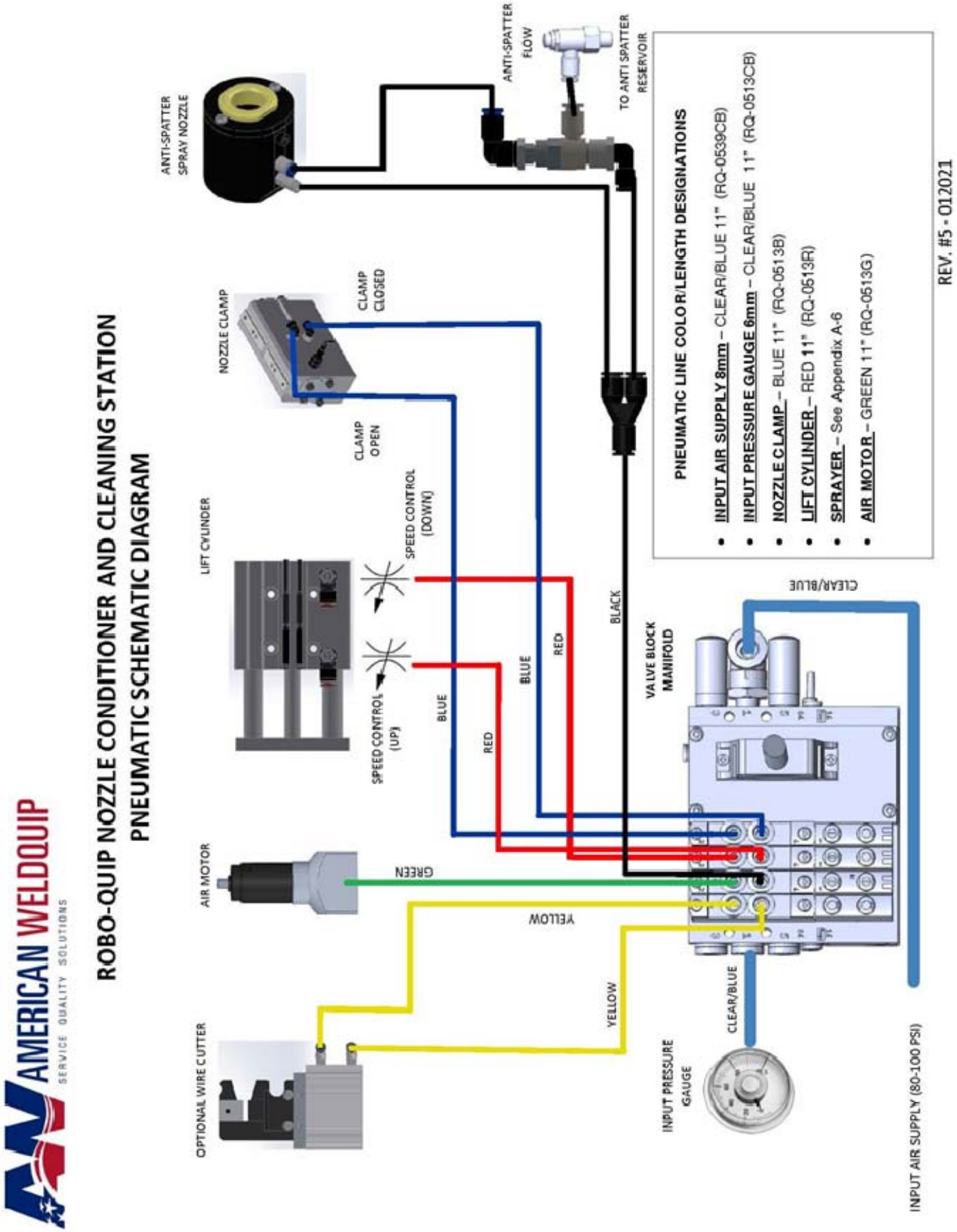
1ea. RQ-0615 Wire Cutter and Slide Chute
2ea. RQ-0554 Spacer Washer
2ea. RQ-0558 Push-to-connect Fitting
18" RQ-0513Y Pneumatic Hose
1ea. RQ-0617 Single Stage Valve
2 ea. RQ-0504 Screw
2 ea. RQ-0508 Lock Washer

1) Remove the rear cover of the Robo-Quip.
2) Remove the two (2) hole plugs on the right side of the Robo-Quip where the wire cutter will be mounted.
3) Place the spacer washers on the threaded ends of the push-to-connect fittings. The push-to-connect fittings are used to secure the wire cutter to the reamer box.
4) Hold the wire cutter in position. Line up the two air input holes on the wire cutter air solenoid to the two holes in the side of the Robo-Quip.
5) Thread the two push-to-connect fittings with the spacer washers installed into the two threaded posts on the wire cutter.
6) Tighten the two (2) push-to-connect fittings.
7) Using a PHILLIPS heads screwdriver loosen and remove the blank valve from the valve manifold. This will be the fourth position from the right.
8) Install the RQ-0617 single stage valve.
9) Cut the 18" length of pneumatic hose in two equal lengths.
10) Push one end of both hoses securely into the push-to-connect fittings on the wire cutter air cylinder.
11) Push the other ends of both hose in the single stage valve on the valve manifold.

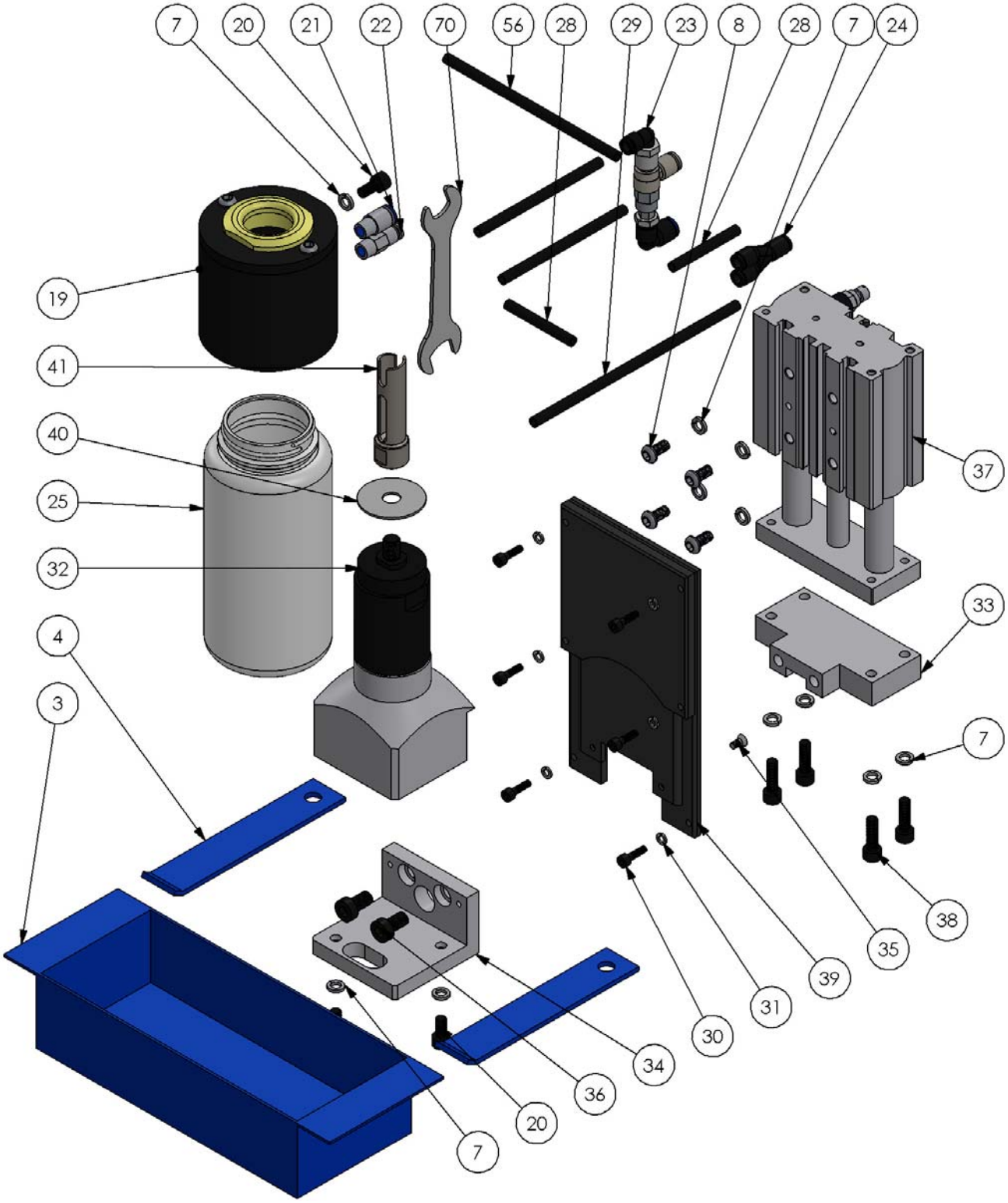


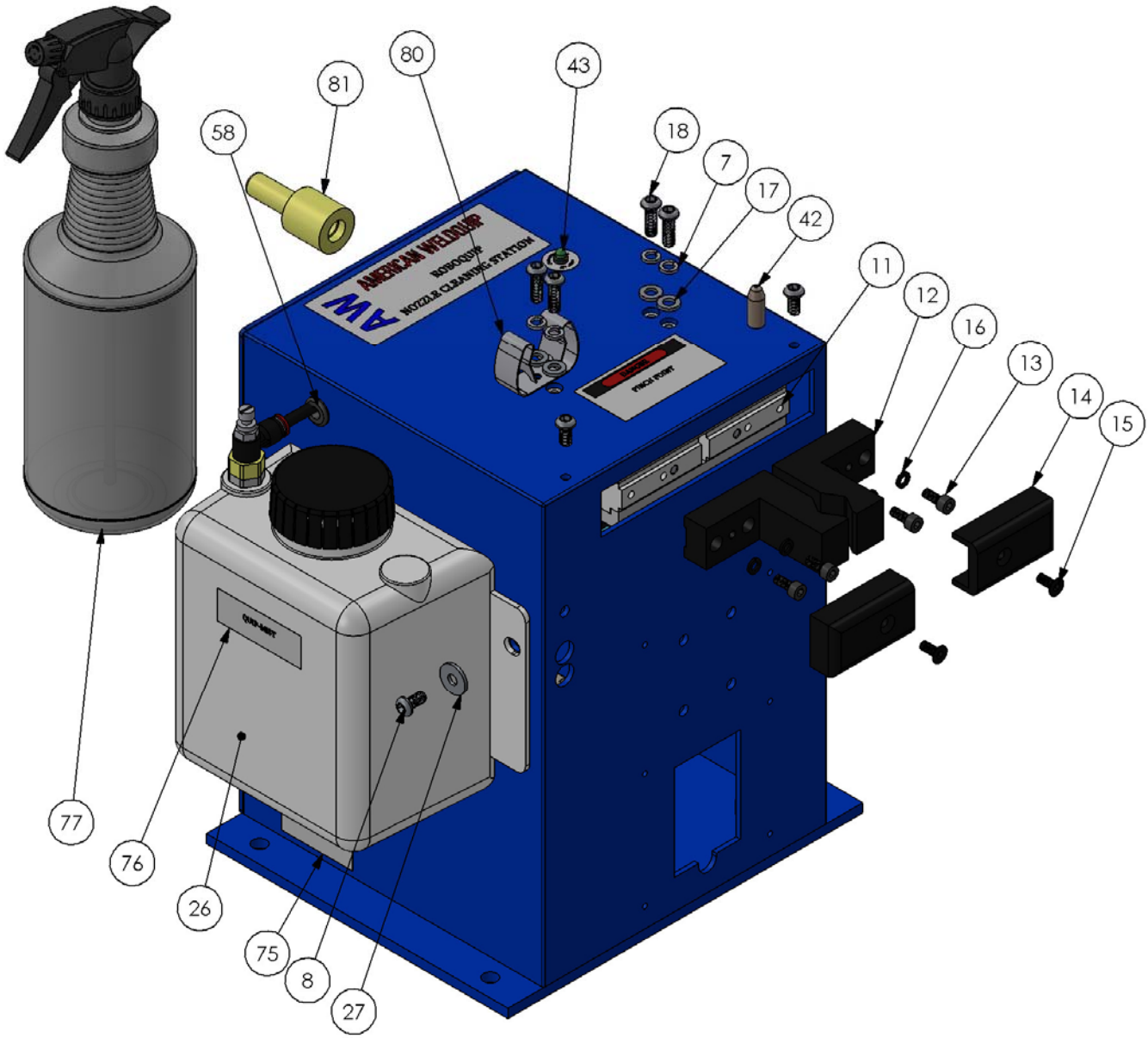
IMPORTANT: The airline connection on the wire cutter that is towards the front of the reamer is connected to the front most push-to-connect fitting on the single stage valve. If reversed, when the Robo-Quip is connected to electric and air, the wire cutter will close without being activated. Reverse the air line connections.

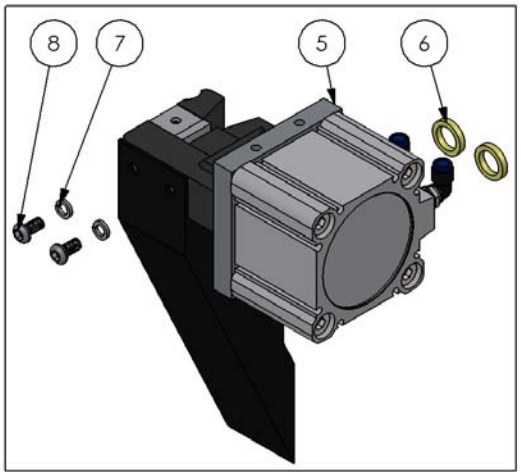
PNEUMATIC DIAGRAM



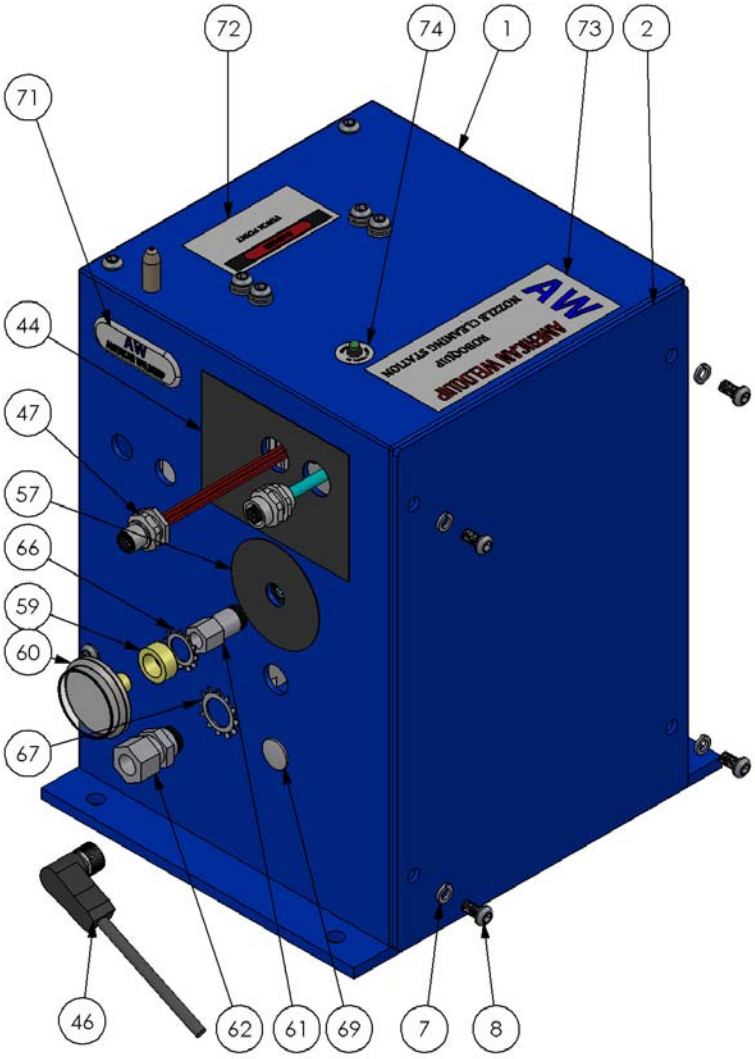
PARTS BREAKDOWN

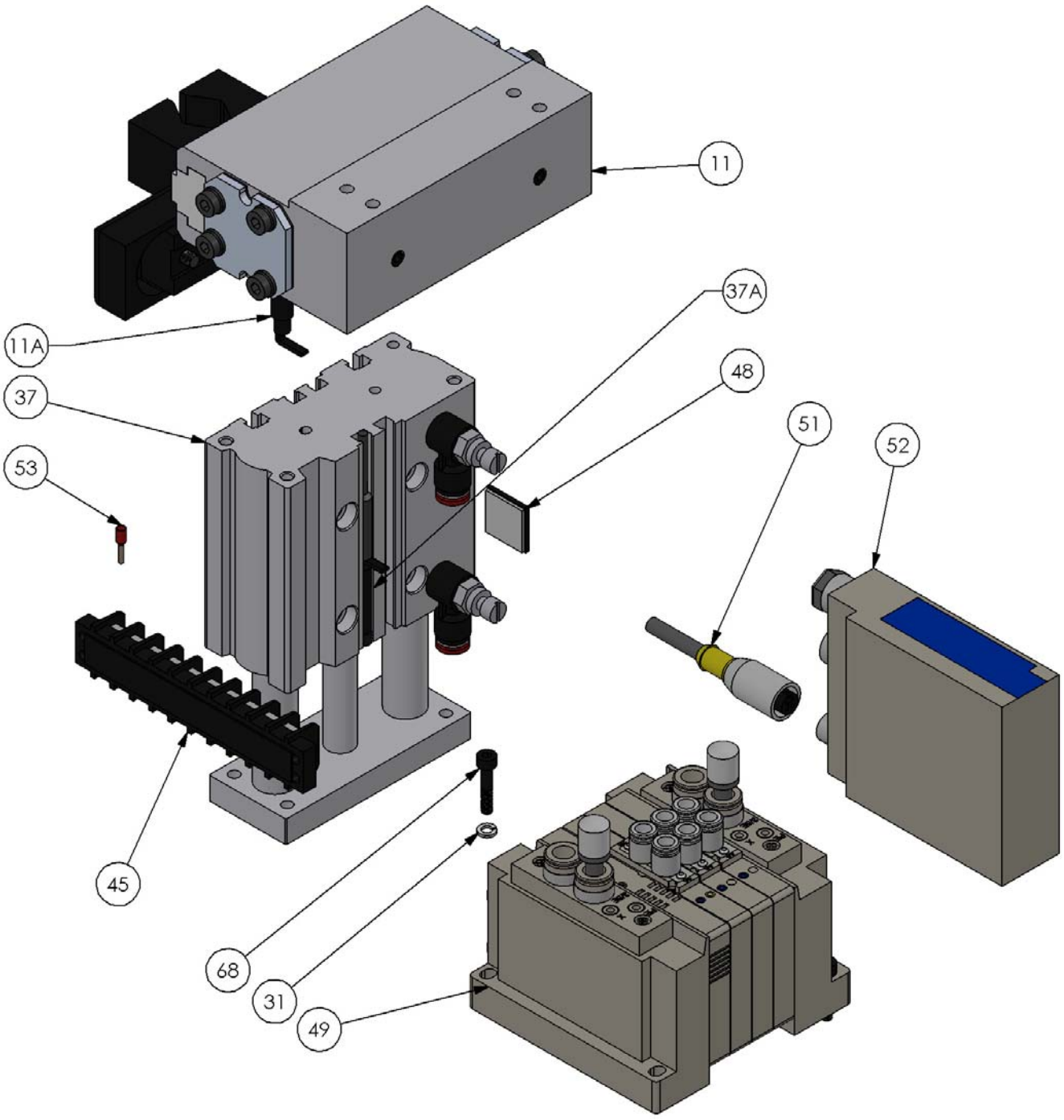



81
80
43
58
18
7
17
42
11
12
16
13
14
15
77
76
26
75
8
27



RQ-5000EWC only




11
37A
11A
48
37
51
52
53
45
68
31
49

ITEM NO.	PART NUMBER	DESCRIPTION
1	RQ-0100	REAMER HOUSING ASSEMBLY
2	RQ-0100C	BACK COVER
3	RQ-0102	DEBRIS TRAY
4	RQ-0103	TRAY SUPPORT
5	RQ-0615	WIRE CUTTER WITH CHUTE - LARGE
6	RQ-0554	SPACER WASHER
7	RQ-0508	M6 LOCK WASHER - SS
8	RQ-0504	M6-1 x 12mm BUTTON HEAD CAP SCREW - STAINLESS STEEL
9	RQ-0513Y	6MM PNEUMATIC HOSE, YELLOW - 12"
10	RQ-0617	VALVE - SMC SINGLE SOLENOID
11	RQ-0600	ROBOHAND COMPLETE
11A	RQ-0612	THREAD IN N/O REED SWITCH
12	RQ-0510	NOZZLE V BLOCK
13	RQ-0521	M5-0.8 x 12mm SOCKET HEAD CAP SCREW
14	RQ-0566	GRIPPER JAW COVER
15	RQ-0567	M5-0.8 x 12mm FLAT SOCKET HEAD CAP SCREW
16	RQ-0557	M5 LOCK WASHER - BO
17	RQ-0536	M6 6.4mmID x 12mmOD WASHER SS
18	RQ-0535	M6-1 x 18mm BUTTON HEAD CAP SCREW - STAINLESS STEEL
19	SEE APPENDIX A-1	ROUND SPRAYER ASSEMBLY
20	RQ-0503	M6-1 x 12mm SOCKET HEAD CAP SCREW
21	RQ-0522	1/8 BSPT TO 6MM MALE PTOC STRAIGHT
22	RQ-0655	1/8 BSPT TO 6MM MALE PTOC STRAIGHT CHECK VALVE
23	RQ-0598	ETHERNET/PROFINET SPRAYER VALVE ASSEMBLY
24	RQ-0608	6MM PTOC "Y" UNION
25	RQ-0532	EXCESS SPRAY BOTTLE
26	RQ-0528	ANTI-SPATTER 1.5QT TANK- COMPLETE
27	RQ-0564	M6 6.4mmID x 18mmOD WASHER SS
28	RQ-0513BK	6MM PNEUMATIC HOSE, BLACK - 2"
29	RQ-0513BK	6MM PNEUMATIC HOSE, BLACK - 6.25"
30	RQ-0507	M4-0.7 X 14mm SOCKET HEAD CAP SCREW SS
31	RQ-0526	M4 LOCK WASHER - SS
32	RQ-0500A	PNEUMATIC MOTOR W/ AIR FITTING ASSEMBLY
33	SEE APPENDIX A-3	REAMER MOTOR LIFT CYLINDER PLATE
34	SEE APPENDIX A-3	LIFT CYLINDER ANGLE BRACKET - 1 PC THICK
35	RQ-0518	M4-0.7 X 8mm FLAT HEAD PHILLIPS MACHINE SCREW SS
36	SEE APPENDIX A-3	M8-1.25 x 14mm LOW HEAD SOCKET HEAD CAP SCREW
37	RQ-0601P	LIFT CYLINDER ASSEMBLY - ETHERNET
37A	RQ-0562	N/O REED SWITCH

ITEM NO.	PART NUMBER	DESCRIPTION
38	SEE APPENDIX A-3	M6-1 x 20mm SOCKET HEAD CAP SCREW
39	RQ-0519	3 PC SLIDE HOLE COVER
40	RQ-0561	0.406" ID X 1.5" OD X 0.051" THK WASHER, ZP
41	SEE CHART	SEE REAMER BLADE CHART (STANDARD IS P/N RB625)
42	75052014C	TCP CHECK CONTACT TIP (ROBO-QUIP)
43	RQ-0563	LED LIGHT
44	RQ-0650	ETHERNET NAMEPLATE
45	RQ-0549	TERMINAL BLOCK
46	RQ-0545-15	CONTROL CABLE - 50FT (15M)
47	RQ-0544	8 PIN RECEPTACLE
48	RQ-0565	FASTENER MOUNT
49	SEE APPENDIX A-4	MANIFOLD
50	RQ-0604	NETWORK RECEPTACLE CABLE
51	RQ-0605	24V CONTROL CABLE
52	SEE APPENDIX A-4	NODE - ETHERNET IP
53	75077024B	INSULATED WIRE FERRULES
54	RQ-0513BK	6MM PNEUMATIC HOSE, BLACK - 8.75"
55	RQ-0513BK	6MM PNEUMATIC HOSE, BLACK - 3.75"
56	RQ-0513BK	6MM PNEUMATIC HOSE, BLACK - 8.25"
57	RQ-0651	AIR PRESSURE NAMEPLATE
58	RQ-0610	0.156"ID X 3/8" HOLE X 5/32" PANEL GROMMET
59	RQ-0541	PRESSURE GAUGE ADAPT WASHER
60	SEE APPENDIX A-7	PRESSURE GAUGE
61	RQ-0542	1/8 NPT FEMALE 6MM PTOC STRAIGHT FITTING
62	RQ-0543	PTOC BLACK HEAD ADAPTER 8MM TUBE - 1/4"
NS	RQ-0513B	6MM PNEUMATIC HOSE, BLUE - 12"
NS	RQ-0539CB	8MM PNEUMATIC HOSE, CLEAR BLUE - 9"
NS	RQ-0513CB	6MM PNEUMATIC HOSE, CLEAR BLUE - 6"
66	SEE APPENDIX A-7	1/2" EXTERNAL TOOTH LOCK WASHER
67	RQ-0491	5/8" EXTERNAL TOOTH LOCK WASHER
68	AST-149	M4-0.7 X 20mm SOCKET HEAD CAP SCREW
69	RQ-0550	HOLE PLUG - 0.5"
70	RQ-0578	WRENCH
71	L1000005	LABEL - AWQ DOMED LABEL
72	L1000006	LABEL - DANGER PINCH POINT
73	L1000007	LABEL - ROBO-QUIP NOZZLE CLEAN
74	L1000008	LABEL - CYCLE COMPLETE
75	L1000009	LABEL - SERIAL NUMBER
76	L1000010	LABEL - QUIP-MIST
77	870032NC	QUIP MIST 32OZ SPRAY
80	RQ-0478	REAMER BLADE GUIDE CLIP
81	RG-RB625	5/8" REAMER BLADE GUIDE

MAINTENANCE

1) RE-ALIGN CLAMP CYLINDER/JAWS TO REAMING CUTTER BLADE

a) Make sure there is +24V DC electrical power to the Robo-Quip.
b) Loosen the four (4) screws on the top of the reamer. DO NOT REMOVE. Once loose, you should be able to wiggle the jaw set around slightly.
c) Place the nozzle cleaning station in "Setup" mode using the robot controller.

CAUTION: MAKE SURE YOUR HANDS ETC ARE CLEAR OF THE FRONT OF THE REAMER. AS SOON AS THE ROBO CONTROLLER IS PLACED IN THE "SETUP" MODE, THE LIFT CYLINDER WILL ADVANCE UPWARD.

d) Using either a spare gooseneck with the consumables on it or moving the Robot into position place the nozzle to the correct depth over the reaming blade making sure it is straight on the reaming blade.

CAUTION: MAKE SURE YOUR HANDS ETC. ARE CLEAR OF THE FRONT AND TOP OF THE REAMER. THE JAWS CLOSING WILL CREATE A PINCH POINT.

e) Activate the jaws through the robot controller. This will close the jaws. **NOTE: The jaws need to remain closed while adjusting and tightening the screws.**
f) While the jaws are closed, give the jaw/clamp assembly a slight wiggle.
g) With the jaws remaining closed, tighten the four (4) screws on the top of the reamer.
h) Release the jaws and allow them to open.
i) To test the alignment, leave the torch in position and cycle the clamp.
j) Use the robot controller to place the nozzle cleaning station in the run position. The reamer motor will advance down, and the air motor will begin to rotate (Rotation will cease after the lift cylinder is in its fully downward position).

2) REED SWITCH REPLACEMENT

The Robo-Quip incorporates two (2) reed switches.

JAW CLAMP CYLINDER REED SWITCH – Normally Open. When the jaws are in the fully open position the reed switch is closed and completes the circuit to provided power through the LED light on the top of the Robo-Quip and +24V DC Cycle Complete signal back to the robot controller. NOTE: This reed switch and one on the lift cylinder are wired in series. If one or the other is defective the LED light will not light and no +24V DC signal will be sent to the robot controller.

JAW/CLAMP CYLINDER REED SWITCH REPLACEMENT

a) Disconnect the two pneumatic air lines.
b) Disconnect one side of the reed switch from the terminal strip. This is the lead located on terminal #6.
c) The other wire end of the reed switch is a crimped connection that is connected in series with the reed switch from the lift cylinder. Cut off the crimp connection.
d) Remove the four (4) screws from the top on the Robo-Quip and remove the complete clamp assembly.
e) The reed switch is screwed into the clamp housing. It is held in place by two locking nuts to prevent unscrewing the reed switch.
f) Reinstall the Jaw/Clamp cylinder back into the Robo-Quip.
g) Reinstall the wiring. It does not matter which lead goes to terminal #6. You will need to re-crimp one of the leads to the reed switch from the lift cylinder.
h) Reconnect the pneumatic air lines.
i) Realign lift and clamp by loosening the four screws on top of the clamp and place reamer in set up mode.

LIFT CYLINDER REED SWITCH – The lift cylinder incorporates one (1) reed switch.

a. The reed switch on the ***left side*** of the lift cylinder is a Normally Open switch. The reed switch is wired in conjunction with the clamp cylinder reed switch (wired in series). If the lift reed switch is defective the LED light will not light and no +24V DC signal will be sent to the robot controller.

3) LIFT CYLINDER REED SWITCH REPLACEMENT

Even though it may be a little tight you do not need to remove the lift cylinder from the Robo-Quip to access the reed switches.

a) Disconnect the two pneumatic air lines. You may want to remove the other pneumatic air lines to gain better access.
b) Depending on the reed switch to be removed, disconnect one side of the reed switch from the terminal strip.
   i. The reed switch on the *left side – CYCLE COMPLETE –* One side goes to the crimp connection that is connected in series with the reed switch on the clamp cylinder. Remove this crimp and remove the other side of the reed switch from terminal #10 on the terminal strip.
c) The reed switches are slid into a track on the lift cylinder. They are held in place by a rubber plug. Gently pull the tail of the plug removing it from the track and set aside for reuse.
d) NOTE: PLACEMENT OF THE REED SWITCH IS IMPORTANT FOR PROPER OPERATION. The reed switch needs to firmly butt up to the set screw within the track.
e) Slide the new reed switch in place so the end of the reed switch without the wire leads is against the set screw.
f) Reinstall the rubber plug behind the reed switch by pressing it into the track. Be careful to keep the reed against the set screw during this process.
g) You will need to re-crimp one of the leads to the reed switch from the clamp cylinder and the other to terminal #10.
h) Reconnect all the pneumatic air lines. Refer to Pneumatic Diagram for proper placement of pneumatic lines.

4) WIRE CUTTER BLADE REPLACEMENT (RQ-0560)

The wire cutter replacement blade kit consists of four (4) components.

a. Cutter Blade
b. Cutter Block
c. Cutter Stop Block
d. Spring

<u>To replace the Cutter Blade Kit:</u>

a) On the bottom of the wire cutter remove the screw using a 5mm Allen wrench securing the cutter block.
b) On the top of the wire cutter remove the two screws using a 3mm Allen wrench and remove slide cover.
c) Using a screwdriver pry the Cutter Stop Block out through the open space. You will see the spring between the space.
d) Remove the spring.
e) Using a small screwdriver reach into the air cylinder shaft and push the cylinder outward until the blade moves all the way forward.
f) Grab the Cutter Blade and pull out and off the air cylinder shaft slot.
g) Insert the new Cutter blade making sure it fits into the grooves in the air cylinder shaft.
h) Insert the new spring making sure it is compressed and properly in its holding slot in the cutter blade.
i) Place the cutter stop block all the way forward, and while keeping a downward pressure push the block back towards the air cylinder. You will notice a slot where the spring will ride and a hole where the dowel pin in the cutter blade will mate. You will feel the pin lock mate with the cutter block.
j) Reattach the slide cover removed in step 2 above with the two screws using a 3mm Allen wrench.
k) Reinstall the cutter block and secure with the screw using a 5mm Allen wrench.

<u>TROUBLESHOOTING</u>

1) LED LIGHT NOT LIT AND/OR NO +24V DC CYCLE COMPLETE SIGNAL BACK TO ROBOT CONTROLLER

a. Loss of power to the reamer. Make sure there is +24V DC to the Robo-Quip.
b. Defective Clamp Cylinder and/or Lift Cylinder reed switch.
c. Defective LED CYCLE COMPLETE light. – Replace the LED

2) AIR MOTOR ROTATES CONTINUOUSLY

a. Reed Switch on the Lift Cylinder is defective <u>or displaced</u>.
   i. Check displacement with motor in the down position.
      • Pull reed switch plug out or towards the top.
      • Dislodge the reed switch by moving it up. This will open the reed switch and the motor should shut off. If this is the case, adjust the set screw location so the switch

is in this position when lift is not activated and push the plug against the reed switch.

ii. Check for reed switch continuity.

- Remove reed switch lead from the terminal strip (#9 or #10) and check for continuity on the reed switch in the active position. If the reed switch does not open when the lift cylinder is moved upward, replace the defective reed switch. See Maintenance Section for reed switch replacement instructions.

b. Check the Air Motor valve on the manifold.
   i. Verify PLC does not have Air Motor valve activated.
   ii. Manually clear the valve by hitting the blue test button on manifold to clear any debris. See Pneumatic Diagram for solenoid valve location (Green and Black hoses).
   iii. If cycling several times dislodges the valve and shuts off the air motor, this may need to be replaced with RQ-0616 (SMC) or RQ-0572 (Festo).

3) AIR MOTOR ROTATES SLOWLY OR NOT AT ALL

a. Check incoming air supply pressure. Check the air gauge on the side of the Robo-Quip for the minimum 80 psi input air pressure.
b. Check the Air Motor valve on the valve manifold for signal. When "CYCLE START' signal is sent to the ROBO-QUIP and the lift cylinder moves upward check the valve LED light on the valve manifold to make sure it is lit. If not,
   i. Check wiring as it is not getting a signal.
   ii. Replace defective valve.
c. Defective Air Motor – Replace.
d. Defective reed switch – This reed switch is on the right side of the lift cylinder. Remove one lead from the terminal strip and check for continuity. With the lift cylinder full downward reed switch should be OPEN. When the lift cylinder is moved upward the reed switch should close. If the reed switch does not close when the lift cylinder is moved upward replace the defective reed switch. See Maintenance Section for reed switch replacement instructions.
e. If the air motor slowly rotates when only incoming air is supplied to the Robo-Quip but not activated.
   i. Remove the valve from the manifold and check the condition of the rubber seals.
   ii. Defective valve – replace.

4) LIFT CYLINDER WILL NOT OPERATE OR IS SLUGGISH

a. Check incoming air supply pressure. Check the air gauge on the side of the Robo-Quip for the minimum 80 psi input air pressure.
b. Check the Lift Cylinder valve on the valve manifold for signal. When "CYCLE START' signal is sent to the ROBO-QUIP the lift cylinder valve LED light on the valve manifold should light. If not,
   i. Check wiring – It is not getting a signal.
c. Check the two (2) speed adjustment valves on the cylinder for proper adjustment and make sure they are not plugged. Replace the speed adjustment valves if defective.
d. Defective Valve - Replace defective valve.
e. Defective Lift Cylinder - Replace the lift cylinder.

5) REAMING BLADE STICKS IN NOZZLE OR MISALIGNED

a. Check incoming air supply pressure. Check the air gauge on the side of the Robo-Quip for the minimum 80 psi input air pressure.
b. Dull or broken reaming cutting blade. Replace Reaming Blade.
c. Excessive spatter build-up in nozzle. Increase the frequency of torch cleaning.
d. Is the torch positioned incorrectly over the reaming blade. Realign torch and nozzle so the blade enters straight into the nozzle.

e. Torch clamping cylinder/jaws misaligned. Perform realignment of torch jaws. See Maintenance section.

6) SPRAYER WILL NOT OPERATE

a. Check incoming air supply pressure. Check the air gauge on the side of the Robo-Quip for the minimum 80 psi input air pressure.
b. Check the Sprayer valve on the valve manifold for signal. When "SPRAYER" signal is sent to the ROBO-QUIP the Sprayer valve LED light on the valve manifold should lit. Either activate by means of the robot or press the sprayer test button on the side of the Robo-Quip.
   i. Check wiring – It is not getting the on signal.
   ii. Defective Valve - Replace defective valve.
c. Check for plugged check valves. There are two (2); replace if plugged.
d. Check for plugged venturi valve, replace if plugged.
e. Check for plugged spray tip. Clean or replace.
f. Check flow adjustment valve on spray reservoir tank. Make sure it is open. Replace tank if plugged.

7) SPRAYER ANTI-SPATTER FLUID LEAKING INTO VALVE ASSEMBLY

a. Replace the check valve between the Sprayer valve on the valve manifold and the venturi.

8) SPRAYER ANTI-SPATTER FLUID LEAKING INTO SPRAY ENCLOSURE AND SPRAY TIP

a. Replace the check valve between the venturi and the spray enclosure.

9) SPRAYER ANTI-SPATTER FLUID SPRAYS WHEN AIR CONNECTION TO REAMER IS CONNECTED

a. Remove the sprayer valve from the manifold and check the condition of the rubber seals.
b. Defective valve – replace.

10) SPRAYER BLOW BY AIR ENTERING INTO ANTI-SPATTER RESERVOIR TANK

a. Plugged orifice on spray tip or too small of orifice used.
b. Plugged Check valve or air lines.

11) NOT ENOUGH ANTI-SPATTER SPRAY

a. Check that the Flow Control adjustment valve on the Reservoir tank is open.
b. Plugged orifice on spray tip or too small of orifice used.
c. Plugged check valve or air lines.
d. Plugged or defective venturi valve.
e. Defective flow valve on reservoir tank.

12) WIRE CUTTER WILL NOT OPERATE OR IS SLUGGISH

a. Check incoming air supply pressure. Check the air gauge on the side of the Robo-Quip for the minimum 80 psi input air pressure.
b. Check the Wire Cutter valve on the valve manifold for signal. When WIRE CUTTER signal is sent to the ROBO-QUIP the wire cutter valve LED light on the valve manifold should light. If not,
   i. Check wiring – It is not getting the on signal.
   ii. Defective Valve - Replace defective valve.
c. Defective wire cutter air cylinder – Replace.

13) WIRE CUTTER WILL NOT CUT THROUGH WIRE

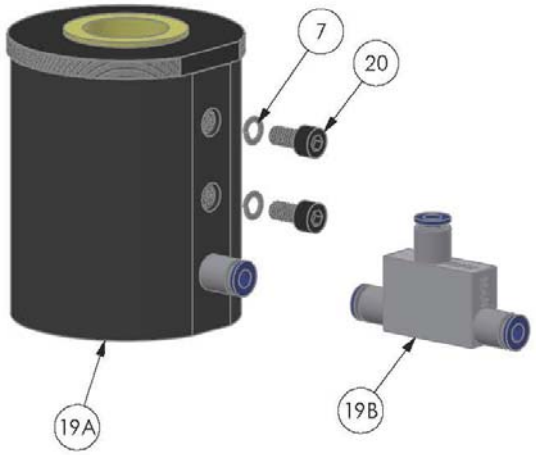
a. Check incoming air supply pressure. Check the air gauge on the side of the Robo-Quip for the minimum 80 psi input air pressure.
b. Check wire size used to be cut. 1/16" is the largest recommended size in most applications.
C. Dull or defective cutting blade – Replace cutting blade.

APPENDIX

A-1 Sprayer Variations

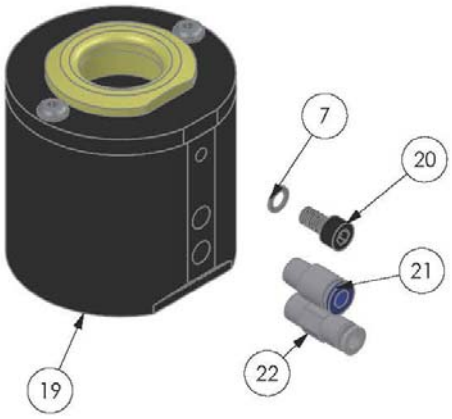
The old sprayer, plastic, is mounted using two socket head screws and one pneumatic air fitting. The new sprayer, now aluminum, utilizes one socket head screw and two pneumatic air fittings. The old sprayer and new sprayer are not interchangeable in the field and must be done at the manufacture by returning the whole unit for update. Below are images of both showing the differences.

Old sprayer



ITEM NO.	PART NUMBER	DESCRIPTION
7	RQ-0508	M6 LOCK WASHER
19A	RQ-0527	SPRAYER ENCLOSURE SYSTEM
19B	RQ-0530	VENTURI ASSEMBLY
20	RQ-0503	M6-1 x 12mm SOCKET HEAD CAP SCREW

New sprayer



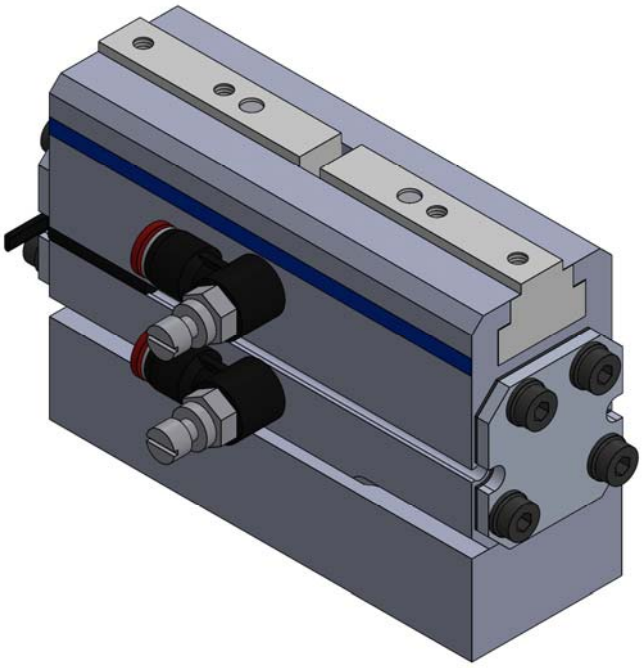
ITEM NO.	PART NUMBER	DESCRIPTION
7	RQ-0508	M6 LOCK WASHER
19	RQ-0486	ROUND SPRAYER ASSEMBLY
20	RQ-0503	M6-1 x 12mm SOCKET HEAD CAP SCREW
21	RQ-0522	1/8 BSPT TO 6MM MALE PTOC STRAIGHT
22	RQ-0655	1/8 BSPT TO 6MM MALE PTOC STRAIGHT CHECK VALVE

A-2 Clamp Cylinder Variations

The difference between the old and new is an older one-piece clamp that was non-serviceable. The new multi-piece clamp can be disassembled and serviced at the manufacturing plant. The major distinguishing factor between the clamps are a screw-in reed switch on the new versus a slide in on the old. The old clamp also contains a secondary block for mounting whereas the new block has mounting holes directly machined in.

***These are interchangeable and the same part number.**

Old clamp



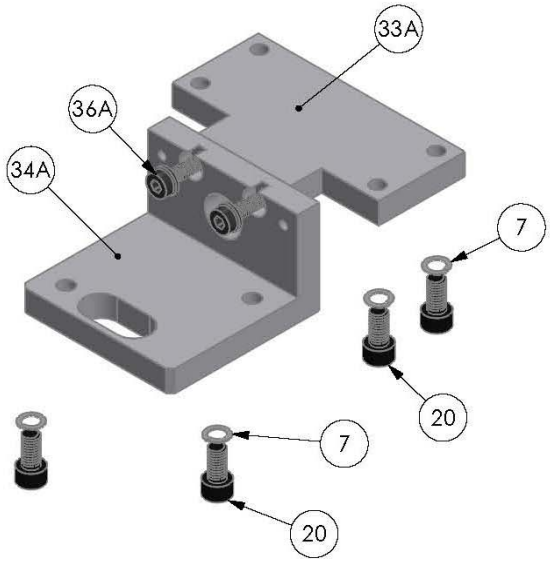
New clamp

A-3 Lift Bracket Variations

A change in the lift bracket has ensured a more stable and level alignment of the air motor. The now thicker, one-piece mounting plate allows for more surface area preventing the weight of the air motor from playing a factor in the misalignment.

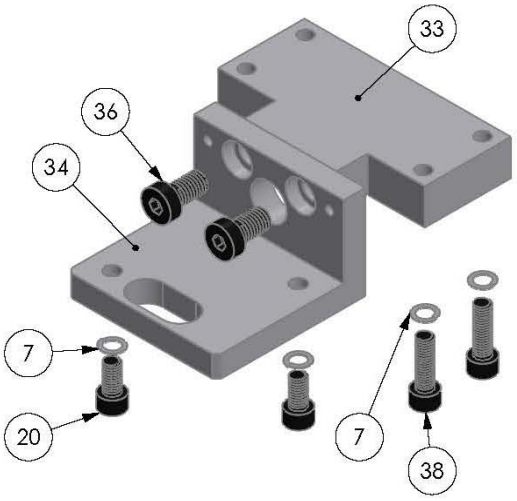
The old and new style mounting brackets are <u>NOT</u> interchangeable. If you have an old-style bracket, please order the old style. Note the updated old-style is now a single piece L-bracket, not two pieces.

Old Bracket



ITEM NO.	PART NUMBER	DESCRIPTION
7	RQ-0508	M6 LOCK WASHER
20	RQ-0503	M6-1 x 12mm SOCKET HEAD CAP SCREW
33A	RQ-0501	REAMER MOTOR LIFT CYLINDER PLATE
34A	RQ-0577	LIFT CYLINDER ANGLE BRACKET - 1 PIECE
36A	RQ-0521L	M5-0.8 x 12mm SOCKET HEAD CAP SCREW - LOCKING

New Bracket

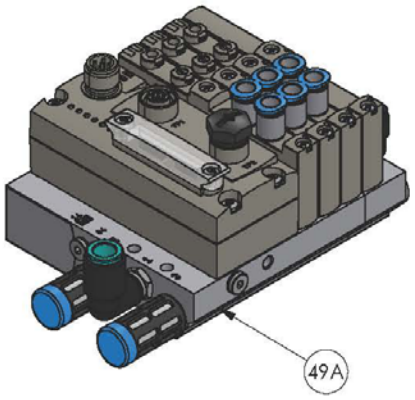


ITEM NO.	PART NUMBER	DESCRIPTION
7	RQ-0508	M6 LOCK WASHER
20	RQ-0503	M6-1 x 12mm SOCKET HEAD CAP SCREW
33	RQ-0596	REAMER MOTOR LIFT CYLINDER PLATE
34	RQ-0595	LIFT CYLINDER ANGLE BRACKET - 1 PC THICK
36	RQ-0482	M8-1.25 x 14mm LOW HEAD SOCKET HEAD CAP SCREW
38	RQ-0481	M6-1 x 20mm SOCKET HEAD CAP SCREW

A-4 Manifold Variations

The manifolds in the RQ-5000E started as a Festo, RQ-0523E. We have since made the move to an SMC, RQ-0523SMC-R and RQ-0619. These manifolds have the same function but different mounting holes.

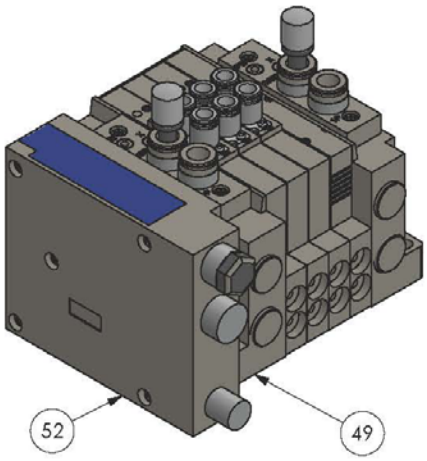
RQ-0523E
(FOR RQ-5000E)



NO LONGER AVAILABLE

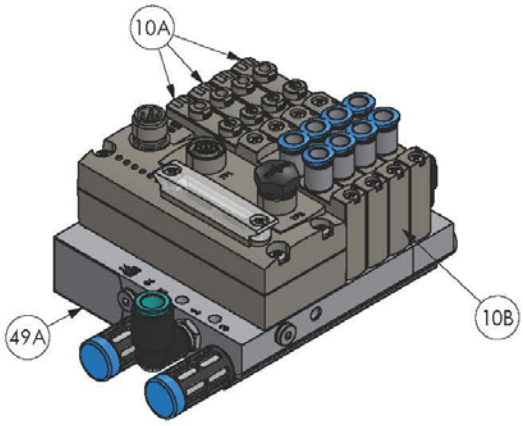
ITEM NO.	PART NUMBER	DESCRIPTION
49A	RQ-0523E	FESTO MANIFOLD

RQ-0523E-SMC
(FOR RQ-5000E)



ITEM NO.	PART NUMBER	DESCRIPTION
49	RQ-0523SMC-R	SMC MANIFOLD
52	RQ-0619	NODE - SMC ETHERNET IP

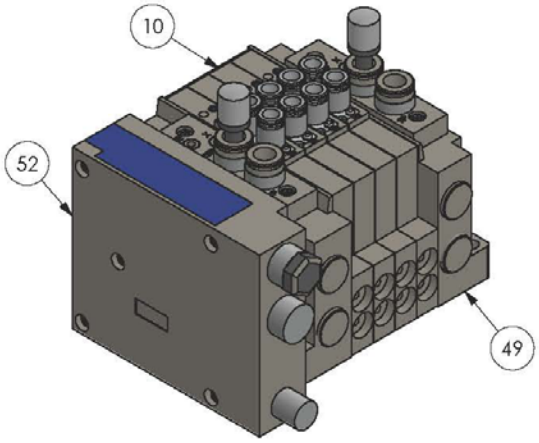
RQ-0523E & RQ-0524
(FOR RQ-5000EWC)



ITEM NO.	PART NUMBER	DESCRIPTION
10A	RQ-0524	VALVE - FESTO SINGLE SOLENOID
10B	RQ-0572	VALVE - FESTO DUAL SOLENOID
49A	RQ-0523E	FESTO MANIFOLD

RQ-0523E, COMPLETE FESTO MANIFOLD, NO LONGER AVAILABLE. RQ-0572 (SPRAYER/AIR MOTOR) AND RQ-0524 (ALL OTHER) VALVES STILL AVAILABLE.

RQ-0523EW-SMC
(FOR RQ-5000EWC)



ITEM NO.	PART NUMBER	DESCRIPTION
10	RQ-0617	VALVE - SMC SINGLE SOLENOID
49	RQ-0523SMC-R	SMC MANIFOLD
52	RQ-0619	NODE - SMC ETHERNET IP

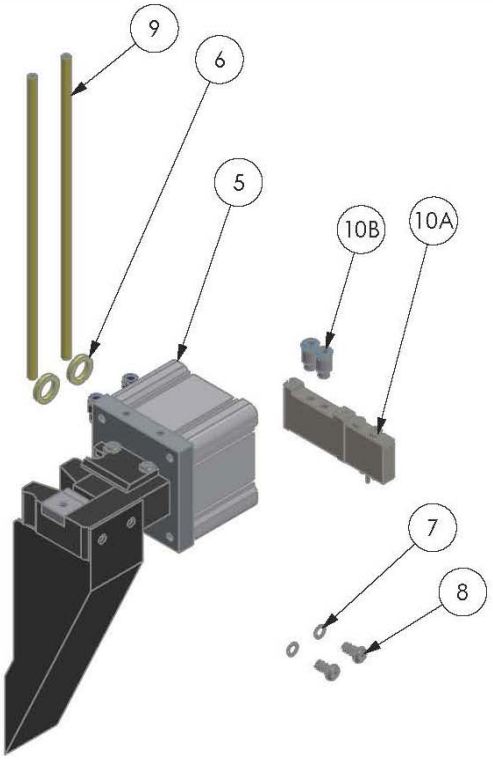
***RQ-0523E-SMC is for standard RQ-5000E reaming stations. RQ-0523EW-SMC is for standard with wire cutter RQ-5000EWC. See Appendix A-5 to convert a RQ-5000E to RQ-5000EWC. ***

Need an adaptor plate, RQ-0100P, to place the SMC manifold on the existing Festo bolt pattern and an updated RQ-0604 network cable as the Festo will not reach

A-5 Wire Cutter Kit

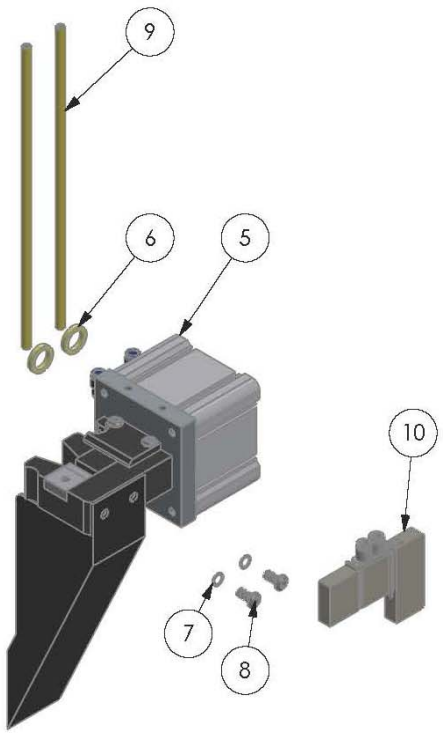
RQ-1000 is needed to add a wire cutter to a standard RQ-5000E nozzle cleaning station with a **FESTO** manifold. The kit provides the needed hardware, including a dual stage valve to replace the blank valve. The RQ-1000SMC provides the hardware to convert a RQ-5000E-SMC with a SMC manifold. This kit also provides a valve to replace the blank.

***This addition can be done in the field and requires only hand tools with no rewiring.**



NOTES:
1) RQ-0615 includes chute and elbow fittings.

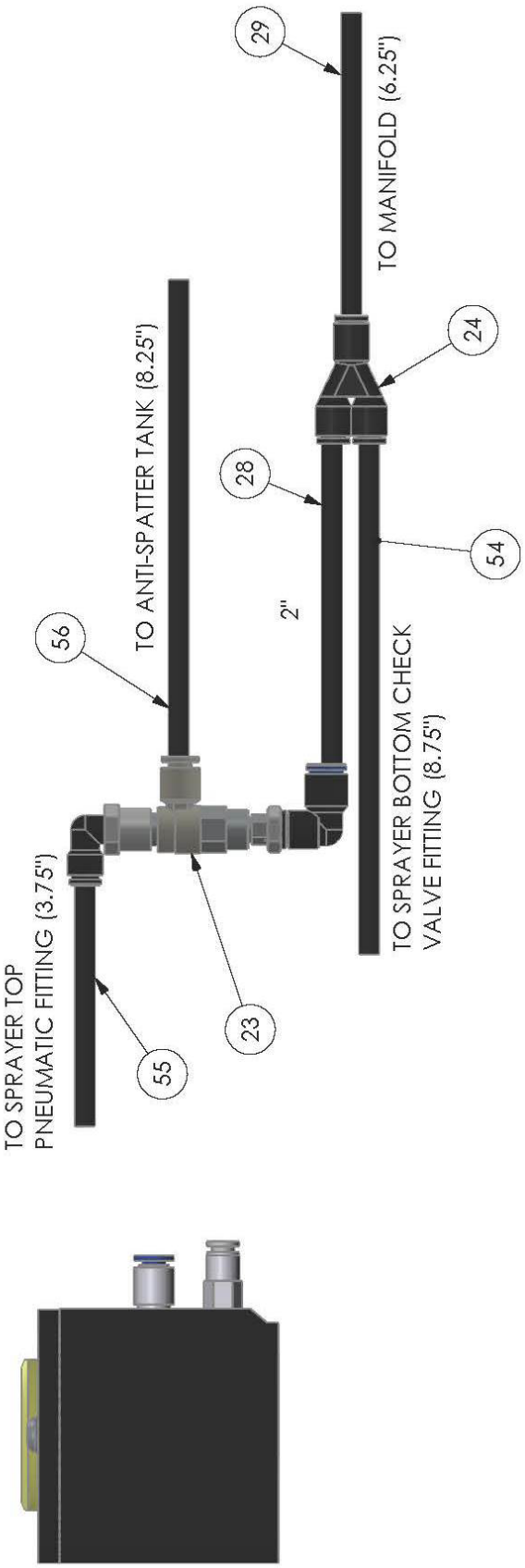
ITEM NO.	PART NUMBER	DESCRIPTION
5	RQ-0615	WIRE CUTTER WITH CHUTE - LARGE
6	RQ-0554	SPACER WASHER
7	RQ-0508	M6 LOCK WASHER
8	RQ-0504	M6-1 x 12mm BUTTON HEAD CAP SCREW - STAINLESS STEEL
9	RQ-0513Y	6MM PNEUMATIC HOSE, YELLOW - 9"
10A	RQ-0524	SINGLE STAGE VALVE
10B	RQ-0558	PUSH-IN STRAIGHT FITTING - FESTO VALVE



NOTES:
1) RQ-0615 includes chute and elbow fittings.

ITEM NO.	PART NUMBER	DESCRIPTION
5	RQ-0615	WIRE CUTTER WITH CHUTE - LARGE
6	RQ-0554	SPACER WASHER
7	RQ-0508	M6 LOCK WASHER
8	RQ-0504	M6-1 x 12mm BUTTON HEAD CAP SCREW - STAINLESS STEEL
9	RQ-0513Y	6MM PNEUMATIC HOSE, YELLOW - 9"
10	RQ-0617	VALVE - SMC SINGLE SOLENOID

A-6 Sprayer Routing



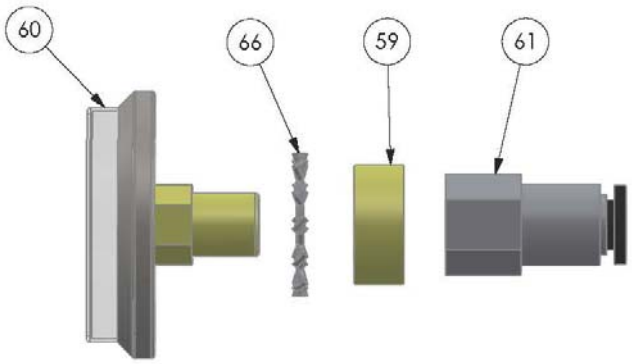
*REFERENCE PARTS BREAKDOWN FOR PART NUMBERS.

A-7 Pressure Gauge

The added external lock tooth washer is needed when installing the Winters brand air pressure gauge.

ITEM NO.	PART NUMBER	DESCRIPTION
59	RQ-0541	PRESSURE GAUGE ADAPT WASHER
60	RQ-0540	PRESSURE GAUGE
61	RQ-0542	1/8 NPT FEMALE 6MM PTOC STRAIGHT FITTING
66	RQ-0498	1/2" EXTERNAL TOOTH LOCK WASHER

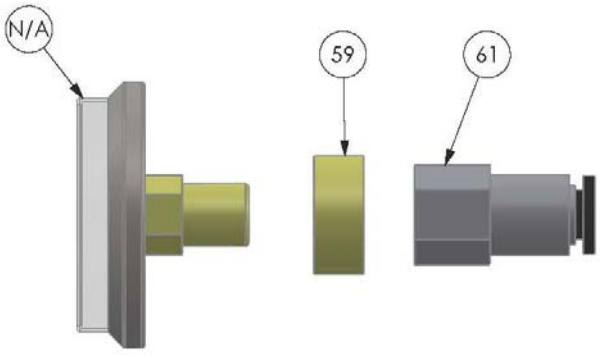
NEW: WINTERS



IF REPLACING ASHCROFT PRESSURE GAUGE, NEED TO ORDER WINTERS GAUGE AND RQ-0498, 1/2" EXTERNAL TOOTH LOCK WASHER.

ITEM NO.	PART NUMBER	DESCRIPTION
59	RQ-0541	PRESSURE GAUGE ADAPT WASHER
61	RQ-0542	1/8 NPT FEMALE 6MM PTOC STRAIGHT FITTING
N/A	N/A	PRESSURE GAUGE (ASHCROFT)

OLD: ASHCROFT (NO LONGER AVAILABLE)



NOTES

AMERICAN WELDQUIP

1375 Wolf Creek Trail – P.O. Box 397

Sharon Center, Ohio 44274

Telephone 330-239-0317

Fax 800-949-9353

www.weldquip.com

www.youtube.com/weldquip1

WORKING TO REDUCE OUR ENVIRONMENTAL IMPACT ON THE WORLD