Safety Depends on You
DO NOT INSTALL, OPERATE, OR REPAIR THIS EQUIPMENT WITHOUT READING THIS MANUAL AND THE SAFETY PRECAUTIONS CONTAINED THROUGHOUT.

OWNERS MANUAL
ROBOTIC MIG (GMAW) Welding Torch
Safety Information

WARNING
ARC WELDING CAN BE HAZARDOUS.
PROTECT YOURSELF AND OTHERS FROM POSSIBLE SERIOUS INJURY OR DEATH. KEEP CHILDREN AWAY.

Fumes and Gases!
Toxic fumes and gases may be produced during welding. Breathing welding fumes can lead to toxification and breathlessness. Do not inhale fumes and gases. Provide sufficient ventilation at the arc or wear an approved air-supply respirator. Keep vapours and solvents away from the arc radiation area.

Hot sparks and spatter!
During welding, hot flying sparks and spatter are generated from the arc which may cause fire or explosion. Remove containers with flammable or explosive liquids. Do not heat explosive liquids, dust or gases by welding or thermal cutting. ARC RAYS CAN BURN!

Strong electric and electromagnetic field!
Electric current flowing through any welding cables cause localized electric and magnetic fields. Malfunction of electronic devices (e.g. computers) may occur near the welding site. Do not use electronic devices near the welding unit or if necessary protect devices from electromagnetic radiation. Implanted Medical Device wearers should consult their doctor and the device manufacturer before performing or going near welding, plasma cutting, or induction heating operations.

Radiation!
Arc welding emits ultraviolet (UV) radiation. Burns on unprotected skin and blindness are possible. Protect your skin by wearing suitable clothing made from flame-resistant material. Protect observers with arc curtains or other protectors from optical radiation. When welding or observing the arc, protect your eyes with the proper optical filter and cover plates. Headshield and filter lens should conform to ANSI Z87.1 standards. Vapours of chlorinated hydrocarbon may convert into toxic phosgene under ultraviolet radiation.

Burn Hazard!
Contact tip, diffuser, gas nozzle and gooseneck may be hot during and after welding. Close proximity to torch components can pose a risk of burns. Wear suitable personal protective equipment (PPE) such as heat resistant gloves and clothing whenever working near heat affected components or equipment. Allow for equipment to cool before working on or near hot equipment.
Safety Information

Electrical Shock!
Contact tip electrode, diffuser (tip retaining head) and work (or ground) surface may be energized when the welding equipment is on. Electric shock is possible on contact. Wear personal protective equipment (PPE) such as insulated gloves and clothing whenever working around electrically live equipment. Insulate the work and ground by using dry insulation large enough to cover the full area of contact. Turn off input power using the disconnect switch at the fuse box prior to working on any welding equipment. Switching off the power source or removal of a fuse is not a sufficient isolation measure.
Check the following to prevent electrical shock:
   a. Equipment is properly grounded and installed according to code.
   b. Repair or replace faulty or damaged equipment.
   c. Perform proper torch maintenance to prevent excess spatter accumulation in the nozzle, or the contact tip.
   d. Electrical insulating components are installed and not damaged. Replace or repair if necessary.
   e. Robot cell and surroundings are not wet.
   f. Equipment is turned off when not in use.

Noise!
High noise levels may be generated during welding. Noise of more than 70 dBA can cause permanent hearing damage and deafness. Wear approved ear protection if noise level is high. Ensure other persons in the working area are not disturbed by noise.

High pressure!
Gas containers and gas supply systems are under high pressure and may explode if damaged or handled incorrectly. Follow manufacturers handling instructions of the gas cylinder and gas regulator. Secure gas containers to a stationary support in an upright position. Place cylinders in provided collets and secure with retaining chain. Protect gas containers against toppling, do not throw or heat.
Read and follow instructions on compressed gas cylinders, associated equipment, and Compressed Gas Association (CGA) publication P-1 listed in Safety Standards.

Guard against moving parts!
Keep all equipment safety guards, covers and devices in position and in good repair. Keep hands, hair, clothing and tools away from V-belts, gears, fans and all other moving parts when starting, operating or repairing equipment.

Protect your vision!
Flying metal sparks or dirt can injure your eyes. Always wear safety glasses in work area AT ALL TIMES.

Injury from Welding Wire!
Do not point the welding torch toward any part of your body, other people or any metal object(s) when feeding the welding wire. Welding wire can be hot and sharp. Be aware of your surroundings and wear suitable PPE to protect hands, eyes and other body parts when working with or near welding wire.
IMPORTANT: Be sure to follow your facility’s lockout / tagout procedures

Operational Error
Incorrect operation and maintenance may cause malfunction and damage to property. Read and follow instruction manual of all welding components, e.g. power source, wire feeder and cooling unit before installing, operating, or servicing. Do not exceed specified duty cycle limits. Allow cooling period: reduce current or reduce duty cycle before starting to weld again.

Handling Cable
Improper treatment of welding or other cables can lead to breach of insulation and affect usability. Protect cables from sharp edges. Keep away from liquids, splash or spray. Do not contact hot parts.

CALIFORNIA PROPOSITION 65 WARNING
This product, when used for welding or cutting, produces fumes, gases and other byproducts which may contain chemicals known to the State of California to cause birth defects or other reproductive harm and, in some cases, cancer. Please see https://www.p65warnings.ca.gov/ for further information.

Applicable Safety Standards
CSA Standard W117.2 CODE FOR SAFETY IN WELDING AND CUTTING obtainable from the Canadian Standards Association, Standards Sales, 178 Rexdale Boulevard, Rexdale, Ontario, Canada M9W 1R3.

ANSI Standard Z49.1 CODE FOR SAFETY IN WELDING AND CUTTING obtainable from the American National Standards Institute, 1430 Broadway, New York, NY 10018.


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1. Specifications

Robotic MIG Torch for GMAW Welding

1.1. System Components

Notes:
1. For hard wire (steel) welding a jump liner may be used in the gooseneck in conjunction with a cable liner. For soft wire (aluminum) welding a single torch liner is used.
2. The interface module, insulation disc and power cable vary depending on the TCP and choice of solid mount or shock absorbing clutch.
2. Installation

2.1. Gooseneck

Gooseneck assembly is shown below.

1. If a jump liner is used; With the contact tip, nozzle, and diffuser (item 2,3,4) removed, slide the jump liner (item 1), orientation as shown, into the gooseneck (item 5) from the nozzle end. Twist the liner while inserting to ensure that it seats properly into the plug (item 6).
2. Tighten diffuser (item 4) onto the gooseneck using a 9/16” wrench, torque to 65 in-lbs (7.3 Nm).
3. Tighten contact tip (item 2) into the diffuser (30 in-lbs, 3.4 Nm).
4. Snap or thread the nozzle (item 3) onto the diffuser (item 4).
2.2. Power Pin Installation

Note: If the power pin is pre-installed or integrated into the power cable proceed to section 2.3.

1. Lay all items on a flat surface for assembly.
2. Thread the power pin (Power pin may differ from shown, item 1) into the back end of the power cable. Ensure that the power pin is seated firmly against the brass connector (item 2) at the end of the power cable, torque to 80.0 in-lb (9.0 Nm).

![Figure 3]

2.3. Power Cable Liner Installation for use with Jump Liner

Note: For torch liner installation without jump liner proceed with the remainder of Section 2, then refer to section 5.2 - 5.5.

1. Verify that the O-ring is secured on the brass collet (item 2) at the end of the liner (item 1), power pin side.
2. Insert the trimmed end of the liner into the power cable from the power pin side. Using a 10mm wrench, thread the brass collet into the end of the power pin securing the liner in place.

![Figure 4]

3. Cut the liner exactly 65 mm from the front end of the power connector.

![Figure 5]
2.4. Robot Position for Cable Installation

Move the robot to a position where the upper arm is aligned with the wrist and the wrist oriented in its zero (0) degree position.

Various insulation discs and interface modules are available for the REVOLUTION360® Torch. The insulation disc may be one or two piece and the interface module may be a solid mount or shock absorbing clutch. The next section outlines installation methods for both of each.
2.5. Insulation Disc

One piece insulation disc:
1. Use the dowel pin on the face of the robot wrist to align the insulation disc. Install the insulation disc using the eight (8) socket head cap screws provided as shown below. Follow the torquing pattern shown, tighten to 20 in-lbs (2.2 Nm). Various thickness of discs are available as shown.

Two-piece insulation disc:
1. Use the dowel pin to align the metal disc (item 1) to the face of the robot wrist. Install the metal disc using socket head cap screws provided. Six (6) or eight (8) screws will be provided depending on robot. Follow the torquing pattern shown to avoid misalignment of the disc.
2. Use the dowel pin on the face of the metal disc to align the insulation disc (item 2). Install the insulation disc using six (6) socket head cap screws provided. Follow the torquing pattern shown, tighten to 20 in-lbs (2.2 Nm).
2.6. Interface Module

**Solid Mount:**
1. Fasten the **solid mount** to the insulation disc using four (4) socket head cap screws provided, torque to 40 in-lb (4.5 Nm). Various thickness of solid mounts are available as shown.

![Figure 9](image)

**Shock Absorbing Clutch:**
1. Remove the casing (item 1) from the shock absorbing clutch (item 3) by removing the button head cap screw (item 2) using a 2.5mm Allen wrench. Fasten the shock absorbing clutch (item 3) to the insulation disc using nine (9) socket head cap screws (item 4), torque to 25 in-lb (2.8 Nm). Re-install the casing.

![Figure 10](image)

**Note:** The remaining instructions illustrating the solid mount also apply the shock absorbing clutch.
2.7. Power Cable Installation

1. If present, remove the shielding gas quick connect fitting (item 1) from the power pin (Power pin may differ from shown). Feed the power pin end of the power cable through the robot arm cavity. Do not tighten the power pin on the wire feeder.

Figure 11
2. Grasp the power module housing (item 1) and rotate the alignment ring (item 2) while depressing the locking button (item 3). Continue to rotate until the locking button is depressed, then remove the rotating ring (item 4).

3. With the rotating ring (item 1) removed, hold the locking button (item 3) and position the alignment ring (item 5) and power connector (item 6) to attach the power module housing (item 2) to the solid mount (item 4) using six (6) M3x14mm screws (item 3). Torque to 30 in-lb (3.4 Nm). Replace the rotating ring (item 1).
4. Insert the Rotary Power Connector (RPC, item 1) into the power module housing, seating the pin into the power connector of the power cable (item 2).

Figure 14
5. Move the hand nut (item 1) ahead on the gooseneck. Align the gooseneck slots (top and bottom, item 2) with the dowel pins (top and bottom, item 3) on the power module housing. While pushing the gooseneck firmly into place, engage the threads of the power module housing with the hand nut. Tighten the hand nut onto the power module housing until the hand nut meets a hard stop.

Figure 15
6. Rotate the rotating ring to find the access hole (item 1). Press the locking button on the bottom of the power module housing (item 2) while rotating the power cable (item 3). The button will fully depress and lock the power cable from rotating at the proper location for tightening the power cable connector clamp. Insert a 9/64” ball-end Allen wrench into the access hole and tighten the clamping screw (internal) 40 in-lbs (4.5 Nm). DO NOT OVERTIGHTEN.

Figure 16

Note: For hard wire welding applications, refer to section 2.3.

1. Insert the new liner assembly from wire feeder end of torch cable with the bronze (item 2) side entering first.
2. While inserting, ensure the bullet (item 3) seats into the diffuser. Remove the nozzle and verify the bullet can be seen through the diffuser gas holes, replace the nozzle.
3. Install the cable and power pin (item 1) into the wire feeder to its proper position.
4. While the bullet is seated in the diffuser, cut the yellow Teflon liner (item 4) square with a sharp tool at a length that reaches the circumference of the drive rolls.
5. Remove the power pin from the wire feeder to access the end of the yellow Teflon liner.
6. Begin threading the collet (item 5 – packaged separately) onto the yellow Teflon liner at the wire feeder end.
7. Thread the collet to a position on the yellow Teflon liner that allows the collet threads to engage with the power pin internal threads while ensuring the bullet stays engaged in the diffuser.
8. Thread the collet fully into the power pin using a 10mm wrench.

Figure 17
2.9. Power Cable and Power Pin Installation

1. For a Lincoln® wire feeder; Install the shielding gas quick fitting (item 3) to the power pin (1/2” wrench). Ensure fitting is tight to avoid leakage. Fit the power pin into the wire feeder. Secure the power pin into the wire feeder using an Allen wrench (item 1). Fasten the gas hose (item 2) to the quick connect fitting on the power pin.

![Figure 18](image)

2. Adjust the wire feeder location to achieve approximately 1.5” cable rise as shown in the figure below. Secure the wire feeder in its correct location according to the manufacturer’s recommendation.

![Figure 19](image)
3. Tool Center Point (TCP) Data

Several components determine the final TCP measurement: Robot insulation disc, torch interface module, gooseneck angle and length. The following table lists the component configurations with resultant TCP. For additional robots or TCP’s please contact Nasarc Technologies. Center of mass data is available upon request.

### 3.1. Solid Mount

![Figure 20](image)

Origin (0,0,0) at center of robot wrist face

<table>
<thead>
<tr>
<th>Robot</th>
<th>Angle</th>
<th>TCP</th>
<th>Gooseneck</th>
<th>Interface Module</th>
<th>Insulation Disc</th>
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### 3.2. Shock Absorber

![Diagram of shock absorber](image)

Origin (0,0,0) at center of robot wrist face

*Figure 21*

<table>
<thead>
<tr>
<th>Robot</th>
<th>Angle</th>
<th>TCP</th>
<th>Gooseneck</th>
<th>Interface Module</th>
<th>Insulation Disc</th>
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<td>HD COPPER DHP</td>
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<td><strong>STEEL JUMP LINER</strong></td>
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<td>Specify by x wire size and y gooseneck&lt;br&gt;x:A=.035-.045, B=.052-.063&lt;br&gt;y:A=22L1, B=22L2, C=45L1, D=45L2</td>
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<td><strong>POWER MODULE HOUSING</strong></td>
<td>NTA01</td>
<td></td>
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<tr>
<td><strong>INTERFACE MODULE</strong></td>
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<tr>
<td>SOLID MOUNT NT04</td>
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<tr>
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<td>SOLID MOUNT NT12</td>
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<tr>
<td>SHOCK ABSORBING CLUTCH NSC01</td>
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<tr>
<td>SHOCK ABSORBING CLUTCH NSC02</td>
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<tr>
<td><strong>INSULATION DISC</strong></td>
<td>NDxxyyz</td>
<td>Specific to Interface Module and Robot Model*</td>
</tr>
<tr>
<td><strong>STEEL POWER CABLE LINER</strong></td>
<td>NLAxxxx</td>
<td>xxxx = wire size&lt;br&gt;3545=.035”-.045”, 5262=.052”-.062”***</td>
</tr>
<tr>
<td><strong>ALUMINUM TORCH LINER</strong></td>
<td>NLCxxxx</td>
<td></td>
</tr>
<tr>
<td><strong>POWER CABLE</strong> (for robot arm)</td>
<td></td>
<td>Specific to interface module and robot model*</td>
</tr>
<tr>
<td>POWER CABLE NCxx</td>
<td>NCxx</td>
<td></td>
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<tr>
<td>POWER CABLE NKxx</td>
<td>NKxx</td>
<td>xx = Specific to robot model*</td>
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<tr>
<td>POWER CABLE NAxx</td>
<td>NAxx</td>
<td></td>
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<tr>
<td>POWER CABLE NFxx</td>
<td>NFxx</td>
<td></td>
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<tr>
<td><strong>POWER PIN</strong></td>
<td>NTPxx</td>
<td>xx = Specific to Wire Feeder*&lt;br&gt;L1=Lincoln®, M1=Miller®, P1 = Panasonic®, F1=Fronius®, O1=OTC/Daihen®</td>
</tr>
</tbody>
</table>

*Contact Nasarc for specific part numbers.*
Figure 22
5. Service
   5.1. Replacing Consumables

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**Nozzle (Snap On)**
1. Hold the gooseneck with one hand and pull down on the nozzle to release the nozzle.
2. Replace the nozzle in a similar motion, the nozzle will snap in place once seated properly.

**Nozzle (Threaded)**
1. To remove the nozzle: Hold the gooseneck with one hand and unthread the nozzle counter clockwise.
2. To replace the nozzle: Hold the gooseneck with one hand and thread the nozzle clockwise.

**Contact Tip**
1. Trim the wire at the end of the contact tip. Retract the wire into the diffuser.
2. Remove the nozzle.
3. Remove the contact tip by unthreading from the diffuser with a suitable gripping device.
4. Replace the contact tip by threading into the diffuser. Torque to 30 in-lbs (3.4 Nm).
5. Replace the nozzle.

**Gas Diffuser**
1. Remove the nozzle and contact tip.
2. Remove the diffuser from the gooseneck using a 9/16” wrench.
3. Replace the diffuser by threading onto gooseneck with a 9/16” wrench. Torque to 65 in-lbs (7.3 Nm).
4. Replace the contact tip and nozzle.

**Jump Liner - Hard Wire (Steel) Welding.**
1. Remove the nozzle, contact tip, and diffuser. Pull out the used jump liner from the front of the gooseneck.
2. Slide the replacement jump liner into the front of the gooseneck. Twist the liner while inserting to ensure that it seats properly into the plug at the opposite end.
3. Replace the gas diffuser, contact tip and nozzle.
5.2. Removing the Power Cable for Liner Replacement

1. Trim the wire at the end of the contact tip.
2. Move the robot to a position with the wrist aligned approximately 30 degrees above the upper arm as shown below.
3. Check that the shielding gas control valve has been turned off. Disconnect the gas tubing from the power pin.
4. For air blast option: Check that the air blast (optional) control valve has been turned off. Disconnect the air blast tubing from the system.
5. Loosen the clamping bolt to the power pin (Lincoln® shown) at the wire feeder (item 1).
6. Remove the shielding gas quick fitting from the power pin (if necessary).
7. Pull the cable (item 2) to expose the wire, cut the wire behind the power pin.
8. Continue to pull the power cable out of the robot arm. Do not remove the cable from the torch.

9. Remove the used liner from the power cable by unthreading the brass collet (item 3) from the power pin using a 10mm wrench. Carefully pull out the used liner including the wire inside.

To replace the power cable liner, hard wire, for use with a jump liner refer to section 5.3.
To replace the torch liner, hard wire, for use without a jump liner refer to section 5.4.
To replace the torch liner for soft wire (aluminum) welding refer to section 5.5.
5.3. Replacing the Power Cable Liner (for use with the jump liner)

If the previous liner is not available use the following procedure to cut the liner to the correct length:

1. Remove the gooseneck and feed the new liner through the power cable. Thread in the brass collet into the end of the power pin (item 2 in Figure 25).
2. Use the liner gauge washer (item 1, provided with replacement liner) to align center the liner. Cut the liner flush with the face of the washer (as shown by the dashed line, item 2 in the diagram below).
3. Unthread the brass collet and pull the liner out.
4. Use the longer flat side of the liner gauge washer to measure and cut the liner 21 mm from the previously cut end.
5. Insert the trimmed end of the liner (item 3) into the power cable from the power pin side. Thread the brass collet into the end of the power pin using a 10mm wrench securing the liner in place.

Figure 26

Insert the power cable into the upper arm of the robot and connect the power pin to the wire feeder. Reconnect the shielding gas tubing into the quick fitting. Reconnect the power cable’s air blast (optional) input tube to the air blast system. Re-install the gas quick connect fitting if previously removed.
5.4. Replacing the Torch Liner, Hard Wire (without the jump liner).

If the REVOLUTION360 gooseneck does not contain a jump liner, follow the instructions below.

If the previous liner is not available use the following procedure to cut the liner to the correct length:

1. Remove the Nozzle (item 1) and the Tip + Diffuser (item 2,3) from the end of the conductor tube (item 5) on the gooseneck (item 6).
2. Feed the new liner through the power cable. Thread in the brass collet into the end of the power pin (wire feeder side).
3. Use the shorter flat side of the liner gauge washer (item 7) as shown, or measure and cut the liner 12 mm from the end of the conductor tube.
4. Replace the gas diffuser; Threading into gooseneck with a 9/16” wrench. Torque to 65 in-lbs (7.3 Nm).
5. Replace the contact tip; Thread into the diffuser. Torque to 30 in-lbs (3.4 Nm).
6. Replace the nozzle: Hold the gooseneck and push the nozzle over the snap ring of the diffuser, the nozzle will snap in place once seated properly.

7. Insert the power cable into the upper arm of the robot and connect the power pin to the wire feeder.
8. Reconnect the shielding gas tubing into the quick fitting.
9. Reconnect the power cable’s air blast (optional) input tube to the air blast system.
10. Re-install the gas quick connect fitting if previously removed.
5.5. Replacing the Torch Liner, Soft Wire, (without the jump liner)

1. Remove the cable and power pin (item 1) from the wire feeder and robot arm to access and remove the old liner (10mm wrench). Remove the nozzle and diffuser (9/16” wrench).
2. Insert the new liner assembly from wire feeder end of torch cable with the bronze (item 2) side entering first. Allow the brass liner to stick out of the power tube of the gooseneck by 10-12mm max (light force applied).
3. Replace the diffuser, ensure the bullet (item 3) seats into the diffuser, torque to 30 in-lbs (3.4 Nm). Verify the bullet can be seen through the diffuser gas holes, replace the nozzle.
4. Install the cable and power pin (item 1) into the wire feeder to its proper position.
5. While the bullet is seated in the diffuser, cut the Teflon liner (item 4) square with a sharp tool at a length that reaches the circumference of the drive rolls.
6. Remove the power pin from the wire feeder to access the end of the yellow Teflon liner.
7. Begin threading the collet (item 5 – packaged separately) onto the Teflon liner at the wire feeder end.
8. Thread the collet to a position on the Teflon liner that allows the collet threads to engage with the power pin internal threads while ensuring the bullet stays engaged in the diffuser.
9. Thread the collet fully into the power pin using a 10mm wrench.

Insert the power cable into the upper arm of the robot and connect the power pin to the wire feeder. Reconnect the shielding gas tubing into the quick fitting. Reconnect the power cable’s air blast (optional) input tube to the air blast system. Re-install the gas quick connect fitting if previously removed.
## 6. Troubleshooting

<table>
<thead>
<tr>
<th>Problem</th>
<th>Cause and remedy</th>
</tr>
</thead>
</table>
| Wire is not feeding           | 1. Out of wire: Install full spool of correct diameter wire.  
                                 2. Wire feed rollers are not turning:  
                                       - Check power and integration connections to the power source.  
                                       - Check communication parameters with the robot.  
                                 3. Burn back at the contact tip: Replace the contact tip.  
                                 4. Wire is seized in the contact tip:  
                                       - Check that the correct contact tip bore matches the wire diameter.  
                                       - Check for proper wire cast diameter.  
                                 5. Verify the liner is not clogged or and damaged and is compatible with the wire diameter. |
| Intermittent or slow wire feed| 1. Improper drive roll tension – refer to the wire feeder owner’s manual to set the drive roll tension correctly.  
                                 2. Wire feed obstruction in the torch – replace the tip, jump liner, or power cable liner.  
                                 3. Power cable is twisted – reinstall the power cable.  
                                 4. Wire feed path is too tight (5th axis angle is too small) – reposition the robot point(s) to allow for easier wire feed ability.  
                                 5. Wire is kinking at gaps in liner junction – replace liner, cut to proper length.  
                                 6. Galled drive rolls – clean or replace the drive rolls. |
| Porous weld                   | 1. Gas pressure is low – check gas supply, solenoid operation, gas fittings and gas hoses for leaks or kinks.  
                                 2. Gas flow is not properly set – adjust to suit the welding parameters.  
                                 3. Gas is blown away by ambient wind conditions – isolate the welding area from windy conditions.  
                                 4. O-ring(s) are damaged – remove welding nozzle and check the condition of O-rings.  
                                 5. Spatter build up in nozzle is blocking gas flow – clean spatter from the inside of the welding nozzle. Clean gas holes in diffuser to allow full gas flow. |
| Welding arc is erratic        | 1. Intermittent wire feed (see cause and remedy above).  
                                 2. Intermittent contact tip to work distance;  
                                       - Wire is fluttering within contact tip: Replace the contact tip.  
                                 3. Contact tip is worn, replace contact tip.  
                                 4. Wrong tip size: Match the wire and tip diameter.  
                                 5. Contact tip or diffuser is not tightened properly, tighten to proper torque spec. |
| Torch component(s) are overheating | 1. Loose fasteners - reinstall welding torch. Tighten all connections to specified torque.  
                                         2. Verify the torch is operating within its duty cycle parameters. |
7. Warranty

**NASARC Cert-Equip WARRANTY POLICY**

**REVOLUTION360®** welding torch is warranted by **NASARC** to the original commercial or institutional end user/owner against defects in materials and workmanship as follows:

Robotic MIG Torches and Components – 1 year

The warranty becomes effective on the date of purchase. During the warranty period, equipment covered by the warranty and found to be defective will be repaired or replaced at the manufacturer’s discretion without charge. The manufacturer’s responsibility is limited to repair or replacement of damaged or defective parts. The equipment must be returned, transportation charges prepaid with proof of purchase date, to an authorized service center or to **NASARC**. If a product warranty card has not been completed or proof of purchase is not available, the warranty will be deemed to become effective at the time the product leaves the factory authorized NASARC warehouse. Warranty repair service does not extend the period of warranty beyond the original period. The warranty is not transferable.

This warranty is considered null and void in the case of damage caused by abuse, misuse, accident, or any other cause that is not the result of defective materials or workmanship.

Repair or replacement is the exclusive remedy for defective equipment under this warranty. This warranty is in lieu of all other warranties written and implied, including any implied warranty of fitness for a particular purpose of this equipment. NASARC shall not be liable for any consequential or incidental damages for breach of any express or implied warranty of this equipment.