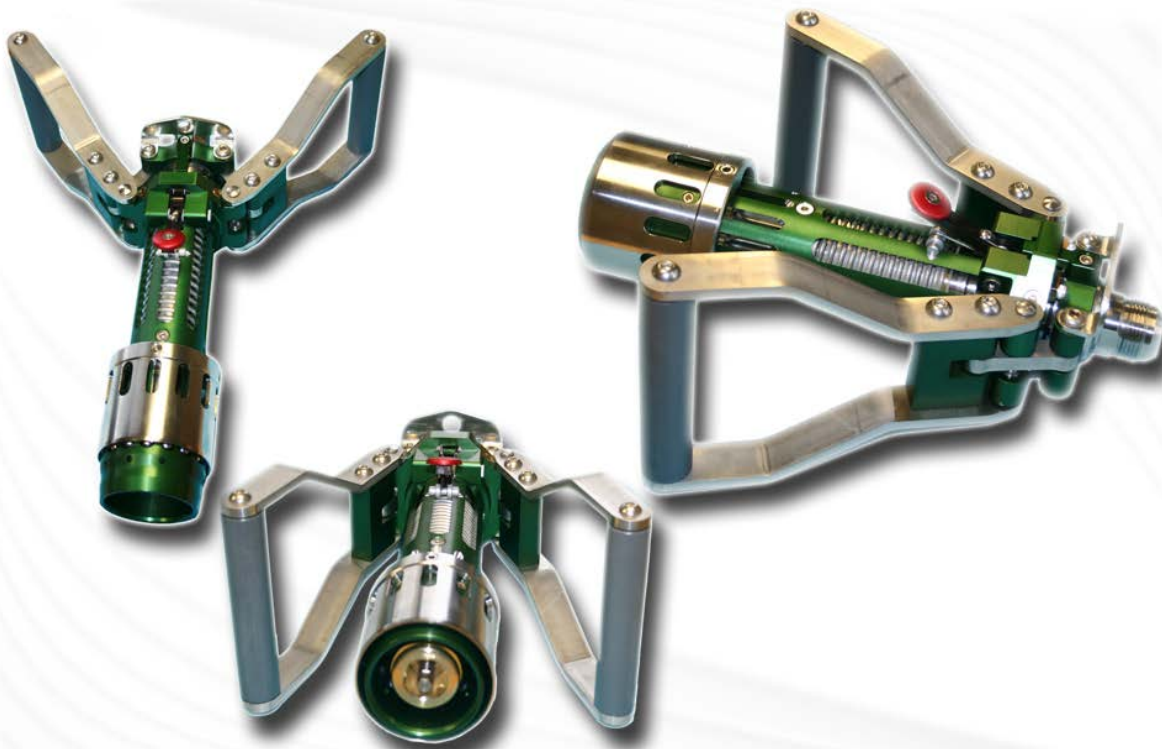




Macro Technologies

A RegO® Brand

CryoMac®3
50 GPM LNG Nozzle
Operation and Maintenance Manual
Part Numbers: CryoMac3-50M and CryoMac3-50M-S



SAFETY INSTRUCTIONS

For your safety and improved service life of the product, please read this manual before use and follow the safety instructions carefully.



Warning Installation, usage and maintenance of this product must be in compliance with all Macro Technologies, LLC Instructions as well as all requirements and provisions of national and local standards, codes, regulations and laws. Inspection and maintenance of a periodic basis is essential. Only qualified personnel should perform installation and maintenance.

Be sure all instructions are read and understood prior to installation, operation and maintenance. These instructions must be passed on to the end user of the valve.



Avoiding the inhalation of, or skin contact with Liquefied Natural Gas (LNG) is advised. LNG can cause asphyxiation, freeze burns, fire and explosions which can result in serious injury or death. See the LNG MSDS for specific information regarding safe handling of LNG. Evacuation of LNG must take place in a well-ventilated area to insure dispersion. Keep LNG far from open flames or other sources of ignition to prevent fire or explosion.

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Safety Instructions and Warnings



Failure to follow the safety warnings may result in serious injury

- 1) Whenever operating the LNG quick connect fueling Nozzle, be sure to wear the proper safety clothing consisting of:



Full face shield



Thermal gloves approved for cryogenic use



Cryogenic smock










Solid shoes capable of withstanding cryogenic spill

- 2) Read the User's Manual in its entirety before operating this product.
- 3) Make sure the operating space is clear to avoid accidental contact with others.
- 4) Do not use the product in any way not described in this manual.
- 5) Only use replacement parts provided by Macro Technologies.
- 6) Do not operate the product if there is any visible damage.
- 7) Stop operation immediately if leakage occurs.
- 8) Follow the maintenance schedule as described on page 13 of this manual.
Only use Macro Technologies replacement parts when performing maintenance.

Key Features

Thank you for purchasing the Macro Technologies CryoMac®3 LNG (Liquid Natural Gas) Fueling Nozzle (Part No. CryoMac3-50M and CryoMac3-50M-S). We know that you will find it safe, easy to use and easy to service. Our Patent Pending design solves many of the issues that have plagued competitive LNG Fueling Nozzles.

Macro Technologies offers the highest quality product with new-age technologies to improve safety and ease of use including:

-  A positive “Vent Position” to release gases trapped between the nozzle and receptacle through the Vent Holes, which improves safety when removing the Nozzle.
-  Ball bearings to lock the Nozzle in place during fueling. Balls bearings help to guide the nozzle and let it “roll” on and off easily.
-  Light weight design makes the Nozzle easier to handle over long work days and easier to slide onto the receptacle.
-  Non-metallic bearings, air gaps, and insulation at key points are used to minimize ice issues.
-  Easy access for maintenance of the receptacle end seal, poppet assembly and the poppet seat. No expensive “clamp dogs” to replace.
-  Reasonable cost while maintaining reliability.
-  Automatic Shutoff when disconnecting.

Specifications

 CAUTION	<i>Failure to follow the safety warnings may result in serious injury</i>
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Fluid Compatibility: LNG, Methane and LN2

Maximum Refueling Pressure: 500 PSIG / 34.5 BAR

Maximum System Pressure: 500 PSIG / 34.5 BAR

Burst Pressure: greater than 1,500 PSIG / 103.5 BAR

Rated Flow: 50 GPM @ 250 PSIG (LNG)

Nozzle Weight: 10.4 LBS

Port Size: 1" Male SAE 37° Flare (SAE J514) (1-5/16 -12 Thread)

Operating Temperature: -320°F to +140°F / -195°C to 60°C

Meets ISO 12617 requirements.

For Use with Macro Technologies receptacle part numbers 13530, 13615, 13620, 13705, 13990 and 14050.

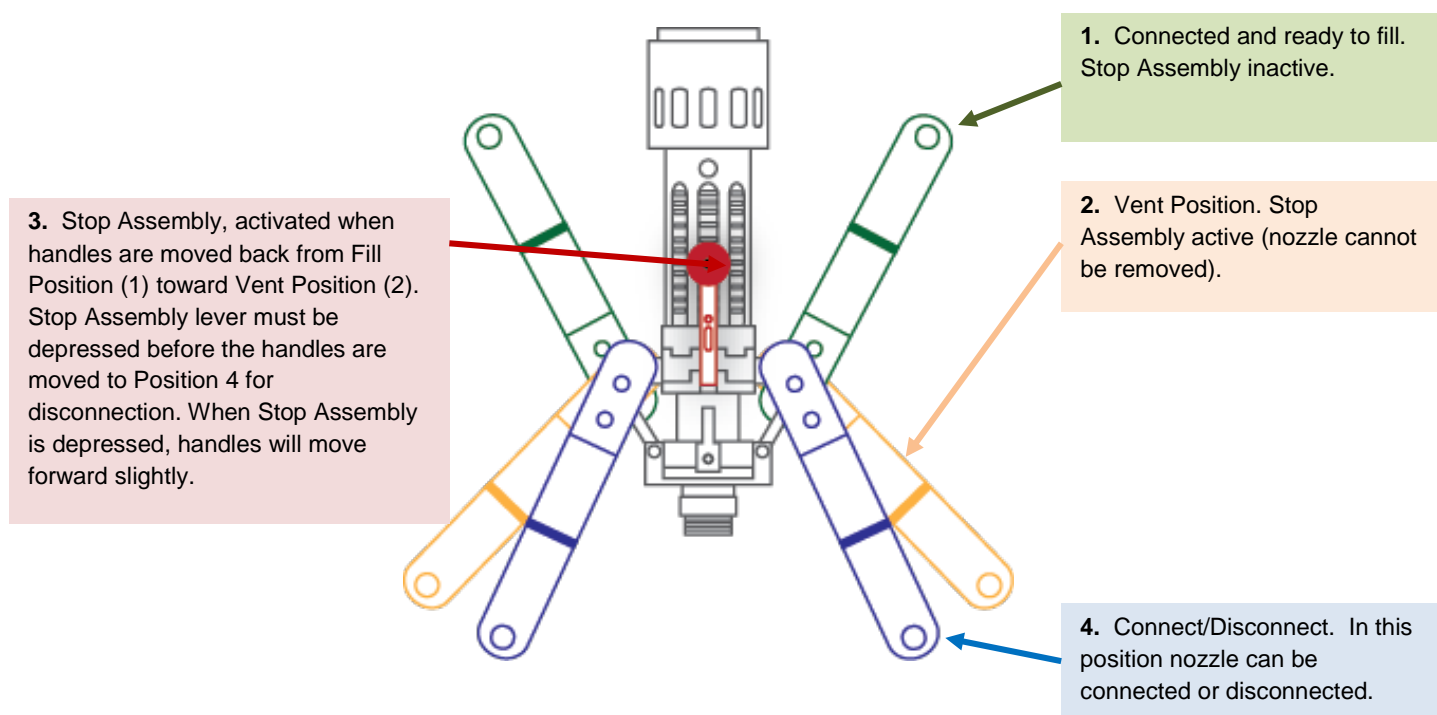
Additionally, the nozzle has been verified to function well with other manufacturer's receptacles such as JC Carter receptacle part number 62050 and Parker (Hannifin) Kodiak series receptacles. We cannot guarantee that these or any other manufacturers will continue to make compatible products.

Macro Technologies fully supports the development of National and International Standards. We are active in participating in the development of these standards.

Product Description

The CryoMac3-50M and CryoMac3-50M-S have three handle positions, Connected, Vent, and Open. In the Connected position (**Position 1** in Figure 1 below), the handles are pushed away from the operator and the nozzle is locked onto the male receptacle and fueling can commence. When the handles are pulled back to the positive stop, Vent **Position 2** in Figure 1 below) the nozzle poppet closes and also allows the mating receptacle poppet to close. In this position the gasses trapped between the closed poppets are released through the vent holes – relieving any pressure on the nozzle. For safety reasons, the nozzle should not be removed from the coupling while in the Vent Position. Once all venting has stopped, the Nozzle can safely be moved to the Connect/Disconnect Position (**Position 4** in Figure 1 below). To get from the Vent to the Connect/Disconnect Position and remove the nozzle from the coupling, you must push the Stop Assembly lever down. Stop Assembly lever must be depressed before the handles are moved to Position 4 for disconnection. When Stop Assembly is depressed, handles will move forward slightly. After Stop Assembly lever has been depressed, handles can be moved to the Connect/Disconnect Position until they stop (the retaining balls should now be visible).

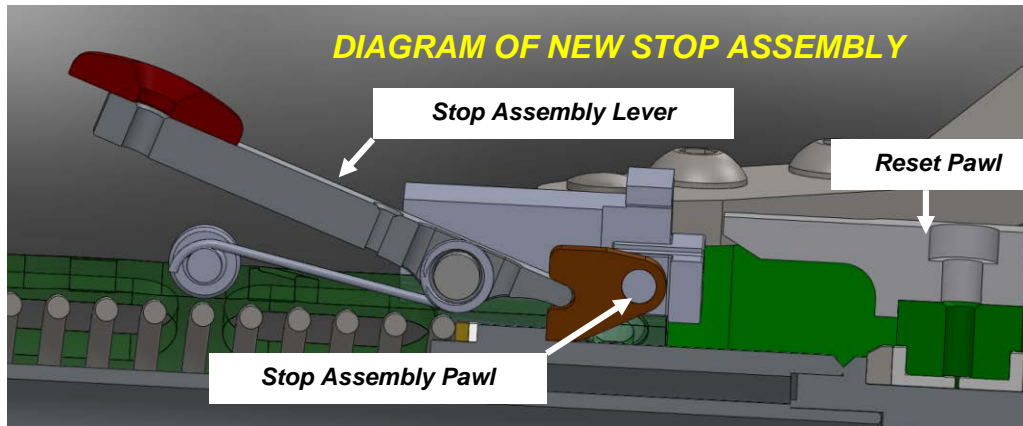
Figure 1: CryoMac®3 Handle Positions



Engineering Upgrades

Features and Benefits of the Stop Assembly:

The CryoMac®3 Stop Assembly has been re-designed to clear ice from the stop assembly area.



When disengaging the nozzle, be careful not to pull or force the handles back as this will increase the load applied to the stop pawl making it difficult to depress the stop lever.

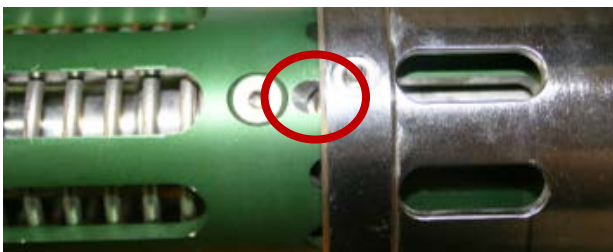
The Stop Assembly is inactive when the nozzle is in the fueling position. The Stop pawl is always in the ready position and is activated when the pawl catches the probe shoulder as the nozzle moves to the vent position (see *Diagram of New Stop Assembly* page 6)

NOTICE

When disengaging the nozzle, if the handles bypass the vent position, the Stop Assembly and/or probe shoulder may be worn. Immediately stop use and remove the nozzle from service. Contact your service department or the manufacturer.

New Features Designed to Address Icing Issues:

- Edges on slots with guide pins designed with ramps to remove ice buildup (see below).



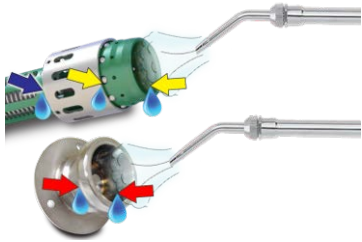
- Internal stop ring has been re-machined to breakup any frost that forms from within the nozzle barrel
- Reset pawl designed to clear ice from Stop Assembly area (see *Diagram of New Stop Assembly* page 6).

Operating Instructions

! CAUTION

Before fueling, be sure to connect the ground cable. This prevents static electricity buildup and possible accidents. Do not attach ground cable to anodized cap or fueling nozzle. Ground cable must be connected to a conductive spot on the vehicle.

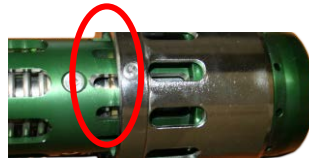
COUPLING NOZZLE FOR FUELING



Step 1)

Using dry compressed air or nitrogen, blow out all water and frost buildup, paying special attention to:

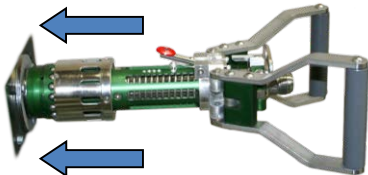
- A) Interior and exterior of retaining ball area
- B) Slots just behind the stainless steel sleeve (see red circle below)



- C) Male receptacle (clear off any moisture or debris that could be present)

! CAUTION

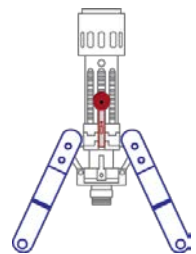
Failure to fully remove moisture from both the nozzle and receptacle can cause ice to form INSIDE THE FUEL SYSTEM once the Nozzle is connected and LNG is present. This ice can cause dangerous leakage as it can block the poppet assemblies or damage the seals.



Step 2)

Push Safety Stop lever down to ensure handles are completely back, then slide the nozzle fully onto the male receptacle

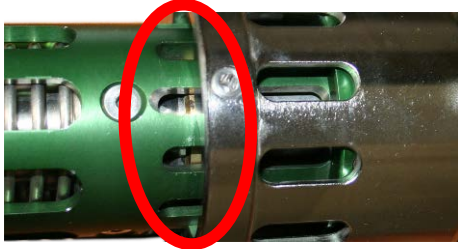
Handle Position



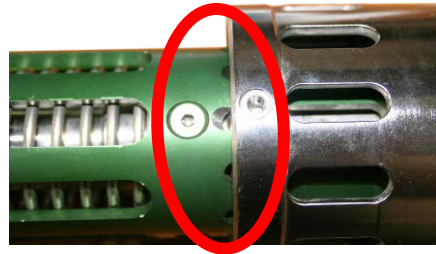
NOTICE

Frost build up in the slot area (red circled areas below) may prevent nozzle attachment and removal. If nozzle does not go onto the receptacle, release the handles, depress the Stop Assembly lever, and then pull back the handles. For the nozzle to slide onto the receptacle, the slots must be fully covered like in the picture below.

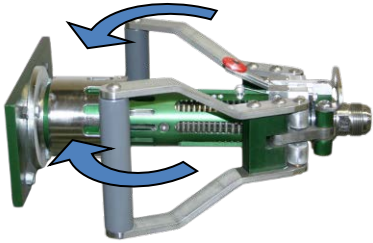
For more information, see **Issue #2** (page 20) in trouble shooting guide.



Slots exposed: Depress release lever, then pull handles back for Connect/Disconnect Position



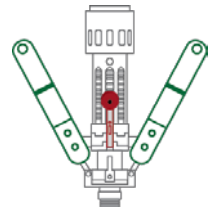
Slots fully covered: Ready to be placed on receptacle



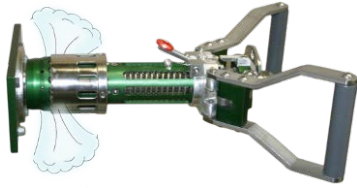
Step 3)

Push the handles toward the receptacle as far as they will go, the fueling process can begin once the handles are fully forward.

Handle Position



UNCOUPLING NOZZLE AFTER FUELING

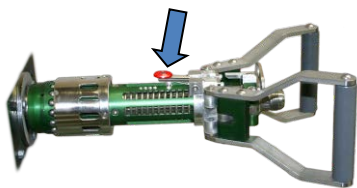
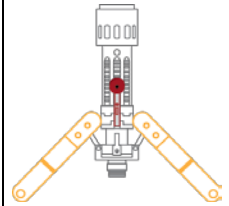


Step 5)

Let the gasses vent out of the nozzle from the exposed vent holes until the venting stops (usually just a few seconds).

If gases continue to vent for a prolonged period of time, check to make sure handles are fully back and both the nozzle and receptacle seal poppets are closed and LNG is no longer flowing.

Handle Position



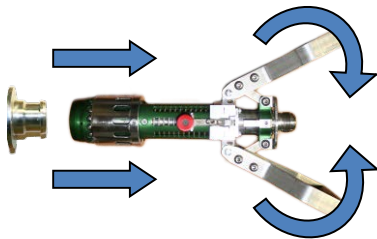
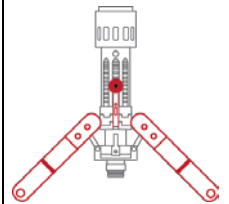
Step 6)

Once gas has stopped venting out of the holes, press the Stop Assembly lever.

(Do Not pull the handles back while pressing the Stop Assembly lever.)

Notice: If you experience difficulty depressing Stop Assembly see **Issue #1** in trouble shooting guide.

Handle Position

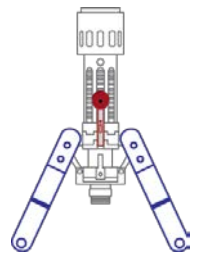


Step 7)

Pull the handles all the way back and toward you to release the nozzle from the receptacle. Remove the nozzle and hang or store in a safe place. Protect the front end of the nozzle and keep it clean.

Notice: If you experience difficulty depressing Stop Assembly see trouble shooting guide.

Handle Position



NOTICE

Important to note that the nozzle operator must maintain control of the handles during connecting and disconnecting of the nozzle and the receptacle. Failure to do so will result in shortened service life of the nozzle.

Product Maintenance

All Macro Technologies products are thoroughly tested to prevent injury and malfunctions during use. The following schedule is provided as a recommended maintenance guideline to ensure operator safety and continued smooth and proper nozzle operation.

Each Fueling:

- Before and after each fueling thoroughly clean the nozzle and receptacle opening of any debris or contamination with clean filtered dry compressed air or dry nitrogen.

Every 3,000 Fills or As-Needed (if leakage occurs while connected):

- Replace the Receptacle Interface Seal (p/n 14591). This part normally should last through thousands of cycles unless excessive amounts of dirt, grit or contaminants are present. Always use clean fuel and take care to blow off with dry nitrogen or dry compressed air both the mating parts inside of the receptacle and inside and around the nose of the nozzle.

Every 3rd Receptacle Interface Seal Replacement or As-Needed (if leakage occurs while disconnected):



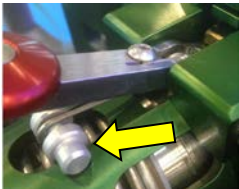
- Replace the Seat Assembly and Poppet Assembly (p/n's 14255 and 13960). These parts normally should last through thousands of cycles unless excessive amounts of dirt, grit or contaminants are present. Always use clean fuel and take care to blow off with dry nitrogen or dry compressed air both the mating parts inside of the receptacle and inside and around the nose of the nozzle.

Every 18,000 Fills or As-Needed (if bypassing the vent position):

- Contact your service department or the manufacturer about complete rebuild of the nozzle. The Stop Assembly and probe shoulder are mechanical devices that will eventually become inoperative due to wear, corrosion and aging of components. The environment and conditions of use will determine the safe service life of these parts. Periodic inspection and maintenance are essential to avoid serious injury and property damage.





NOTICE

- Dirt, grit or contaminants will cause premature wear and leakage.
- The vent holes in some manufacturer's receptacles may be sharp and/or contain burrs, if so they may cause premature seal failures.
- NO lubrication should be used on the nozzle. If lubrication is used, it could impair the operability of the nozzle.
- If the Stop Assembly does not function properly, contact Macro Technologies and arrange to have the CryoMac3 returned and repaired.

CryoMac®3 Inspection Schedule Checklist		
<u>Inspection</u>	<u>Each Fueling</u>	<u>Daily</u>
<u>Before, during and after fueling check for any leaks</u>	✓	
<u>Visually inspect items listed below:</u>		✓
Cleanliness of Stop Assembly area (See <i>Features and Benefits of the Stop Assembly</i>)		✓
Check Sleeve for wear <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> OK  </div> <div style="text-align: center;"> Replace  </div> </div> (See <i>Replacement of Sleeve Assembly</i>)		✓
Check if Spring Rest is present  If Spring Rest is missing see <i>Trouble Shooting Guide Issue #1</i> .		✓
<u>Dry cycle onto receptacle and check items listed below:</u>		✓
Check Stop Assembly function (See <i>Features and Benefits of the Stop Assembly</i> and <i>Trouble Shooting Guide Issue #9 – Bypassing the Vent Position</i>)		✓
Check hinge pins for free movement (See <i>Trouble Shooting Guide Issue #10 - Difficulty Operating Handles</i>)		✓

Replacement of Poppet Assembly and Seat/Seal Assembly

If the nozzle is leaking only while connected to the receptacle you may replace the Seat/Seal Assembly (p/n 14255) without replacing the Poppet Assembly (p/n 13960). The current poppet assembly can be used with the new Seat/Seal Assembly if the nozzle does not leak when disconnected. If the nozzle experiences any leakage while disconnected, both the Poppet Assembly and Seat/Seal Assembly need to be replaced.

Parts Needed (parts are sold separately)			
Poppet Assembly: p/n 13960	Receptacle Interface Seal: p/n 14591	Seat Assembly: p/n 14255 (contains Receptacle Interface Seal)	Socket Tool: p/n T-2961
			

Tools Needed: In addition to the above parts, you will also need an open ended 1-1/8" wrench a Torque Wrench (recommended) or Socket Wrench with a 1" socket attachment and a vise.

NOTICE

If purchased separately, the receptacle interface seal must be assembled with the brass retainer according to Macro Technologies instructions using the proper seal repair tool kit: p/n 14590.



Step 1)

Remove all items from their shipment packaging taking care in handling them so that they are not damaged. Carefully inspect parts to ensure that all sealing surfaces are clean, free of dirt and contamination.

Step 2)

Place the wrench in the vise and secure the end of the Nozzle as shown to the left.

Step 3)

Align Socket Tool (T-2961) with Seat/Seal Assembly hex and place 1" socket wrench onto Socket Tool and turn counterclockwise to remove the Seat/Seal Assembly. Once the Seat/Seal Assembly is fully unscrewed, the spring behind the Poppet Assembly will push the Poppet Assembly out of the Nozzle.

NOTICE

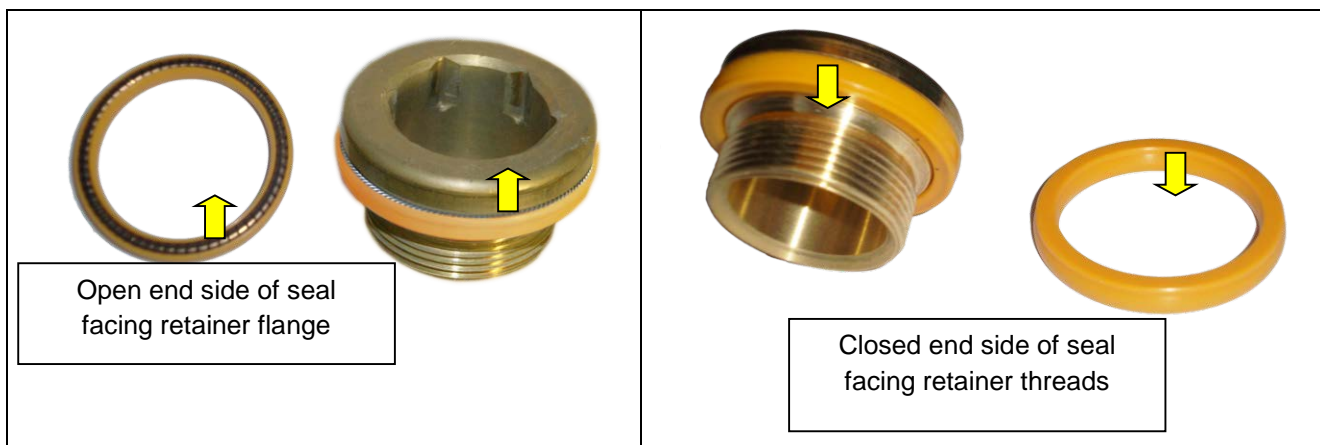
Make sure that the removal tool is all the way pushed into the mating Seat/Seal Assembly hex or you could possibly strip the retainer. Use care when removing the retainer. If not removed carefully, the poppet may pop out of the nozzle, potentially causing personal injury and damage the parts.

Step 4)

Remove the old Poppet Assembly and Seat/Seal retainer.

If the nozzle is only leaking while connected, the current Poppet Assembly does not need to be replaced. However, it should still be carefully inspected to ensure that all sealing surfaces are clean and undamaged.

Inspect Seat/Seal Assembly (p/n 14255) to confirm that receptacle interface seal has been positioned correctly. The seal should be positioned with the open side facing the retainer flange. The closed side should be facing towards the retainer threads. **If assembled backwards, the Seal will fail prematurely.**



If purchased separately, the Receptacle Interface Seal must be assembled with the brass retainer according to Macro Technologies instructions using the proper seal repair tool kit: p/n 14590. See *Replacement of Interface Seal* if you are repairing the Receptacle Interface Seal separately.



Step 5)

Use the Socket Tool (p/n T-2961) to carefully align Poppet Assembly and Seat/Seal Assembly.

NOTICE

Use of Socket Tool T-2961 is important and critical in order to properly guide all components into place. Failure to properly guide components into place with Socket Tool T-2961 may result in misalignment of critical sealing surfaces.

If not aligned correctly, the seal on the Poppet Assembly and/or the seal of the Seat/Seal Assembly may become damaged.

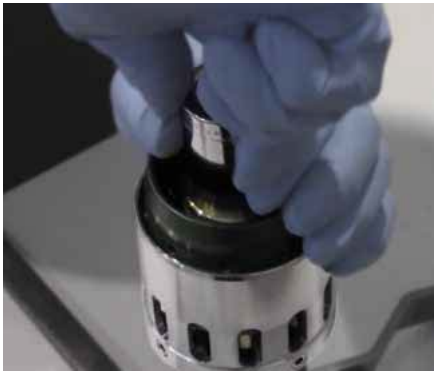


Step 6)

Place the Poppet Assembly, Seat/Seal Assembly, and Socket Tool on the spring with the tool facing away from the nozzle.

NOTICE

Do not apply Anti-seize, Loctite, or Teflon tape when replacing Seat/Seal assembly. Doing so may cause leakage.



Step 7)

Push the Poppet Assembly down by hand while threading the Seat/Seal assembly clockwise onto the Nozzle. Once you feel the assembly threading into the Nozzle, you can remove the pressure.

Step 8)

Attach the socket wrench and torque to 45-50 Ft-Lb.


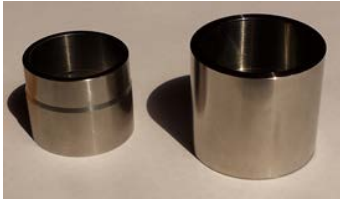
When tightening with torque wrench, the final turns will exhibit higher levels of torque than by hand. This indicates the thread locking system is engaging.

NOTICE

Improper Torque will cause failure

Replacement of Interface Seal

If the nozzle is leaking only while connected to the receptacle you may replace the Receptacle Interface Seal without replacing the entire Seat/Seal Assembly (p/n 14255) and the Poppet Assembly (p/n 13960). The current Seat Assembly can be used if carefully inspected to ensure that all sealing surfaces are clean and undamaged. It is recommended to change the Seat Assembly every 3rd Interface Seal replacement. The current poppet assembly can be used with the new Seat/Seal Assembly if the nozzle does not leak when disconnected. If the nozzle experiences any leakage while disconnected, both the Poppet Assembly and Seat/Seal Assembly need to be replaced.

Parts Needed (parts are sold separately)	
Receptacle Interface Seal p/n 14591	Seal Repair Tool Kit: p/n 14590
	

At this point, the old Poppet Assembly and Seat/Seal Assembly have been removed from the nozzle. See *Replacement of Poppet Assembly and Seat/Seal Assembly* (pages 12-13).

Step 1)

Remove all items from their shipment packaging taking care in handling them so that they are not damaged. Carefully inspect parts to ensure that all sealing surfaces are clean, free of dirt and contamination.

Step 2)

Remove the old interface seal with care not to scratch the retainer sealing surfaces.

Step 3)

On a clean, flat surface, place the retainer with the threads up. *Figure 1*



Figure 1

Step 4)

Carefully slide the larger end of the seal guide tool over the threads until the guide bottoms out on the shoulder of the retainer. *Figure 2*



Figure 2

Step 5)

Slide the interface seal over the guide so the open (spring) end of the seal is facing down towards the retainer. Let it rest on the shoulder of the guide. *Figure 3*



Figure 3

Step 6)

Slide the seal ring onto the guide and let it rest on the seal. *Figure 4*

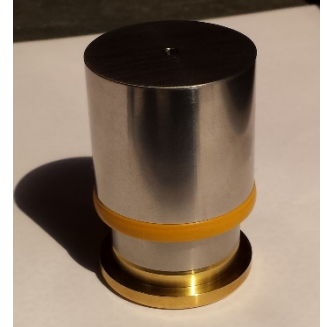


Figure 4

Step 7)

While holding the ring/seal combination as level as possible, press the seal firmly over the shoulder of the guide and all the way down to the seal's final resting place on the shoulder of the seal retainer. *Figure 5*

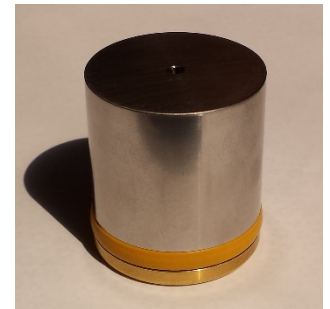


Figure 5

Step 8)

Remove the seal ring then the guide from the assembly and store the seal ring and guide tools fitted together such that the edges that interface the seal will not get damaged. Damage to these surfaces can cause damage to new seals on future repairs. The Seat/Seal Assembly is now complete.



Replacement of Sleeve Assembly



Failure to follow the safety warnings may result in serious injury



Step 1)

Remove the nozzle from service. Place the nozzle with the handles down and in the [Connect/Disconnect Position \(4\)](#). Get the required tools (5/32" and 1/8" Allen wrench) and the parts (Kit Part Number 14103 containing a sleeve, nose piece, 16 balls, 6 guide pins, and a rubber band)

Step 2)

Place a rubber band around the balls to prevent them from falling out during replacement.



Step 3)

Remove the four pins from the stainless steel Sleeve using the 5/32" Allen wrench and store them in a safe place, these pins will be re-used later.



Step 4)

Lower the stainless steel Sleeve so it sits on the Handle Mounts.



Step 5)

Remove the six pins from the Ball Cage using a 1/8" Allen wrench. Discard old pins.



Step 6)

Lift the Ball Cage off the Nozzle.



Step 7)

Lift the stainless steel Sleeve off the Nozzle.



Step 8)

Slide the new stainless steel Sleeve onto the Nozzle and set it on the handle mounts.

Step 9)

Slide the new Ball Cage onto the Nozzle.

Step 10)

Place a rubber band around the Ball Holes to prepare to put the new balls in.



Step 11)

Place the balls in the holes one by one by lowering the rubber band, sliding the ball in, and then raising the rubber band back to hold the ball in place.

**Step 12)**

Once all the balls are in, align the holes in the Nozzle with the holes in the ball housing and screw in the six new pins using the 1/8" Allen wrench. Torque pins to 30-40 in-lbs. Use Loctite 242 on pins.

Step 13)

Align the four holes so that they are visible through the slots in the Nozzle.


**Step 14)**

Raise the Sleeve and screw the four pins (that were saved in Step 3) into place with the 5/32" Allen wrench. Torque pins to 145-155 in-lbs. Use Loctite 242 on pins.


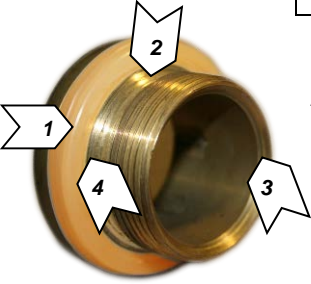
Step 15)

Remove the rubber band.

Trouble Shooting Guide:

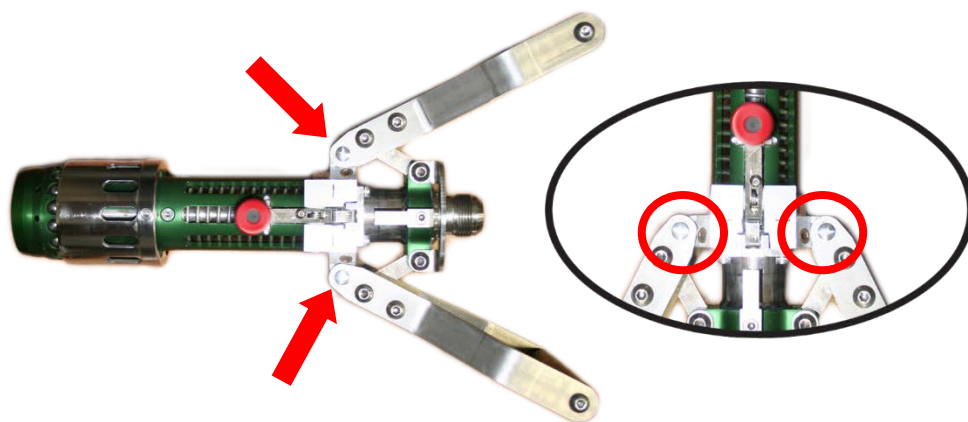
<u>Item #</u>	<u>Issue</u>	<u>Possible Cause</u>	<u>Remedy</u>
1	Difficulty depressing Stop Assembly	Ice buildup on Stop Assembly or Spring Rest is missing	Using dry compressed air or nitrogen, blow out all water and frost buildup. One can also move the handles back and forth between the vent position and fill position. If Spring Rest is missing contact your service department or manufacturer.
2	Difficulty Connecting	Nozzle handles are in vent position	Depress the Stop Assembly lever (without pulling on handles), release Stop Assembly lever then pull handles all the way back to the disconnect position (Position 4 from <i>Figure 1</i>)
3	Difficulty Connecting/ Disconnecting	Loose guide pins on the sleeve 	Torque pins to 145 – 155 in/lbs.
4	Difficulty Disconnecting	Ice buildup on nozzle Stop Assembly and/or guide pin slots	Using dry compressed air or nitrogen, blow out all water and frost buildup Move the handles back and forth between the vent position and fill position

Trouble Shooting Guide (continued):

<u>Item #</u>	<u>Issue</u>	<u>Possible Cause</u>	<u>Remedy</u>
5	Leak while nozzle is disconnected	Scratched or scored sealing surface on Poppet Assembly 	Replace Poppet Assembly (p/n 13960)
6	Leak while nozzle is connected	Scratched or scored sealing surface on Seat Assembly  <i>Sealing surfaces: 1) receptacle seal 2) probe mating surface 3) poppet seat 4) retainer to seal surface</i>	Replace Seat Assembly (p/n 14255)
7	Leak between fueling hose and nozzle flare fitting	Damaged sealing surface on flare fitting	Contact Macro Technologies for brass cone washer to place between male flare fitting threads and hose fitting
8	Excess venting after fueling	Handles are not pulled all the way back (Position 3) Nozzle and/or Receptacle seal poppets are not closed properly	Pull handles all the way back until they reach a positive stop <u>Stop operation if leakage occurs.</u>
9	Bypassing the vent position	Stop Assembly and/or probe shoulder are worn.	<u>Stop operation and remove nozzle from service.</u> Contact your service department or the manufacturer.

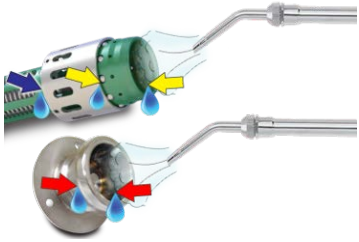
Trouble Shooting Guide (continued):

<u>Item #</u>	<u>Issue</u>	<u>Possible Cause</u>	<u>Remedy</u>
10	Difficulty moving handles	Damaged or missing hinge pins	<p><u>Stop operation and remove nozzle from service.</u></p> <p>If any of the hinge pins on the nozzle fall off or are missing this will jeopardize the alignment of the probe and incur costly damage to the unit. See figure below</p>

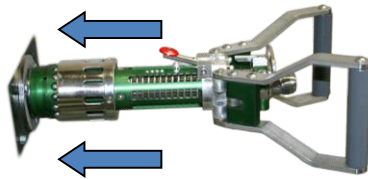


CryoMac®3 LNG Fueling Nozzle – One Page Guide

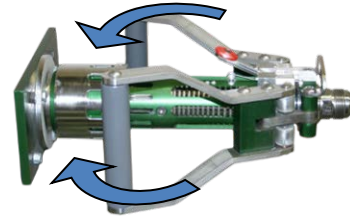
Coupling the nozzle for fueling



Step 1) Blow moisture off nozzle and receptacle using dry compressed air or nitrogen



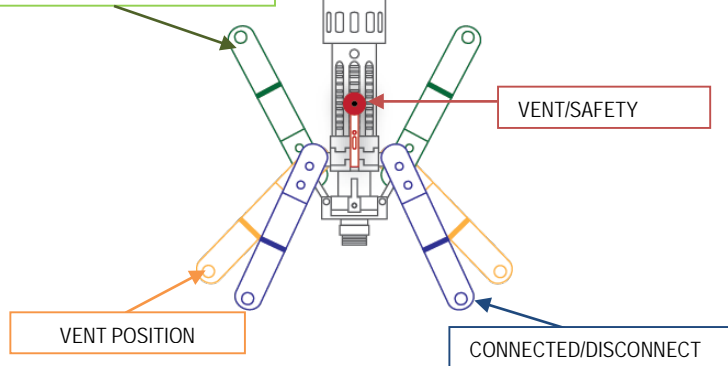
Step 2) Push Safety Stop lever down to ensure handles are completely back, then slide the Nozzle fully onto the male Receptacle



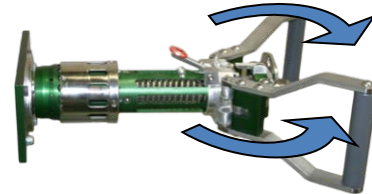
Step 3) Push the handles toward the receptacle as far as they will go, the fueling process can begin once the handles are fully forward.

HANDLE POSITIONS

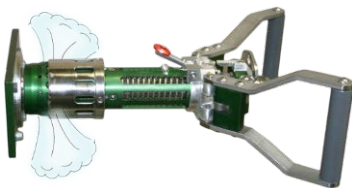
CONNECTED/READY TO FILL



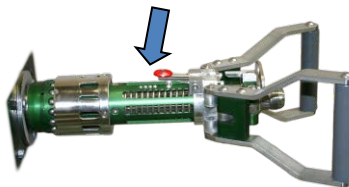
Uncoupling the nozzle after fueling



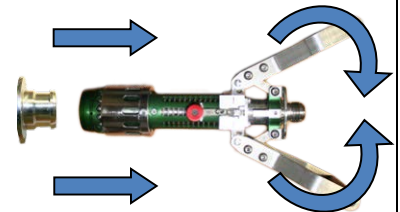
Step 4) Once the fueling has finished, pull the handles backward, away from the receptacle until they will not move any further.



Step 5) Let the gasses vent out of the nozzle from the exposed vent holes until the venting stops (usually just a few seconds).



Step 6) Once gas has stopped venting out of the holes, press the Stop Assembly lever (***Do Not pull the handles back while pressing the Stop Assembly lever***)



Step 7) Pull the handles all the way back and toward you to release the nozzle from the receptacle.

Limited Warranty

Macro Technologies, LLC warrants products and repair kits manufactured by it to be free from defects in materials and workmanship under normal use and service for a period of 12 months from the date of installation or operation or 18 months from the date of shipment from the factory, whichever is earlier. If within thirty days after buyer's discovery of what buyer believes is a defect, buyer notifies Macro Technologies, LLC thereof in writing, Macro Technologies, LLC, at its option, and within forty-five days, will repair, replace F.O.B. point of manufacture, or refund the purchase price of that part or product found by it to be defective. Failure of buyer to give such written notice within thirty days shall be deemed an absolute and unconditional waiver of any and all claims of buyer arising out of such defect.

This warranty does not extend to any product or part that is not installed and used in accordance with Macro Technologies, LLC printed instructions, all applicable state and local regulations, and all applicable national standards, such as those promulgated by NFPA, DOT, CGA, and ANSI. This warranty does not extend to any product or part that has been damaged by accident, misuse, abuse or neglect, nor does it extend to any product or part which has been modified, altered, or repaired in the field.

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If Macro Technologies, LLC furnishes technical advice to buyer, whether or not at buyer's request, with respect to application, further manufacture or other use of the products and parts, Macro Technologies, LLC shall not be liable for technical advice and buyer assumes all risks of such advice and the results thereof.

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WARNING

All Macro Technologies, LLC products are mechanical devices that will eventually become inoperative due to wear, corrosion and aging of components made of materials such as rubber, etc. The environment and conditions of use will determine the safe service life of these products. Periodic inspection and maintenance are essential to avoid serious injury and property damage.

Many Macro Technologies, LLC products are manufactured components which are incorporated by others on or in other products or systems used for storage, transport, transfer and otherwise for use flammable and explosive liquids and gases. Such substances must be handled by experienced and trained personnel only, using accepted governmental and industrial safety procedures.

NOTICE TO USERS OF PRODUCTS

The Limited Warranty stated above is a factory warranty to the first purchasers of Macro Technologies, LLC products. Since most users have purchased these products from Macro Technologies, LLC distributors, the user must within thirty (30) days after the user's discovery of what user believes is a defect, notify in writing the distributor from whom he purchased the product/parts. The distributor may or may not at the distributor's option, choose to submit the product/parts to Macro Technologies, LLC pursuant to its Limited Warranty. Failure by buyer to give such written notice within thirty (30) days shall be deemed an absolute and unconditional waiver of buyer's claim for such defects.

Acceptance of any alleged defective product/parts by Macro Technologies, LLC's distributor for replacement or repairs under the terms of Macro Technologies, LLC's Limited Warranty in no way obligates Macro Technologies, LLC to the terms of the above warranty

