The optional Minimum-Quantity Lubrication has these functions:

- An oil reservoir and atomizer continuously spray small quantities of oil onto the cutting tool.
- Flood coolant is not necessary.
- The part is easier to see during machine operation.
- The surface finish is smoother.
- The dry chips make recycling easier.
**Caution:** When you do maintenance or repair on CNC machines and their components, you must always follow basic safety precautions. This decreases the risk of injury and mechanical damage.

Do these steps before you do work in the machine or in the control cabinet:

- Set the main circuit breaker to the [OFF] position.
- Use an approved lock with an approved safety tag. Always follow lock-out procedures in accordance to local government rules.
- After turning off the machine, wait at least 5 minutes before working in the control cabinet, to allow power to dissipate. Wait for the voltage indicator LED on the vector drive to go off completely.
- Always turn off the main air supply when you work on any part of the pneumatic system.
- Make sure to rest the spindle head on a block of wood when work is done on a vertical axis. This will prevent any unintended movement that could result in the axis falling.
- Never alter any safety circuits on the machine.

You should not do machine repair or service procedures unless you are qualified and knowledgeable about the processes. Serious damage to the machine components can result in costly repairs. The service technicians at your Haas Factory Outlet (HFO) have the training and experience, and are certified to do these tasks safely and correctly. The repair and service work performed by your HFO is protected with a limited warranty.

**Danger:** Some service procedures can be dangerous or life-threatening. DO NOT attempt a procedure that you do not fully understand. If you have any doubts about doing a procedure contact your Haas Factory Outlet (HFO) and schedule a service visit.

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**Machine Compatibility**

The [Auto Air Gun (AAG)](http://diy.haascnc.com) is necessary to install the MQL system. Go to [http://diy.haascnc.com](http://diy.haascnc.com) for more information.
<table>
<thead>
<tr>
<th>Part Number</th>
<th>QTY</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>30-11653</td>
<td>1</td>
<td>MQL OIL RESERVOIR ASSEMBLY</td>
</tr>
<tr>
<td>30-11654</td>
<td>1</td>
<td>MQL ATOMIZER ASSEMBLY</td>
</tr>
<tr>
<td>58-1355</td>
<td>1</td>
<td>HOSE 1/4 OD POLYETHYLENE RED</td>
</tr>
<tr>
<td>58-2010</td>
<td>1</td>
<td>HOSE, 5/32 OD NYLON</td>
</tr>
<tr>
<td>58-2110</td>
<td>1</td>
<td>FITTING, COMPRESSION NUT 5/16-24-M FOR 5/32 OD TUBING B-1371</td>
</tr>
<tr>
<td>58-0017</td>
<td>1</td>
<td>FITTING, COMPRESSION INSERT 5/32 B-19268</td>
</tr>
<tr>
<td>58-2130</td>
<td>1</td>
<td>FITTING, COMPRESSION SLEEVE FOR 5/32</td>
</tr>
<tr>
<td>58-1821</td>
<td>1</td>
<td>3/32OD X .014 WALL X 12IN BRASS TUBE</td>
</tr>
<tr>
<td>46-0108</td>
<td>1</td>
<td>NUT, 1/4 - 28 JAM NUT, ZINC PLATED STE</td>
</tr>
<tr>
<td>41-0050</td>
<td>3</td>
<td>PPHS SS 10-12 X 1/2</td>
</tr>
<tr>
<td>58-1847</td>
<td>1</td>
<td>LBO 1/4 UNION TEE</td>
</tr>
<tr>
<td>93-2364</td>
<td>1</td>
<td>OIL, REFILL CANOLA - 32 OZ / 1 QT</td>
</tr>
</tbody>
</table>

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Some machines do not have marks on the front right panel for the bracket holes. For these machines, use this template or the bracket to mark the location of the holes for the bracket.

**Tools Required**

- Drill
- Drill Bit - Size 27 (0.144”)

**Templates**

![Template Diagram]

**Electrical Schematic**

![Electrical Schematic Diagram]
Prerequisites

All VMCs made after July 5, 2015 are MQL-prepared. MQL-prepared VMCs have the MQL oil tube installed at the factory. But you must change the position of the MQL oil tube to make it go from the lubrication cabinet to the MQL reservoir. For all other VMCs, you must install the MQL oil tube from the spindle head to the MQL reservoir.

STEP 1

Push [POWER OFF].

Set the main circuit breaker to the OFF position.

Lock the main circuit breaker. Use an approved lock with an approved safety tag.

Close the primary air valve. This stops the air supply to the machine.
STEP 2

Remove the reservoir bowl [1] from the MQL oil reservoir assembly.

Hold the MQL oil reservoir assembly [3] or the template on the right-front panel [2] so that the pressure gauge [4] is 5.5 ft (1.7 m) from the ground.

⚠️ **Caution:** Attach the MQL reservoir to the front-right panel only.

STEP 3

Put marks for the (3) hole locations for the bracket onto the front-right panel [1].

✅ **Note:** Some machines have these hole marks.

Drill the (3) 0.144” (size 27 drill bit) holes in the front-right panel [2].

Attach the bracket to the front-right panel. Use the (3) self-tapping screws [3].

✅ **Note:** If you damage the sheet metal, use the (3) screws and the (3) nuts.

STEP 4

Remove the upper spindle head cover.

Install the clear MQL oil tube [1] through the cable carrier and cable channels as shown.

✅ **Note:** MQL-prepared machines have the MQL oil tube installed at the factory. Find it behind the spindle head cover.


Install the upper cover for the spindle head.
STEP 5
Connect the other end of the tube to the oil output port [1] on the MQL reservoir assembly.

Note: MQL-prepared machines have the MQL oil tube installed at the factory. Find it in the lubrication cabinet. You must reroute it to the oil output port on the MQL reservoir assembly.

STEP 6
Align the check valve [1] on the MQL atomizer [2] with the through-hole on the cylinder clamp [3].
Install the MQL atomizer to the AAG with the jam nut [4].

Note: For AAGs with the thread inside the cylinder, use the straight brass fitting supplied with the kit. Discard the jam nut.

STEP 7
Put the clear MQL oil tube [1] through the hole [2] in the cylinder clamp for the AAG.
Install the brass tube [3] into the clear MQL oil tube [1].
Install the compression nut [4], the sleeve [5], and the insert [6] into the tube.
STEP 8
Disconnect the red tube from the AAG solenoid in the lubrication panel.

STEP 9
Cut a 2" piece of tube [3].
Use the piece of the tube to install the tee-fitting [2] to the AAG solenoid.
Connect the AAG tube [1] to one of the ports on the tee-fitting. This is the hose that was disconnected in Step 7.

STEP 10
Install the red 1/4" tube [2] from the lubrication panel to the MQL reservoir assembly. Use the (3) cable ties and the (3) magnetic cable mounts.
Connect the tube [4] to the other port of the tee-fitting [3].
Connect the other end of the tube to the air inlet port [1] of the MQL reservoir assembly.
Start the AAG. Make sure that no leaks are in the system.
Conclusion

Do the VMC - Minimum-Quantity Lubrication - System Purge procedure.

Go to http://diy.haascnc.com for more information.

Operate the MQL with the M83 and M84 codes.

- M83 starts the MQL.
- M84 stops the MQL.
Prerequisites

All GRs made after September, 2015 are MQL prepared. MQL-prepared GRs have these properties:

- The red tube that carries the air goes from the lubrication panel to the spindle head. You install a tee fitting on the air tube.
- The clear tube that carries the oil goes from MQL reservoir to the spindle head.

For all other GRs, you must install these two tubes:

1. The red tube that carries the air from the lubrication cabinet to the spindle head.
2. The clear tube that carries the oil from the MQL reservoir to the spindle head.

STEP 1

Push [POWER OFF].

Set the main circuit breaker to the OFF position.

Lock the main circuit breaker. Use an approved lock with an approved safety tag.

Close the primary air valve. This stops the air supply to the machine.

STEP 2

Remove the reservoir bowl [1] from the MQL oil reservoir assembly.

Hold the MQL oil reservoir assembly [2] or the template on the left panel [3] so that the pressure gauge is 5.5 ft (1.7 m) from the ground.

⚠️ Caution: Attach the MQL reservoir to the left panel only.

Put marks for the (3) hole locations for the bracket onto the panel [4].

⚠️ Note: Some machines already have these holes marked on the panel.

Drill the (3) 0.144" (size 27 drill bit) holes in the panel.

Attach the bracket [5] to the panel. Use the (3) self-tapping screws [6].

⚠️ Note: If you damage the sheet metal, use the (3) screws and the (3) nuts.
STEP 3

For GRs made after September, 2015 go to step 5.

Note: MQL-prepared machines have the tubes for the AAG installed at the factory.

Put the red tube for the AAG from the lubrication cabinet to the cable carrier below the table.

Note: Use the position of the black tube that goes to the Tool Release Piston (TRP) as a guide.

STEP 4

Install the clear MQL oil tube [1] and the red air tube [2] as shown.

Put the clear tube [1] from the spindle head to the MQL reservoir.

Put the red tube [2] from the spindle head to the cable carrier below the table.

You install the tee fitting [3] in the next step.

STEP 5

Find the red tube [1] for the AAG air where it goes out of the cable carrier below the table. Find the end of the red tube [2] from the MQL reservoir assembly.

Cut the red tube for the AAG air [3].

STEP 6
Remove the upper cover for the spindle head [1]. Put the red and clear tubes through the hole in the top cover [2]. Use the clamp [3] to attach the tubes.

STEP 7

STEP 8
Connect the red tube to the AAG solenoid in the lubrication panel.
STEP 9
Align the check valve [1] on the MQL atomizer [2] with the through hole on the cylinder clamp [3].

Install the MQL atomizer to the AAG with the jam nut [4].

Note: For older AAG's with the thread inside the cylinder, use the straight brass fitting supplied with the kit. Discard the jam nut.

STEP 10
Put the clear MQL oil tube [1] through the hole [2] in the cylinder clamp for the AAG.

Install the brass tube [3] into the clear MQL oil tube [1].

Install the compression nut [4], sleeve [5], and insert [6] into the tube.


Start the AAG. Make sure that no leaks are in the system.

Conclusion
Do the VMC - Minimum-Quantity Lubrication - System Purge procedure.

Go to http://diy.haascnc.com for more information.

Operate the MQL with the M83 and M84 codes.

- M83 starts the MQL.
- M84 stops the MQL.
The Minimum-Quantity Lubrication (MQL) system supplies oil to the tool. The MQL system has tubes that supply the oil. Air can get into the tubes. This procedure shows you how to remove the air from the tubes.

**Prerequisites**

Do this procedure at these times:

1. Before you operate the system for the first time.
2. After you try to operate the system with the oil reservoir empty.
3. After you change fluids.

**STEP 1**

Fill the oil reservoir with MQL lubricant [1].

Install the reservoir [2] into MQL Reservoir assembly.

**Caution:** Only use lubricants that are non-toxic and specially made for MQL systems. Refer to the Lubricant Table for Haas Machine Components for recommended lubricants.

Go to [http://diy.haascnc.com](http://diy.haascnc.com) for more information.

**STEP 2**

Find the atomizer needle valve [1]. Turn the needle valve counterclockwise (2) full turns from the closed position.

Set the oil regulator pressure to 40 psi (2.8 bar).

Operate this code in [MDI] mode:

```plaintext
%
M83;
%
```

Operate the MQL system [2] until no air is in the system. The mist can stop momentarily. This shows that air is in the system. If the mist does not stop, no air is in the system.

Push [RESET] to cancel the purge cycle.
STEP 3

Close the atomizer needle valve. Then open it (1/2) to (1) turn.

Set the pressure for the oil regulator. Set the air pressure to 30 psi (2.1 bar).

Do these steps to make sure the MQL system operates correctly: Hold a small piece of paper approximately 3 inches from the atomizer. Operate the program in Step 2. A round wet pattern shows that the MQL system is adjusted correctly.

Some oils have a higher viscosity. Oils with higher viscosity flow slowly. To make the oil flow correctly, do these steps:

- Adjust the air pressure.
- Adjust the needle valve.

Adjust the air pressure high enough to atomize the oil and carry the oil to the tool. Change the pressure for different tools, workpieces, programs and the type of oil that you use.

Do not use more than the necessary quantity of oil. The necessary quantity prevents these problems:

- Chips attach to the tool.
- Chips attach to the workpiece.

Conclusion

If the pressure of the oil mist from the spray head is not sufficient, make sure no kinks are in the oil tube.

If no kinks are in the oil tube, the filter is possibly clogged. The filter is inside the reservoir. Refer to the VMC - Minimum-Quantity Lubrication - Filter - Maintenance procedure.

Go to http://diy.haascnc.com for more information.