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## INSTALLATION AND OPERATING MANUAL FOR AUTOMATIC COOLANT RETURN SYSTEM SERIES

Thank you and congratulation on your purchase of a new Vac-U-Lok Automatic Coolant Return System. Vac-U-Lok's products are engineered and manufactured to improve your company's performance and productivity in the short-term as well as the long run. This installation and operating manual is designed to assist you in the installation and maintenance of your Vac-U-Lok Automatic Coolant Return System.

### Operating Principles

The Automatic Coolant Return System is designed to automatically collect and drain flood coolant and other liquids while still in operation (under vacuum). The unit operates on 115VAC, single phase power and as little as 10psi compress shop air. It is easy to run and mounts near the coolant tray of any type of machine - machining centers, grinders, routers, lathes, EDMs and many more.

**It is mandatory that these operating instructions be read and understood prior to the Automatic Coolant Return System's installation and start-up.**

### **1.0 INSTALLATION (Continued)**

#### 1.1 Unpacking

Open the box and remove the unit that is wrapped thoroughly in bubble wrap. Inspect the unit carefully for any signs of damage incurred in transit. Since all product is shipped FOB DeKalb, Illinois, such damage is the normal responsibility of the carrier and should be reported to them *immediately*. The ACRS-1HD units are also shipped with two (2) U-bolts for mounting.

#### 1.2 Location / Mounting

The Automatic Coolant Return System is mounted in the vertical position and is typically mounted to the sheet metal of the machine tool enclosure--back side by the coolant tray using the two (2) U-bolts provided. The bottom of the unit has a valve with a 1/2" NPT thread (ACRS-1HD) or an 1-1/4" NPT tread (ACRS-2HD-2NPT, ACRS-3HD-3NPT and ACRS-Dual-3HD-3NPT) to accommodate a hose barb and short hose to direct the flow of coolant upon discharge.

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1.2 Location / Mounting (Continued)

When mounting the ACRS-1HD unit to the sheet metal of the machine tool enclosure, the bottom valve of the unit should be approximately one (1) foot above the coolant tray. If this positioning is not convenient or not possible, Vac-U-Lok does offer a stand for the unit (part# CRS-Stand). The ACRS-2HD-2NPT, ACRS-3HD-3NPT and ACRS-Dual-3HD-3NPT are mounted to a free-standing independent stand and should be anchored to the facilities floor near your machine tool coolant tray.

1.3 Power Requirements

All ACRS series units operate on 115VAC, single phase power. For the unit to work, the power cord must be plugged-in to a 115VAC socket and the power switch must be turned to the "ON" position. In addition, the unit must have a shop air connection of at least 10 psi.

**CAUTION:** After the electrical connection has been made, do not open the control box!  
Unplug the electrical connection before attempting any work on the control box.  
Improper use could result in bodily injury or death to personnel operating the unit.

1.4 Vacuum Connections

Please review the Vac-U-Lok Vacuum Workholding System Layout diagram in the back of this manual. The vacuum connections provided here are guidelines for the appropriate Vac-U-Lok Vacuum Systems and Automatic Coolant Return Systems:

Heavy-Duty Vacuum System Model #	Tank Size	Coolant Return Threaded Outlet	General Guidelines Type of Coolant Return
SHDP-7	20 gallon	3/4" NPT	ACRS-1HD
SHDP-20	30 gallon	1" NPT	ACRS-1HD
SHDP-45	60 gallon	1-1/4" NPT	ACRS-1HD or ACRS-2HD-2NPT
SHDP-70	80 gallon	1-1/2" NPT	ACRS-2HD-2NPT or ACRS-3HD-3NPT
SHDP-117	120 gallon	2" NPT	ACRS-2HD-2NPT or ACRS-3HD-3NPT
SHDP-180	200 gallon	2" NPT	ACRS-3HD-3NPT or ACRS-Dual-3HD-3NPT
SHDP-180-1-0	No Tank	2" NPT	ACRS-3HD-3NPT or ACRS-Dual-3HD-3NPT
SHDP-234-1-0-2P	No Tank	3" NPT	ACRS-3HD-3NPT or ACRS-Dual-3HD-3NPT
SHDP-360-1-0-2P	No Tank	3" NPT	ACRS-3HD-3NPT or ACRS-Dual-3HD-3NPT

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#### 1.4 Vacuum Connections (Continued)

Only three (3) hose connections are needed for the Automatic Coolant Return Systems: One at the top of the unit (the "Top" connects to the vacuum source), one on the right hand side at the strainer (the "Arm" connects to the vacuum chucking fixture), and one at the bottom of the unit (the "Bottom" connects to the coolant tray). The "Top" needs the appropriate hose barb connection to the Vac-U-Lok Vacuum System. The length of vacuum hose and size of hose barb will depend on the Vac-U-Lok Vacuum System you have purchased. The "Arm" requires the appropriate hose barb connection to the Vac-U-Lok Vacuum Chuck. The length of vacuum hose and size of hose barb will also depend on the Vac-U-Lok Vacuum Chuck you selected. . The "Bottom" requires the appropriate hose barb connection to your coolant tray. The length of vacuum hose and size of hose barb will also depend on the Vac-U-Lok ACRS model you have selected (ACRS-1HD has a 1/2" NPT connection and the remaining units in the series have a 1-1/4" NPT connection).

Teflon tape or teflon putty is necessary when making all connections. Hose clamps are optional. If your coolant contains debris or other foreign solid particles, an additional, suitable inlet filter (five micron rating or less) may be necessary to connect to the inlet port. The "Arm" of the unit has an eighty (80) mesh screen inside the Strain area that will contain most of the particles. Please consult Vac-U-Lok for recommendations if additional filters are needed.

#### 1.5 Capacity

The capacity of these units is tested with a steady stream of liquid passing through at a constant leak rate. A sudden rush of liquid may possibly exceed the stated steady rates listed below. If the stated rates are exceeded, it is possible for liquid to rush through the unit and on to the vacuum pump. If a sudden rush of liquid does exceed the capacity of your ACRS unit, please check the condition of the vacuum pump oil immediately. If exceed liquid has made its way to your vacuum pump, we highly recommend changing your vacuum pump oil immediately.

The ACRS-1HD will collect and drain up to 15 gallons of coolant per hour while the ACRS-2HD-2NPT will handle up to 55 gallons per hour. The ACRS-3HD-3NPT will handle up to 80 gallons per hour. The ACRS-Dual-3HD-3NPT will handle up to 115 gallons per hour.

Please note that the ACRS series units can only handle solid liquid. Inside the system, as the vacuum level increases (higher inches of mercury), the boiling point of liquid gets lower. This creates a mist that will go past your ACRS unit and into your vacuum pump. As long as your vacuum system has been running for 20 to 30 minutes prior to engaging your ACRS system, the mist will burn off and pass through the exhaust mist on your vacuum pump. This will appear as a small white puff of "smoke" which is not smoke at all. It is mist.

Vac-U-Lok's EWME-300 unit is a coalescing filter which aids in "knocking down" mist into droplets and recycling it back through the Automatic Coolant Return System.

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**1.5 Capacity (Continued)**

Vac-U-Lok also offers a special Battery-Back-up System designed to alert the operator the Automatic Coolant Return System has accumulated liquid indicating the ACRS unit is probably not functioning properly. The Back-Up System has a float switch in the unit attached to a battery operated alarm. When and if the liquid (coolant) collects up to the level of the float switch, the alarm will be sounded. When the alarm sounds, it is very important that the operator stop machining and figure out why liquid (coolant) has reached the float switch.

Several possible problems may exist. The unit's power may have been turned "off". A power outage to the 115V single phase circuit may have occurred. A third possibility is that the shop air connection may be disconnected or at zero. A fourth possibility is that one or more valves inside the ACRS units are not working properly due to clogging. It is very important to take care of the problem before proceeding. You must confirm that no liquid entered the vacuum system before starting your machining operation again.

**2.0 OPERATION****2.1 Start-Up**

Secure all vacuum connections from the vacuum pump to the vacuum workholding device (including the vacuum safety system connection). Plug in the 115V power cord for the Automatic Coolant Return System into a wall socket or power strip. Connect the ACRS unit to a shop air connection of at least 10psi and confirm that the unit's regulatory is set for less than 15psi. Turn on your vacuum system (pump, motor, motor starter, inlet filter and tank with vacuum gage) and start your vacuum workholding operation.

**WARNING:** The Automatic Coolant System will not work if the unit is not plugged in and turned "ON". Coolant will enter the vacuum system and could possibly cause damage to your vacuum pump.

**CAUTION:** After the electrical connection has been made, DO NOT open the control box! Unplug the electrical connection before attempting any work on the unit's control box. Improper use could result in bodily injury or death to personnel operating the unit.

**2.2 Function**

The Automatic Coolant Return System is designed to automatically collect and drain flood coolant while still in operation (under vacuum). The coolant initially enters the upper chamber of the unit thru the Y-strain (The "arm") on the right hand side and drains to the lower chamber. Once in the lower chamber, the coolant will fill up past the sight glass to reach the second switch (switch #2) on the left hand side of the unit. As soon as the coolant reaches that switch, the unit will automatically drain the coolant with the assistance of approximately ten (10) pounds of air pressure applied to it by the regulator located just below the control box (customer needs to supply an air pressure source and an air fitting). Meanwhile, the upper chamber remains under vacuum. The unit operates on 115VAC, is easy to run, and mounts near the coolant tray of any type of machine - machining centers, grinders, routers, lathes, and many more.

### 2.3 Shut-down

To drain the remaining coolant out of the unit after finishing the vacuum workholding operation for the day, simple push and hold (for 5 to 10 seconds) the red (or black) button of the left side the unit's control box. This will by-pass the second float switch and allow air pressure to fill the lower chamber and drain the coolant.

Please note: Recommendations for Shut-down: If using flood-coolant, the Vac-U-Lok vacuum system warranty is void without a Coolant Return System from Vac-U-Lok. Additional recommendations for using any vacuum system include turning the vacuum pump on twenty (20) to thirty (30) minutes prior to and twenty (20) to thirty (30) minutes after each usage. With the Vac-U-Lok Heavy-Duty Vacuum Systems, running these models will heat up the vacuum pump oil to approximately 200 degrees and help evaporate some of the liquid that vaporizes past the Automatic Coolant Return System in the oil filtering system. Since the oiling system for the Heavy-Duty units is a recycling system, the vacuum pump oil will need to be changed more frequently when using coolant.

With the Heavy-Duty Systems, the inlet filter glass jar and inlet filter will need to be cleaned on a regular basis.

## 3.0 MAINTENANCE

Vac-U-Lok's Automatic Coolant Return System needs very little maintenance; however, to insure the unit performance, it is recommended that the following steps be observed:

- 1) Drain the Automatic Coolant Return System of any remaining coolant at the end of each day by pushing and holding (for 5 to 10 seconds) the red (or black) button of the left side the unit's control box.
- 2) Check and clean out any debris from the Y-strainer eighty (80) mesh filter or bucket filter on a daily or weekly basis. This should be done with no vacuum in the lines.
- 3) When using the Automatic Coolant Return Systems, draining the vacuum system's tank may not have to be done again, however, it should be checked on a regular basis (weekly, bi-monthly or monthly depending on usage and machining operations) by the drain valve underneath the reservoir tank. More aggressive contaminants or liquids in the air stream may require an extra, external inlet filter for collection before entering the vacuum reservoir (ie. located on the "Top" of the Coolant Return System).

**WARNING:** Vac-U-Lok strongly recommends that all major repair operations be conducted at the factory. Improper handling of repairs could result in extreme danger to personnel operating the Automatic Coolant Return System.

**CAUTION:** All remedies are to be performed with the vacuum system completely shut down! Improper use could result in extreme danger to personnel operating the Automatic Coolant Return System.

**CAUTION:** All remedies are to be performed with the vacuum system completely shut down! Improper use could result in extreme danger to personnel operating the vacuum system.

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4.1 **Trouble:** Coolant is flowing out the top of the ACRS unit and going into the vacuum tank reservoir.

4.1.1 Possible Cause: The solenoid valve controlling the air flow (located inside the control panel) is stuck or broken.

Remedy: Replace the solenoid valve. Only an experienced electrician should replace this unit.

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i. Possible Cause: The top liquid flow switch is stuck (in the up position).

Remedy: Clean out bottom chamber of ACRS unit with degreasing solvent and hot water mixture – Ratio of 1:5 (Grease Lightening, Dawn Dishwashing Liquid or any other degreasing solvents).

To run the solvent mixture thru the unit, bleed off any vacuum in the lines coming to the ACRS unit to performance the following functions. The unit must be plugged into 115V outlet and must have shop air attached to it to perform these functions:

**CAUTION:** All remedies are to be performed with the vacuum system completely shut down! Improper use could result in extreme danger to personnel operating the vacuum system.

- (a) Remove the hose from the hose barb at the Top of the ACRS unit.
- (b) Pour very slowly approximately one (1) gallon of the hot solvent mixture into the top of the ACRS unit with a funnel. Use caution in pouring the hot solvent mixture as spillage may cause minor burns on the personnel performing this operation.
- (c) Once the solvent mixture has drained from the top chamber into the bottom chamber, the mixture should be shaken (carefully) for approximately two (2) minutes to loosen any debris or coolant build-up that may be causing the liquid flow switches to stick. Please allow the solvent mixture to sit for approximately fifteen (15) minutes after shaking it up.

Remedy: Clean out bottom chamber of ACRS unit with degreasing solvent and hot water mixture (Continued)

- (d) Direct the hose attached to the bottom of ACRS unit away from or out of the coolant tray for the machine. Prepare an alternative draining location for the solvent mixture to be evacuated.
- (e) Turn “ON” the ACRS unit at the control box.
- (f) Press the “RED” button on the left side of the control box and hold it in for approximately fifteen (15) second or until all the liquid in the bottom chamber has been evacuated.
- (g) Follow (b) thru (f) with the solvent mixture one more time. Rinse the top and bottom chambers of the ACRS unit with only hot water three additional times to ensure the solvent mixture has been cleaned out.
- (h) After finishing the above listed procedures, screw the 1-1/4” NPT plastic cap back onto the unit using a generous amount of Tephlon plumber’s putty on the threads.

#### Disclaimer

We reserve the right to change the product at any time without any form of notification. The information in this manual is accurate to the best of our ability at the time of printing. Vac-U-Lok will not be responsible for errors encountered when attempting to perform tasks outlined in this installation and operations manual.