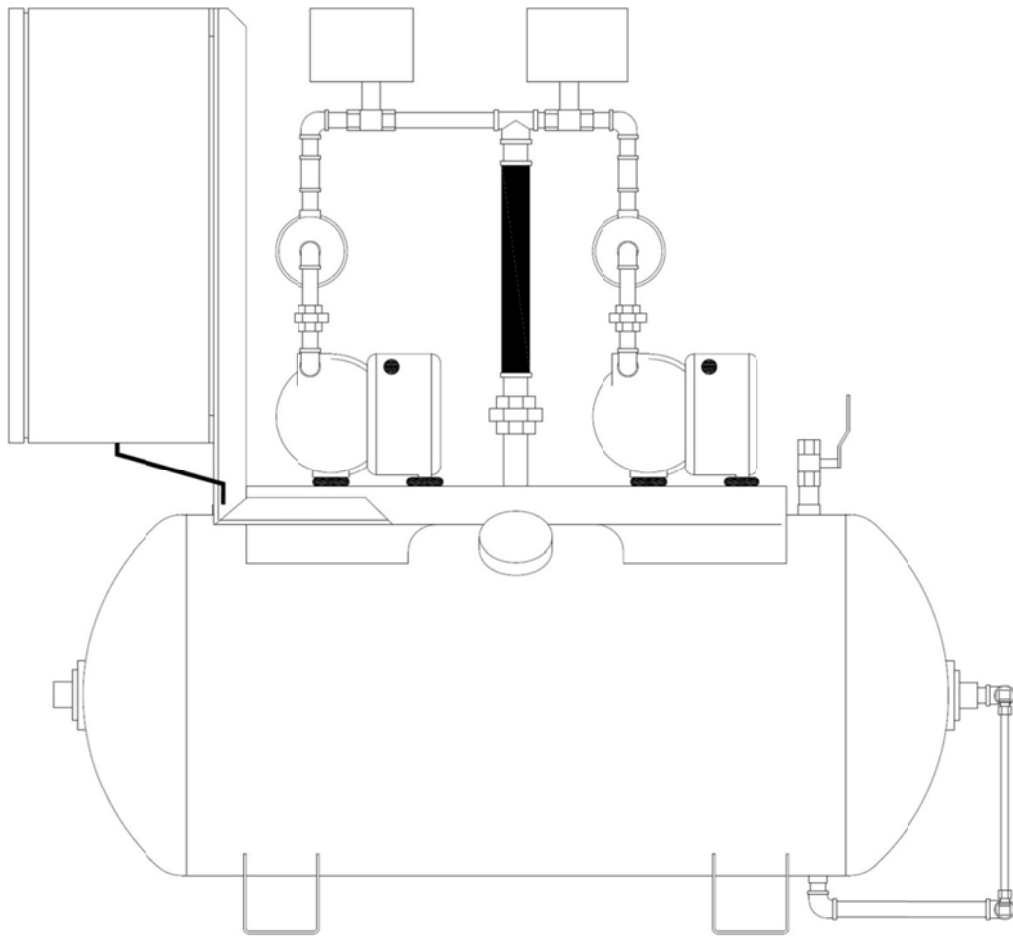


Q-VAC PRIMING SYSTEMS

OPERATION & MAINTENANCE MANUAL

QVD-RV Series



Q-VAC MODEL: _____

SERIAL NUMBER: _____

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INTRODUCTION

Q-Vac Automatic Priming Systems have been designed to provide safe and reliable service with low maintenance. However, the operator must exercise good judgment and follow proper safety procedures to avoid personal injury or damage to the equipment. Please review and follow all instructions in this manual before attempting to install, start or operate equipment.

SAFETY

All products offered by CFP have been designed and manufactured for safe operation. However, the responsibility for safe operation rests with those who use and maintain these products. Your safety department should establish a safety program based on OSHA, federal, state and local codes. It is important that due consideration be given to hazards which arise from the presence of electrical power, hot liquids, toxic gases and rotating equipment. Proper installation and care of protective devices is essential to safe system operation. These safety procedures are to be used in conjunction with the instructions contained in this manual.

STORAGE

Keep the system in a cool dry environment with the isolation valves closed to keep out dirt, moisture, and foreign objects. Every 2 - 3 months rotate the motor shaft by hand.

UNPACKING

Upon receipt of system, immediately inspect for signs of damage. Carefully remove the crating from around system. Be sure to keep equipment in the upright position. CFP products are shipped Ex-Works factory, which means that any damage is the responsibility of the carrier and should be reported to them.

LIFTING

Lift the equipment carefully and with weight evenly distributed. CFP is not responsible for equipment that has been damaged through mishandling or dropping.

INSTALLATION

The design of the piping system, foundation layout and plant location are the responsibility of the purchaser. CFP and its representatives may offer advice but cannot assume responsibility for operation and installation design.

LOCATION

Install the unit in a well ventilated and dust free area protected from the elements. The system should be placed a sufficient distance from walls and other equipment to facilitate general maintenance and service.

MOUNTING

The system must be installed on a level surface in a horizontal position. The foundation must be designed to support the total unit weight, without any settling or crushing, be rigid and substantial enough to absorb any equipment vibration, maintain true alignment with any drive mechanism, and must permanently support the system baseplate at all points. The vacuum system must be leveled and secured with foundation bolts. Foundation bolts must be of adequate size to withstand the mechanical stresses exerted on it.

VENTILATION

Locate the vacuum system in an area with sufficient airflow and accessibility. To prevent excessive ambient temperature rise it is imperative to provide adequate ventilation. Cooling is an important aspect of reliable equipment operation and it is therefore important to install the unit in a reasonably cool area where the temperature does not exceed 100°F (38°C). For higher ambient temperatures contact the factory.

ELECTRICAL PREPARATION

All system wiring is performed at the factory. Check area classification to ensure all electrical enclosures comply with code. Required customer wiring is minimal, but should be done by a qualified electrician in compliance with OSHA, National Electric Code and any other applicable local electrical code concerning switches, fused disconnects, etc. CFP includes a wiring diagram for use by the installer. It is recommended that a main disconnect switch be fitted between the priming system and the incoming power.

After the electrical wiring connections are completed, check the incoming voltage to make sure that the incoming voltage is the same as the vacuum system voltage. Check the system for proper motor rotation. Directional arrows are located on each vacuum pump. Jog each motor individually by briefly turning the HOA switch to the HAND position and then OFF. If the rotation is incorrect switch any two of the three main power leads on the contactor inside the control panel. Failure to do so could result in serious equipment damage.

WARNING: Install, ground, and maintain equipment in accordance with the National Electrical Code and all applicable federal, state and local codes.

PIPE CONNECTIONS

Before installation, remove all protective inserts on the pump suction and discharge. All piping connected to the system must be installed without imposing any strain on the system components. Improperly installed piping can result in misalignment, pump failure, and general operating problems. Use flexible connectors where necessary. Piping should be cleaned properly before installation.

INLET PIPING

NOTE: Install a temporary screen at the system inlet for initial start-up to protect the system against carryover of pipe debris and welding slag. The screen must be removed after the initial run-in period.

Inlet piping should no smaller than the system inlet connection. Install the priming system as close to the point of use as possible to minimize friction losses. If the system has to be installed further away from the process, be sure to oversize the inlet piping accordingly.

At least one properly sized priming valve should be installed for each centrifugal pump serviced by the priming system.

As a precaution against flooding the vacuum receiver, a water trap can be installed in the main vacuum line between the priming system and the priming valves. Please contact the factory for additional information on this optional safety device.

EXHAUST PIPING

Exhaust piping is not required. However, if exhaust piping is desired it should be sized no smaller than the exhaust port to eliminate back pressure. If both vacuum pumps are connected into one exhaust pipe

the piping should be oversized to accommodate the combined flow and suitable check valves should be used at the exhaust port of each vacuum pump.

OPERATING PRINCIPLE

Before any centrifugal pump can begin pumping water it must first be primed; that is, the air must be removed from the suction piping and pump casing and replaced with water. This is not a problem when the pump is submerged or when the water supply is above the pump. However, this is a major issue when the water level is located below the centrifugal pump.

A Q-Vac Priming System is a cost effective, efficient, and reliable method of priming centrifugal pumps by removing the air in the system with vacuum pumps. The differential pressure created by a vacuum pump draws the water from its source up through the suction piping and pump casing until it reaches a specially designed priming valve installed just above each pump.

A priming valve allow the priming system to continuously remove any air from the suction piping and pump volutes while also mechanically separating the wet side of the process from the vacuum system. As a control feature, a water level control switch or “pump protector” is typically installed into each priming valve to provide a “proof of prime” electrical signal. This signal can easily be interlocked with a pump motor starter or used in a control center.

By maintaining a suitable vacuum level at all times, each pump connected to the priming system can always be fully primed and ready to run. Since the vacuum pumps on a Q-Vac Priming System only run when necessary to maintain a set vacuum range, the total run time of the priming system is minimal and completely independent from the centrifugal pumps being primed.

MAJOR SYSTEM COMPONENTS

Q-Vac QVD-series priming systems include the following major components & features.

VACUUM PUMP

Single-stage, oil-lubricated rotary vane vacuum pumps with direct drive motors generate vacuum for the system. The construction is heavy-duty and compact, resulting in a small footprint. The standard design is air-cooled with a high-efficiency multi-stage exhaust filter that results in 99.9% oil mist removal. Each pump is provided with all the accessories needed to ensure safe, long term operation, including a gas ballast valve. A gas ballast valve's main function is to help prevent water vapor from condensing in the pump, which would cause emulsification of the lubricating oil, resulting in possible pump seizure. If the oil is contaminated with moisture, close the vacuum pump isolation valve completely and run the pump for 30 minutes to remove moisture from the oil. If after 30 minutes, the oil is still contaminated with moisture, stop the pump and change the oil. The pump should be filled with the recommended QSS-series vacuum pump oil through the oil fill plug until it reaches the 1/2 way mark of the vacuum pump's oil sight glass.

VACUUM RECEIVER

An ASME code air receiver holds vacuum for the system. The vacuum receiver includes a system inlet valve, vacuum gauge, liquid level sight gauge, high water level switch, vacuum release valve, and manual tank drain. To drain the receiver, close the system inlet valve and open the vacuum release valve before opening the manual tank drain.

AUTOMATIC PURGE SYSTEM

This optional priming system feature adds special programming and NEMA 4 electrically operated isolation valves for each pump. When a vacuum pump is signaled to stop by the PLC its isolation valve will close and the pump will continue to run for 20 minutes drawing fresh, dry air through the gas ballast port prior to shutting down. This feature extends oil change intervals and helps maintain each vacuum pump in peak condition.

CONTROL PANEL

A NEMA 4 enclosed control panel provides automatic operation of the vacuum priming system. Each system includes motor starters with overload protection & reset switches, pump running lights, HOA selector switches, alarm light with reset button, alarm horn with silence button, dry alarm contacts, vacuum transducer, and micro processing controller with HMI and illuminated display. The microprocessor cycles the vacuum pumps on and off as needed, provides alternation, lead/lag control, frequent start protection, hour meters, and alarm monitoring.

Vacuum Transducer: Senses vacuum level and transmits it electronically to the microprocessor.

HOA Selector Switches: Hand-Off-Auto vacuum pump control.

Reset Button: Used to reset the starter overloads.

Pump Running Light: Indicates a pump is running.

Alarm Light: A visual indicator of an alarm condition. See controller display for the specific condition.

Alarm Horn: An audible indicator of an alarm condition. See controller display for specific condition.

Alarm Silence Button: This button will silence the alarm horn.

Alarm Reset Button: is used to reset the alarm circuit after the condition has been rectified. This button will reset both the alarm light and the alarm horn if the condition has been corrected.

FREQUENT START PROTECTION

This feature ensures that each vacuum pump runs a minimum of 10 minutes after start to prevent excessive cycling. Frequent start-stop cycling reduces component life.

AUTOMATIC ALTERNATION

This feature switches the lead and lag pump after every run cycle to ensure approximately equal run time of each vacuum pump to maximize operating life.

START-UP PROCEDURE

1. Q-VAC rotary vane priming systems are fully tested at the factory and shipped with oil inside the vacuum pumps. Before operating, check the oil level of each pump. The oil level should be visible at the middle of the sight glass before start-up.



2. Remove the protective plugs from the vacuum pump exhaust ports.
3. Completely close the system inlet valve, drain valve, and all vacuum release valves.
4. Ensure that each pump's inlet isolation valve is open. This step can be ignored for systems including the automatic purge option.
5. Using the HOA switches, jog the motors briefly and check direction of rotation. The correct direction of rotation is marked by an arrow on the motor or pump housing. If rotation is incorrect, switch any two of the three leads at the control panel.

WARNING: OPERATING PUMP BACKWARD CAN CAUSE VANE FAILURE.

6. Operate each pump in HAND and check that motor current is within specifications for the motor.



DANGER: HIGH VOLTAGE!
Lethal shock hazard present.
USE EXTREME CAUTION!

**You may notice a rattling sound on systems smaller than the QVD-30RV-80H.
This noise is the spring loaded check valve opening and closing and is normal.**

7. Place both HOA selector switches to AUTO mode.

SHUT-DOWN PROCEDURE

Turn each HOA switch to the OFF position.

GENERAL OPERATION

The following is a description of how a QVD series priming system will operate.

MANUAL OPERATION

When an HOA selector switch is turned to HAND the selected pump(s) will immediately start and the PUMP ON light(s) will illuminate to indicate pump operation. Each vacuum pump placed in HAND will run continuously until its HOA switch is manually switched off or the flooded receiver alarm is initiated.

AUTOMATIC OPERATION

The microprocessor controls the automatic operation of the priming system and monitors alarm conditions. Both HOA switches must be placed in the AUTO position to engage the duplex run program. When only one HOA switch is in the AUTO position the simplex run program will initiate.

At initial start-up both vacuum pumps will run until their high vacuum set points have been reached and each pump has run for a minimum of 10 minutes (20 minutes with auto purge feature).

If the vacuum level in the system drops to the "LEAD PUMP ON" set point the LEAD pump will run until it reaches its high set point and it has run for a minimum of 10 minutes (20 minutes with auto purge feature).

If the vacuum level drops further and reaches the "LAG PUMP ON" set point the LAG pump will turn on so that both lead and lag pumps are running together. Each pump will continue to run until it has reached its high vacuum set point and it has run for a minimum of 10 minutes (20 minutes with auto purge feature).

If the vacuum level continues to drop and reaches the "LOW VACUUM ALARM" set point, the "LOW VACUUM ALARM" will be triggered.

To maintain approximately equal run time for each vacuum pump, the lead and lag pumps alternate duty after every run cycle.

The vacuum set points of each priming system are field adjustable but should not be changed without consulting the factory. Typical control set points are below.

Lead Pump: On at 22" HgG
Off at 26" HgG

Lag Pump: On at 20" HgG
Off at 24" HgG

Low vacuum alarm: 19" HgG

PLC DISPLAY & KEYPAD



HOUR METERS

The total elapsed run time for each vacuum pump can be viewed by pressing the up arrow key on the controller. Each time this key is pressed the display will forward to the next screen until the original display screen has been reached.

VACUUM LEVEL

Pressing the down arrow key will display the current vacuum level of the system. Pressing this key again will return the display to the original display screen.

CONTROL SETPOINTS

WARNING: Changing control setpoints may affect priming system performance and warranty. Do not change the pre-programmed setpoints without first consulting the factory.

The vacuum setpoints of the system can be accessed by pressing the left arrow key on the controller. Once a setpoint display is selected a flashing cursor below the left most digit will flash on and off. If a setpoint is to be changed, enter the new setpoint value in inches of Mercury ("HgG). After the new number has been entered, press the Enter key to confirm. To move to a different control setpoint without changing the value, or to exit the control setpoint menu, press the Enter key and the left arrow key until the original display screen has been reached.

SYSTEM ALARMS

There are three conditions which will trigger the priming system alarm circuit. Dry alarm contacts are provided within the control panel to accommodate remote monitoring of these alarm conditions. The following is a description of how these alarm conditions function and affect system operation.

The **ALARM LIGHT** is triggered during all alarm conditions and will remain on until the alarm condition has been corrected.

The **ALARM HORN** is triggered during all alarm conditions. The alarm horn can be silenced using the alarm silence button.

FLOODED VACUUM RECEIVER ALARM

In any pump priming operation it is possible for a priming valve to fail or for excessive condensation to accumulate inside the vacuum receiver. To prevent possible damage by this situation a liquid level switch tied to an alarm circuit is provided. If the liquid level inside the receiver rises to 50% of the receiver capacity the flooded vacuum receiver alarm will be triggered. This situation will cause the alarm light to illuminate and will sound the alarm horn. As a protective device, this alarm will automatically shut down the priming system until the receiver has been drained and the alarm condition reset button has been pressed.

LOW VACUUM ALARM

Upon initial start-up, or if a situation occurs where the priming system can not maintain a sufficient vacuum level, a low vacuum alarm will be triggered. This alarm consists of a warning light and an audible alarm but it will not affect the operation of the system. This alarm will remain on until the low vacuum condition has been corrected.

PUMP START FAILURE

If a vacuum pump fails to start due to mechanical failure or a motor overload issue the start failure alarm will be triggered. This situation will cause the alarm light to illuminate and will sound the alarm horn. This alarm will remain on until the situation has been corrected and the alarm reset button has been pressed.

MAINTENANCE

Proper maintenance for your Q-Vac system is critical to ensure proper operation and a long service life. Every Q-Vac system has been designed with features to make routine maintenance quick and easy.

WARNING: Before attempting any maintenance, disconnect all power from the system by switching off the main breaker or disconnect switch. This will prevent the system from automatically starting.

MAINTENANCE SCHEDULE

First 8 hours: Check piping for signs of leakage and tighten if necessary.

Monthly: Check oil level, oil quality, and condensate level in vacuum receiver.

It is normal for the oil to be slightly foamy and lightly colored when the vacuum pump is running. If the oil is milky or dark colored, it must be changed. Regular oil inspection is required to ensure proper operation, longevity, and performance.

Under normal circumstances it should not be necessary to add oil between recommended oil changes. Check the oil level only when the pump is off. Replenish if the oil level drops below the MIN. level on the sight glass. Oil must be added through the fill port only.

CAUTION: Do not add oil while pump is running, since hot oil can escape from the fill opening. Be careful when draining hot oil, personal injury could result.

Check condensate level in air receiver. Drain by closing the system inlet valve, opening the receiver vent, and opening the manual drain valve. When receiver is fully drained reverse these steps.

Every 250 hours or 3 months: Change oil.

When using our specially formulated QSS-series vacuum pump oil, change the oil and oil filter (if existing) every 3 months or 250 hours of operation, whichever comes first. If other oil must be used, confirm that it meets minimum requirements and double the oil change frequency. If the oil is milky or dark colored the oil should be changed. Drain the oil when it is hot by opening the oil fill port and the oil drain valve after closing the pump isolation valve and opening the vacuum release valve. Be sure to dispose of used oil according to all legal requirements. For systems subject to extreme ambient temperatures we recommend QPS-series premium synthetic vacuum pump oil.

IMPORTANT: More frequent oil changes may be required if the oil is milky or dark colored. Change the oil filter (if existing) every time the oil is changed. Do not add oil while pump is running. Be careful when draining hot oil, personal injury could result.

Every 500 hours or 6 months: Replace inlet filters, exhaust filters, and clean pump

For easier servicing, close the pump isolation valve and open the pump's vacuum release valve.

Clean dirt from the vacuum pump and motor to ensure proper cooling.

Do not attempt to clean or re-use the exhaust filter. Make sure that all filters are disposed of properly.

BEARING LUBRICATION

Vacuum Pumps Bearings—No maintenance is required. Bearings are self-lubricating.

Motor Bearings

European IEC motors use sealed bearings and do not require lubrication. All motors are shipped from the factory with the bearings properly packed with grease. During extended storage of 6 months or greater, the bearings should be re-lubricated with a quality lithium based grease of #2 consistency. NEMA motors will have grease fittings located on each end of the motor.

Bearings may be lubricated with the motor running or stationary, but stationary is preferred. Typical greases used are Texaco Premium RB and Chevron SR1 #2. Roller-bearings (V-belt drive systems) use Texaco Premium RB or Chevron Black Pearl EP #2.

Before greasing a bearing clean the area and replace the pipe plug with a grease fitting if not equipped. Remove the grease drain plug, located at the lower portion of each motor face (typically a plastic plug), and loosen any hardened grease that may block the drain. Add the recommended volume of grease using a hand operated grease gun. Run the motor for two hours. Replace the pipe plug in grease drain.

Mixing lubricants is not recommended due to possible incompatibility. Signs of incompatibility are extreme soupiness from the grease relief drain or from the shaft opening. When changing a lubricant, re-grease after 100 hours of service.

Frequency/volume of greasing is based on service conditions, speed and frame size. See tables below.

Standard conditions: 8 hour day operation, normal or light loading, clean environment at a 100 °F maximum ambient temperature.

Severe conditions: 24 hour operation or shock loading, vibration, dirty or dusty environment, running at a 100°F to 120°F ambient temperature.

Extreme conditions: heavy shock, vibration, or dust.

Motor Bearing Lubrication Schedule Roller bearings – divide time by 2				
Speed (RPM)	NEMA Frame	Standard Conditions	Severe Conditions	Extreme Conditions
1800	182-215	3 years	1 year	6 months
1800	254-365	2 years	6-12 months	3 months
1800	404-449	1 year	6 months	1-3 months
3600	ALL	6 months	3 months	1 month

Lubrication Volume	
NEMA Frame	Volume (Cubic inches)
182-215	0.5
254-286	1.0
324-365	1.5
404-449	2.5

TROUBLESHOOTING

Every Q-Vac Priming System is tested and checked at the factory. However, the following is a basic troubleshooting guide.

WARNING: Before attempting any repairs, disconnect all power from the system by switching off the main breaker or disconnect switch. This will prevent the system from automatically starting from a vacuum switch.

The unit will not start:

1. Check reset button on control panel (if installed). Overloads may have been triggered.
2. Check setting of HOA switch and vacuum setpoints.
3. Check power. Make sure that supply voltage matches motor voltage.
4. To check electrical control panel disconnect power. Make sure that all wires are tight. Wires may vibrate loose during shipment or operation. See wiring diagram on conduit box of motor for correct wiring configurations.
5. Check motor overload in control panel.
6. Check fuses. Fuses may have blown.

Unit starts, but labors and draws a very high current:

1. Check if motor rotation is correct by comparing it to the arrow on the motor or pump housing. If incorrect switch any two of the three main power leads on the contactor inside the control panel (3-phase only).
2. Exhaust filter element may need to be replaced.
3. Check power supply. Excessively high or low voltage or phase imbalance will damage motor.
4. Check to see if pump is overfilled with oil. Oil level should be in the middle of the sight glass on the side of the pump reservoir.
5. Check oil. Oil may be too heavy (high viscosity) or the ambient temperature is below 5°C (41°F). Replace with proper Q-Vac oil.
6. Foreign particles may have carried over into pump causing damage to the vanes or other internal parts. Contact CFP.

Unit is not drawing enough vacuum:

1. Check if motor rotation is correct by comparing it to the arrow on the motor or pump housing. If incorrect switch any two of the three main power leads on the contactor inside the control panel.
2. Check to see if the oil is milky or contaminated. Replace at once.
3. Check hour meter. If the oil has been used longer than the recommended life expectancy (as specified in the Maintenance Schedule, the pump will not draw ultimate vacuum. Use specially formulated Q-Vac vacuum pump oil.
4. Check vacuum gauge. Gauge may be faulty. Replace.
5. Check oil level. Oil level should be maintained at the middle of the top sight glass on the side of the pump reservoir.
6. Check if the inlet valves are open and the inlet filters are clean.
7. Ensure that no lines are open to the atmosphere, causing loss of vacuum.
8. Check for leaks in the piping systems using conventional leak detection methods.
9. Check coupling between pump and motor (if applicable). If damaged, replace.
10. Check to see if inlet check valve assembly is stuck in closed position due to contamination. Disassemble and clean inlet check valve and screen as required.
11. Exhaust element may need to be replaced.
12. Internal parts may be worn or damaged. Contact factory.
13. One or more of the vanes in the rotor may be stuck. Contact factory.

Overheating problems:

1. Stop unit and disconnect power.
2. Check to see if the oil is contaminated or varnished. Replace at once.
3. Check hour meter. Oil should not be used longer than the recommended life expectancy (as specified in the Maintenance Schedule).
4. Check oil level. Oil level should be maintained at the middle of the top sight glass on the side of the pump reservoir.
5. Check oil for excessive foaming. If foaming, replace.
6. Check oil-return valve inside pump. Valve may be clogged or may be functioning incorrectly. Contact factory.
7. Exhaust element may need to be replaced.
8. Make sure that pump is being cooled correctly. Check that pump is clean and located in a well-ventilated area.
9. Inspect fan for damage.
10. Clean motor and pump air grills if needed.
11. Check heat-exchanger (if existing). Clean if necessary.

Unit smokes out the exhaust port:

1. Note the vacuum level. Operating for extended time below 20" Hg will result in exhaust smoke and may be indicative of application issues. Contact factory.
2. Stop unit and disconnect power.
3. Check internal exhaust element. Exhaust element may not be seated correctly or may need to be replaced.
4. Check operating temperature. Excessive heat will cause smoking.
5. Check oil-return valve inside pump. Valve may be clogged or may be functioning incorrectly. Consult factory.
6. Check oil return line. Line may be clogged or broken. If so, clean clogged line or replace line. Be sure to use same size line when replacing. Contact factory.

Unit has abnormally high oil-consumption:

1. Check around pump for oil leaks. Oil tubing may be damaged or defective. Replace if necessary.
2. Abnormal oil consumption could be the result of smoking problems at the exhaust side (see above).

Unit is making excessive noise:

1. Check oil for excessive foaming. If foaming, replace.
2. Check if motor rotation is correct by comparing it to the arrow on the motor or pump housing. If incorrect switch any two of the three main power leads on the contactor (3-phase only).
3. Check bearings. If bearings are noisy, contact factory for replacement instructions.
4. Foreign particles may have carried over into the pump, causing damage to the vanes or other internal parts. Contact factory.
5. One of the vanes in the rotor may be stuck. Contact factory for instructions.

PRIMING VALVES



QV-series priming valves have been specifically designed for priming applications. Their long body design, 316 stainless steel trim, and fusion bonded epoxy finish provide long life and leak-free performance, even in aggressive water.

STANDARD FEATURES

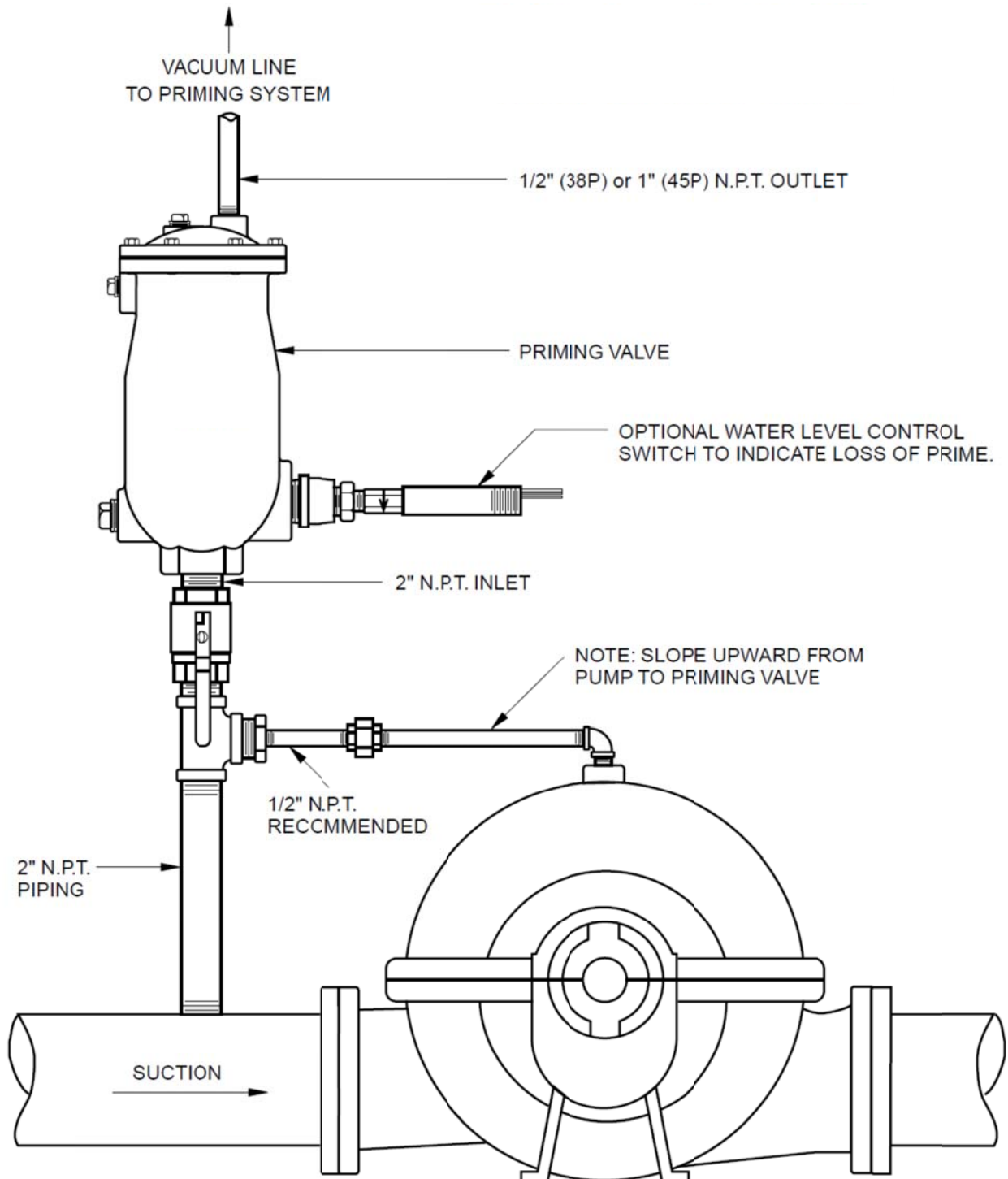
- Cast iron construction
- Long body design
- 316 stainless steel trim
- Resilient seat for positive shutoff
- Fusion bonded epoxy finish
- Unconditionally guaranteed float
- Performance proven for over 40 years
- Meets AWWA standards

OPERATIONAL HIGHLIGHTS

- Maintains pump prime
- Improves pump & pipeline efficiency
- Protects against air related surges
- Eliminates air bound pumps

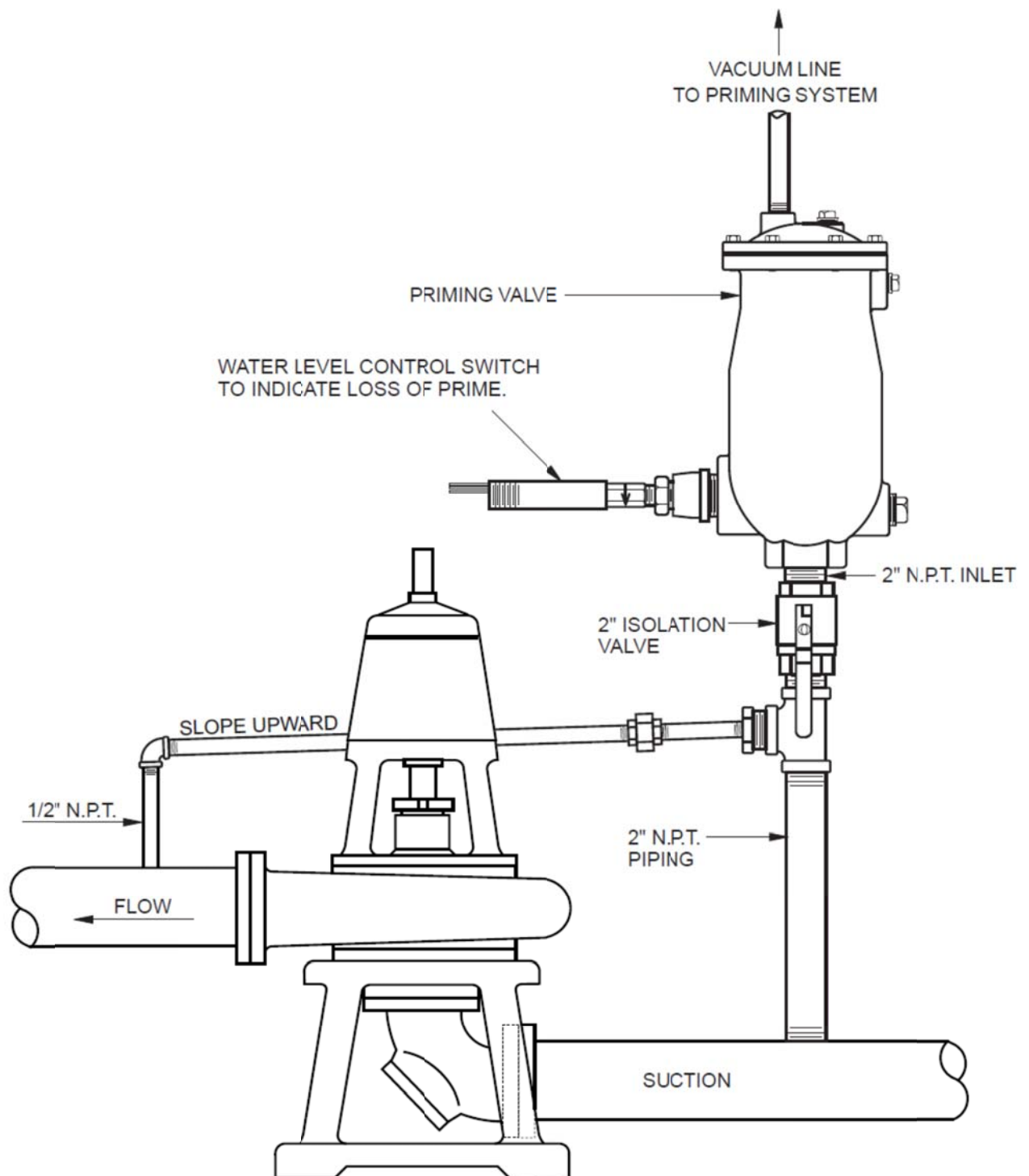
QV-SERIES PRIMING VALVES						
Model	Inlet	Outlet	Orifice	C.W.P.	Width	Height
QV-38P	2" NPT	1/2" NPT	3/16"	150 PSI	7"	15 5/16"
QV-38P.2	2" NPT	1/2" NPT	5/16"	75 PSI	7"	15 5/16"
QV-45P	2" NPT	1" NPT	23/64"	150 PSI	9 1/2"	17 9/16"
QV-45P.3	2" NPT	1" NPT	1/2"	75 PSI	9 1/2"	17 9/16"

TYPICAL PRIMING VALVE ARRANGEMENT



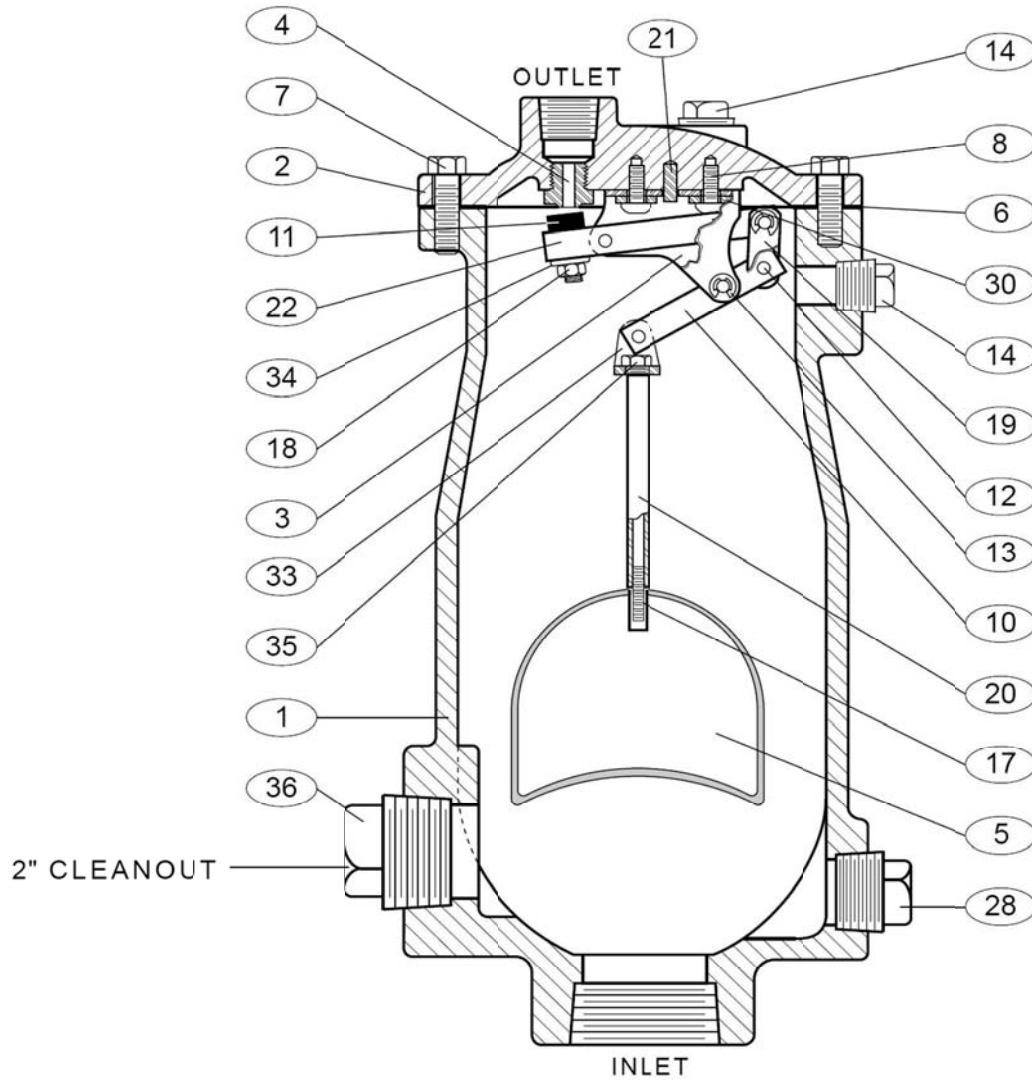
THE PURPOSE OF THE VACUUM PRIMING VALVE IS TO AUTOMATICALLY ALLOW AIR TO BE DRAWN OUT OF THE PUMPING SYSTEM UNTIL THE PUMP FILLS WITH WATER.

TYPICAL PRIMING VALVE ARRANGMENT



THE PURPOSE OF THE VACUUM PRIMING VALVE IS TO AUTOMATICALLY ALLOW AIR TO BE DRAWN OUT OF THE PUMPING SYSTEM UNTIL THE PUMP FILLS WITH WATER.

PRIMING VALVE PARTS



1	BODY	10	FLOAT ARM	20	EXTENSION SHAFT
2	COVER	11	ORIFICE BUTTON	21	LOCATING PIN
3	LEVERAGE FRAME	12	PIVOT PIN	22	ORIFICE BUTTON ARM
4	SEAT	13	RETAINING RING	28	PIPE PLUG
5	FLOAT	14	PIPE PLUG	30	WASHER
6	GASKET	17	FLOAT RETAINER	33	CLEVIS
7	COVER BOLT	18	LOCK NUT	34	LOCK WASHER
8	RETAINING SCREW	19	LINK	35	RETAINING SCREW
				36	PIPE PLUG

WATER LEVEL CONTROL SWITCH

A SPDT water level control switch, sometimes referred to as a “pump protector”, is normally used to signal when a pump is primed, or to provide a warning if the prime has been lost. This “proof of prime” signal can be interlocked with a centrifugal pump’s motor controller or to an alarm. A DPDT water level control switch is available upon request.

INSTALLATION

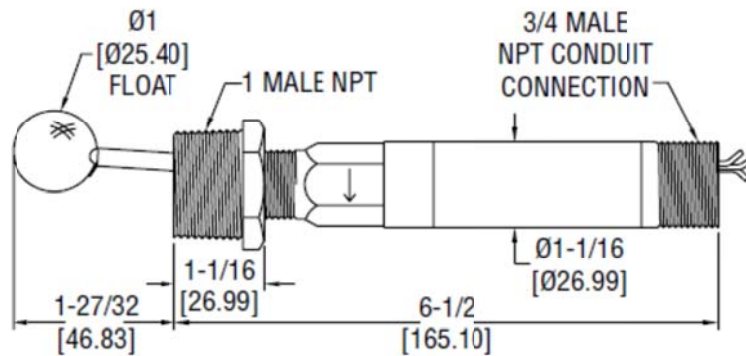
1. Unpack the level switch and included pipe fittings. Remove any packing material.
2. Install the pipe fittings and level switch into the priming valve using pipe sealant on all threaded connections. The switch must be installed with the arrow on the side of the body pointing down.

ELECTRICAL CONNECTIONS

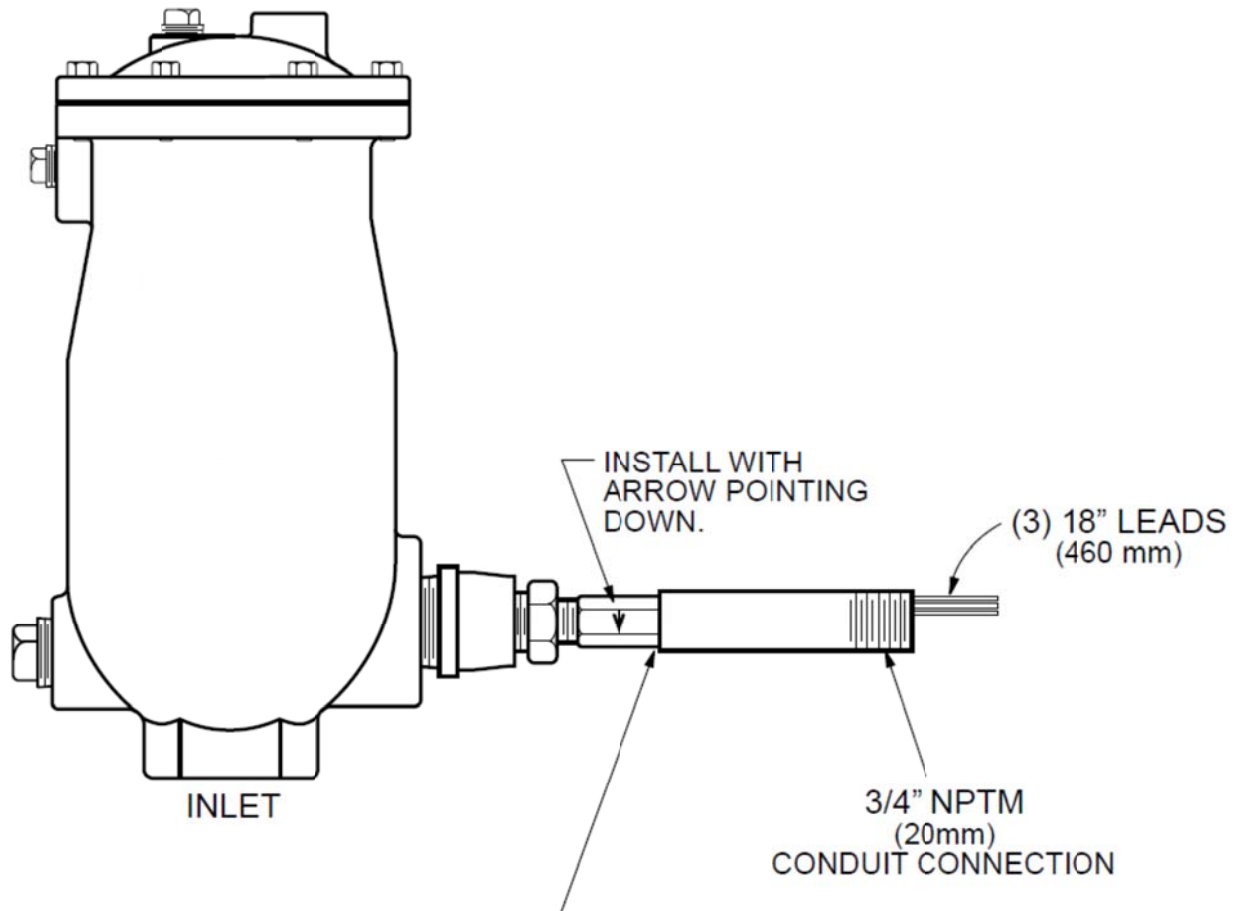
Connect wire leads in accordance with local electrical codes and switch action required.

N.O. contacts will close and N.C. contacts will open when the water in the priming valve causes the level switch float to rise. They will return to “normal” condition on decreasing liquid level.

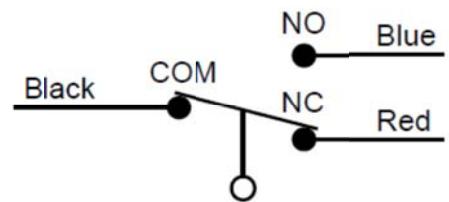
Black = common,
Blue = N.O.
Red = N.C.



WATER LEVEL CONTROL SWITCH INSTALLATION



WATER LEVEL CONTROL SWITCH
SPDT SWITCH
RATED 5A @ 125/250 VAC
3A INDUCTIVE @ 30 VDC
UL and CSA LISTED
EXPLOSION PROOF.



WIRING DIAGRAM

PRIMING VALVE MAINTENANCE

Q-Vac Priming Valves do not require scheduled lubrication or maintenance.

WARNING: Wear safety glasses to look into the valve outlet after installation. Released fluid can cause injury.

Inspection: Periodic inspection to verify operation can be performed. The valve should not leak fluid at any connection or through the outlet. If there is leakage through the outlet, check for wear on the orifice button (11).

Lubrication: The valve is a self-contained automatic valve and does not require lubrication to enhance its operation.

Tools: No special tools are needed to maintain or repair the valve.

TROUBLESHOOTING

Several problems and solutions are presented below to assist you in troubleshooting the valve assembly in an efficient manner.

- Leakage at Bottom Connection: Tighten valve threaded connection. If leak persists, remove valve and seal threads with sealant.
- Leakage at Cover: Tighten bolts per Table 2, replace gasket (6).
- Valve Leaks when Closed: Disassemble and inspect orifice button (11), and float (5).

NOTE: Many floats contain sand for weight but if water is detected, replace float.

DISASSEMBLY

The valve can be disassembled without removing it from the pipeline. All work on the valve should be performed by a skilled mechanic with proper tools. No special tools are required.

WARNING: The valve must be drained before removing the cover or pressure may be released causing injury.

1. Close inlet shut-off valve. Open drain valve or remove drain plug. Remove the cover bolts (7) on the top cover.
2. Pry cover (2) loose and lift off valve body.
3. Remove the 2 retainer rings (13) and pivot pins (12) that pass through the lever frame (3). The float (5) and linkage will be free from the cover. Disconnect float from lever (10).
4. To remove lever frame (3), remove two round-head fasteners (8). Rotate seat (4) counter-clockwise to remove.
5. Remove locknut (18) and orifice button (11) from orifice button arm (22).
6. Clean and inspect parts. Replace worn parts as necessary and lubricate with a FDA grease such as Lubriko #CW-606. Note: Some floats contain sand for weight; if water is detected, replace float.

REASSEMBLY

All parts must be cleaned and gasket surfaces should be wire brushed in the direction of the serrations or machine marks. Worn parts, gaskets and seals should be replaced during reassembly.

1. Apply Loctite 780 thread sealant to seat (4) and assemble to cover with maximum torque of 20 ft- lbs. DO NOT OVER TORQUE.
2. Assemble lever frame (3) to cover over locating pin (21) in cover. Secure with screws (8) and washers (30).
3. Install new orifice button (11) flush to arm (22). Assemble lockwasher (34) and locknut (18) over orifice button but do not tighten.
4. Connect arms (10 & 22) and assemble to lever frame (3) with four pivot pins (12) and retaining rings (13); rings should snap over pins.
5. Adjust orifice button (11) so that orifice button arm (22) slopes away from cover about 1/16" when resting gently against seat (4). Secure button by tightening lockwasher (34) and nut (18).
6. Attach float (5) and guide shaft (20) by installing last pivot pin (12) into lever frame (3). Float should move freely pressing the orifice button (11) against the seat (4) when pushed upward. Verify that all retainer rings (13) are properly secured.
7. Lay new cover gasket on clean surface. Assemble gasket (6) and cover (2) over bolt holes in body (1).
8. Insert lubricated bolts (7) and tighten to the torques listed below.
9. Place valve back in service. Slowly open inlet isolation valve.

Valve Cover Bot Torques

Model Number	Bolt Size	Torque (ft-lbs)
38P	7/16"	30
45P	1/2"	45

LIMITED WARRANTY FOR Q-VAC PRIMING SYSTEMS

The Seller (Combined Fluid Products Co.) warrants to the original Buyer that all Q-Vac vacuum priming systems manufactured at the Seller's facility in Lake Zurich, Illinois are free from defects in material and workmanship at the time of shipment for a period of one (1) year from date of initial operation or 18 months from the date of shipment, whichever comes first, subject to the other conditions hereof. Warranty claims must be made in writing and received by Seller within the above warranty period.

This Limited Warranty does not cover any replacements of normal maintenance items such as oil, vanes, and intake or exhaust filter elements, etc. This Limited Warranty is valid only when the product has been properly installed, used in a normal manner, and serviced according to the operating and maintenance manual. This warranty shall not extend to products that have been misused, neglected, altered, or repaired without Seller's authorization during the warranty period. Operating conditions beyond our control, such as improper voltage, excessive ambient temperature, or other conditions that would affect the performance or life of the product will also cause this Limited Warranty to become void.

Written permission to return parts for warranty repair must be obtained, and all returns must be prepaid to the factory. If, after examination, the product or part is found to be defective, it will be repaired or replaced on a no charge basis and returned to the Buyer freight prepaid via standard motor freight. A credit in the same amount of the return standard motor freight charges will then be issued to the Buyer as reimbursement for the incoming freight. In the event that a warranty repair requires a CFP Mechanic on site, travel expenses and travel time are at the expense of the Buyer and are not covered under this Limited Warranty. If it is determined that the Warranty has not been breached by Seller, then the usual charges for repair or replacement will be made, FOB the factory.

This Limited Warranty applies only to the above and is for the period set forth. Seller's maximum liability shall not, in any case, exceed the contract price for the product, part or component claimed to be defective, and Seller assumes no liability whatsoever for any special, indirect, or consequential damages arising from defective equipment or from the use or sale of any of its products or services. Seller will not reimburse Buyer for any labor charges or for other expenses incurred in the removal or replacement of any defective systems or components.

SELLER DISCLAIMS ALL OTHER WARRANTIES WITH RESPECT TO THE PRODUCTS, WHETHER EXPRESS OR IMPLIED, AND SPECIFICALLY DISCLAIMS THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL CFP BE LIABLE TO CUSTOMER OR THIRD PARTIES IN WARRANTY, CONTRACT, NEGLIGENCE, STRICT LIABILITY OR OTHERWISE, FOR ANY DAMAGES, WHETHER INCIDENTAL OR CONSEQUENTIAL, WHICH ARE ALLEGED TO HAVE BEEN CAUSED BY ONE OR MORE OF THE PRODUCTS, BEYOND THE TERMS HEREOF.

This Limited Warranty in no way negates or otherwise amends the Seller's Standard Terms and Conditions of Sale.

FACTORY CONTACT INFORMATION

Q-VAC Priming Systems are a product of Combined Fluid Products Co.

Mailing Address:

Combined Fluid Products Co.
805 Oakwood Road
Lake Zurich, Illinois (USA)

Telephone: (847) 540-0054

Email: sales@combinedfluidproducts.com

Website: www.vacuumprimingsystems.com