Operation and Maintenance Manual
For All Variations of:
DP310G2–G8, DP310F2–F8

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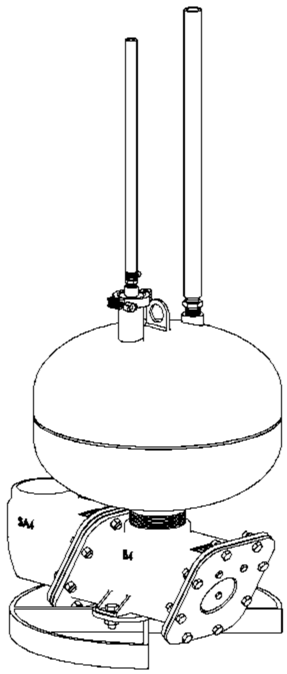
SYSTEM OVERVIEW

Each **PITBULL**® pumping system is comprised of a pump with two check valves, a control panel, and the connecting airline with probe line.

Pump with check valves and airline



Control panel with probe and probe line.

THE PITBULL® PUMPING PRINCIPLE

The **PITBULL**® pumps liquid by allowing liquid to fill the pump through the inlet check valve, and then when full, it pressurizes with compressed air and forces the liquid out through the discharge check valve. The check valves act to direct the liquid in the correct direction.

In its standard configuration the **PITBULL**® uses gravity to fill the pump, requiring the pump to be below the liquid level in order to fill. In the **PITBULL**® self-priming configuration the pump will pull liquid into it, and can be located above the liquid level

Pump filling through inlet check valve. **Pump pressurized, forcing liquid out discharge.**

PANEL INSTALLATION

The DP310 control panels are shipped loose for remote mounting. Fifteen feet of airline and probe line are included as standard. *To finish installing the control panel, please follow the steps outlined below.*

1- Mount the panel above the liquid level on the inlet side whenever possible.

2- Bring your compressed air supply to the inlet (A) on the side of the panel (see figure).

- Please follow the table for the recommended air piping size for your pump model to insure full and correct functioning of your system. Be aware that the **PITBULL**® uses compressed air in spurts, and needs a larger diameter airline than the average air consumption would require.

Pump# - Inlet		Air Supply
S2C/S	2"	3/4" pipe
S3C/S	3"	1" pipe
S4C/S	4"	1" pipe
Custom 6" and larger		1-1/2" pipe

Filtration; please attach filter and autodrain (provided) at this location. Do Not Lubricate!

2- Provide the panel with a 110VAC power source. The hole for the power cord strain relief will fit 1/2" conduit if the standard cord is not acceptable.

3- (optional) On dry piped applications it is often desirable to run an exhaust line from the open exhaust port back up to the top of the feed tank, or to a suitable drain. This will prevent spillage in the event of compressed air or power failure (see "Recommended Installation" sketches) and will reduce exhaust noise. Note that this line will require a drain valve/port because of condensation.

- **Mufflers:** you may choose to install a muffler, especially in high-pressure applications. However, avoid porous media mufflers that will plug up and throttle/stop the pump. **CIPC** also sells straight through (no restriction) mufflers, part #ST-6B, as an option for vacuum generators.

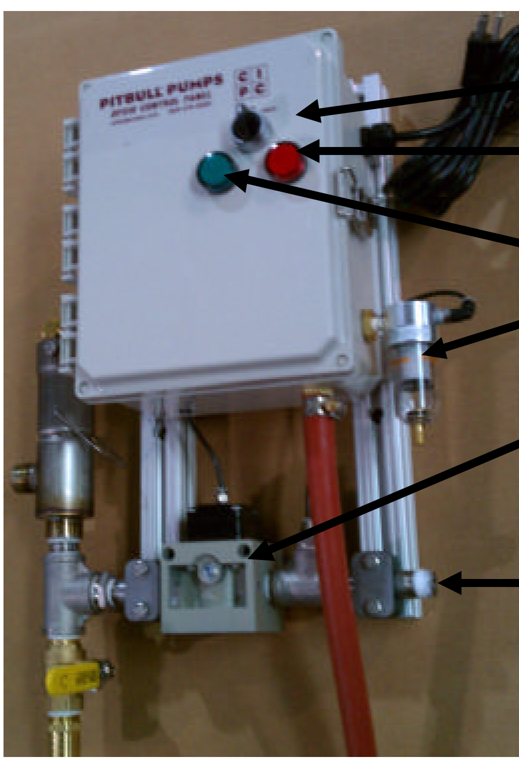
IMPORTANT

DO NOT install a solenoid valve on the air supply as the on/off control for the PITBULL®.

DO NOT use the air supply as the on/off control for the PITBULL®.

DO NOT use the power supply as the on/off control for the PITBULL®.

DO use the supply of liquid (the PITBULL® will not cycle without liquid) or the exhaust path as your on/off control (the pump can't fill/cycle with the vent path closed).



On/Off switch

Discharge indicator

Power indicator

Control filter

Piloted discharge regulator

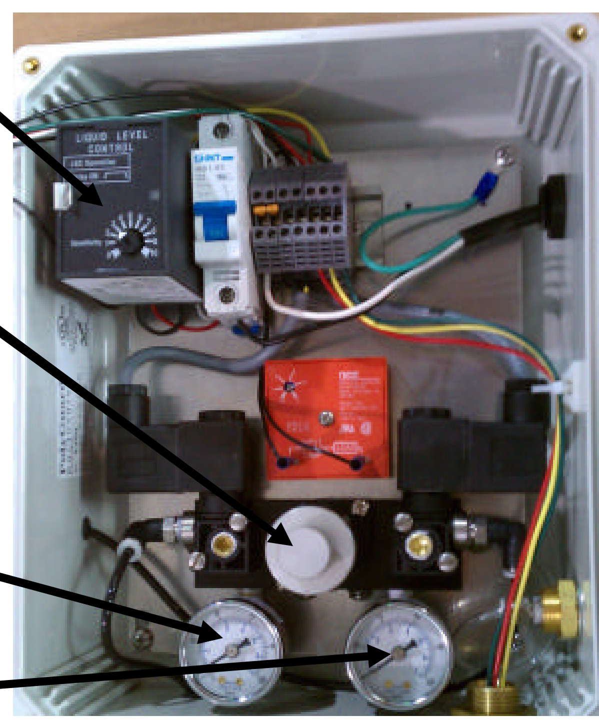
Install filter provided on this pipe nipple and bring your air supply to the filter.

Probe sensitivity

Discharge pressure control

Discharge pressure

Air supply pressure



INSTALLATION OF THE PUMP PIPING

INSTALLING THE PUMP

The pump should be placed on the bottom of the sump, as near level as reasonable and tilted no greater than 10 degrees.

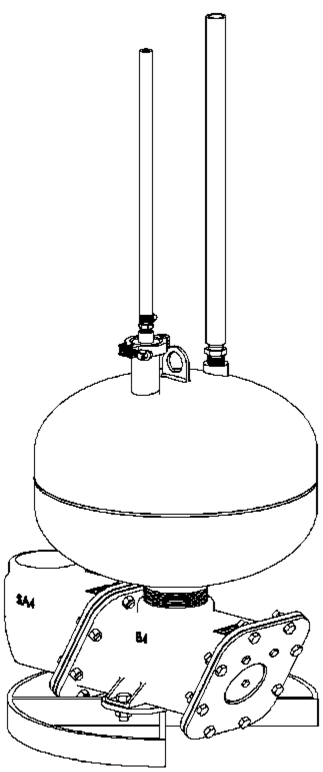
Try to keep approximately 2X the pump's piping diameter of open space in front of the inlet to allow full liquid and solids flow into the port (example: 3" submersible should have 6" of open space in front of the inlet port).

Discharge Piping:

Try to match the discharge piping to the size of the outlet port. Avoid reducing more than one pipe size unless imperative. The reasons and trade-offs are as follows,

1- for an average flow rate of 50 gpm, the **PITBULL**® will be discharging liquid at 100+ gpm in discreet bursts so friction losses need to be based on the burst flow, not the averaged flow over time. Our pipe sizes are oversized for the average flow but appropriate for the flow in bursts.
2- The **PITBULL**® will pass large solids. Watch out for pumping bigger stuff than your piping can take.

****Note:** If you are reducing the piping and have potential for large solids, consider adding a strainer to the pump inlet. **CIPC** offers threaded inlet adapter (see parts section for numbers) with big-ported strainers as an option. Or improvise your own.



Keep at least one pipe diameter open in front of the inlet

Installing probe:
1) Place gasket in groove on pump ferrule

Shown with gasket in place

2) Insert probe though gasket and ferrule into pump

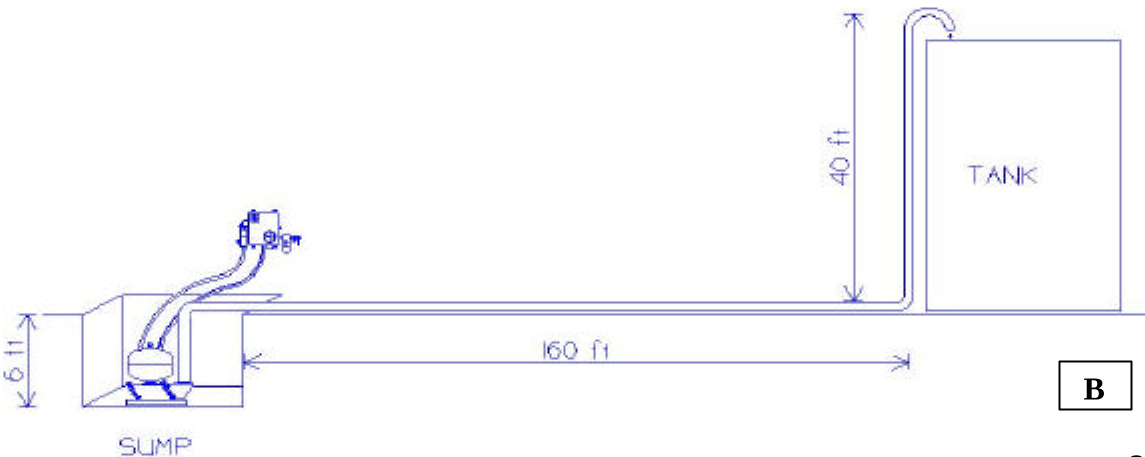
3) Align probe top cap on ferrule, place clamp around ferrule and cap, and hand tighten clamp

START-UP SETTINGS

The control panel automatically controls the fill and discharge strokes. The discharge pressure is preset for 40 psi using the discharge pressure adjustment. <u>When initially starting up the pump, do not change the probe sensitivity</u> and only adjust the discharge pressure (see ‘B’ in photo below) if needed. Please see the section on adjusting settings if you have (1) a very long pipe run, >300’ or (2) a reduction of two more pipe sizes in the discharge piping. In those cases you will need to increase the discharge stroke.

<u>Setting the discharge pressure.</u> Try to determine the total dynamic head required for the application. In simple terms, take the vertical height that the pump must push the liquid and convert it to psi (there are 2.31 ft per 1 psi), and then add in your calculated or 'guesstimated' friction loss (guess high if the liquid is viscous) in psi, and finally add 15 psi for a safety margin. This total should be enough to push the liquid out of the pump at a good flow rate. Note: too little discharge pressure will cause little (or none) fluid to exit the pump (the pump is essentially deadheaded). Too much pressure and compressed air is wasted.

Example: The pump is in a sump 6' deep, and must pump to an elevated tank 40'



B

Set discharge pressure with this knob and gauge

above grade, through 200' of 2" pipe at an average flow rate of 20 gpm.

The elevation difference is 6' + 40' = 46' and 46/2.31= 20 psi. Now, the flow rate was said to be 20 gpm, but the **PITBULL**® has separate fill and discharge cycles and therefore *<u>to put out a 20 gpm flow rate the pump must take in 40 gpm while no fluid is discharging, and then discharge at 40 gpm while no fluid is filling to pump in order to average the 20 gpm.</u>* So, use 40 gpm to calculate friction loss.

**<u>for Dual Pump Systems</u> there is no gap between cycles, so size lines directly for the flow rate.

TIP: If your discharge piping size is the same as the **PITBULL**®, the velocity will be low enough that friction loss is negligible on shorter runs with watery fluids.

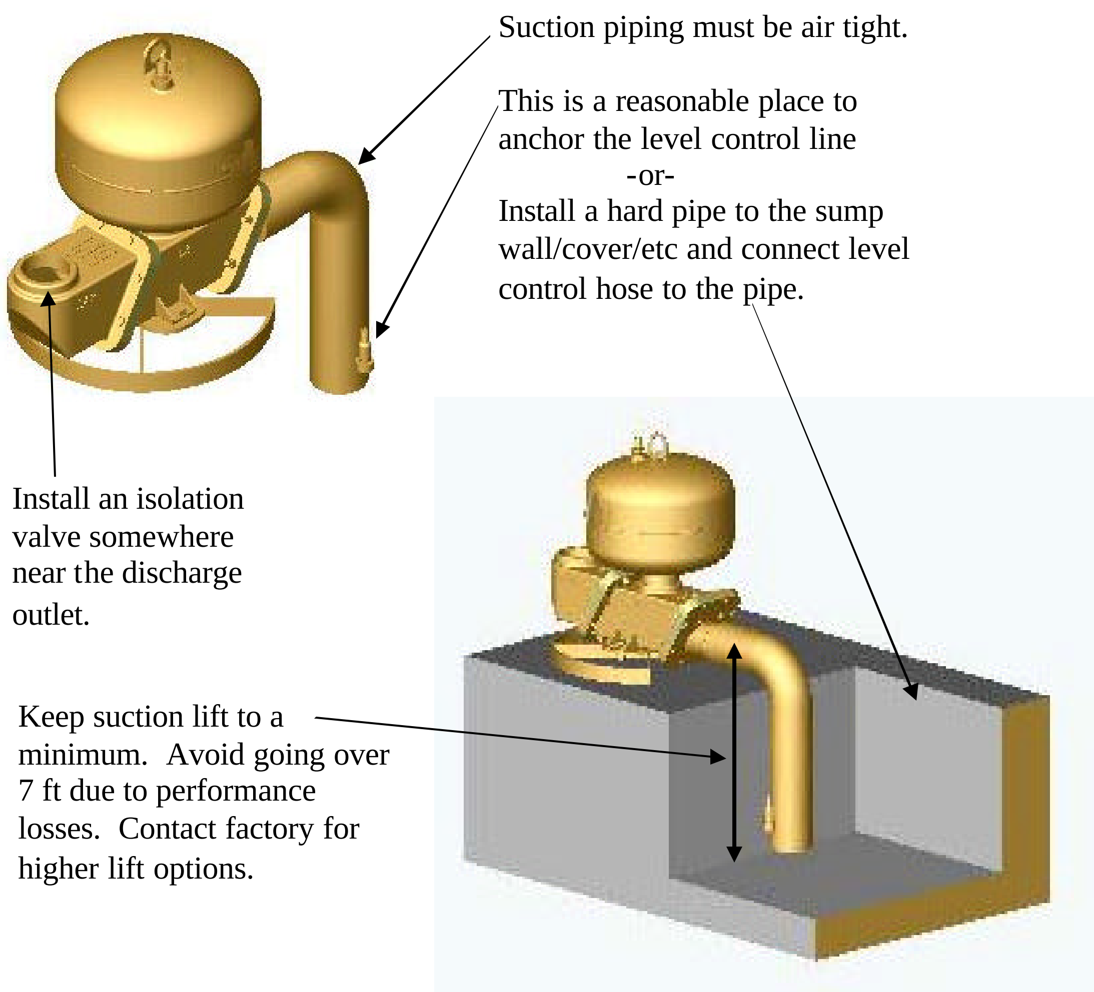
Finally, from a friction loss chart you find that the loss for 40 gpm of water flowing through 200' of 2" pipe is 3.6 ft/100', or a total of 7.2' (3.1psi). So set the discharge regulator for 20 + 3.1 + 15 = 38.1 psi.;40 is close enough. (Note that the friction loss was small)

SELF PRIMING INSTALLATIONS (PERMANENT)

INSTALLATION OF SELF-PRIMING CONFIGURATION

All the previous information applies to self-priming installation since there is no difference in how the pump functions. The important installation and set-up difference to account for are;

1) The level control line does not anchor to the pump because the pump is not in the sump. Instead, the level control line must end in the sump at the liquid level you wish the pump to hold. *TIP- ¾" <u>or larger pipe</u> is often used as the submersed end of the level control line and the level control hose supplied with the system is connected to the top of the pipe with the other end in the sump at the desired level. If the pipe is clamped, it can be adjusted up or down to change the sump level*.
2) The suction/down-pipe and its connections must be air-tight. NO LEAKS.
3) On the discharge piping there needs to be an isolation valve. The <u>important reason</u> for this is when the piping system is dry, the pump can pull air in through the discharge if <u>any</u> debris is under the discharge check seat. This will waste the vacuum being created and the suction lift is lost. Close the valve until the pump cycles into the discharge mode; once liquid is in the piping the check valve will seal well enough to prime.
4) The 'fill' time will be longer depending on the suction lift. See page 11 for fill time settings.



START-UP PROCEDURE CONTINUED

For Filter Press Applications: you do not need to worry about the pump stalling. It will continue to pump until the discharge pressure is equal to the press backpressure, at which time it will remain pressurized but unable to force liquid out. It can remain in this state indefinitely and will begin pumping as soon as the discharge head is lowered or the discharge pressure is raised.

Initial start-up: With compressed air and power supplied to the panel first, slowly open the inlet isolation valve. Try to run the pump with the valve only 1/4-1/3 open for the first stroke or two while confirming that everything is functioning correctly.

To change/re-set the sensitivity of the probes: **This procedure is rarely required when pumping conductive sludges and slurries.** Usually the combination of wastewater and solids produces so many ions that the liquid is very conductive. If your application falls into this category just leave the "Sensitivity Adjustment" knob near the "Low" setting, almost all the way counterclockwise (this is the standard factory setting upon shipment).

However, if your liquid is only mildly conductive, you may need to set the sensitivity higher to be able to detect it. Please follow this simple procedure to reset the sensitivity (see figure below).

1- Remove the 'high' and 'ground' probe wires from the probe terminals (marked below).
2- Add a length of temporary wire to each terminal that is long enough to reach a container of the liquid being pump.
3- Place both jumpers into the liquid so that they are not physically touching each other or the container side wall.
4- Increase the sensitivity adjustment until the discharge light comes on.
5- Pull the high level wire out of the liquid. Observe that the discharge light goes on and off consistently with the insertion and removal of the high level wire from the liquid. Make any further sensitivity adjustments until this is the case. Use the least sensitive setting that will allow this consistent detection of the liquid.

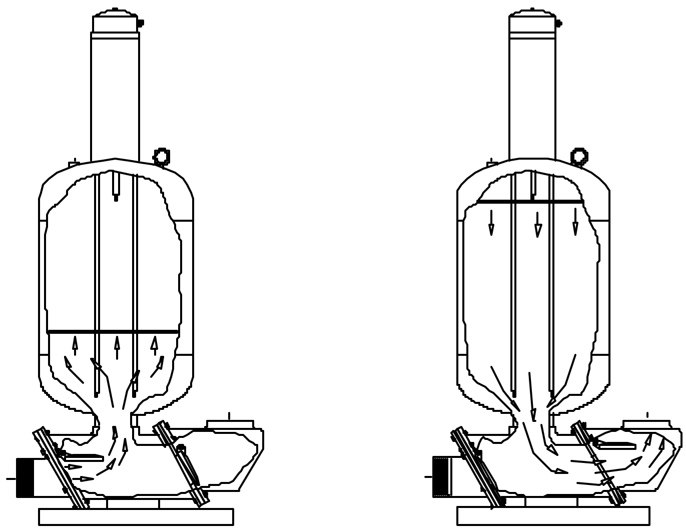
Probe sensitivity-
'0' lowest, for very conductive fluids.
'1-5' for typical water based fluids.
'10" very barely conductive fluids

Connect temporary wires t the RED (R) and YELLOW (Y) terminals, and remove the existing red and yellow wires from the probe. You must reconnect the probe wires after setting the sensitivity

TROUBLESHOOTING

The **PITBULL®** pumps with DP 310 series control panels are designed to discharge one pump chamber full of contents on every stroke. The stroke is therefore volume-dependent and not time dependent. This means that <u>once the pump is in the discharge mode, it will stay in that pressurized mode until the pump is empty.</u> If the pump is deadheaded, then it will stay pressurized indefinitely.

The sketch below shows that the pump cycles between high and low liquid levels inside. The discharge stroke is not initiated until the high probe detects liquid, and once it does, the pump will pressurize until the low probe and ground probe are uncovered (out of the liquid).



Cycling problems can occur if there is a non-conductive build-up on the probes. These insulators desensitize the probes until they can no longer detect liquid. The practical solution to this problem is two part.

<u>First</u>- increase the sensitivity as high as possible without getting false level readings (if the pump is in the discharge mode when empty, the probes are set too sensitive or shorted).

<u>Second</u>- plan on preventative maintenance to clean the probes before they foul. This will prevent you from having to clean slurry from the air valving that was flooded when the fouled probes did not detect the high level in the pump.

<u>The PM approach is much, much easier.</u>

IF: the pump constantly discharges, blowing air down the discharge piping long after the pump is empty.

THEN: first check the discharge light. If it is lit, then the controls are sensing liquid that isn't there. If the light is off then the problem is either the discharge air valve (stuck open), or the pilot valve (stuck open or burnt out). See the section on servicing the discharge air valve, and/or replace the pilot valve.

Given that the discharge light is lit, there must be a conductive path between the high **or** low probe and the ground probe. The path is from tip to tip, and can follow any wet surface up one insulated probe, across the pump's top, and down the other insulated probe. This can occur more easily in highly conductive sludges that build up layers on the probes. Also note - wet or nicked probe wires will create the same short path. Check that the wiring is in good condition, and then remove the probe wires from the top of each probe, unscrew the probes from the pump (turn the whole 1/2" npt fitting by its hex base, not the smaller compression nut) pull and clean all three probes, wiping all build-up off and cleaning the metal tip to the bare metal.

IF: the pump does not cycle and is in the 'fill' mode (discharge light not lit).

THEN: it is most likely that the pump has not filled to the level of the high probe inside, or the high level has been reached but not detected.

You will know right away if a flooded pump has not detected the high level because liquid will come right up the exhaust path, flooding the exhaust valve. If this is the case, then the probes are insulated from build-up, or the sensitivity is set too low. Use the same cleaning procedure from above to clean the probes. Once clean, if there is any doubt about the sensitivity setting, double check it using the procedure outlined under the START UP section. Also, broken or corroded probe wiring will cause this condition.

TROUBLESHOOTING CONTINUED

The reasons for the pump not filling are either that the liquid path is blocked (in the piping or at the check valve), preventing flow, or that the exhaust path is blocked (if no air is vented out the top of the pump, no liquid can enter and displace it). To fix these conditions simply requires opening the blockage, noting that the exhaust path must be free and clear from the pump opening to wherever the exhaust is finally released.

IF: the pump cycles normally but output (flow or pressure) is low.

THEN: the likely problem is check valve failure. If the inlet is failed open (full or partially) then the pump will blow liquid back through the inlet on each cycle, causing low discharge pressure and reduced flow. If the discharge check has failed open, output pressure may be maintained, but the flow drops off because some of the liquid runs back into the pump each cycle to be 'pumped' again.

In either case, inspect and repair or replace the checks as needed. Take these opportunities to inspect seats and replace elastomers to prevent damage to the check valve body.

IF: the fill cycle is excessively long.

THEN: most likely, the pump is being throttled by a restriction in the exhaust path. Long vent lines with dips to collect water, mufflers that are plugged up and small diameter vent lines are some of the most common causes. If it is confirmed the vent path is free and wide open, then suspect the inlet piping after it is confirmed that the fill head is adequate in the first place.

FAILURE CONDITIONS OF CONTROL PANEL COMPONENTS

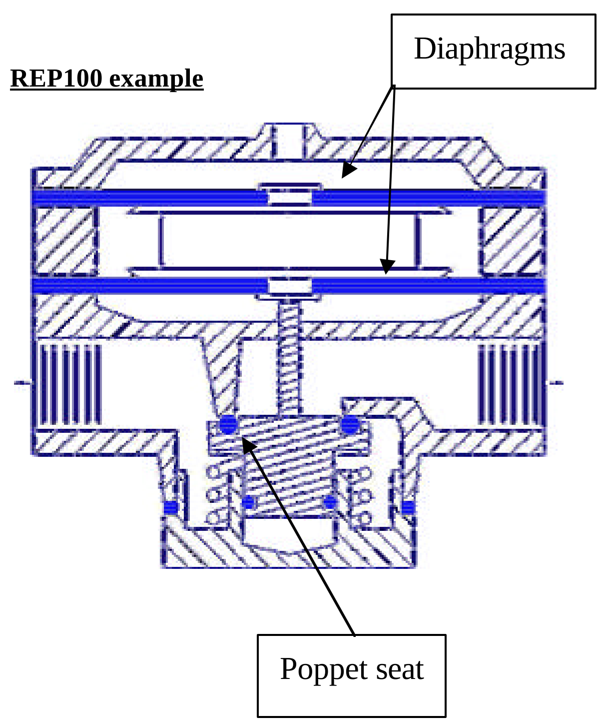
Discharge regulator: When debris is stuck under the poppet, the regulator will allow excess air pressure by, which it will try to vent out of its bonnet, causing a significant leak (hissing) at the bonnet. When the diaphragms are torn, the similar symptoms will occur: if the top diaphragm is torn, the pilot air signal will blow through making an audible leak and most likely the regulator will not open and pass air downstream. If the lower diaphragm is torn, there will also be an air leak and a chance the regulator won't open. Clean or repair using the appropriate repair kit from the parts list. See cutaway view below.

REP50, REP100 and REP150 Regulators

Piloted discharge regulators: All (3) regulators regardless of size function and fail in the same way. When debris is stuck under the poppet, the regulator will allow excess air pressure by, which it will try to vent out of its bonnet, causing a significant leak (hissing) at the bonnet. Also you may hear the leaking air escaping out the exhaust valve.

When the diaphragms are torn, different symptoms will occur. If the top diaphragm is torn, the pilot air signal will blow through, making an audible leak and most likely the regulator will not open and pass air downstream. If the lower diaphragm is torn, there will also be an air leak but is likely the regulator will open.

Clean or repair using the appropriate repair kits for the REP50 thru150K (contains both diaphragms, poppet assembly).



TROUBLESHOOTING CONTINUED

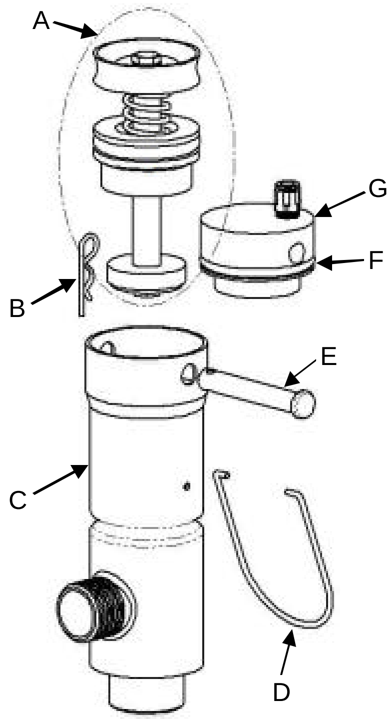
EXVS75 Exhaust valve:

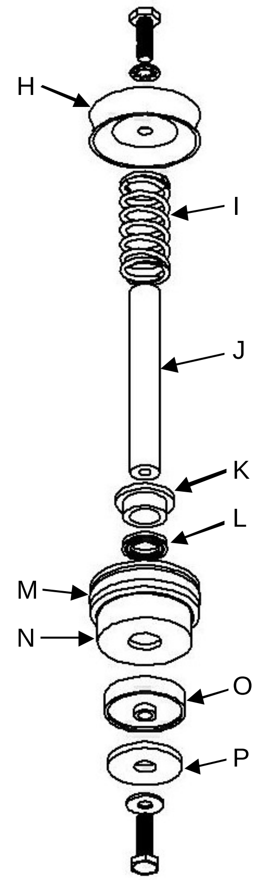
Failed open- will cause a lack of pressure in the pump during discharge, because the discharge air is coming right back up through the exhaust valve. The discharge gauge will drop further than normal, and liquid may spray from the exhaust. Also, the fill cycle will be relatively short like in a deadheaded condition.

Response - Remove retaining ring and pin, and then pull the valve cap 'G' up and out. Pull the exhaust valve internals out (std. pliers on the top shaft bolt work well) and inspect. Look for **1)** debris inside valve, **2)** worn/missing poppet seat, **3)** worn piston seal and **4)** a cut/nicked o-ring on the valve cap.

Failed closed- will cause the pump to slow or stop cycling.

Response - Do the same disassembly/inspection of the exhaust valve as above.



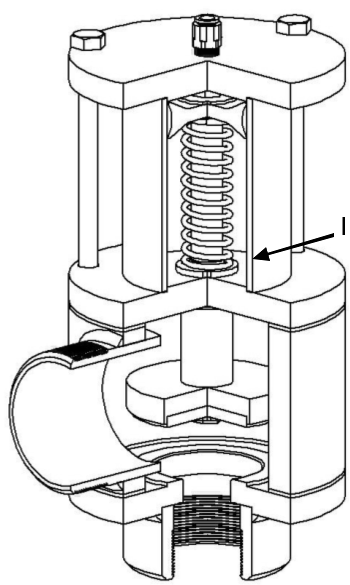


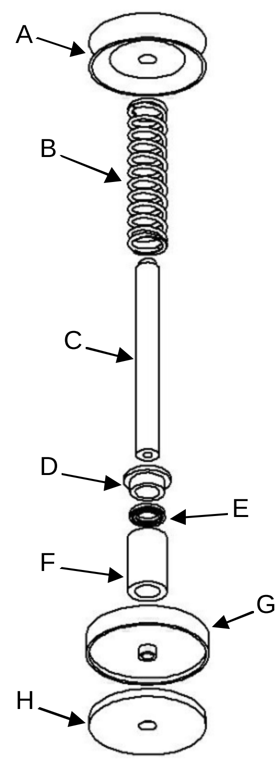
A – Exhaust valve internals
B – Cotter pin
C – Exhaust valve body
D – Spring D-ring
E – Clevis pin
F – Valve cap o-ring
G – Valve cap

H – Piston cup seal
I – Return spring
J – Shaft
K – Guide bushing
L – Wiper shaft seal
M – Seal housing o-ring
N – Shaft seal housing
O – Poppet back
P – Poppet seat

EXV200 Exhaust valve

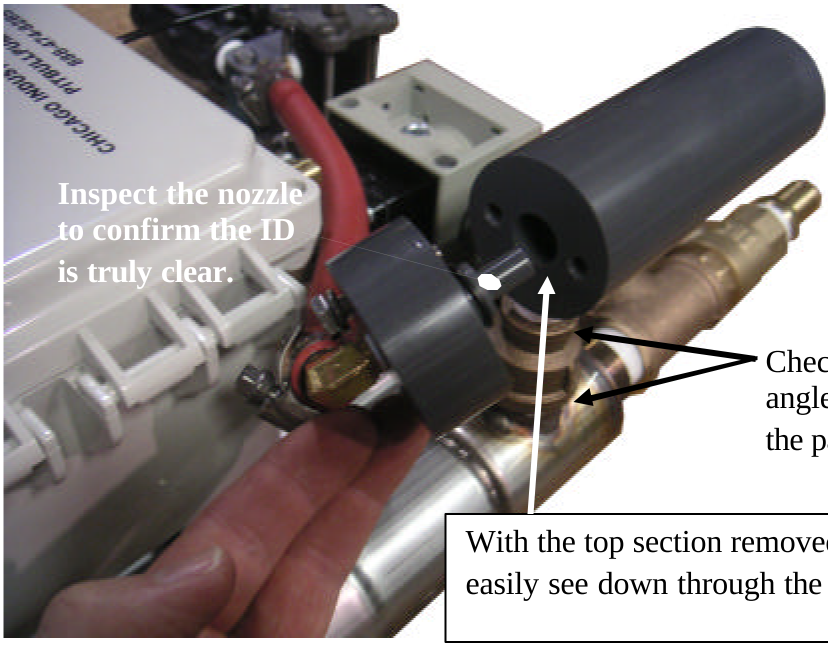
This valve operates with the same in principle as the *EXVS75.* Failure modes will also be the same.





A – Piston cup seal
B – Return spring
C – Shaft
D – Guide bushing
E – Wiper shaft seal
F – Spacer
G – Poppet back
H – Poppet seat
I – Cylinder

FLOW INDUCER TROUBLESHOOTING AND REPAIR

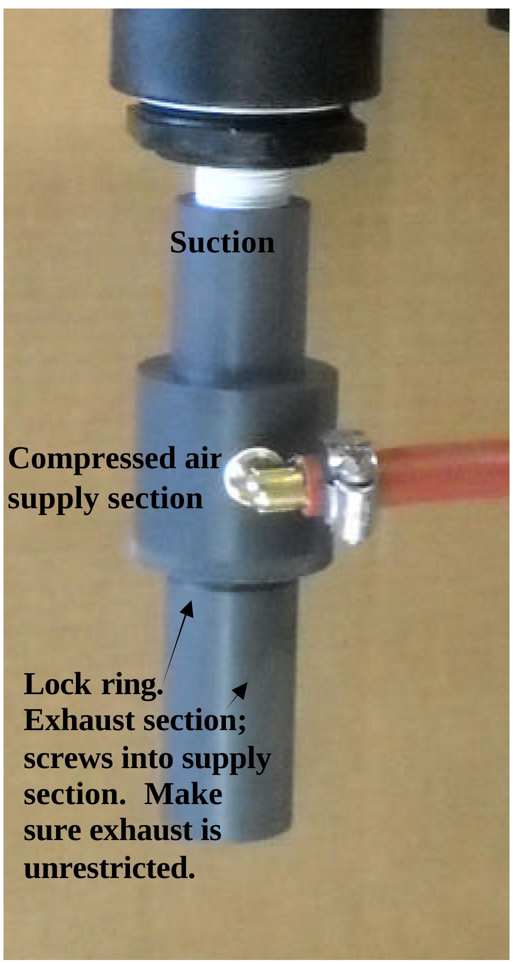


Flow Inducers with side vacuum port

The bore must be clear/smooth or the vacuum flow will not happen even if the unit sounds like it is working. Remove the top and look through the bore. Clean with water/soap if needed and/or use a plastic bristle cylinder brush.

Check between exhaust valve and right angle turn into the bore for debris clogging the path.

With the top section removed you can easily see down through the bore.



Flow Inducers with top vacuum port

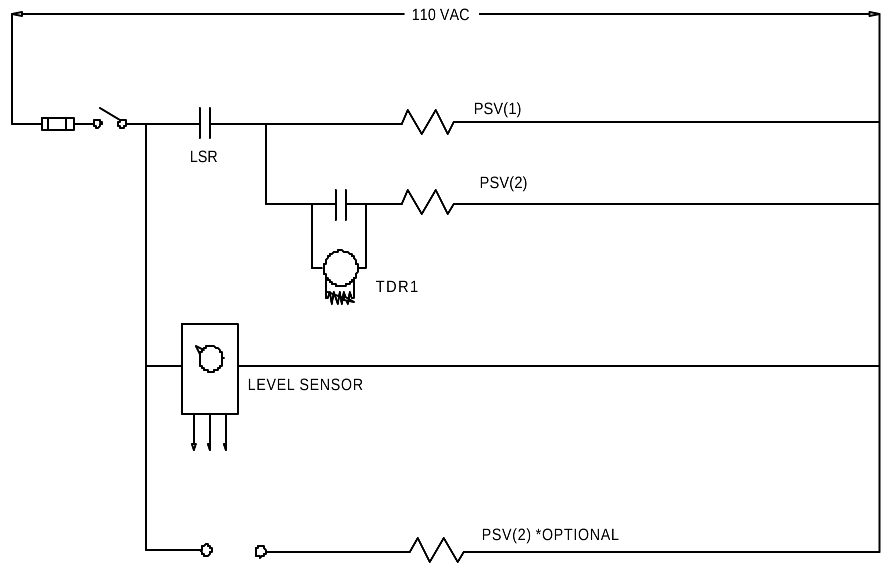
This style flow inducer has the air supply in the side and pulls vacuum in the top and exhaust out the bottom. There are (3) sections, suction, supply and exhaust.

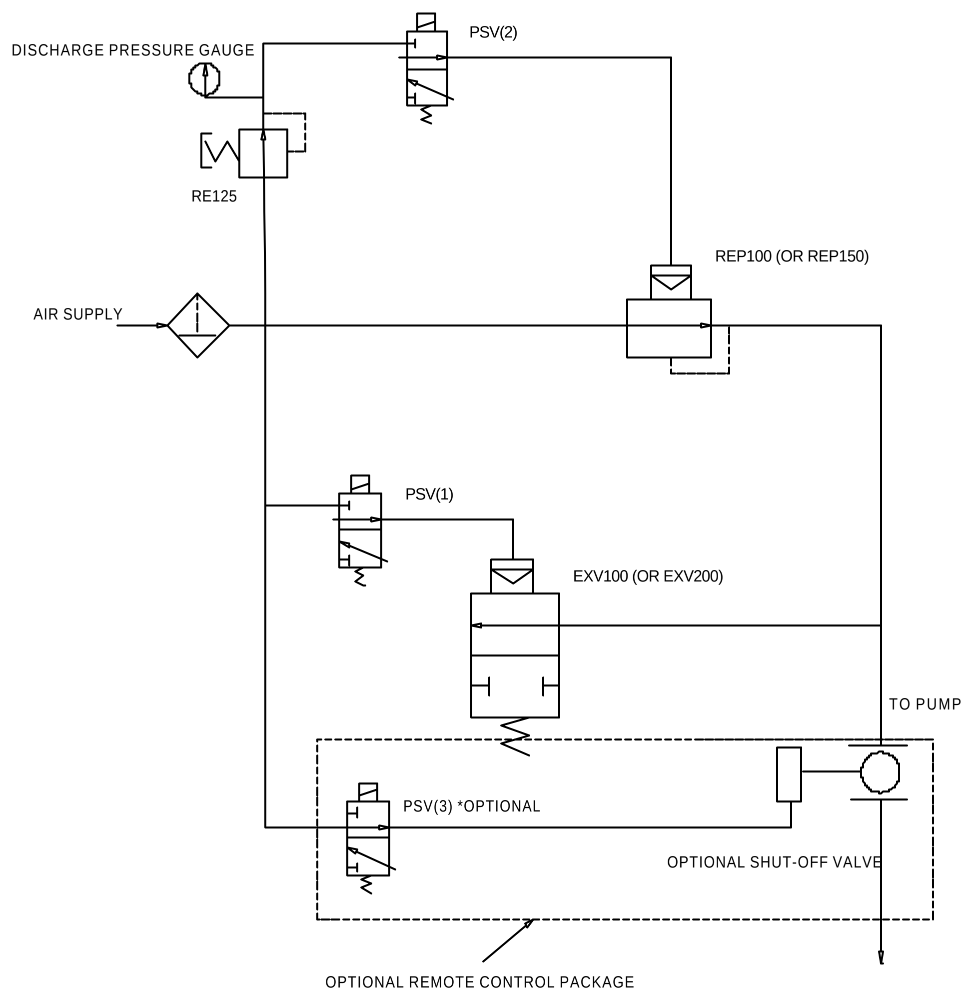
First inspect the flow path by looking through from the suction out the exhaust. If all clear, then there is either an air supply problem or an adjustment problem (this is assuming there is nothing connected to the exhaust; remove any muffler or tubing before troubleshooting).

Air supply- remove the supply hose from the hose barb and confirm there is plenty of air flow and pressure (need 60 psi or more).

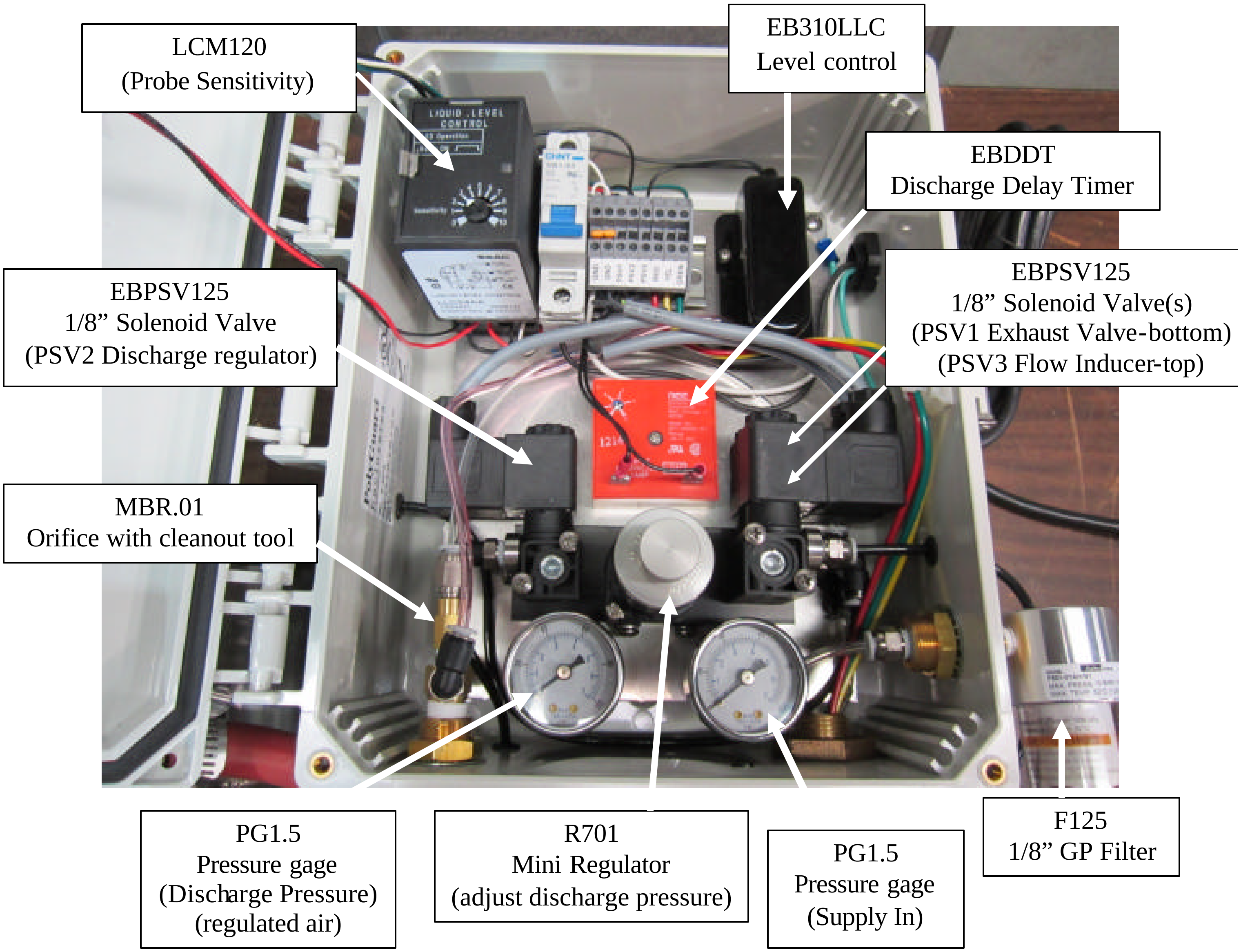
Adjustment- loosen the locking ring and with fingers only, screw the exhaust section up into the fatter supply section until it bottoms. This is ‘0’ degrees; from here start unscrewing. At 270 degrees out from ‘0’ (3/4 of a turn) there will be good flow and suction. Maximum flow and maximum air consumption will occur at 2 full turns out. 1.75 turns is generally the maximum needed.

Wiring Diagram

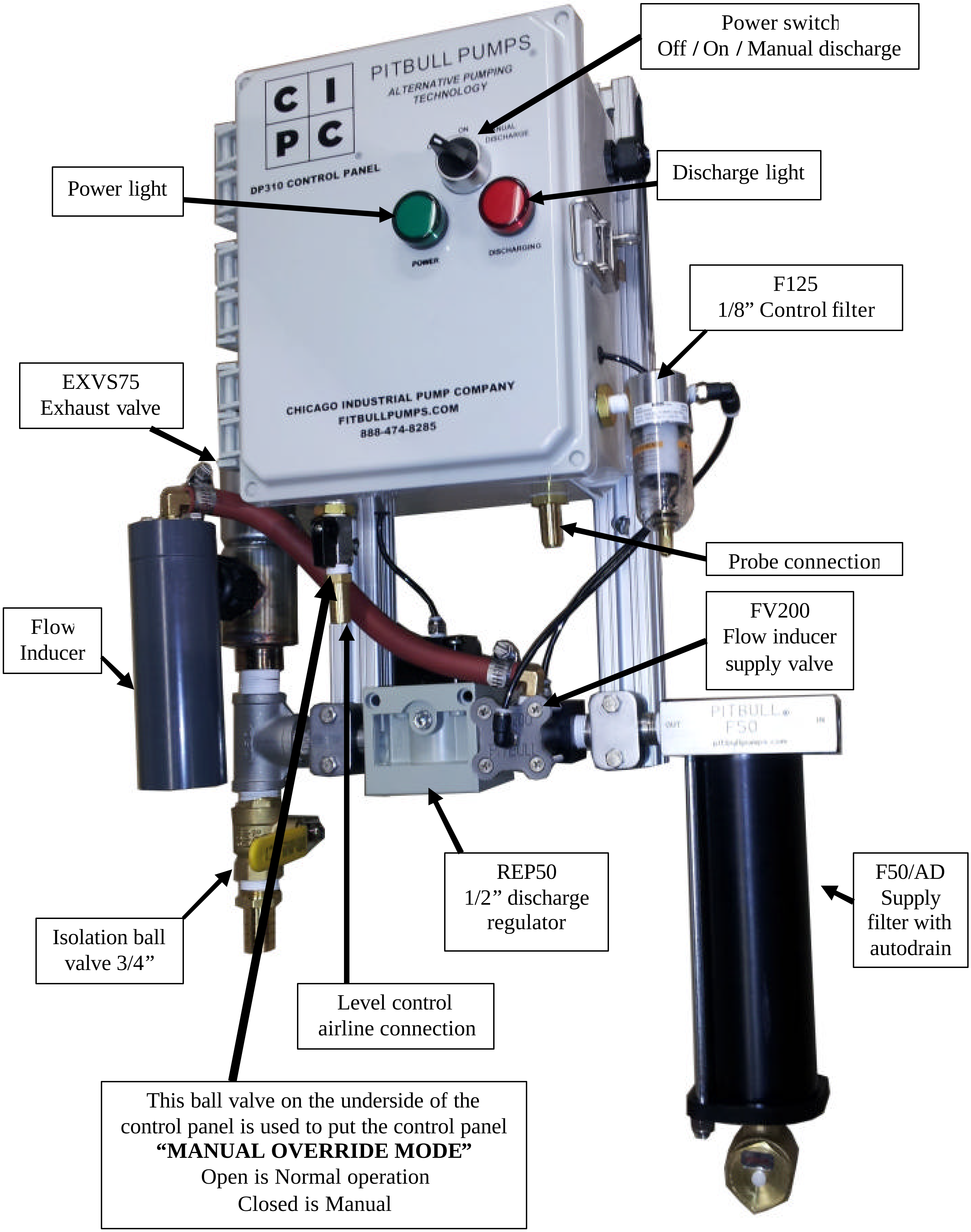




INNER CONTROL PANEL COMPONENT IDENTIFICATION



CONTROL PANEL COMPONENT IDENTIFICATION



DP310 CONTROL PANEL SPARE PARTS AND COMPONENTS

Note: all panels share the enclosure and internal components. The differences are in the size of discharge regulators and exhaust valves. All other parts are interchangeable.

Part #	Description
******	Complete control panel with all valving and filtration (All Models: DP310G2–G8, and DP310F2–F8)
EBDDT	Discharge delay timer
EBPSV125	1/8” Solenoid valve
EB310LLC	Level control
EXVS75	Complete 3/4" stainless exhaust valve, viton seat, nitrile seal.
EXVS75IN	Complete drop in replacement internal assembly
EXVS75S	3/4" SS exhaust valve seat, and seal rebuild kit
EXV200	2" exhaust valve.
EXV200K	2" exhaust valve rebuild kit
F125	1/8” Control filter
FE125	Element for 1/8” control filter
LCM120	Probe control
MBR.01	Bubbler orifice (orifice and clean-out tool)
PG1.5	Discharge pressure gage.
REP50	1/2" piloted discharge regulator.
REP50K	1/2" piloted discharge regulator repair kit.
REP100	1" piloted discharge regulator.
REP100K	1" piloted discharge regulator repair kit.
REP150	1-1/2" piloted discharge regulator.
REP150K	1-1/2" discharge regulator (pilot operated) repair kit.
R701	Mini regulator

FLOW INDUCERS

F2	Flow inducers for 2" pumps
F3	Flow inducers for 3" pumps
F4	Flow inducers for 4" pumps
F6	Flow inducers for SH4, 6x4 and 6” pumps
F8	Flow inducers for 8” and larger pumps

* Flow inducers should be exhausted into large diameter, rubber hose or approved mufflers.

MUFFLERS

ST-6B	Muffler for F2–F3 flow inducers
ST-12C	Muffler for F4–F8 flow inducers

AIR SUPPLY FILTERS

F50/AD	1/2" filter with high flow autodrain
FE50	40 micron filter element for F50 filter
F100/AD	1" filter with high flow autodrain
FE100	40 micron filter element for F100 filter
F150/AD	1-1/2" filter with high flow autodrain
FE150	40 micron filter element for F150 filter

INLET TRANSFER ADAPTERS

2CTAD	2” carbon steel adapter *(Fig 14A & 14B)*
2SSTA	2” 316SS adapter *(Fig 14A & 14B)*
3CTAD	3” carbon steel adapter *(Fig 14A & 14B)*
3SSTA	3” 316SS adapter *(Fig 14A & 14B)*
4CTAD	4” carbon steel adapter *(Fig 14A & 14B)*
4SSTA	4” 316SS adapter *(Fig 14A & 14B)*

Adder for threaded inlet adapter plate (same adapter as on inlet of transfer pumps).
Includes: plate with male threaded end, valve plate gasket, extra length bolts for check valve flapper posts(sealing bolts). Pump is capable of dry-piping inlet with this adapter. Note size and construction of pump.

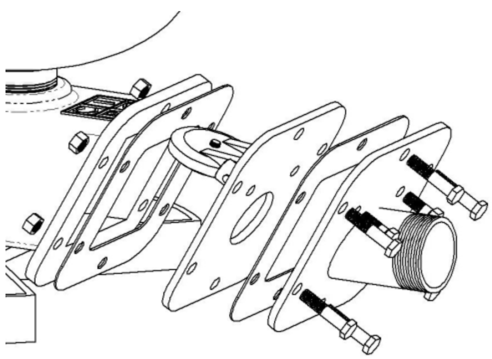


Fig 14A

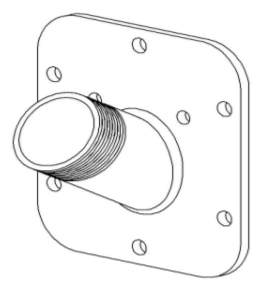


Fig 14B

CIPC CHECK VALVES

CIPC recommends that customer's stock inlet and discharge check valve internals, and in cases of expected high wear such as abrasive slurries we recommend entire spare check valves. Following is a list of **CIPC** check valve part numbers and descriptions.

Part #	Size	Description
2CVP/C(_)	**2"**	**CIPC steel swing check, plate style, full port, complete assembly for S2C pumps.** *(Fig 20A)*
2CVP/S(_)	**2"**	**CIPC 316SS swing check, plate style, full port, complete assembly for S2S pumps.** *(Fig 20A)*
2CVF/(_)	**2"**	**Flapper (316SS)** *(Fig 20B, 20D exploded)*

Seat adders for check valve flappers

** Pumps are built with NITRILE seats as standard **

(N)		Nitrile seat for 2" check
(V)		Viton seat for 2" check.
(T)		Teflon seat for 2" check.
(UHD)		Heavy duty urethane seat for 2" check
(E)		EPDM seat for 2" check.
2CVSK(_)	**2"**	**Seat kit (2 seats), for 2" checks**
(N)		Nitrile seat for 2" check
(V)		Viton seat for 2" check
(T)		Teflon seat for 2" check
(UHD)		Heavy duty urethane seat for 2" check
(E)		EPDM seat for 2" check
2CVGK	**2"**	**Flange gasket kit (4 gaskets) for 2" check valve** *(Fig 20C)*

*** (3) gaskets required for submersible (1 spare) & (4) required for transfer pumps*

** **CIPC** *strongly recommends that new gaskets be installed whenever reassembling check valves*.

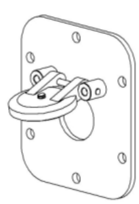


Fig 20A


Fig 20B

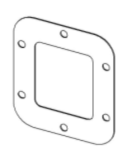


Fig20C

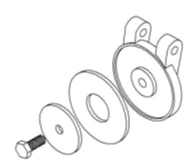


Fig20D

Seat Material Selection Properties:

Nitrile — Good all-purpose elastomer. Medium chemical, oil and solvent resistance, good strength, temperatures up to 170°F.

Viton — Excellent resistance to oxidizers and solvents. Medium strength, temperatures up to 250°F.

Teflon — Best chemical resistance of all. Inert to acid bases and solvents. Lower cycle life, non-elastomeric, temperatures up to 300°F.

Urethane HD — Best resistance to abrasion. Toughest of the elastomers, with mild chemical resistance, temperatures up to 150°F.

EPDM — Good heat and acid/base resistance. Tougher than Viton but poor solvent resistance, temperatures up to 300°F.

CIPC CHECK VALVES CONTINUED

3CVP/C(_)	**3"**	**CIPC steel swing check, plate style, full port, complete assembly for S3C pumps.** *(Fig 20A)*
3CVP/S(_)	**3"**	**CIPC 316SS swing check, plate style, full port, complete assembly for S3S pumps.** *(Fig 20A)*
3CVF/(_)	**3"**	**Flapper (316SS)** *(Fig 20B, 20D exploded)*

Seat adders for check valve flappers

** Pumps are built with NITRILE seats as standard **

(N)	Nitrile seat for 3" check
(V)	Viton seat for 3" check
(T)	Teflon seat for 3" check
(UHD)	Heavy duty urethane seat for 3” check
(E)	EPDM seat for 3" check

3CVSK(_) **3"** **Seat kit (2 seats), for 3” checks**

(N)	Nitrile seat for 3" check
(V)	Viton seat for 3" check
(T)	Teflon seat for 3" check
(UHD)	Heavy duty urethane seat for 3” check
(E)	EPDM seat for 3" check

3CVGK **3"** **Flange gasket kit (4 gaskets) for 3” check valve** *(Fig 20C)*

** *(3) gaskets required for submersible (1 spare) & (4) required for transfer pumps*

** **CIPC** *strongly recommends that new gaskets be installed whenever reassembling check valves*.

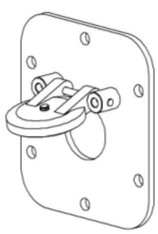


Fig 20A


Fig 20B

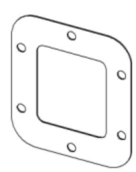


Fig20C

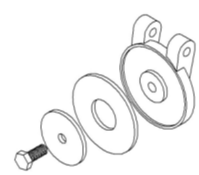


Fig20D

Seat Material Selection Properties:

Nitrile Good all-purpose elastomer. Medium chemical, oil and solvent resistance, good strength, temperatures up to 170°F.

Viton Excellent resistance to oxidizers and solvents. Medium strength, temperatures up to 250°F.

Teflon Best chemical resistance of all. Inert to acid bases and solvents. Lower cycle life, non-elastomeric, temperatures up to 300°F.

Urethane HD Best resistance to abrasion. Toughest of the elastomers, with mild chemical resistance, temperatures up to 150°F.

EPDM Good heat and acid/base resistance. Tougher than Viton but poor solvent resistance, temperatures up to 300°F.

CIPC CHECK VALVES CONTINUED

4CVP/C(_)	**4"**	**CIPC steel swing check, plate style,** **full port, complete assembly for S4C pumps.** *(Fig 20A)*
4CVP/S(_)	**4"**	**CIPC 316SS swing check, plate style,** **full port, complete assembly for S4S pumps.** *(Fig 20A)*
4CVF/(_)	**4"**	**Flapper (316SS)** *(Fig 20B, 20D exploded)*

Seat adders for check valve flappers

** Pumps are built with NITRILE seats as standard **

(N)	Nitrile seat for 4" check
(V)	Viton seat for 4" check.
(T)	Teflon seat for 4" check.
(UHD)	Heavy duty urethane seat for 4" check.
(E)	EPDM seat for 4" check.

4CVSK(_) **4"** **Seat kit (2 seats), for 4” checks**

(N)	Nitrile seat for 4" check
(V)	Viton seat for 4" check.
(T)	Teflon seat for 4" check.
(UHD)	Heavy duty urethane seat for 4” check.
(E)	EPDM seat for 4" check

4CVGK **4"** **Flange gasket kit (4 gaskets) for 4” check valve** *(Fig 20C)*

*** (3) gaskets required for submersible (1 spare) & (4) required for transfer pumps*

** **CIPC** *strongly recommends that new gaskets be installed whenever reassembling check valves*.

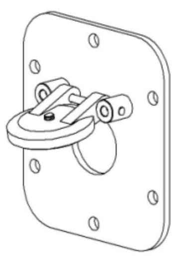


Fig 20A

Fig 20B

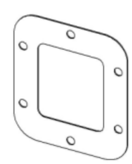


Fig20C

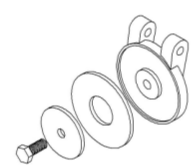


Fig20D

Seat Material Selection Properties:

Nitrile Good all-purpose elastomer. Medium chemical, oil and solvent resistance, good strength, temperatures up to 170°F.

Viton Excellent resistance to oxidizers and solvents. Medium strength, temperatures up to 250°F.

Teflon Best chemical resistance of all. Inert to acid bases and solvents. Lower cycle life, non-elastomeric, temperatures up to 300°F.

Urethane HD Best resistance to abrasion. Toughest of the elastomers, with mild chemical resistance, temperatures up to 150°F.

EPDM Good heat and acid/base resistance. Tougher than Viton but poor solvent resistance, temperatures up to 300°F.

CIPC SIDE INLET CHECK VALVE ASSEMBLIES

4SICV	**4"**	CIPC side inlet internal swing check, stainless steel, for 4” high flow side inlet pumps
4SICV-DT	**4”**	CIPC side inlet internal swing check, stainless steel, with low level downtube, for 4” high flow side inlet pumps
6SICV	**6"**	CIPC side inlet internal swing check, stainless steel, for 6x4, 6” side inlet pumps
6SICV-DT	**6”**	CIPC side inlet internal swing check, stainless steel, with low level downtube, for 6x4, 6” side inlet pumps
8SICV	**8"**	CIPC side inlet internal swing check, stainless steel, for 8” side inlet pumps
8SICV-DT	**8”**	CIPC side inlet internal swing check, stainless steel, with low level downtube, for 8” side inlet pumps

To order, contact **CIPC** with your pump serial number

CIPC WAFER CHECK VALVES

4WCV	**4"**	CIPC stainless steel wafer swing check, full port, for 4” high flow and 6x4 pumps
6WCV	**6"**	CIPC stainless steel wafer swing check, full port, for 6” pumps
8WCV	**8"**	CIPC stainless steel wafer swing check, full port, for 8” pumps

To order, contact **CIPC** with your pump serial number

ALL RUBBER FLAPPER CHECK VALVES

For 2”, 3”, and 4” pumps

These all rubber hinged designed check valve flappers are used in place of our standard plate style flapper. Designed to be used on stringy or irregular shaped products they may build up around our standard check valve flapper. Designed only for specific qualifying applications.

Contact **CIPC** with your specific pumping application.

NON-METALLIC CHECK VALVES FOR VINYLESTER PUMPS

Contact **CIPC** with your pump serial number for current available products for your pump.