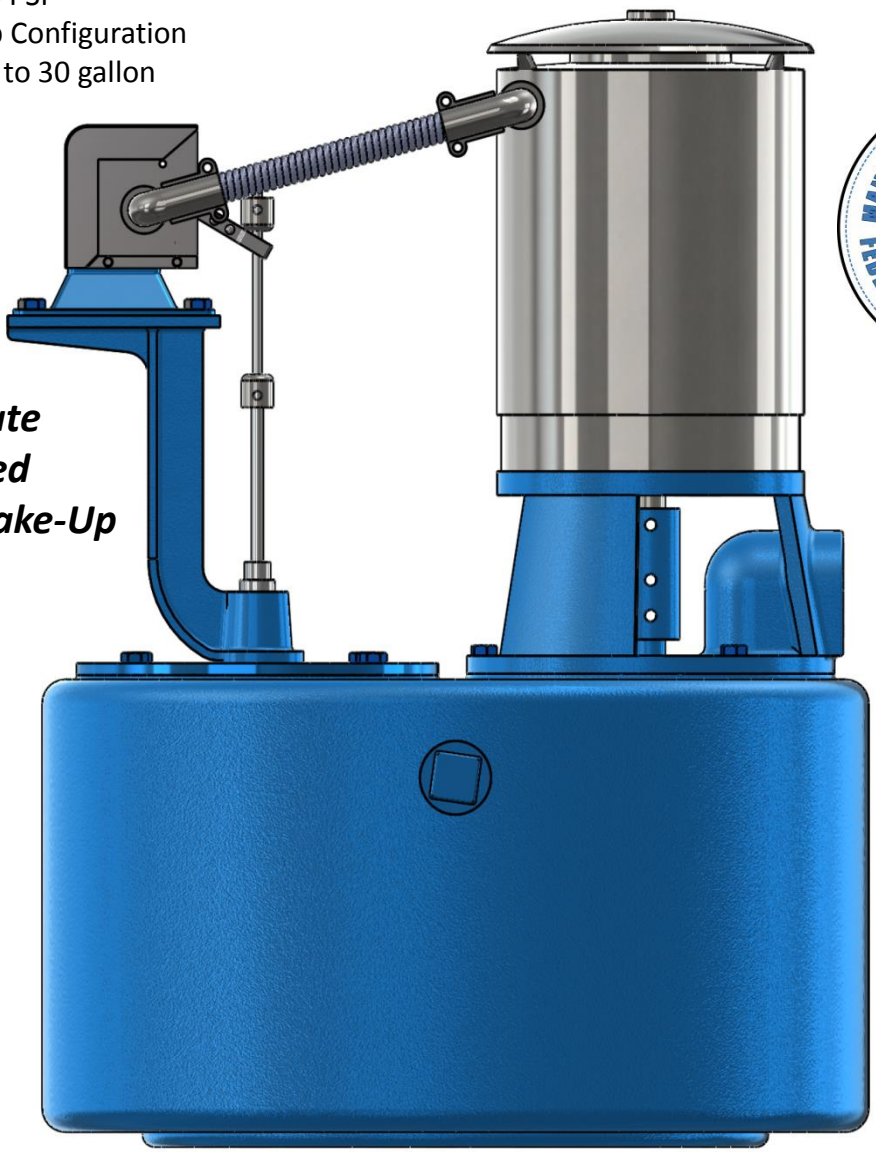
FEDERAL PUMP CORP
1144 Utica Ave, Brooklyn, NY 11203

Series VCL Condensate Return Units
Low Inlet Condensate Pump Systems
July 2015 New Catalogue Release
Bulletin 109C.01

- Low Inlet Condensate Receiver (7” from floor)
- Close Grained Cast Iron
- Simplex and Duplex Design
- To 20,000 SQ-Ft EDR
- Pump Capacity to 30 GPM
- Pressure to 50 PSI
- Vertical Pump Configuration
- Receiver Sizes to 30 gallon

- Temperature to 250 Degree F
- Individual Float Control or
- Mechanical Alternating
- Motors in ODP or TEFC Enclosure
- Single or Three Phase Power



- ***Condensate***
- ***Boiler Feed***
- ***Water Make-Up***

Cast Iron basins are “free standing “ design no bolt down hole connections. Receivers available in round or square configuration . Can be provided with Simplex or Duplex Control Panels mounted to the receivers with motors and float controls wired to the Control Panel provided.

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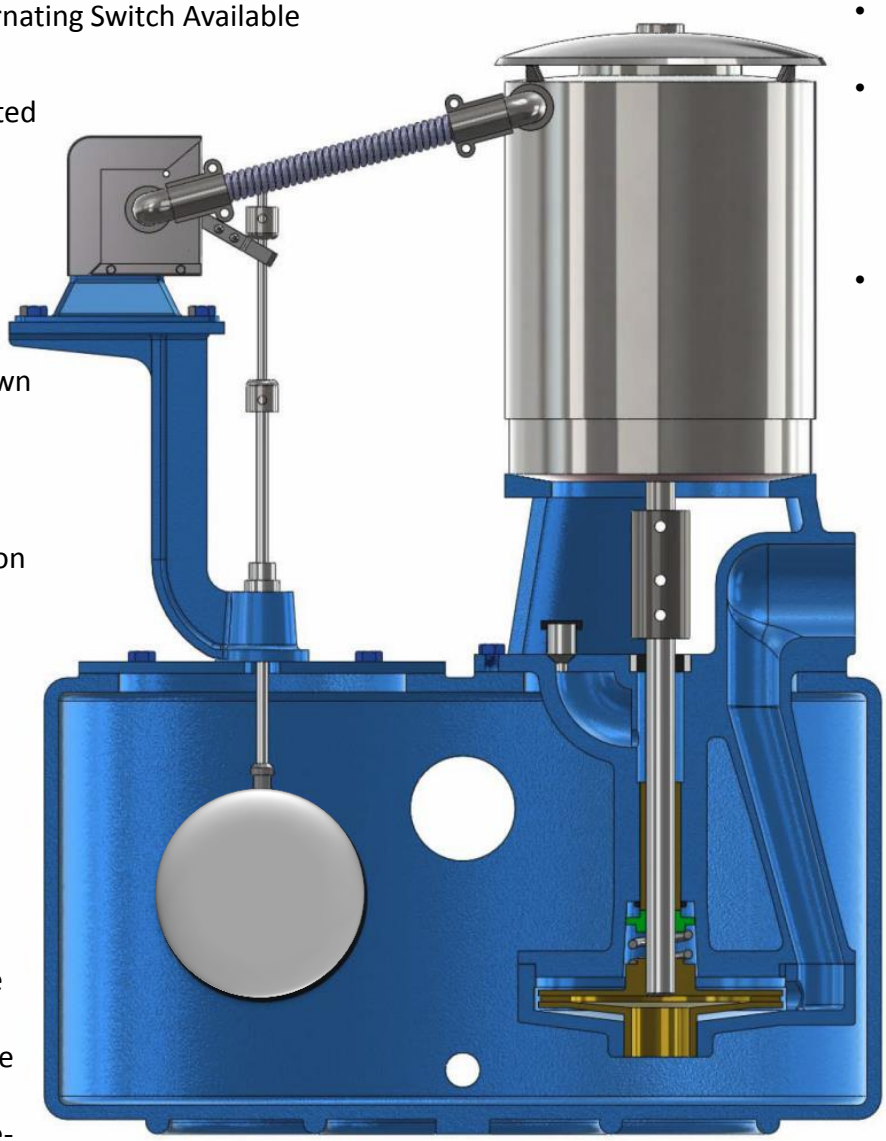
NEMA 1 or NEMA 4 Float Controls
Simplex or Duplex Arrangement
Mechanical Alternating Switch Available

- Cast Iron Elevated Float Stand
- Stainless Steel Float Bulb
- Stainless Steel Float Rods and Float Stops .
- Gasket bolt down connections to cast iron tank.

- Low suction inlet connection to service difficult installations.
- Vented condensate tank.
- Optional inlet strainers available.
- Cold water make-up valve with air gap fitting available for boiler feed or water make-up systems.
- Optional sight gauge glass and thermometer available



- Motors in ODP or TEFC Construction.
- Stainless Steel Pump Shaft connected to Pump Motor through ridged steel bolted coupling.
- Oil lubricated bronze bearing with spring loaded oil cap.

- Cast Iron bronze fitted pump construction with lower mechanical seal and upper shaft seal assemblies.
- Integral vertical case assembly with threaded discharge connections.
- Lower drain connection for condensate tank.

VCL Series provides an innovative approach to difficult installations where condensate collection requires low tank connections without compromising pump performance.

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CONVERSION TABLES

Multiply	By	To Get
BHP (Boiler Horsepower)	34.5	Lbs./Hr of Steam at 212°F
BHP (Boiler Horsepower)	0.069	GPM Water
BHP (Boiler Horsepower)	33,479	BTU/Hr
Lbs./Hr Steam	0.002	GPM Water
Lbs./Sq. In	2.307	Feet of Water
Feet of Water (Head)	0.4335	Lbs./Sq. In
Cubic Feet of Water	7.48	Gallons of Water
Cubic Feet per Minute	62.43	Lbs. of Water/Minute
Cubic Feet per Minute	448.8	Gallons per Hour

Heating Water with Steam

How many Lbs. per hour of steam is need to heat 60 gallons per minute flow rate of water from 60°F to 180°F?

$$\text{Lbs./Hr} = \frac{60 * (180-60)}{2} \qquad \text{Lbs./Hr} = \frac{60 * (120)}{2} \qquad \text{Lbs./Hr} = \frac{7200}{2} \qquad \text{Lbs./Hr} = 3600$$

Sizing a Boiler Feed Pump Receiver

The receiver tank should be able to hold five minutes worth of condensate for boilers up to 200 BHP and 10 minutes of condensate for boilers over 200 BHP.

An additional 33 percent should be added as a safety factor. One BHP (Boiler Horsepower) will produce .069 gallons per minute of condensate. Developing a formula results in:
BHP x .069 x minutes of storage x 1.33 = Receiver size, in gallons

Examples:

150 BHP Boiler
150 x 0.69 x 1.33 = 68.83 gallons
Select an available receiver tank equal to or larger than 68.8 gallons. (Probably a 70-gallon tank will be the standard commercially available tank.)

250 BHP Boiler
250 x .069 x 10 x 1.33 = 367.1 gallons

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Conversion Factors and Equivalent Data
Sizing Steam Condensate and Boiler Feed Pumps

Boiler H.P.	MBH	SQ. FT.EDR	Lb./Hr Steam Cond.	Actual GPM Cond.	Boiler H.P.	MBH	SQ. FT.EDR	Lb./Hr Steam Cond.	Actual GPM Cond.
2	66.95	280	70	0.14	52	1740.7	7280	1820	3.64
4	133.9	560	140	0.28	54	1807.65	7560	1890	3.78
6	200.85	840	210	0.42	56	1874.6	7840	1960	3.92
8	267.8	1120	280	0.56	58	1941.55	8120	2030	4.06
10	334.75	1400	350	0.7	60	2008.5	8400	2100	4.2
12	401.7	1680	420	0.84	62	2075.45	8680	2170	4.34
14	468.65	1960	490	0.98	64	2142.4	8960	2240	4.48
16	535.6	2240	560	1.12	66	2209.35	9240	2310	4.62
18	602.55	2520	630	1.26	68	2276.3	9520	2380	4.76
20	669.5	2800	700	1.4	70	2343.25	9800	2450	4.9
22	736.45	3080	770	1.54	72	2410.2	10080	2520	5.04
24	803.4	3360	840	1.68	74	2477.15	10360	2590	5.18
26	870.35	3640	910	1.82	76	2544.1	10640	2660	5.32
28	937.3	3920	980	1.96	78	2611.05	10920	2730	5.46
30	1004.25	4200	1050	2.1	80	2678	11200	2800	5.6
32	1071.2	4480	1120	2.24	82	2744.95	11480	2870	5.74
34	1138.15	4760	1190	2.38	84	2811.9	11760	2940	5.88
36	1205.1	5040	1260	2.52	86	2878.85	12040	3010	6.02
38	1272.05	5320	1330	2.66	88	2945.8	12320	3080	6.16
40	1339	5600	1400	2.8	90	3012.75	12600	3180	6.3
42	1405.95	5880	1470	2.94	92	3079.7	12880	3220	6.44
44	1472.9	6160	1540	3.08	94	3146.65	13160	3290	6.58
46	1539.85	6440	1610	3.22	96	3213.6	13440	3360	6.72
48	1606.8	3720	1680	3.36	98	3280.55	13720	3430	6.86
50	1673.75	7000	1750	3.5	100	3349.3	14000	3500	7

Pump BHP=$\frac{\text{(Flow) X (Head in Feet) X (S.G.)}}{\text{(3960) X(Pump Efficiency)}}$

1 SQ.FT. E.D.R. = 240 BTUH @215°F

1 Boiler H.P. = 33493 BTU/Hr

Example: Pump rating 30 GPM at 30 PSI with pump efficiency of 58% at that design condition. Fluid is water.

$\frac{\text{(30 GPM) X (30 PSI) X (2.31'/PSI) X (1.0 S.G.)}}{\text{(3960) X (.58)}}$

BHP= 0.91 Pump BHP at design condition

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PUMP SELECTION: 3450 RPM

Unit No.	Max. Sq.-Ft Direct Radiation	Equivalent Boiler HP	Radiation will Condense GPM	Pump Capacity GPM	Discharge Pressure PSI	Motor HP 3450 RPM	Receiver Gallons Simplex	Receiver Gallons Duplex
VCL-110	1000	7.2	½	1.5	10	0.33	10	15
120	1000	7.2	½	1.5	20	0.33	10	15
130	1000	7.2	½	1.5	30	0.75	10	15
140	1000	7.2	½	1.5	40	1.0	10	15
150	1000	7.2	½	1.5	50	1.5	10	15
VCL-210	2000	14.5	1	3.0	10	0.33	10	15
220	2000	14.5	1	3.0	20	0.33	10	15
230	2000	14.5	1	3.0	30	0.75	10	15
240	2000	14.5	1	3.0	40	1.0	10	15
250	2000	14.5	1	3.0	50	1.5	10	15
VCL-410	4000	29.0	2	6.0	10	0.33	10	15
420	4000	29.0	2	6.0	20	0.33	10	15
430	4000	29.0	2	6.0	30	0.75	10	15
440	4000	29.0	2	6.0	40	1.0	10	15
450	4000	29.0	2	6.0	50	1.5	10	15
VCL-610	6000	43.0	3	9.0	10	0.33	15	15
620	6000	43.0	3	9.0	20	0.33	15	15
630	6000	43.0	3	9.0	30	0.75	15	15
640	6000	43.0	3	9.0	40	1.0	15	15
650	6000	43.0	3	9.0	50	1.5	15	15
VCL-810	8000	58.0	4	12.0	10	0.33	15	15
820	8000	58.0	4	12.0	20	0.33	15	15
830	8000	58.0	4	12.0	30	0.75	15	15
840	8000	58.0	4	12.0	40	1.0	15	15
850	8000	58.0	4	12.0	50	1.5	15	15
VCL-1010	10000	72.0	5	15.0	10	0.33	15	15
1020	10000	72.0	5	15.0	20	0.33	15	15
1030	10000	72.0	5	15.0	30	0.75	15	15
1040	10000	72.0	5	15.0	40	1.0	15	15
1050	10000	72.0	5	15.0	50	1.5	15	15
VCL-1510	15000	108.0	7.5	22.5	10	0.33	30	30
1520	15000	108.0	7.5	22.5	20	0.33	30	30
1530	15000	108.0	7.5	22.5	30	0.75	30	30
1540	15000	108.0	7.5	22.5	40	1.0	30	30
VCL-2010	20000	144.0	10	22.5	10	0.33	30	30
2020	20000	144.0	10	22.5	20	0.33	30	30
2030	20000	144.0	10	22.5	30	0.75	30	30
2040	20000	144.0	10	22.5	40	1.0	30	30

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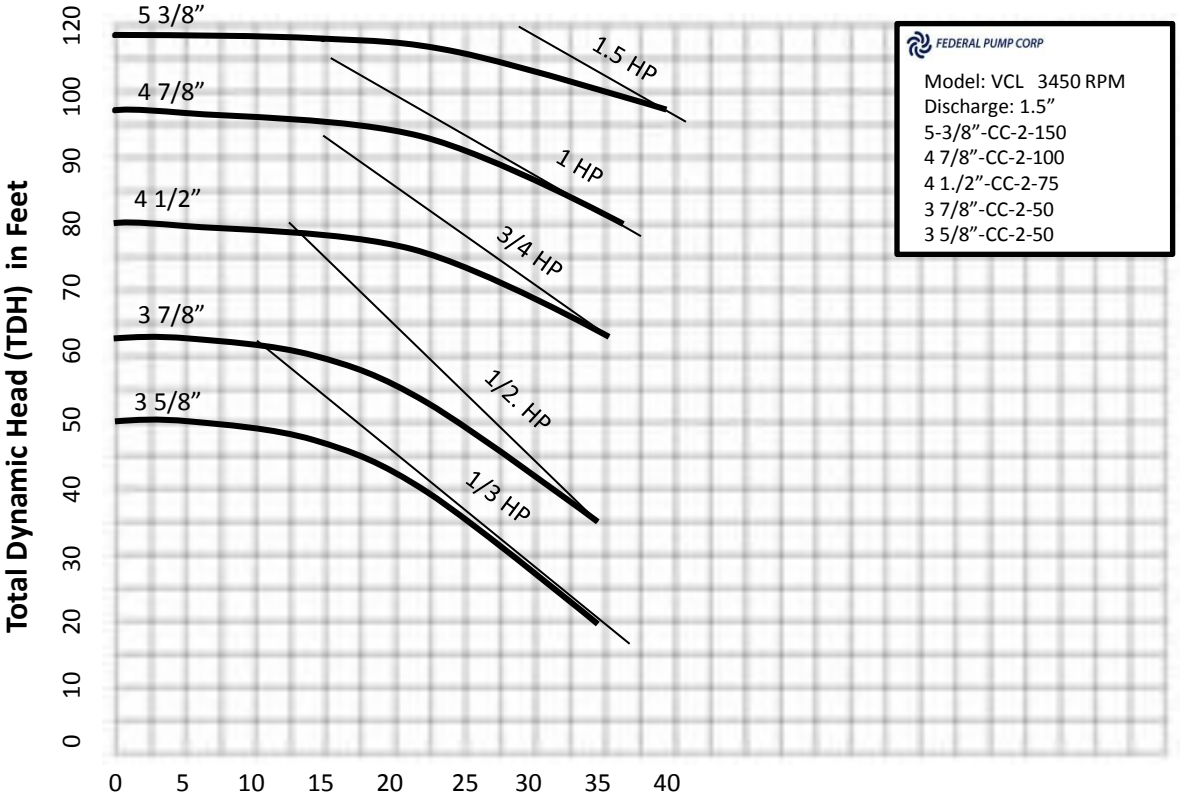
PUMP SELECTION: 3450 RPM



Convert PSI to TDH: PSI X 2.31= Feet Head — 30 PSI = 69.3'TDH

Convert HP to kW: HP X 0.746 — 1HP= 0.746 kW=746 Watts

Convert Watts to Amps — 1 HP X 746 W/Voltage=
115V= 6.5 Amps
208V= 3.6 Amps
230V= 3.2 Amps
460V= 1.6 Amps

Motor Amps: General Guideline

HP	115V	208V	230V	460V
1/3	2.1	1.2	1.1	0.55
1/2	3.2	1.8	1.6	0.8
3/4	4.9	2.8	2.5	1.3
1	6.5	3.6	3.2	1.6
1 1/2	9.8	5.6	5.0	2.5

Note: Refer to electric motor manufacturer nameplate for exact information.

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PUMP SELECTION: 1750 RPM

Unit No.	Max. Sq.-Ft Direct Radiation	Equivalent Boiler HP	Radiation will Condense GPM	Pump Capacity GPM	Discharge Pressure PSI	Motor HP 3450 RPM	Receiver Gallons Simplex	Receiver Gallons Duplex
VCL-110-4	1000	7.2	½	1.5	10	¼	10	15
VCL-210-4	2000	14.5	1	3.0	10	¼	10	15
VCL-410-4	4000	29.0	2	6.0	10	¼	10	15
VCL-610-4	6000	43.0	3	9.0	10	¼	15	15
VCL-810-4	8000	58.0	4	12.0	10	¼	15	15
VCL-1010-4	10000	72.0	5	15.0	10	¼	15	15

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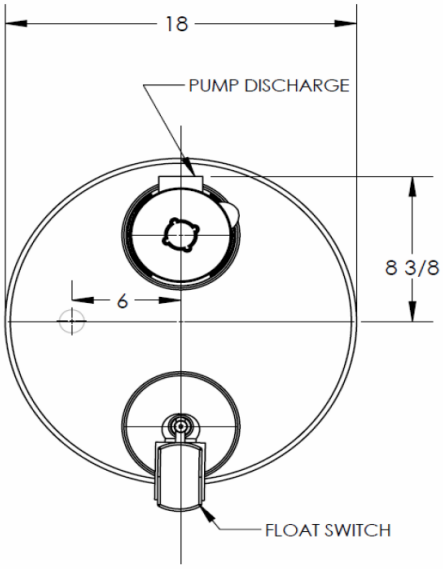
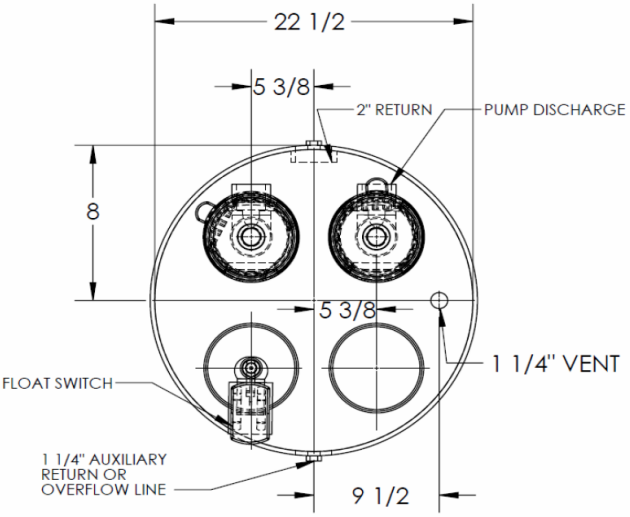
Dimensions: VCL/VTC Series (Round Configuration) D.1-VCL/VTC

Simplex Unit with 10 gallon Receiver

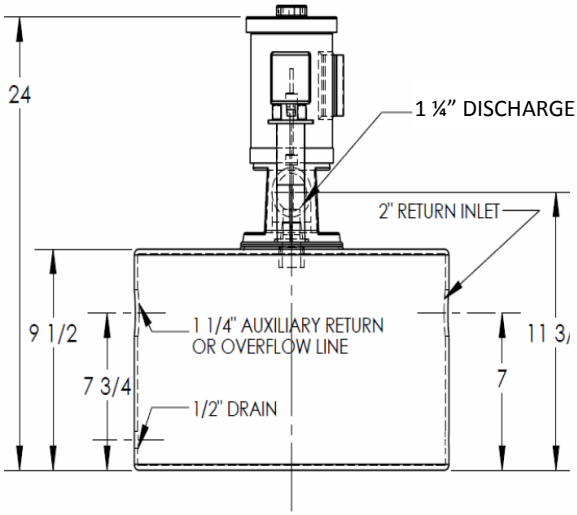


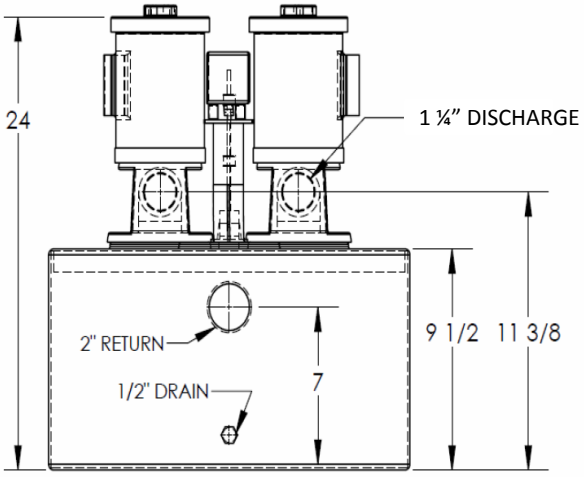
Simplex or Duplex Unit with 15 gallon Receiver



All dimensions are in inches

Standard Duplex Unit provided with (2) float switches (1 per pump)





Notes:

1. VCL Condensate unit not provided with bolt down holes. Weight of unit holds it in place.
2. Duplex VCL units provided with individual float switches. If mechanical alternating float switch selected, second float cover will be provided with blank plate.
3. Refer to separate dimensional print if control panel mounted and wired to receiver.

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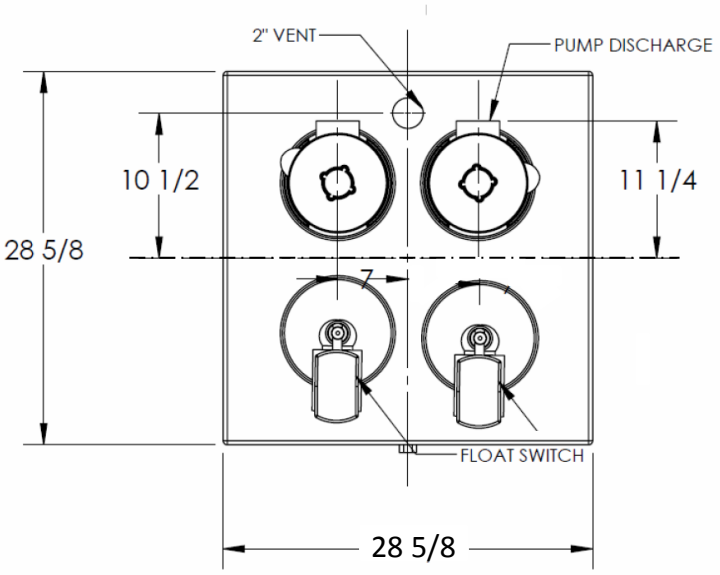
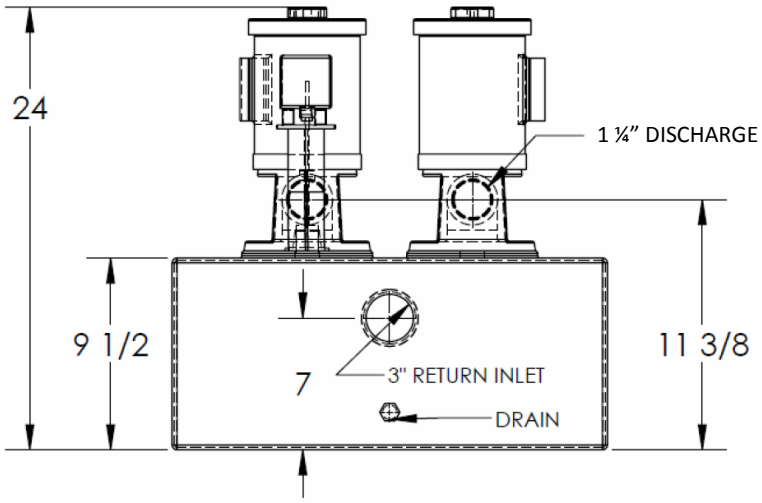
Dimensions: VCL/VTC Series (Square Configuration) D.1-VCL/VTC

30 Gallon Cast Iron Receiver



All dimensions are in inches



Notes:

1. VCL Condensate unit not provided with bolt down holes. Weight of unit holds it in place.
2. Duplex VCL units provided with mechanical alternating float switch as standard. If required with individual float switches ensure control panel is provided with 24 hour alternator to provide lead/lag cycle time load sharing.
3. Refer to separate dimensional print if control panel mounted and wired to receiver.

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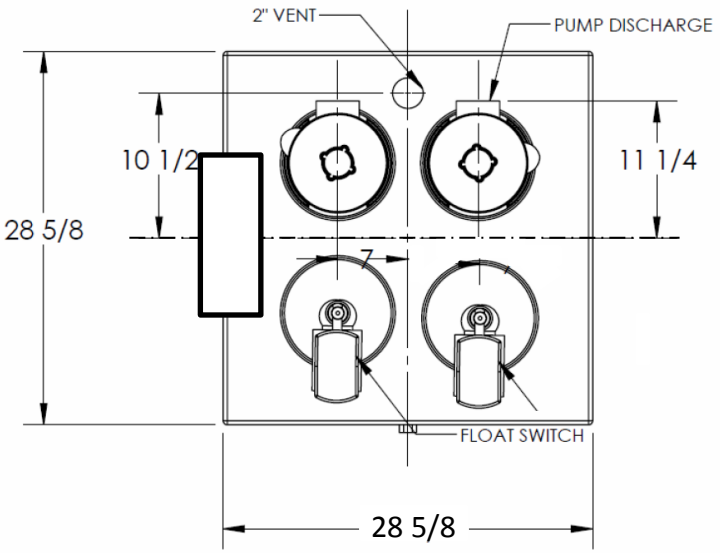
Dimensions: VCL/VTC Series (Square Configuration) D.1-VCL/VTC

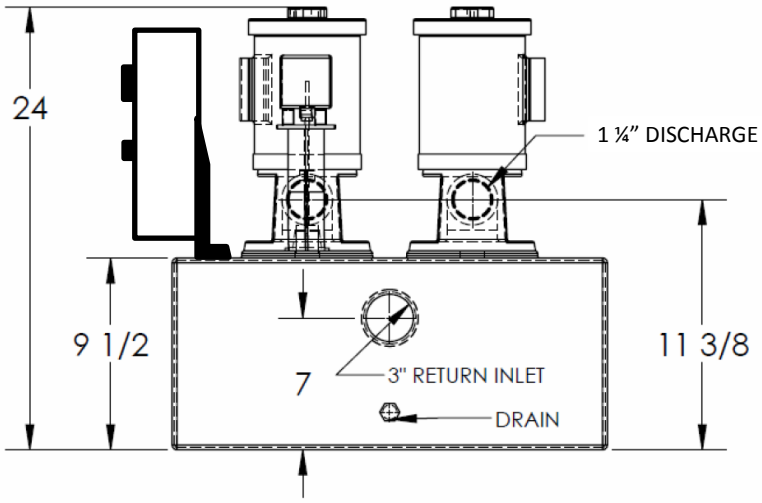
30 Gallon Cast Iron Receiver

Duplex Control Panel Mounted



All dimensions are in inches

Mounted and Wired Duplex Control Panel

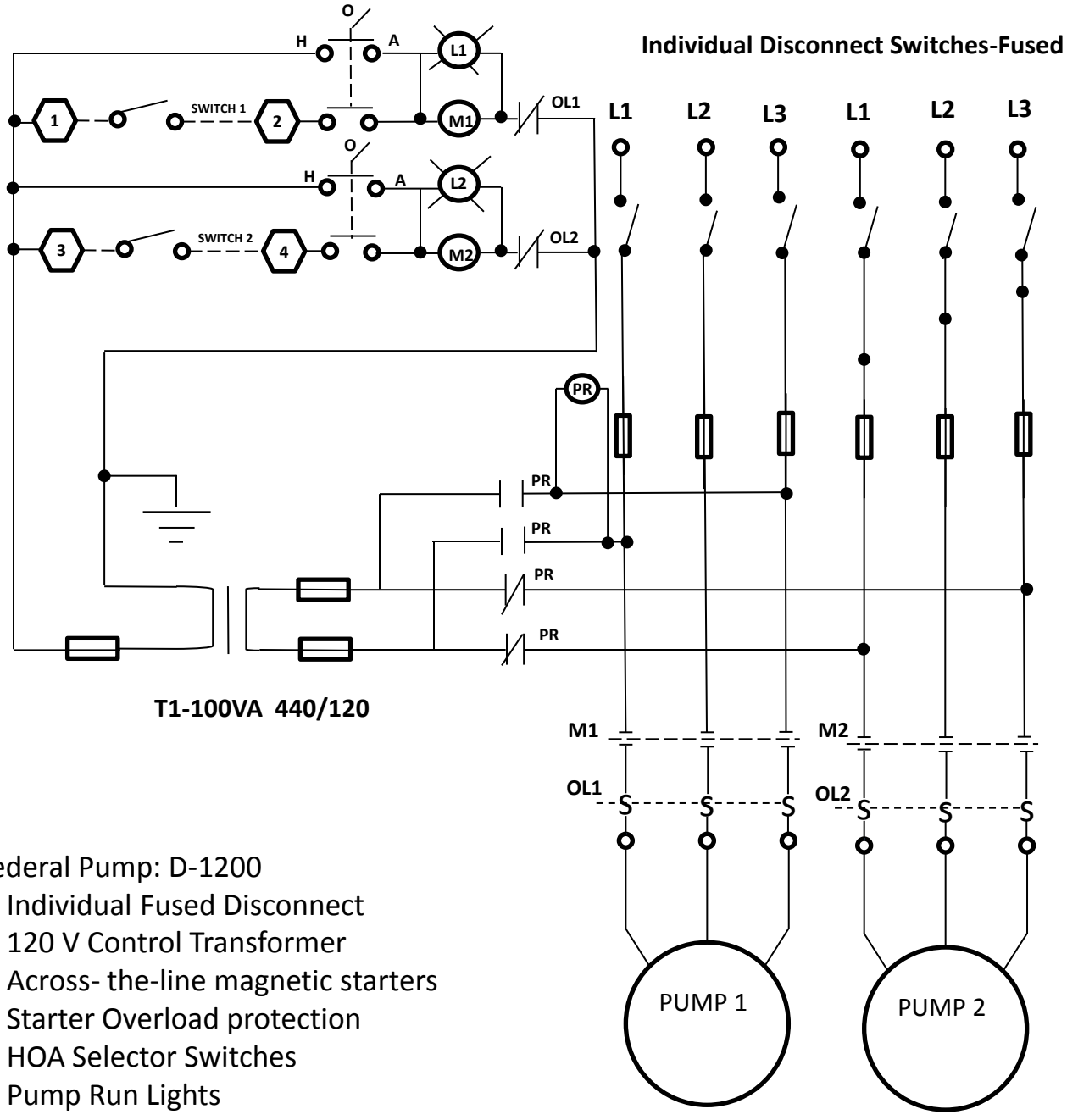


Notes:

1. VCL Condensate unit not provided with bolt down holes. Weight of unit holds it in place.
2. Duplex VCL units provided with mechanical alternating float switch as standard. If required with individual float switches ensure control panel is provided with 24 hour alternator to provide lead/lag cycle time load sharing.
3. Refer to separate dimensional print if control panel mounted and wired to receiver.

TYPE VCL

D-1200 Duplex Controls with Mechanical Alternating Float



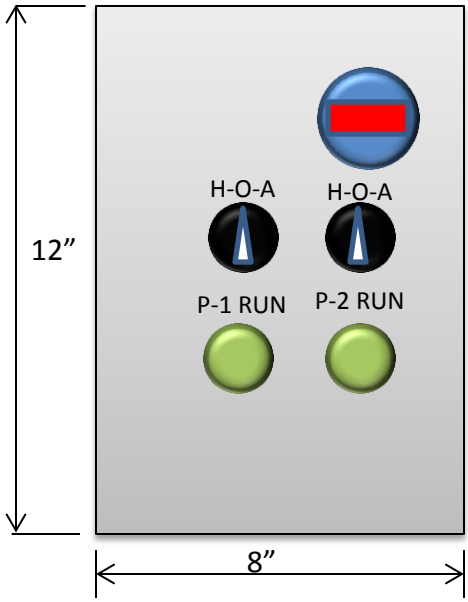
Federal Pump: D-1200

- Individual Fused Disconnect
- 120 V Control Transformer
- Across- the-line magnetic starters
- Starter Overload protection
- HOA Selector Switches
- Pump Run Lights

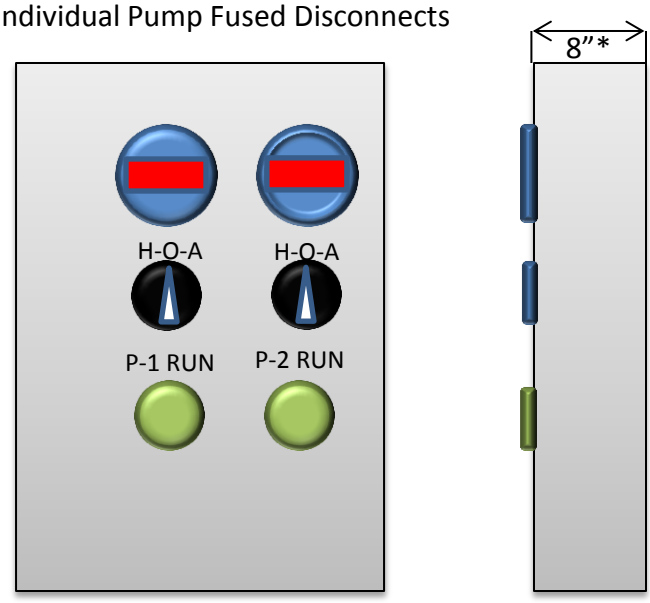
TYPE VCL

D-1200 Duplex Controls with Mechanical Alternating Float

☐ Single Fused Disconnect



☐ Individual Pump Fused Disconnects



Federal Pump: D-1200A

- Single Fused Disconnect
- 120 V Control Transformer
- Across- the-line magnetic starters
- Starter Overload protection
- HOA Selector Switches
- Pump Run Lights

Federal Pump: D-1200B

- Individual Fused Disconnect
- 120 V Control Transformer
- Across- the-line magnetic starters
- Starter Overload protection
- HOA Selector Switches
- Pump Run Lights

☐ NEMA 1 ☐ NEMA 7

☐ NEMA 4

*Dimensions are approximate only and may vary based upon additional options or enclosure specified. For certified dimensions, contact the Factory prior to approval.

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Suggested Specifications

Duplex Condensate Unit

Furnish and install where shown in the plans a Federal Pump Model VCL low suction inlet connection Duplex condensate unit with each pump rated as shown in the equipment schedule or as highlighted in the plans. The entire unit including float switch assembly and controls shall be factory assembled and pre-wired and supplied as a single unit. Inlet connection will not exceed 7" from the floor.

Each Duplex condensate unit shall include (2) vertical mounted cast iron bronze fitted pump assemblies with lower and upper shaft mounted mechanical seals suitable for 210 degree F condensate liquid collection and transfer. Pump shall include oil lubricated bronze shaft mounted bearing and be connected the vertical motor with steel bolt on coupling assembly. Pump shaft shall be stainless steel construction. Pumps shall be centerline discharge top pull out design to permit removal of the pump assembly from the cast iron receiver. Electric motors shall be connected to vertical pump support assembly and connected to the pump shaft with solid steel couplings. Motor enclosure shall be ODP (or as shown in the plans) with Class B Insulation and provided with 1.15 service factor.

Cast iron receiver will be free standing design constructed of close grain cast iron, seamless and contain no welded connections. Receivers shall include a single drain connection (to be piped by the contractor to the waste drain) and single inlet connection. Contractor will provide an inlet strainer bolted to the receiver inlet connection. Receiver will be provided with a vent connection. Contractor will pipe the vent connection as shown in the plans.

The condensate unit will include a receiver mounted mechanical alternating float switch provided with stainless steel float rods and stops and stainless steel float ball that will control the operation of the pumps based upon the liquid level in the receiver. The mechanical alternating float switch will initiate lead and lag pump operation and sequence lead/lag operation between the pumps upon completion of each pump cycle to ensure even pump wear. Float switch shall be Square D or equal.

Pump manufacturer will provide sight gauge glass and externally mounted thermostat to allow visual indication of tank water level and condensate temperature.

Provide receiver mounted Duplex Level Control Panel; Federal Pump model D-1200 to include individual fused disconnect switches, across-the-line-type magnetic starters with overload protection, pump run lights, HOA selector switches, 115 fused secondary control circuit transformers (for 3 phase voltages), numbered wiring and terminal strip and provided in NEMA 1 enclosure. Control Panel will be UL508 approved. Pump manufacturer will mount and wire the control panel and connect motors and float switches providing automatic operation once installed.

Duplex Unit will be tested by the pump manufacturer prior to shipment. Pump manufacturer will provide equipment start-up assistance and verify the unit is installed according to the Pump Manufacturer's requirements.

Optional:

Pump manufacturer will provide high water alarm float switch contact option that will identify high water alarm and signal alarm condition to remote area. Provide dry contacts in the Duplex Condensate Control Panel for pump operation and high water alarm condition for remote monitoring.

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Suggested Specifications

Simplex Condensate Unit

Furnish and install where shown in the plans a Federal Pump Model VCL low suction inlet connection Simplex condensate unit with the pump rated as shown in the equipment schedule or as highlighted in the plans. The entire unit including float switch assembly and controls shall be factory assembled and pre-wired and supplied as a single unit. Inlet connection will not exceed 7" from the floor.

Each Simplex condensate unit shall include (1) vertical mounted cast iron bronze fitted pump assemblies with lower and upper shaft mounted mechanical seals suitable for 210 degree F condensate liquid collection and transfer. Pump shall include oil lubricated bronze shaft mounted bearing and be connected the vertical motor with steel bolt on coupling assembly. Pump shaft shall be stainless steel construction. Pump shall be centerline discharge top pull out design to permit removal of the pump assembly from the cast iron receiver. Electric motor shall be connected to vertical pump support assembly and connected to the pump shaft with solid steel couplings. Motor enclosure shall be ODP (or as shown in the plans) with Class B Insulation and provided with 1.15 service factor.

Cast iron receiver will be free standing design constructed of close grain cast iron, seamless and contain no welded connections. Receivers shall include a single drain connection (to be piped by the contractor to the waste drain) and single inlet connection. Contractor will provide an inlet strainer bolted to the receiver inlet connection. Receiver will be provided with a vent connection. Contractor will pipe the vent connection as shown in the plans.

The condensate unit will include a receiver mounted float switch provided with stainless steel float rods and stops and stainless steel float ball that will control the operation of the pumps based upon the liquid level in the receiver. The float switch will initiate pump operation. Float switch shall be Square D or equal.

Pump manufacturer will provide sight gauge glass and externally mounted thermostat to allow visual indication of tank water level and condensate temperature.

Provide receiver mounted Simplex Level Control Panel; Federal Pump model S-1000 to include fused disconnect switch, across-the-line-type magnetic starter with overload protection, pump run light, HOA selector switch, 115 fused secondary control circuit transformers (for 3 phase voltages), numbered wiring and terminal strip and provided in NEMA 1 enclosure. Control Panel will be UL508 approved. Pump manufacturer will mount and wire the control panel and connect motor and float switch providing automatic operation once installed.

Simplex Unit will be tested by the pump manufacturer prior to shipment. Pump manufacturer will provide equipment start-up assistance and verify the unit is installed according to the Pump Manufacturer's requirements.

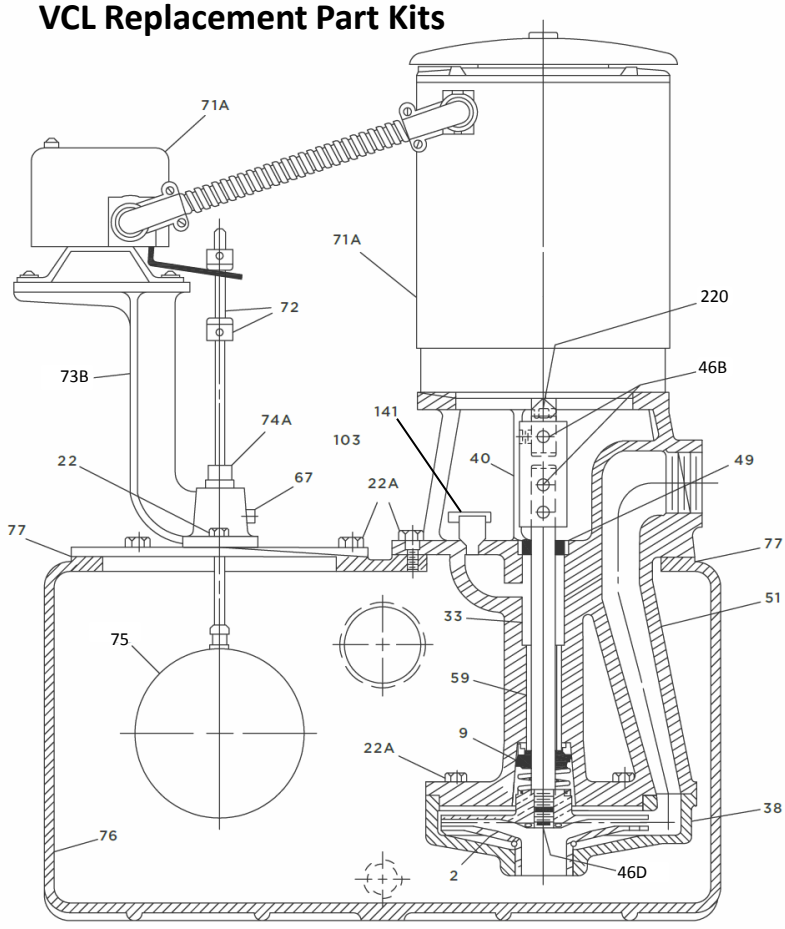
Optional:

Pump manufacturer will provide high water alarm float switch contact option that will identify high water alarm and signal alarm condition to remote area. Provide dry contacts in the Simplex Condensate Control Panel for pump operation and high water alarm condition for remote monitoring.

FEDERAL PUMP CORP

VCL Replacement Part Kits

No	Description	Required	Material
2	Impeller	1	Bronze
9	Mechanical Shaft Seal	1*	Various
22	Cap Screw	2	Steel
22A	Cap Screw	10	Steel
22D	Cap Screw	2	Steel
33	Shaft	1*	Stainless Steel
38	Suction Plate	1	Cast Iron
40	Coupling	1*	Steel
46B	Set Screw	4*	Steel
46D	Impeller Set Screw	1	Steel
49	Shaft Seal	1*	Various
51	Casing Assembly	1	Cast Iron
59	Lower Bearing	1*	Bronze
67	Set Screw	1*	Steel
71A	Float Switch	1*	Various
72	Float Rod and Stops	Set*	Stainless Steel
73B	Float Switch Pedestal	1	Cast Iron
74A	Stuffing Box & Guide Pipe	Set	Various
75	Float	1*	Stainless Steel
76	Receiver	1	Cast Iron
77	Gasket	2*	Rubber
103	Cover	1	Cast Iron
110	Motor	1	Various
141	Oil Cup	1	Steel
220	Motor Bolts	2	Steel



Repair	Items Included
Gasket Kit	77 + 22A
Seal Kit	9,49 + Gasket Kit
Bearing Kit	Seal Kit + 59 + 141
Impeller Kit	46D+ 2+ Bearing Kit
Shaft Kit	Bearing Kit +33
Casing Kit	51 + 38 +141+ Bearing Kit
Motor Kit: 1/4HP-1750 PRM 115V/1Phase-ODP	110 + 40+ 46B
Motor Kit: 1/3HP-3500RPM 115V/1Phase-ODP	110 + 40+ 46B
Motor Kit: 3/4HP-3500 RPM 115V/1Phase-ODP	110 + 40+ 46B
Motor Kit: 1HP-3500RPM 115V/1 Phase	110 + 40+ 46B
Motor Kit: 1.5HP-3500RPM 115V/1 Phase	110 + 40+ 46B

Repair	Items Included
Motor Kit: 1/3HP-3500RPM 200-230/460V- 3Phase-ODP	110 + 40+ 46B + Motor Bolts
Motor Kit: 3/4HP-3500 RPM 200-230/460V -3 Phase-ODP	110 + 40+ 46B + Motor Bolts
Motor Kit: 1HP-3500RPM 200-230/460V -3 Phase-ODP	110 + 40+ 46B + Motor Bolts
Motor Kit: 1.5HP-3500RPM 200-230/460V -3 Phase-ODP	110 + 40+ 46B + Motor Bolts
Motor Bearing Kit ¼ HP	Motor bearing + Coupling
Motor Bearing Kit: 1/3 HP	Motor bearing + Coupling
Motor Bearing Kit: ½ HP	Motor bearing + Coupling
Motor bearing Kit: ¾ HP	Motor Bearing + Coupling
Motor bearing Kit: 1 HP	Motor Bearing + Coupling
Motor bearing Kit: 1.5HP	Motor Bearing + Coupling

Repair	Items Included
Float Switch Kit	71A + 72
Float Rod Kit	67 + 74A +72
Float Ball Kit	75 + Gasket Kit
Float Stand	73B + Gasket Kit
Float Guide Pipe Kit	67 + 74+ 72 + Gasket kit
Receiver: 10 Gal Cast Iron	76 + Gasket Kit +103
Receiver: 15 Gal Cast Iron	76 + Gasket kit +103
Receiver: 30 Gal Cast iron	76 + Gasket Kit + 103
Replacement Pump Kit	Assembled pump only !

FEDERAL PUMP CORP

VCL Replacement Part Kits

Federal Pump Replacement part kits are designed to provide the end user with factory authorized replacement parts that meet design specifications ensuring proper pump performance. These kits include the accessory and support components to ensure those required repair are addressed properly and included in each kit. Use only Factory Authorized and supplied original replacement parts when repairing the installed Federal Pump.

Repair Issue	Kit Required
Leaking Seal	Mech Seal Kit
Failed Pump bearing	Bearing Kit-Pump
Leaking Receiver	Gasket Kit
Wobbly pump shaft	Shaft Kit
Bent Float Rod	Float Rod Kit
Lack of Pressure	Impeller kit
Erosion	Casing Kit
Motor Failure	Motor Kit
Noisy Motor	Bearing Kit-Motor
Loss of Float Control	Float Switch kit
Damaged float	Float Kit
Damaged receiver	Receiver kit
Damaged Coupling	Coupling Kit
Replacement Pump	Pump Kit

Seal Kit:	Gasket Kit:	Casing Kit:	Float Kit:	Motor Bearing Kit:
Mechanical seal Upper shaft Seal Gasket Kit	Pump/receiver gasket Replacement Bolts Float switch/receiver gasket	Lower casing Bearing Kit Coupling	Replace Float Replacement Rod Stops Gasket kit	Motor Bearings Coupling Replacement Bolts

Pump Bearing Kit:	Float Switch Kit	Shaft Kit:	Receiver Kit:	Impeller Kit:	Float Rod Kit
Seal Kit Lower pump bearing Oil bearing cap	Float Switch Replacement rod stops Replacement mount bolts	Pump shaft Bearing kit Coupling	CI Receiver Gasket Kit Drain Plugs	Bearing kit Impeller Impeller set screw	Float Rod/Guide Float Stops Gasket Kit

Motor Kit	Replacement Pump Kit
New Motor New Coupling Motor Bolts	Replacement Pump New Coupling Gasket kit