

Product Code 1: Condensate Return Systems Products And Accessories



Effective: March 15, 2013

Replaces: Current Federal Pump Brochure

Date: March 15, 2013

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I. Introduction

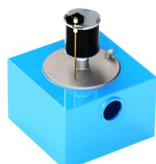
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Product Code 1: Condensate Return Systems

M SERIES



MC1/MMC1/MCH: Designed for simplex smaller applications (drip from air conditioning units coils as one example) or for applications beyond condensate return units including sinks and drains where gravity drainage is impractical.

Pump Capacity: 10 GPM at 9 psi provided with steel receivers with motor HP ratings to 1/3HP for 115V single phase or 230V 3 phase power service. MCH units are design for hot condensate service. Pump capacity for MCH is to 15 G.P.M. at 40 psi to 3/4 HP.

Receiver Tank: Available in steel, sized at 5 Gallon for the MC1/MM1 and 6-10 gallon for the

VRC



VRC Series: Designed for small to medium condensate applications to 10,000 EDR SQ.FT. and is available in simplex (single pump) or duplex (2 pump) systems.

Pump Capacity: Maximum 15 GPM at 20psi for each pump, with motor HP ratings to 2 HP, 3500 R.P.M. available in single phase or 3 phase power service. Standard simplex units are provided with a single float switch that controls pump operation. Standard duplex units are provided with mechanical alternating float switch. For duplex VRC series, pumps are mounted on opposite sides of the receiver.

Receiver Tank: Available in cast iron, sized from at 6 to 10 Gallon

VCL/VTC

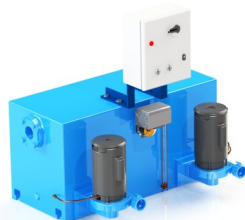


VCL/VTC Series: Uniquely designed for round or square tank configuration to 20,000 EDR SQ.FT. and is available in simplex (single pump) or duplex (2 pump) systems. with low condensate tank inlet connections.

Pump Capacity: Maximum 30 GPM at 50psi for each pump, with motor HP ratings to 1 1/2, 3500 R.P.M. available in single phase or 3 phase power service. Standard simplex units are provided with a single float switch that controls pump operation. Standard duplex units are provided with mechanical alternating float switch. Pumps are vertically mounted into the receiver.

Receiver Tank: Cast iron, available in round configuration for 10 and 15 gallon and square 30 gallon receivers.

CCV

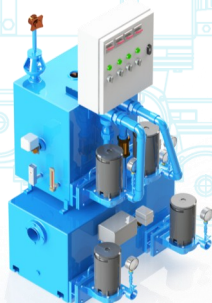


CCV Series: Designed for medium to large condensate applications to 100,000 EDR SQ.FT. and is available in simplex (single pump) or duplex (2 pump) systems.

Pump Capacity: Maximum 150 GPM at 80psi for each pump, with motor HP ratings to 15 HP, 3500 R.P.M. available in single phase or 3 phase power service. Standard simplex units are provided with a single float switch that controls pump operation. Standard duplex units are provided with mechanical alternating float switch.

Receiver Tank: Available in cast iron, sized from at 15 to 120 Gallon.

VCUD



VCUD Series: Uniquely designed for vacuum condensate service where the integrated system provides a vacuum drawing condensate into the receiver. System designed to 65,000 SQ.FT. EDR in duplex (2 pump) configuration.

Pump Capacity: Maximum 45 GPM at 60psi for each pump, with motor HP ratings to 5 HP, 3500 R.P.M. available in single phase or 3 phase power service. Standard duplex units are provided with mechanical alternating float switch. Pumps are vertically mounted into the receiver.

Receiver Tank: Available in cast iron and steel, sized from 25 to 80 gallon.

CCH

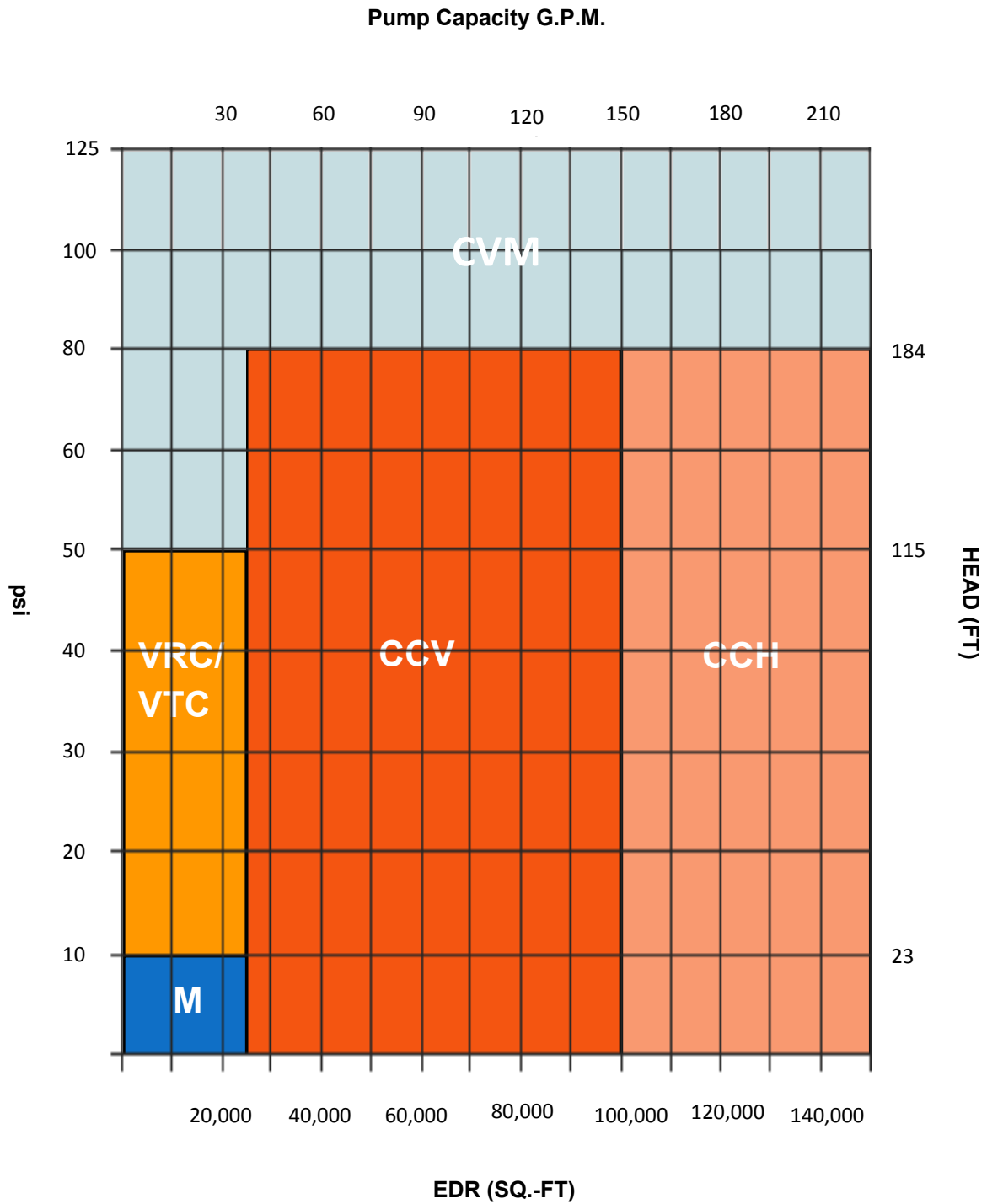


CCH Series: Designed for medium to large condensate applications to 150,000 EDR SQ.FT. CI

Pump Capacity: Maximum 225 GPM at 80psi for each pump, with motor HP ratings to maximum 15 HP, maximum 3540 R.P.M. available in single phase or 3 phase power service. Standard duplex units include a mechanical alternating float switch, pre-piped connections from receiver tank to individual pumps; all skid mounted.

Receiver Tank: Available in cast iron, sized from at 15 to 120 Gallon.

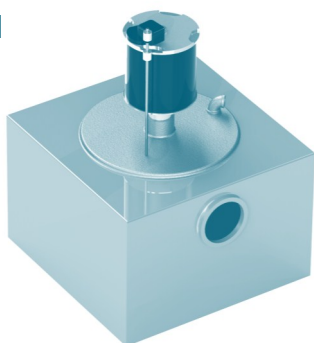
Condensate Series: Range of Operation



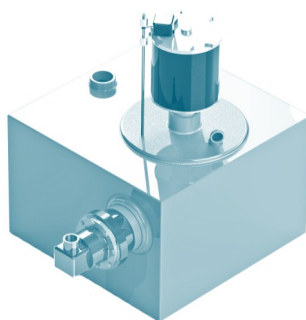
Catalog Sections: M-Series

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Product Information	P.1-M
Suggested Specification	S.1-M
Material of Construction	M.1-M
Selection Table	ST.1-M
Dimensions	D.1-M
O&M	OM.1-M
Price Sheets	PR.1-M

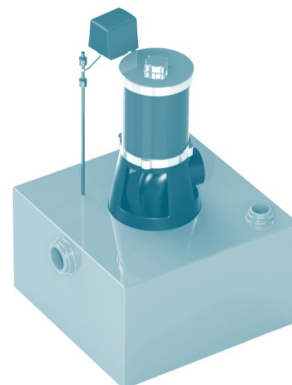
MC-1



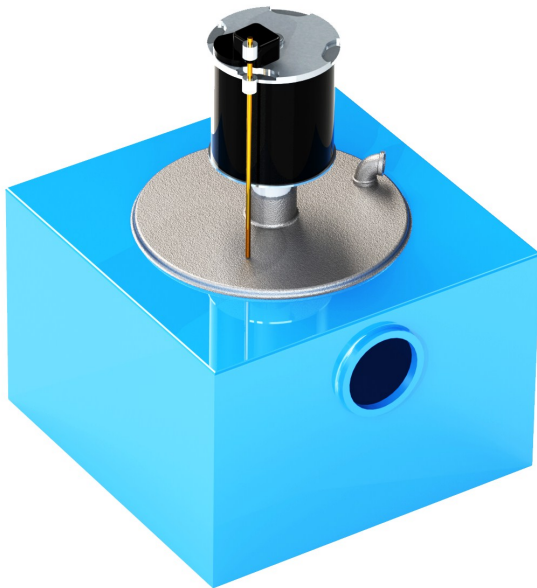
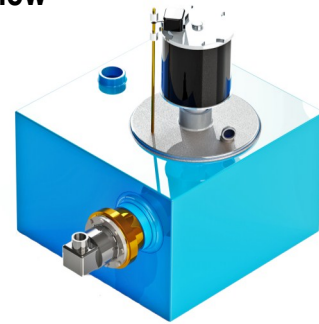
MMC-1



MCH



Product Information: MMC-1/MC-1 Condensate Return Units

P.1-M**Fig 1: MC-1 ISO View****Fig 2: MMC-1 ISO View****Fig 3: MCH ISO View**

Heavy Fabricated Steel—5 gallon Receiver

The **MC1** series are designed for simplex smaller applications (drip from air conditioning units coils as one example) or for applications beyond condensate return units including sinks and drains where gravity drainage is impractical. The **MMC-1** is a modified version of the MC-1 where an inlet cut out switch is included. Fluid **temperature is limited to 160°F**. Pump capacity range 5 to 25 GPM at 2 to 9 psi provided with fabricated steel receivers. Motor HP ratings is 1/3HP at 1750 RPM, available single phase for 115V or 230V power service.

The **MCH** units have been designed for hot condensate return with **temperatures to 210°F**. Units are available in 6 or 10 gallon fabricated steel tank sizes. Pump capacity range from 1 1/2 to 15 GPM at 20 to 40 psi. Motor HP rating from 1/3 to 3/4 HP at 3500 RPM. available single phase for 115V or 230V power service.

- **MOTOR:** Single phase, 60 cycle, 115 or 230 volts, with built-in overload protective device. 115 volt motor is supplied with 7 FT power cord and plug. 230 volt motor is supplied with conduit box for electrical connection.
- **PUMP:** Standard-fitted construction with stainless steel shaft (**refer to section M.1-M**).
- **TANK:** Heavy duty fabricated steel.
- **FLOAT SWITCH:** Integrally mounted to electric motor with automatic ON/OFF operation.

Suggested Specifications: MMC/MC1

S.1-M

Condensate Return Units

(Option MMC-1)

Furnish and install as shown in the plans a Federal Pump Corporation Series: MC1, Condensate Return Unit with each pump rated as shown in the pump schedule. The entire unit including float switch and controls shall be factory assembled and pre-wired and supplied as a single operating unit.

Each condensate return unit shall include (1) vertical in-tank mounted centrifugal pump connected to a vertical 1/3 HP, 1750 RPM, single phase, 60 cycle, 115 or 230 V, with built-in overload protective device. 115 volt motor is supplied with covered extension cord and plug. 230 V motor is supplied with conduit box for electrical connection. Pumps shall be in-tank mounted, top pull out design allowing the motor, float switch, and pump to be removed without disturbing suction inlet connecting piping. Each pump shall include a stainless steel shaft, bronze bearing, and aluminum impeller. Electric motors shall be ODP (Open Drip Proof) design or as shown in the equipment schedule.

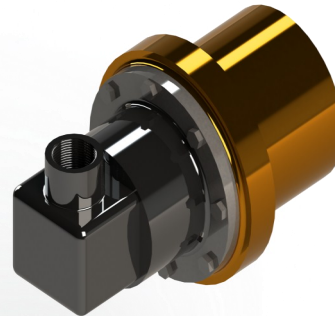
Condensate unit will be designed to withstand maximum water temperature of 160°F. The 5 gallon receiver shall be constructed of heavy duty fabricated steel.

The condensate return unit (s) will include a receiver mounted float switch that provides automatic operation of the pump. Upon reaching the factory predetermined high water level in the receiver, the float switch will initiate pump operation that will discharge the tank contents.

The float switch will disengage the pump upon a predetermined factory set low water level in the receiver. Pump, motor and float switch shall be factory-assembled and provided as a single operating unit. The condensate unit will be supplied with a 115 V power cord 7 FT in length.

The MMC-1 unit includes an additional float switch that is activated if water in the tank rises to a dangerous level. Switch will automatically shut down the air conditioning unit (or remote unit) supplying fluid to the receiver, and simultaneously activate an audible or visual alarm. The pump manufacturer will test all system connections, prior to shipment, and paint the equipment in machine enamel finish.

Fig: MMC-1 Cut-Out Switch



Suggested Specifications: MCH

S.1-M

Condensate Return Units

Furnish and install as shown in the plans a Federal Pump Corporation Series: MCH, Condensate Return Unit with the pump rated as shown in the pump schedule. The entire unit including float switch and controls shall be factory assembled and pre-wired and supplied as a single operating unit.

Each condensate return unit shall include (1) vertical in-tank mounted centrifugal pump connected to a vertical motor, (HP as shown on the plans) 3500 RPM, single phase, 60 cycle, 115 or 230 V, with built-in overload protective device. 115 volt motor is supplied with 7 FT extension cord and plug. 230 V motor is supplied with conduit box for electrical connection. Pumps shall be vertically mounted and suspended into the receiver, top pull out design allowing the motor and pump to be removed without draining the condensate receiver. Each pump shall include a stainless steel shaft, lower mechanical seal, enclose bronze impeller, and oil lubricated bearing. Electric motors shall be ODP (Open Drip Proof) design or as shown in the equipment schedule.

Condensate unit will be designed to withstand maximum water temperature of 210°F. The receiver shall be constructed of heavy duty fabricated steel.

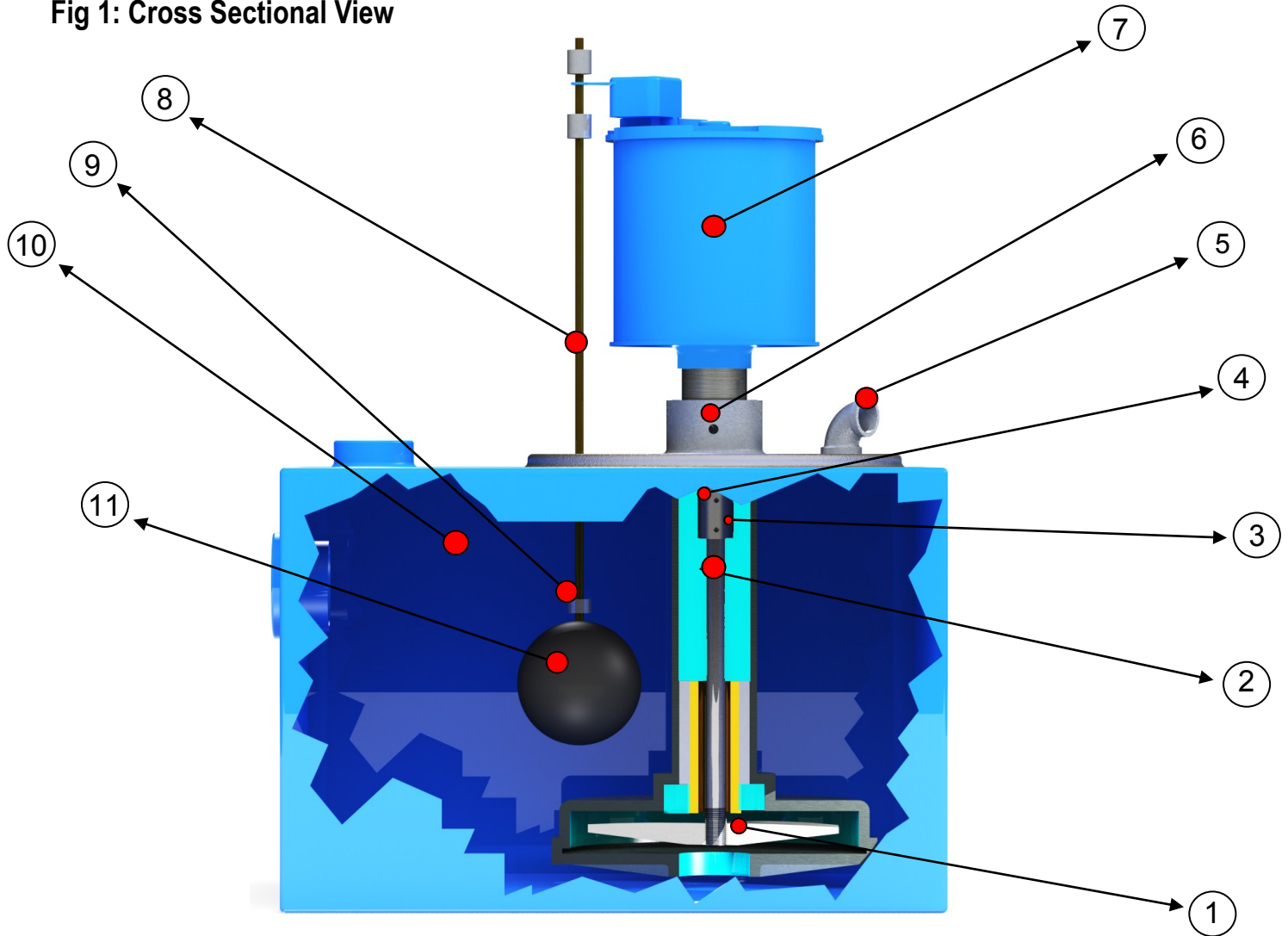
The condensate return unit(s) will include a receiver mounted float switch that provides automatic operation of the pump. Upon reaching the factory predetermined high water level in the receiver, the float switch will initiate pump operation that will discharge the tank contents.

The float switch will disengage the pump upon a predetermined factory set low water level in the receiver. Pump, motor and float switch shall be factory-assembled and provided as a single operating unit.

Material of Construction: MMC/MC1

M.1-M

Fig 1: Cross Sectional View

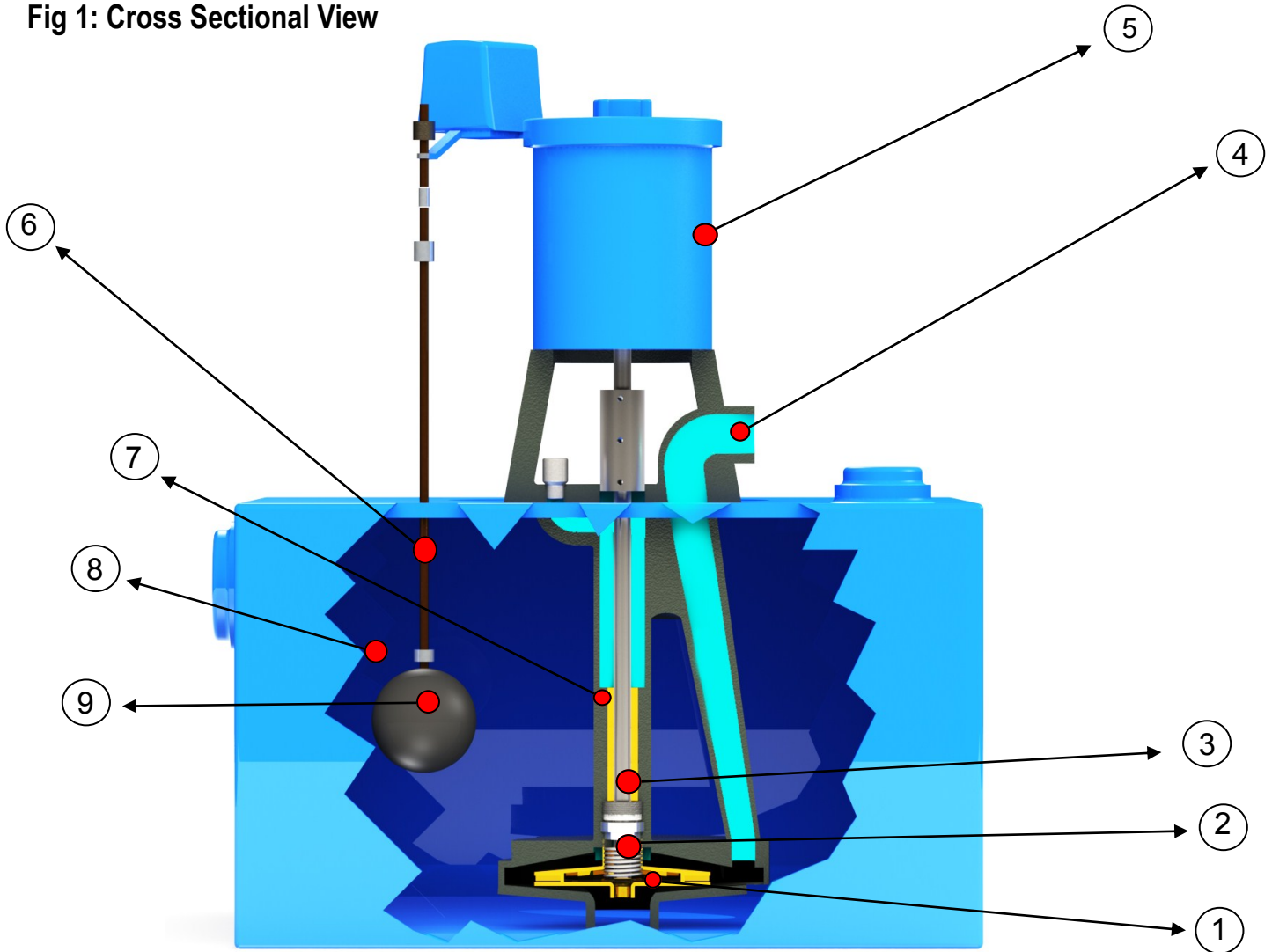


Item	Item No	Material	Description	Applications
Impeller	1	Aluminum	Balanced/Trimmed	Condensate Service
Shaft	2	Stainless Steel	Provides power	Motor/pump shaft
Coupling	3	Steel	Motor/Pump Connection	Transmits Power
Adjusting Screw	4	Steel	Impeller Setting	Adjustable
Pump Casing	5	Cast Iron	Receiver Mounted	Condensate Service
Motor Set Screw	6	Steel	Connects Motor	Hold Motor in Place
Electric Motor	7	Steel	Single Phase 1750 RPM	Provided with 7 FT Power Cord for 115V Service
Float Rod	8	Brass	Level Control	Automatic Operation
Float Stop	9	Aluminum	Level Adjustment	ON/OFF Set points
Receiver	10	Steel	5 Gallon Receiver	Provided with Blue Enamel Paint
Float Assembly	11	Plastic	Float Ball	Senses Liquid Level

Material of Construction: MCH

M.1-M

Fig 1: Cross Sectional View



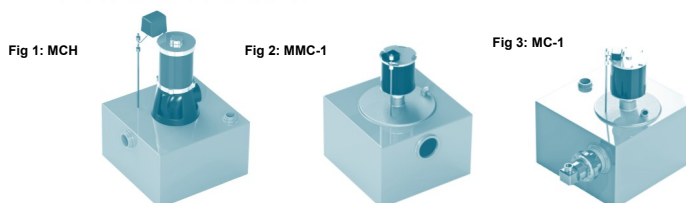
Item	Item No	Material	Description	Applications
Impeller	1	Bronze	Balanced/Trimmed	Condensate Service
Mechanical Seal	2	EPDM	Rated to 210°F	Prevents Pump Leak
Shaft	3	Stainless Steel	Provides Power	Connects Motor To Impeller
Pump Casing	4	Cast Iron	Receiver Mounted	Condensate Service
Electric Motor	5	Steel	Single Phase 3500 RPM	Class B Installation
Float Rod/Stop	6	Stainless Steel	Controls Liquid Level	Provides ON/OFF
Pump Bearing	7	Bronze	Oil Lubricated	Provides Shaft Balance
Receiver	8	Cast Iron	Vented CI Receiver	Available in steel and Stainless Steel
Float Assembly	9	St Steel	Mech. Alt Float Switch	High temp condensate use

Selection Table: MMC-1/MC-1 Series

ST.1-M

10, 15, 20, 25 Pump Capacity 1750 RPM: Midget Condensate Disposal Unit Selection Table

Model NO	EDR	Pump Capacity GPM	Pump Pressure PSI	HP Rating (1750 RPM)	Receiver Capacity (GAL)
MC-1/MMC-1	6,700	10	9	1/3	5
MC-1/MMC-1	10,000	15	7	1/3	5
MC-1/MMC-1	13,500	20	4	1/3	5
MC-1/MMC-1	16,750	25	2	1/3	5

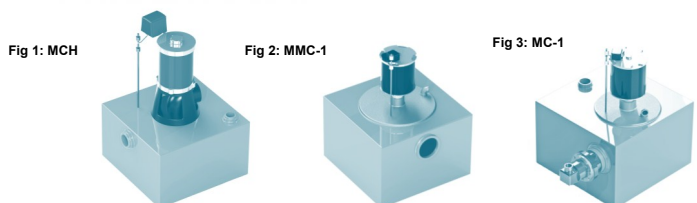


Selection Table: MCH Series

D.1-M

1,000-10,000 EDR 3500RPM: Duplex Condensate Return Selection Table

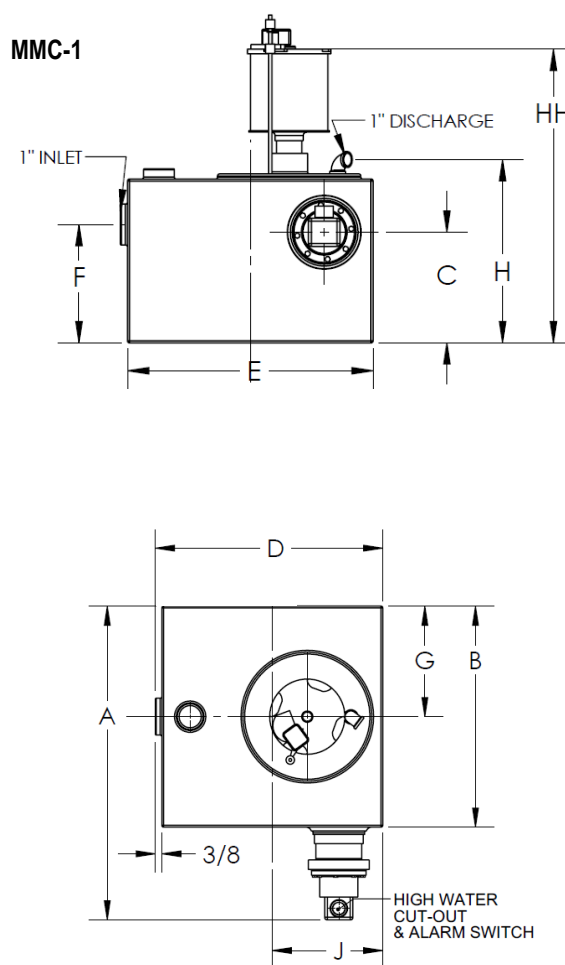
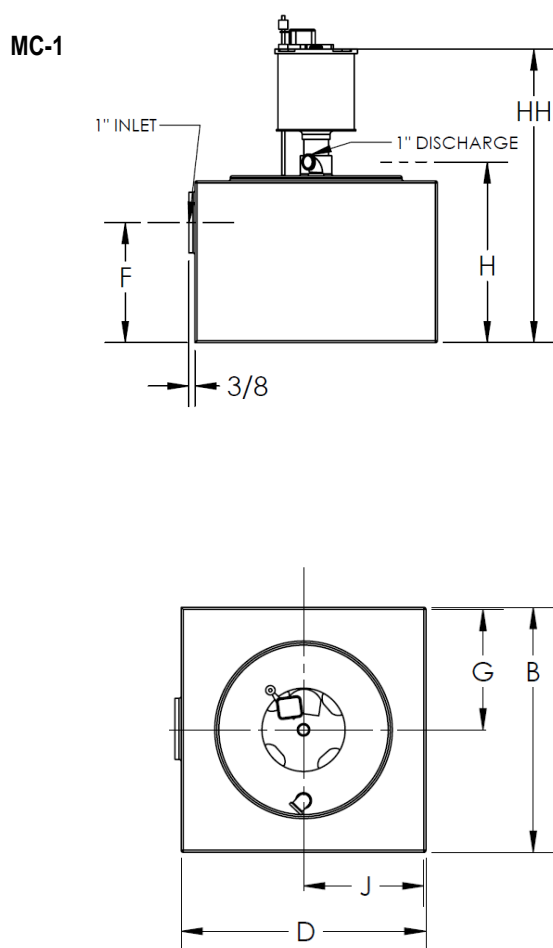
Sq.-Ft EDR	Pump Pressure psi	Pump Capacity GPM	HP Rating (ea.)	Receiver Capacity Gallons	Basic Order No CI Receiver
1,000	20 30 40	1-1/2	1/3 1/2 3/4	6	MCH-120-2 MCH-130-2 MCH-140-2
2,000	20 30 40	3	1/3 1/2 3/4	6	MCH-220-2 MCH-230-2 MCH-240-2
4,000	20 30 40	6	1/3 1/2 3/4	6	MCH-420-2 MCH-430-2 MCH-440-2
6,000	20 30 40	9	1/3 1/2 3/4	6	MCH-620-2 MCH-630-2 MCH-640-2
8,000	20 30 40	12	1/3 1/2 3/4	10	MCH-820-2 MCH-830-2 MCH-840-2
10,000	20 30 40	15	1/3 1/2 3/4	10	MCH-1020-2 MCH-1030-2 MCH-1040-2



Dimensions: MMC1/MC-1 Series

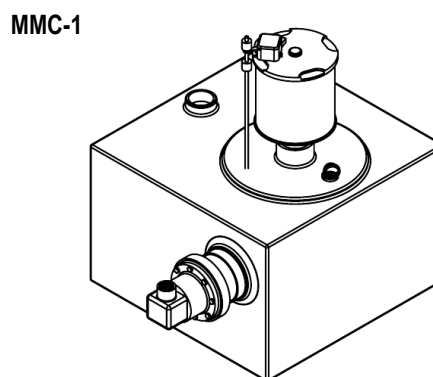
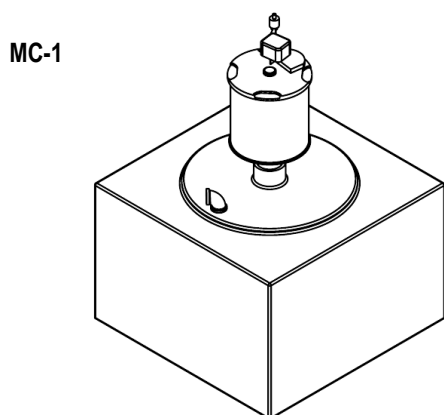
D.1-M

MC-1/MMC-1: 5 Gallon Receiver



All Dimensions are in inches

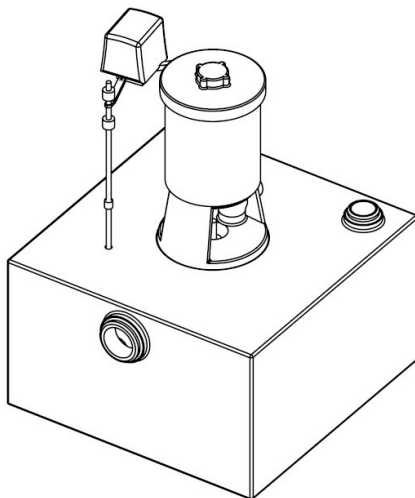
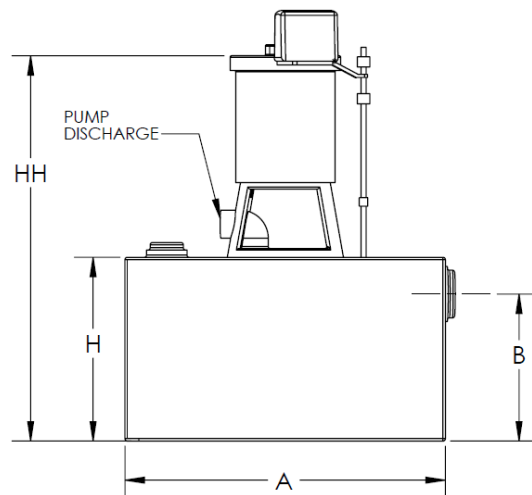
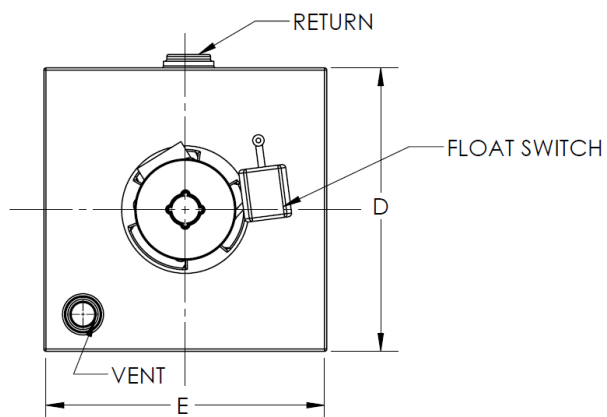
Pump	A	B	C	D	E	F	G	H	HH	J
MMC1	17 3/4	12	6 1/2	12	12 1/4	7	6 1/8	10 7/8	18 1/2	6
MC	-	12	-	12	12 1/4	7	6 1/8	10 7/8	18 1/2	6



Dimensions: MCH Series

D.1-M

MCH: 6 and 10 Gallon Receiver

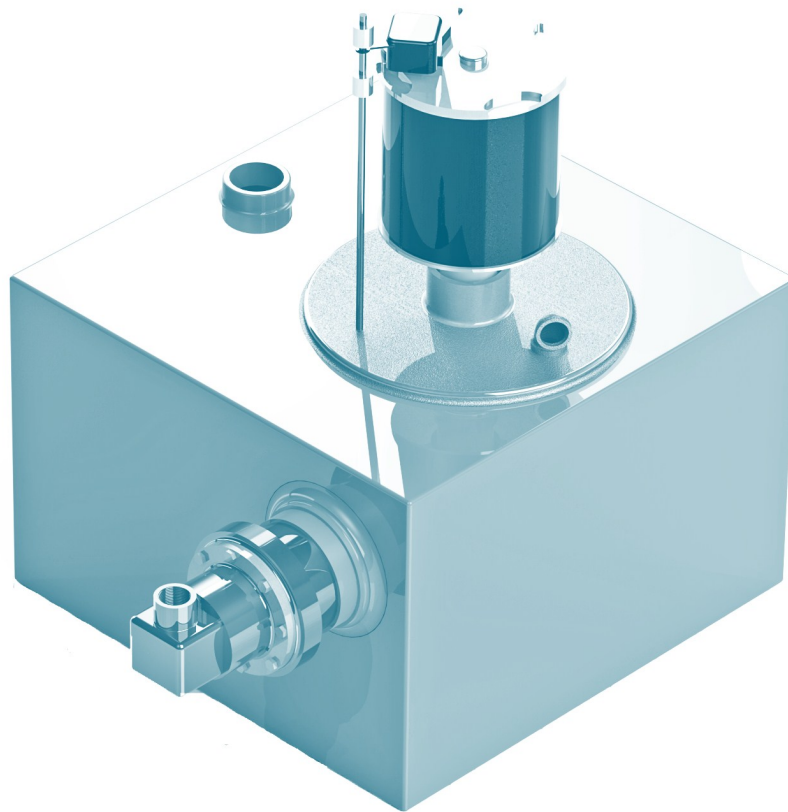


All Dimensions are in inches

Receiver Capacity Gallons	A	DR	E	HH	I-Inlet	J-Vent	Pump Discharge Size
6	12 1/4	1/2	12 1/4	22	1 1/2	1	1 1/4
10	16 1/4	1/2	16 1/4	24	2	1 1/4	1 1/4

Product Code: 1
Condensate Return Units-Series M

Installation, Operation and Maintenance Overview



Warning Symbol! This symbol used throughout the Operations manual draws the user's attention to safety instructions. When used the safety warning decal advises: ATTENTION! BE ALERT! YOUR SAFETY IS INVOLVED! FAILURE TO FOLLOW THESE INSTRUCTIONS MAY RESULT IN A SAFETY HAZARD!

Location of Installation: _____

Serial No: _____

Model No: _____

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1. Mechanical Components and Installation

- a. Pump Identification and Inspection**
- b. Locating the Equipment**
- c. Recommended Piping Connections**
- d. Pump components**

2. Electric Components and Installation

- a. Electrical Components**
- b. Start-up Checklist**
- c. Preparing Unit for Operation**
- d. Pump and Motor Measurements**

3. Operation Sequence

- a. Operation Sequence**

4. Maintenance

- a. Pump Maintenance**
- b. Replacement Parts and Kits**

NOTE: SUBSTITUTION OF REPLACEMENT PARTS BY OTHER SUPPLIERS THAN FEDERAL PUMP OR SERVICE PROVIDERS NOT AUTHORIZED BY FEDERAL PUMP VOIDS ALL EQUIPMENT WARRANTY AND MAY LEAD TO EQUIPMENT MALFUNCTION. ENSURE ALL REPLACEMENT PARTS ARE FACTORY AUTHORIZED AND SERVICED BY FACTORY DESIGNATED REPRESENTATIVES!

These instructions cover the installation and maintenance of Federal Pump condensate return systems. By following the instructions, the life of the pumping unit can be extended.

1. Mechanical Components and Installation

(a) Pump Identification

Pump Identification and inspection: Immediately upon receipt of the condensate unit, inspect and check the unit for any shipment related damages. If damages are noticed, do not put the unit in operation. Report the damage to the transportation's shipping agent or other parties responsible. Each condensate unit is provided with a stainless steel nameplate that identifies the serial or model number of the unit. Refer to that model number within this manual when requesting service and replacement parts in the future.

(b) Locating Equipment

Upon receipt of the condensate pump unit, ensure the unit is installed in a dry area with ambient temperatures ranging from 60 degree F to 85 degree F and stored above floor level ensuring the condensate unit is not emerged in water due to any potential flooding.

If the unit is not stored but planned for immediate installation, ensure the unit is accessible for inspection and maintenance 360 degrees and provide clearance around the condensate unit for free air circulation; mount the unit on an elevated foundation well above wet or damp floors (3"-6" or as shown on the plans). In addition to floor level potential hazards, ensure the unit is not exposed to any above head dripping potential water intrusion into the electric motors, external switches and/or control panel. Locate the unit as shown on the construction documents (new or replacements) and ensure a well-qualified and licensed mechanic is involved in the installation.

Once the condensate unit is mounted to the elevated pump pad; the units should be shimmed level and grouted with cement. Once the grouting cement has hardened, tighten down the "hold-down" bolts. Hold down bolts should be sized and located as shown in the plans or the product specifications provided with this unit.

(c) Recommended Piping Connections

The Federal Pump condensate unit generally is provided with a receiver tank, float switch(s), pump and electric motor combination and a system mounted control panel. Connections from the receiver tank to the pump are generally completed at the factory prior to shipment to the customer. If the piping from the receiver to the pump is missing or damaged, do not proceed with the installation until the damage is repaired. Connections to the condensate receiver include:

- a. Drain connections from the receiver to a separate drain.
- b. Connections from the discharge of the pump to its intended area of service.
- c. Vent pipe from the top of the condensate unit to a predetermined vent connection.
- d. In some cases, the condensate unit may have a make-up water line piped from a fresh water source to the condensate receiver.
- e. These connection should be made by a licensed contractor, certified in boiler or mechanical equipment installations, and authorized by local permitting agencies.

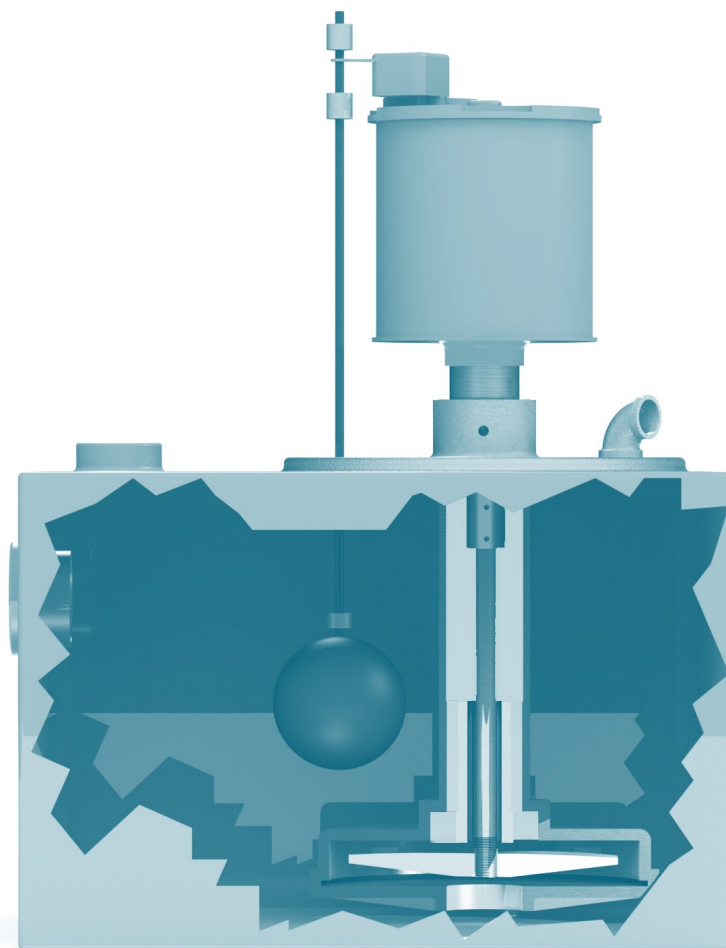
Piping connections should be made in accordance with all local building code requirements. Refer to your local building department inspectors for additional information. Piping provided by the installer should include pipe hangers located and sized accordingly to ensure there is no pipe strain transmitted to the pumps. Connections from each pump to the system piping should include individual isolating valves, check valves and other fittings as shown in the drawings.

(d) Pump Components

The Federal Pump condensate unit includes a number of electromechanical devices that should be identified prior to pressuring the system or prior to providing power to the system. Those devices may include:

- (1) Steel condensate receiver tank with (1) pump for a simplex system
- (1) Float switch for on/off automatic operation of the condensate pumps.
- (1) Single phase electric motor (115V with power cord and plug) (230V with conduit box)
- (1) Float rod and float ball

Sample MC-1 Unit Shown



2. Electric Components and Installation



Prior to starting the unit, ensure each component is in sound condition and connected appropriately. Prior to any electric or water connections the installer needs to verify the electric power source (voltage and cycles) corresponds to the motor nameplate power requirements. The installer needs to ensure the pump rotates freely when turned by hand prior to any electrical connections.

Upon inspection of the condensate unit and verification that external connections are adequate for the intended use, the installer should proceed with the electrical inspection

(a) Electrical Components

The Federal Pump condensate unit is provided with electric motor, float switch and a 115V power cord or conduit box for 230V (1) single phase applications. Check all connections to ensure they are tight and are not exposed to potential water flooding, leaks or damage. Upon inspection and approval of the electric connections between the motors, controller and float switch and pilot devices the installer is ready to complete the installation.



Electric connections: A certified electrician or other qualified mechanic will connect the electric power to the control panel disconnect switch and follow the wiring diagram provided in the control panel by the factory prior to shipment. Upon completion of the electric installation, the installer should measure the electric connections with appropriate amp gauges or other devices to ensure the connections are appropriate and meet all local building codes.

(b) Start –UP Check List

- ☐ **Power is OFF!**
- ☐ **All valves leading to and from the condensate unit are in the off position!**
- ☐ **All piping connections have been made as outlined in the engineer's plans!**
- ☐ **All piping connections are tight!**
- ☐ **All electrical connections are tight!**
- ☐ **Pump is installed on elevated pad and not subject to any dripping water or other fluids!**
- ☐ **All switches are in place, not loose or broken!**
- ☐ **System is securely held in place!**

(c) Preparing Unit for Operation

Upon completion of the electric connections, the installer should open the supply line, allow the receiver to meet a pre-determined level and witness activation of the float switch that will start the pump, draining the condensate from the receiver and terminate pump operation at a pre-determined low level in the receiver. The levels have been preset at the pump manufacturer's factory. **INSTALLER TO ENSURE PUMPS ARE ROTATING IN THE PROPER DIRECTION AT INITIAL START-UP.**

(d) Pump and Motor Measurements

The installer should measure the amp draw within the control panel and compare to the electric motor specifications to ensure the unit is operating within the recommended and specified condition. In addition, it is recommended the installer check the discharge pressure of the pump to measure the pump performance to ensure the unit is operating within specified conditions.

3. Operation Sequence

(a) Operation Sequence

The condensate receiver and pump is designed to start pump operation based upon the liquid level within the condensate receiver. Upon the liquid level reaching a pre-determined high level in the condensate receiver, the float switch will activate the pump that will pump the condensate from the receiver to a predetermined location. Once the liquid level drops to a pre-determined level, the float switch will automatically shut down the pump.

4. Maintenance

(a) Pump Maintenance

Annual or semi-annual inspection of the condensate unit should be completed by the maintenance personnel or with a certified Federal Pump repair service or by a certified Federal Pump local representative. Motor amp readings and pump discharge pressure readings should be recorded every 6 months and compared to original specified conditions. The user should manually review the installation and ensure any strainers leading to or from the pump system are cleaned, there is no rust or evidence of leaking from the condensate return unit and all electrical alarm and/or operating lights should be checked to ensure bulbs are working.

(b) Replacement Parts and Kits

Federal Pumps and its local sales representative stock repair parts and kits to assist the end user should the condensate return unit require repair parts or overhaul. Many of these repair parts are assembled in kits to provide ease in over all maintenance. Contact your local Federal Pumps representative for additional information.

Catalog Sections: VRC Series

Catalog Section	Section Number
Product Information	P.1-VRC
Suggested Specification	S.1-VRC
Material of Construction	M.1-VRC
Selection Table	ST.1-VRC
Dimensions	D.1-VRC
Submittal Data	S.1-VRC
O&M	OM.1-VRC
Price Sheets	PR.1-VRC

Fig 1: VRC simplex

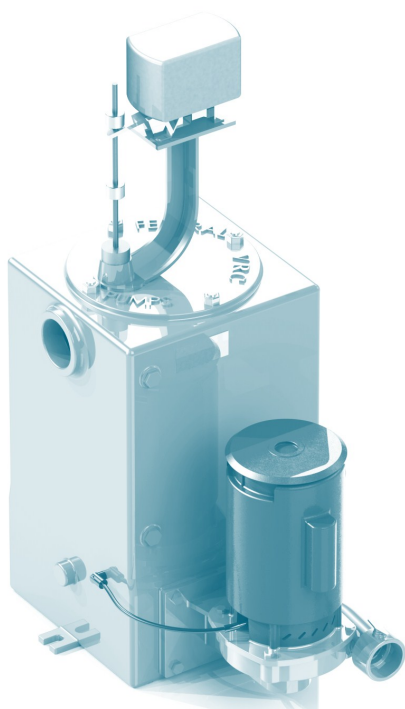
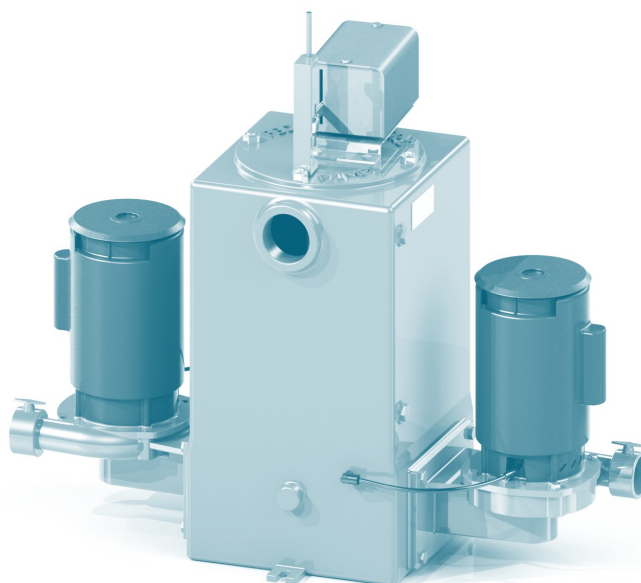


Fig 2: VRC duplex



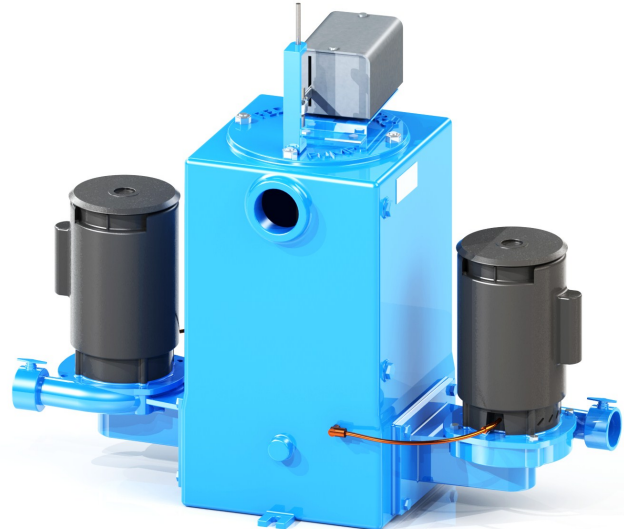
Product Information: VRC Condensate Return Units

P.1-VRC

Fig 1: VRC Simplex ISO View



Fig 2: VRC Duplex ISO View



Cast Iron Receivers

The VRC series, sized to 10,000 EDR SQ.-FT, is available in simplex (single pump) or duplex (2 pump) systems and includes cast iron receivers sized at 6 and 10 gallon with pump flow and pressure ratings to 15 GPM at 70psi with maximum 2 HP motors.

Pumps are provided in cast iron/bronze fitted construction, back-pull-out design for ease in repair and maintenance. Standard simplex units are provided with a single float switch that controls pump operation. Standard duplex units are provided with mechanical alternating float switch. For duplex VRC series, pumps are mounted on opposite sides of the receiver.

- **MOTOR:** ODP as standard; available in single phase and 3 phase voltages.
- **PUMP:** Cast Iron/Bronze fitted construction, back pullout design. The motor and rotating assembly are removable without disturbing piping connection. Maximum water temperature at the pump suction is 210°F.
- **RECEIVER:** Single-piece cast iron rated for a maximum internal pressure of 5 psi. Designed for venting to atmosphere.
- **OPTIONS:** Inlet strainer, gauge glass, thermometer, pump discharge pressure gauges, electrical control panels, float switch modification and various electric motor enclosures.

Suggested Specifications: VRC

S.1-VRC

Duplex Condensate Return Units

Furnish and install as shown in the plans a Federal Pump Corporation Duplex Series: VRC, Condensate Return Unit with each pump rated as shown in the pump schedule. The entire unit including float switch and controls shall be factory assembled, pre-wired and supplied as a single operating unit.

Each duplex condensate return unit shall include (2) close coupled cast iron bronze fitted pumps directly connected to close coupled motors sized in accordance with the equipment schedule. Pumps shall be top pull out design to permit removal of the motor and rotating assembly without disturbing discharge piping. Each pump shall include an enclosed bronze balanced impeller and mechanical shaft seal with copper venting line from the seal chamber to the receiver. Electric motors shall be ODP (Open Drip Proof) design or as shown in the equipment schedule.

Pumps will be designed to withstand maximum water temperature of 210°F. Pumps shall be rated at 125 psi. working pressure. Isolation valves located between the pump suction and receiver will be pre-mounted by the pump manufacturer that provide for the isolation and removal of the entire pump casing for future overhaul and prevent leaking from the receiver. System piping from pump discharge connections shall be provided by the installing contractor.

The receiver shall be of single-piece cast iron construction of the size shown in the equipment schedule. Receivers shall include a single drain connection of 1/2" and a single 1" vent connection.

Contractor shall provide drainage connection from the condensate return receiver drain piped to an acceptable drain line.

The condensate return unit (s) will include a receiver mounted mechanical alternating float switch that alternates the lead operation of each pump. Upon reaching the factory predetermined high water level in the cast iron receiver, the float switch will initiate the lead pump that will discharge the condensate to a remote boiler feed or other

receiver.

The float switch will disengage the lead pump upon a predetermined factory set low water level in the cast iron receiver and mechanically alternate the second pump to operate as the lead pump for the next cycle. Float switch will be Square D or equal externally mounted; NEMA 1 design or as shown on the plans.

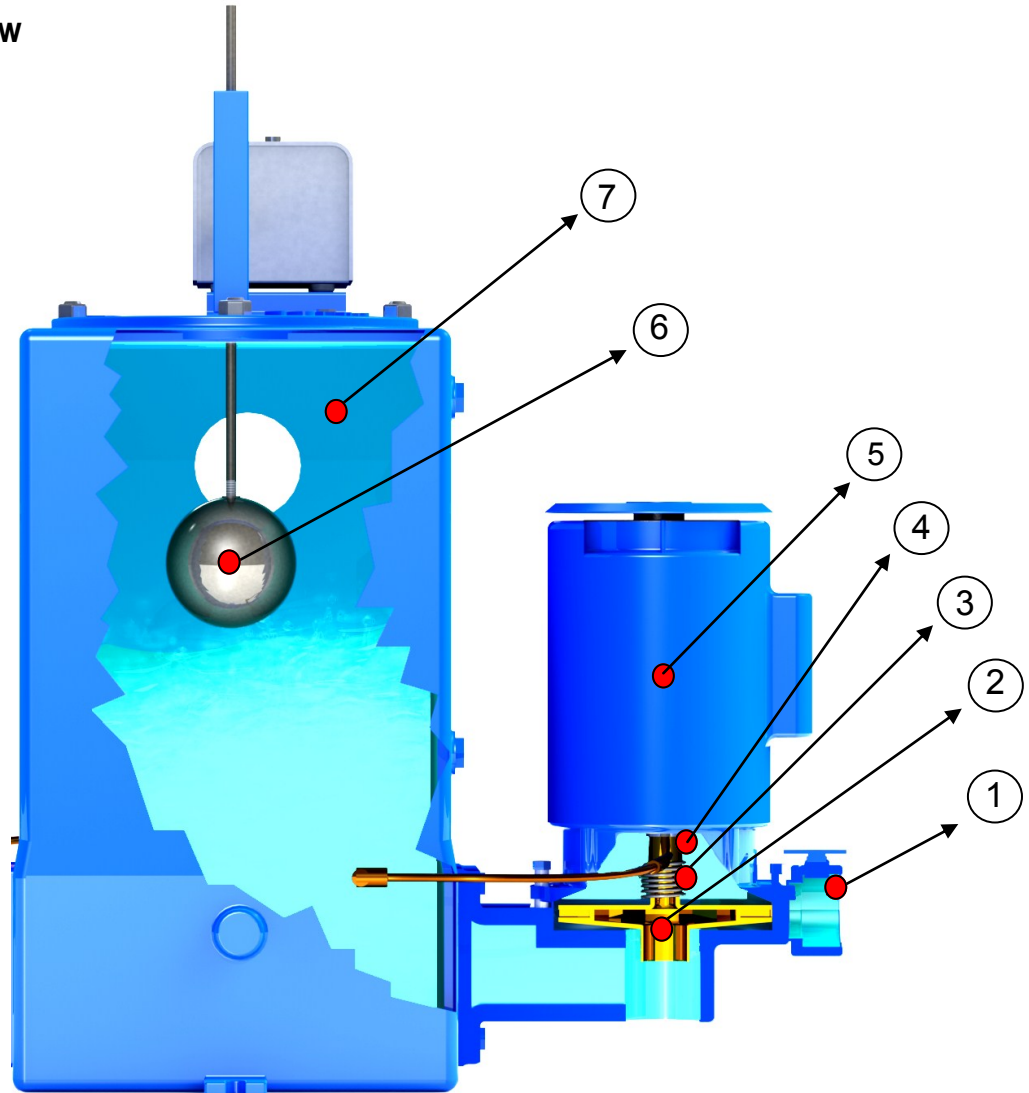
Pump motors and mechanical alternating float switch shall be pre-wired and connected to a duplex control panel of NEMA 1 (or as shown in the plans) construction and will include individual motors starters, disconnect switches, HOA switches, run lights and designed for automatic operation. The duplex control panel shall be mounted on the cast iron receiver and provided as a single functioning unit.

The pump manufacturer will test all system connections, prior to shipment, and paint the equipment in machine enamel finish.

Engineering Data: Material of Construction

M.1-VRC

Fig 1: Cross Sectional View



Note: Typical 6 GAL duplex receiver CROSS SECTION

Item	Item No	Material	Description	Rating	Applications
Pump Casing	1	Cast Iron	Receiver Mounted	A 48-Class 30	Condensate Service
Impeller	2	Bronze	Balanced/Trimmed	SAE 40/ASTM-B584	Condensate Service
Shaft	3	Steel	Provides power	SAE 1045/ASTM A576	Motor/pump shaft
Mechanical Seal	4	Ceramic/Carbon	EPDM Elastomer	210°F	High Temperature
Electric Motor	5	Steel	1 and 3 Phase (with 1.15 SF)	ODP Standard	Class B Installation
Float Assembly	6	St Steel	Mech. Alt Float Switch	304 St Steel	High temp condensate use
Receiver	7	Cast Iron	Receiver/Tank	A48-Class 30	Vented Condensate Receiver

Selection Table: VRC Series

ST.1-VRC

2,000-10,000 EDR 3500RPM: Duplex Condensate Return Selection Table

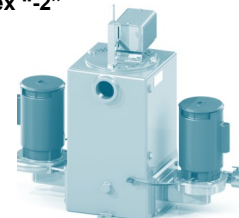
Sq.-Ft EDR	Pump Pressure Psi	Pump Capacity GPM	HP Rating (ea.)	Receiver Capacity Gallons	Product Selection CI Receiver Duplex
2000	10	3	1/3	6	VRC-210-2CI-2
6000		9	1/3	6	VRC-610-2CI-2
10000		15	1/3	10	VRC-1010-2CI-2
2000	20	3	1/3	6	VRC-220-2CI-2
6000		9	1/3	6	VRC-620-2CI-2
10000		15	1/3	10	VRC-1020-2CI-2
2000	30	3	1/2	6	VRC-230-2CI-2
6000		9	1/2	6	VRC-630-2CI-2
10000		15	1/2	10	VRC-1030-2CI-2
2000	40	3	3/4	6	VRC-240-2CI-2
6000		9	3/4	6	VRC-640-2CI-2
10000		15	3/4	10	VRC-1040-2CI-2
2000	50	3	1	6	VRC-250-2CI-2
6000		9	1	6	VRC-650-2CI-2
10000		15	1	10	VRC-1050-2CI-2
2000	60	3	1 1/2	6	VRC-260-2CI-2
6000		9	1 1/2	6	VRC-660-2CI-2
10000		15	1 1/2	10	VRC-1060-2CI-2
2000	70	3	2	6	VRC-220-2CI-2
6000		9	2	6	VRC-620-2CI-2
10000		15	2	10	VRC-1020-2CI-2

Note1: For Simplex Unit change last digit in product selection from “-2” to “-1”.

Simplex “-1”



Duplex “-2”



2,000-10,000 EDR

1750RPM: Duplex Condensate Return Selection Table

Sq.-Ft EDR	Pump Pressure Psi	Pump Capacity GPM	HP Rating (ea.)	Receiver Capacity Gallons	Product Selection CI Receiver Duplex (1)
2000	10	3	1/4	6	VRC-210-4CI-2
6000		9	1/4	6	VRC-610-4CI-2
10000		15	1/4	10	VRC-1010-4CI-2
2000	15	3	1/3	6	VRC-215-4CI-2
6000		9	1/3	6	VRC-615-4CI-2
10000		15	1/3	10	VRC-1015-4CI-2
2000	20	3	1/2	6	VRC-220-4CI-2
6000		9	1/2	6	VRC-620-4CI-2
10000		15	1/2	10	VRC-1020-4CI-2

Note1: For Simplex Unit change last digit in product selection from “-2” to “-1”.

Simplex “-”



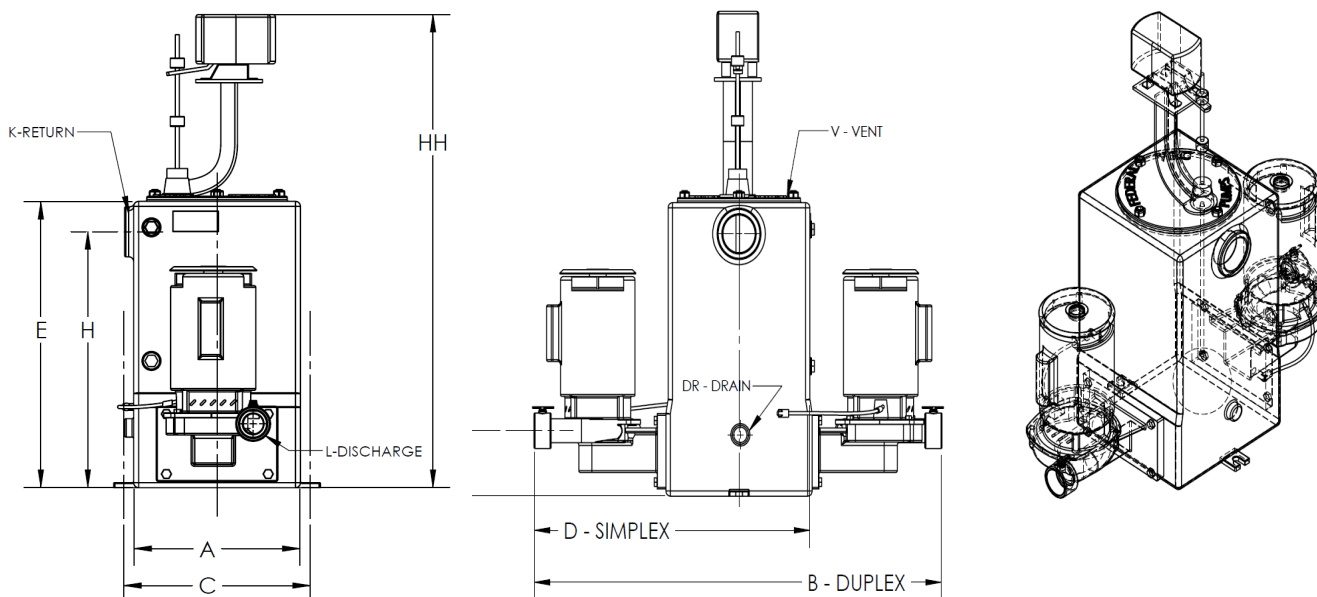
Duplex “-2”



Dimensions: VRC Series

D.1-VRC

6 Gallon Cast Iron Receiver

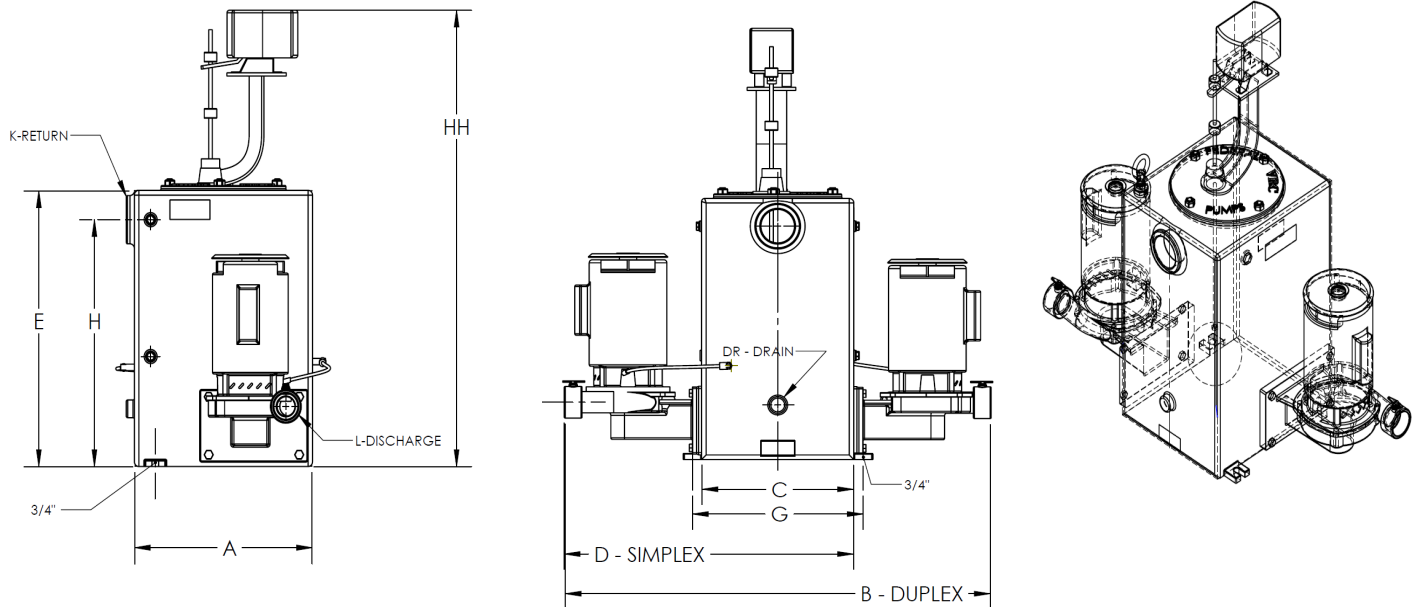


All dimensions are in inches

Model No.	Tank (GAL)	A	B	C	D	DR	E	H	HH*	K	L	L (TYPE)	M	V
210-2	6	9 ½	31	11	20 ½	½	17	16	24	2	1 ¼	NPT	3 1/8	1
220-2														
230-2														
240-2														
250-2														
610-2														
620-2	6	9 ½	40 ½	11	25 ¼	½	17	16	24	2	1	FLG	5 ¾	1
630-2														
640-2														
650-2														
220-4														
260-2														
270-2	6	9 ½	40 ½	11	25 ¼	½	17	16	24	2	1	FLG	5 ¾	1
660-2														
670-2														
620-4														

Note: HH* - Dimension is maximum and may vary based upon simplex or duplex float switch used.

10 Gallon Cast Iron Receiver



All dimensions are in inches

MODEL NO.	TANK (GAL)	A	B	C	D	DR	E	G**	H	HH*	K	L	L (TYPE)	M	V
1010-2	10	14	31	10	20 ½	½	17	11 ½	16	24	2	1 ¼	NPT	3 1/8	1
1020-2															
1030-2															
1040-2															
1050-2															
1010-4															
1015-4															
1060-2	10	14	40 ½	10	25 ¼	½	17	11 ½	16	24	2	1	FLG	5 ¾	1
1070-2															
1020-4															

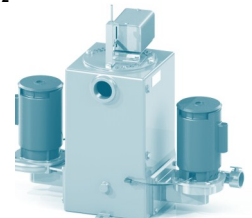
Note: HH* - Note: HH* - Dimension is maximum and may vary based upon simplex or duplex float switch used.

Note: G Bolt down hole connections for 10 gallon tank are at diagonal corners**

Simplex "-1"



Duplex "-2"

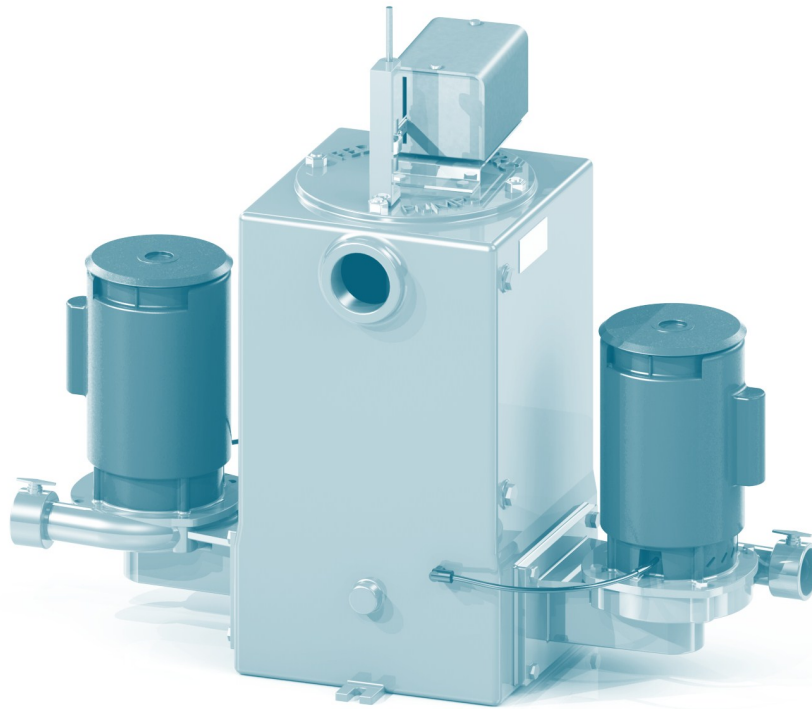


SUBMITTAL DATA

SD.1-VRC

Product Code: 1 CONDENSATE RETURN UNIT - VRC

SUBMITTAL DATA



Customer: _____

Purchase Order Number: _____

Project Name: _____

Project Location: _____

Equipment Number: _____

Tag Number: _____

Condensate Receiver Size: _____ GAL _____ SIMPLEX ☐ _____ DUPLEX ☐

Float Switch Type: _____

Control Panel: _____

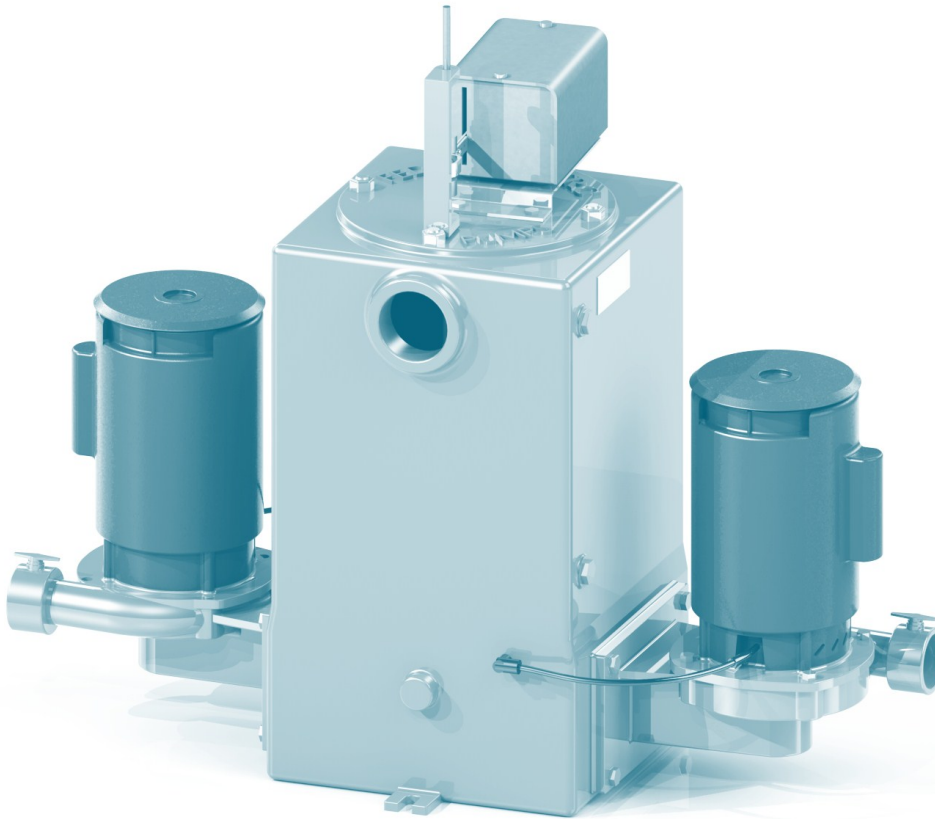
Accessories: _____

Motor: _____ RPM _____ HP _____ VOLT _____ PH _____ CYC

_____ ODP ☐ _____ TEFC ☐ _____ OTHER ☐

Product Code: 1
Condensate Return Units-Series VRC

Installation, Operation and Maintenance Overview



Warning Symbol! This symbol used throughout the Operations manual draws the user's attention to safety instructions. When used the safety warning decal advises: ATTENTION! BE ALERT! YOUR SAFETY IS INVOLVED! FAILURE TO FOLLOW THESE INSTRUCTIONS MAY RESULT IN A SAFETY HAZARD!

Location of Installation: _____

Serial No: _____

Model No: _____

Table of Contents

1. Mechanical Components and Installation

- a. Pump Identification and Inspection**
- b. Locating the Equipment**
- c. Recommended Piping Connections**
- d. Pump components**

2. Electric Components and Installation

- a. Electrical Components**
- b. Start-up Checklist**
- c. Preparing Unit for Operation**
- d. Pump and Motor Measurements**

3. Operation Sequence

- a. Operation Sequence**

4. Maintenance

- a. Pump Maintenance**
- b. Replacement Parts and Kits**

NOTE: SUBSTITUTION OF REPLACEMENT PARTS BY OTHER SUPPLIERS THAN FEDERAL PUMP OR SERVICE PROVIDERS NOT AUTHORIZED BY FEDERAL PUMP VOIDS ALL EQUIPMENT WARRANTY AND MAY LEAD TO EQUIPMENT MALFUNCTION. ENSURE ALL REPLACEMENT PARTS ARE FACTORY AUTHORIZED AND SERVICED BY FACTORY DESIGNATED REPRESENTATIVES!

These instructions cover the installation and maintenance of Federal Pump condensate return systems. By following the instructions, the life of the pumping unit can be extended.

1. Mechanical Components and Installation

(a) Pump Identification

Pump Identification and inspection: Immediately upon receipt of the condensate unit, inspect and check the unit for any shipment related damages. If damages are noticed, do not put the unit in operation. Report the damage to the transportation's shipping agent or other parties responsible. Each condensate unit is provided with a stainless steel nameplate that identifies the serial or model number of the unit. Refer to that model number within this manual when requesting service and replacement parts in the future.

(b) Locating Equipment

Upon receipt of the condensate pump unit, ensure the unit is installed in a dry area with ambient temperatures ranging from 60 degree F to 85 degree F and stored above floor level ensuring the condensate unit is not emerged in water due to any potential flooding.

If the unit is not stored but planned for immediate installation, ensure the unit is accessible for inspection and maintenance 360 degrees and provide clearance around the condensate unit for free air circulation; mount the unit on an elevated foundation well above wet or damp floors (3"-6" or as shown on the plans). In addition to floor level potential hazards, ensure the unit is not exposed to any above head dripping potential water intrusion into the electric motors, external switches and/or control panel. Locate the unit as shown on the construction documents (new or replacements) and ensure a well-qualified and licensed mechanic is involved in the installation.

Once the condensate unit is mounted to the elevated pump pad; the units should be shimmed level and grouted with cement. Once the grouting cement has hardened, tighten down the "hold-down" bolts. Hold down bolts should be sized and located as shown in the plans or the product specifications provided with this unit.

(c) Recommended Piping Connections

The Federal Pump condensate unit generally is provided with a receiver tank, float switch(s), pump and electric motor combination and a system mounted control panel. Connections from the receiver tank to the pump are generally completed at the factory prior to shipment to the customer. If the piping from the receiver to the pump is missing or damaged, do not proceed with the installation until the damage is repaired. Connections to the condensate receiver include:

- a. Drain connections from the receiver to a separate drain.
- b. Connections from the discharge of the pump to its intended area of service.
- c. Vent pipe from the top of the condensate unit to a predetermined vent connection.
- d. In some cases, the condensate unit may have a make-up water line piped from a fresh water source to the condensate receiver.
- e. These connection should be made by a licensed contractor, certified in boiler or mechanical equipment installations, and authorized by local permitting agencies.

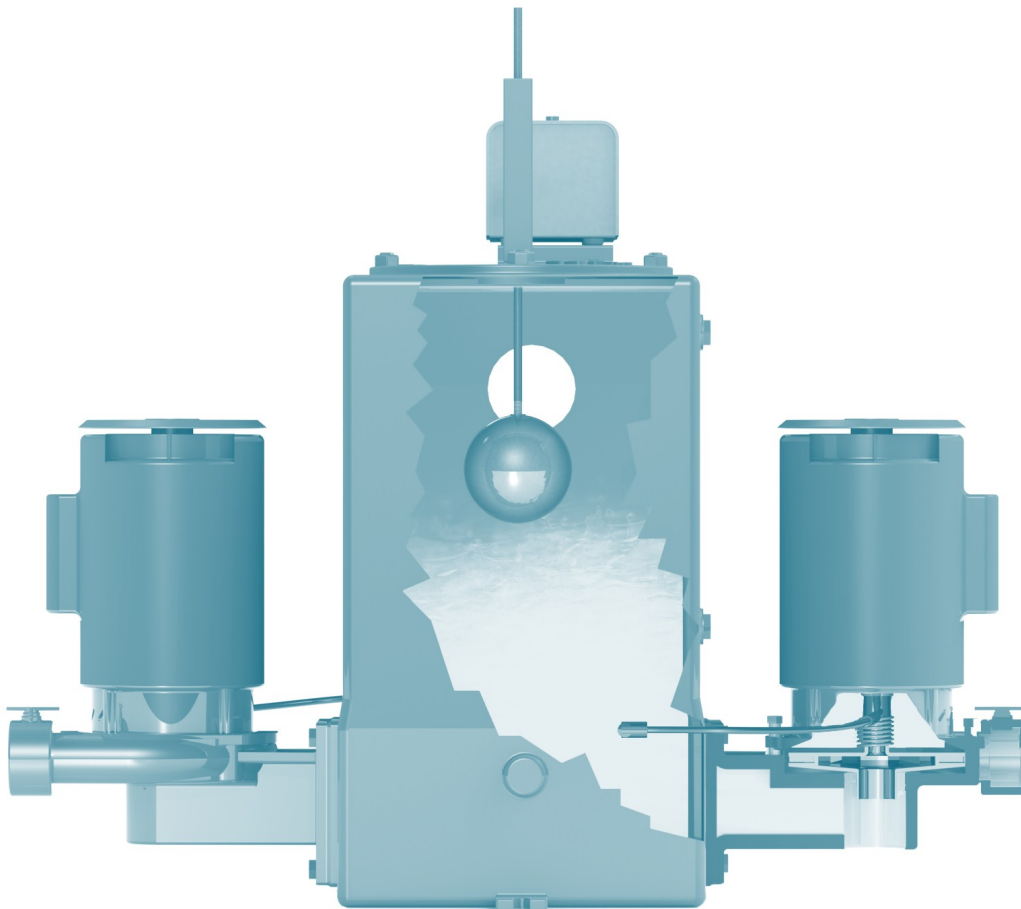
Piping connections should be made in accordance with all local building code requirements. Refer to your local building department inspectors for additional information. Piping provided by the installer should include pipe hangers located and sized accordingly to ensure there is no pipe strain transmitted to the pumps. Connections from each pump to the system piping should include individual isolating valves, check valves and other fittings as shown in the drawings.

(d) Pump Components

The Federal Pump condensate unit includes a number of electromechanical devices that should be identified prior to pressuring the system or prior to providing power to the system. Those devices may include:

- Condensate receiver tank with (2) pumps-duplex system; (1) pump for a simplex system
- Float switch(s) for on/off automatic operation of the condensate pumps.
- Gauge glass for external view of the condensate level in the tank (optional)
- Pressure gauges to measure pump discharge pressure (optional)
- Thermometer to measure receiver liquid temperatures (optional)
- Control panel wired to the system electric components.

Sample VRC Unit Shown



2. Electric Components and Installation



Prior to starting the unit, ensure each component is in sound condition and connected appropriately. Prior to any electric or water connections the installer needs to verify the electric power source (voltage and cycles) corresponds to the motor nameplate power requirements. The installer needs to ensure the pump rotates freely when turned by hand prior to any electrical connections.

Upon inspection of the condensate unit and verification that external connections are adequate for the intended use, the installer should proceed with the electrical inspection

(a) Electrical Components

The Federal Pump condensate unit is provided with electric motors, float switches and (in most cases) a receiver mounted control panel that has been pre-wired and pre-set by the factory. Check all connections to ensure they are tight and are not exposed to potential water flooding, leaks or damage. Upon inspection and approval of the electric connections between the motors, controller and float switch and pilot devices the installer is ready to complete the installation.



Electric connections: A certified electrician or other qualified mechanic will connect the electric power to the control panel disconnect switch and follow the wiring diagram provided in the control panel by the factory prior to shipment. Upon completion of the electric installation, the installer should measure the electric connections with appropriate amp gauges or other devices to ensure the connections are appropriate and meet all local building codes.

(b) Start –UP Check List

- ☐ **Power is OFF! Disconnect switch(s) are in the OFF position and the H-O-A switch is in the “O” position**
- ☐ **All valves leading to and from the condensate unit are in the off position!**
- ☐ **All piping connections have been made as outlined in the engineer’s plans!**
- ☐ **All piping connections are tight!**
- ☐ **All electrical connections are tight!**
- ☐ **Pump is installed on elevated pad and not subject to any dripping water or other fluids!**
- ☐ **All switches are in place, not loose or broken!**
- ☐ **System is bolted down and grouted in place!**

(c) Preparing Unit for Operation

Upon completion of the electric connections, the installer should open the supply line to the condensate receiver, set the H-O-A switch in the “A” position, set the disconnect switch to the ON position, allow the receiver to meet a pre-determined level and witness activation of the float switch that will start the pump(s), draining the condensate from the receiver and terminate pump operation at a pre-determined low level in the receiver. The levels have been preset at the pump manufacturer’s factory. **INSTALLER TO ENSURE PUMPS ARE ROTATING IN THE PROPER DIRECTION AT INITIAL START-UP.**

(d) Pump and Motor Measurements

The installer should measure the amp draw within the control panel and compare to the electric motor specifications to ensure the unit is operating within the recommended and specified condition. In addition, it is recommended the installer check the discharge pressure of the pump to measure the pump performance to ensure the unit is operating within specified conditions.

3. Operation Sequence

(a) Operation Sequence

The condensate receiver and pumps are designed to start pump operation based upon the liquid level within the condensate receiver. Upon the liquid level reaching a pre-determined high level in the condensate receiver, the float switch will activate the lead pump that will pump the condensate from the receiver to a predetermined location. Once the liquid level drops to a pre-determined level, the float switch will automatically shut down the lead pump and alternate operation to the lag pump that will repeat the pump operation once the condensate level in the receiver reaches the predetermined high water level.

4. Maintenance

(a) Pump Maintenance

Annual or semi-annual inspection of the condensate unit should be completed by the maintenance personnel or with a certified Federal Pump repair service or by a certified Federal Pump local representative. Motor amp readings and pump discharge pressure readings should be recorded every 6 months and compared to original specified conditions. The user should manually review the installation and ensure any strainers leading to or from the pump system are cleaned, there is no rust or evidence of leaking from the condensate return unit and all electrical alarm and/or operating lights should be checked to ensure bulbs are working. The VRC condensate return units are closed-coupled designed pumps where the bearings are located within the motor housing. These bearings are typically “grease-for-life” type enclosed bearings that do not have external grease connections. Each VRC pump includes a mechanical seal that prevents leaking of the fluid. During inspection should the operator observe leaking from the pump casing the mechanical seal should be changed.

(b) Replacement Parts and Kits

Federal Pumps and its local sales representative stock repair parts and kits to assist the end user should the condensate return unit require repair parts or overhaul. Many of these repair parts are assembled in kits to provide ease in over all maintenance. Contact your local Federal Pumps representative for additional information.

Catalog Sections: VCL/VTC

Catalog Section	Section Number
Product Information	P.1-VCL/VTC
Suggested Specs	S.1-VCL/VTC
Material of Construction	M.1-VCL/VTC
Selection Table	ST.1-VCL/VTC
Dimensions	D.1-VCL/VTC
O&M	OM.1-VCL/VTC
Price Sheets	PR.1-VCL/VTC

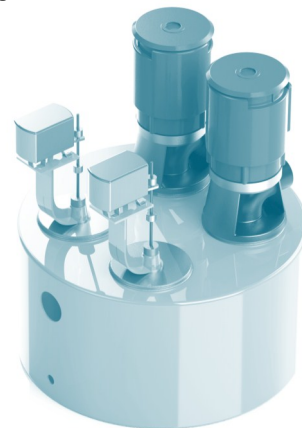
Fig 1: VCL



Fig 1: VCL



Fig 1: VCL



Product Information: VCL/VTC Condensate Return Units

P.1-VCL/VTC

Fig 1: VTC Simplex ISO View



Fig 2: VCL ISO View Duplex



Cast Iron Receivers

VCL/VTC: The VCL series available in round or square tank configuration include pumps vertically mounted into the receiver and are available in simplex or duplex operation.

Pump capacity rating is from 1 1/2 GPM to 30 GPM with discharge pressure to 50 psi. Construction includes CI/BF with SS shaft and mechanical seal. Pumps are vertical design coupled to standard motors.

Receiver tanks are available in round or square configuration; in Cast iron, steel or SS construction from 10 to 30 Gallon capacity.

- **MOTOR:** Drip-proof, ball bearing design available in single phase and 3 phase voltages.
- **PUMP:** The motor and rotating assembly are removable without disturbing inlet condensate return piping connection. Maximum water temperature at the pump suction is 210°F.
- **RECEIVER:** Single-piece cast iron rated for a maximum internal pressure of 5 psi. Designed for venting to atmosphere.
- **MODIFICATIONS:** Inlet strainer, gauge glass, thermometer, pump discharge pressure gauges, electrical control panels, and electric motors in TEFC or other enclosures.

Suggested Specifications: VCL

S.1-VCL/VTC

Duplex Condensate Return Units—VCL

Furnish and install as shown in the plans a Federal Pump Corporation Duplex Series: VCL. Each Condensate Return Unit with each pump rated as shown in the pump schedule. The entire unit including float switch and controls shall be factory assembled and pre-wired and supplied as a single operating unit.

Each duplex condensate return unit shall include (2) vertical in-tank mounted cast iron bronze fitted pumps coupled to vertical motors close coupled motors sized in accordance with the equipment schedule. Pumps shall be center-line discharge, top pull out design to permit removal of the motor and rotating assembly without disturbing inlet piping. Each pump shall include an enclosed bronze impeller and mechanical shaft seal with enclosed oil lubricated line shaft bearing. Electric motors shall be ODP (Open Drip Proof) design or as shown in the equipment schedule.

Pumps will be designed to withstand maximum water temperature of 210°F. System piping from pump discharge connections shall be provided by the installing contractor.

The receiver shall be of single-piece cast iron construction of the size shown in the equipment schedule. Receivers shall include a single drain connection and a single vent connection with sizes as shown on the plans. Contractor shall provide drainage connection from the condensate return receiver drain piped to an acceptable drain line.

The condensate return unit(s) will include a receiver mounted mechanical alternating float switch that alternates the lead operation of each pump. Upon reaching the factory predetermined high water level in the cast iron receiver, the float

switch will initiate the lead pump that will discharge the condensate to a remote boiler feed or other receiver.

The float switch will disengage the lead pump upon a predetermined factory set low water level in the cast iron receiver and mechanically alternate the second pump to operate as the lead pump for the next cycle. Float switch will be Square D or equal externally mounted; NEMA 1 design or as shown on the plans.

Pump motors and mechanical alternating float switch shall be pre-wired and connected to a UL listed duplex control panel of NEMA 1 (or as shown in the plans) construction and will include individual motors starters, disconnect switches, HOA switches, run lights and designed for automatic operation. The duplex control panel shall be mounted on the cast iron receiver and provided as a single functioning unit.

The pump manufacturer will test all system connections, prior to shipment, and paint the equipment in machine enamel finish.

Suggested Specifications: VTC

S.1-VCL/VTC

Duplex Condensate Return Units—VTC

Furnish and install as shown in the plans a Federal Pump Corporation Duplex Series: VTC. Each Condensate Return Unit with each pump rated as shown in the pump schedule. The entire unit including float switch and controls shall be factory assembled and pre-wired and supplied as a single operating unit.

Each duplex condensate return unit shall include (2) vertical in-tank mounted cast iron bronze fitted pumps coupled to vertical motors close coupled motors sized in accordance with the equipment schedule. Pumps shall be center-line discharge, top pull out design to permit removal of the motor and rotating assembly without disturbing inlet piping. Each pump shall include a regenerative turbine bronze impeller and mechanical shaft seal with open line shaft water lubricated bearing. Electric motors shall be ODP (Open Drip Proof) design or as shown in the equipment schedule.

Pumps will be designed to withstand maximum water temperature of 210°F. System piping from pump discharge connections shall be provided by the installing contractor.

The receiver shall be of single-piece cast iron construction of the size shown in the equipment schedule. Receivers shall include a single drain connection and a single vent connection with sizes as shown on the plans. Contractor shall provide drainage connection from the condensate return receiver drain piped to an acceptable drain line.

The condensate return unit(s) will include a receiver mounted mechanical alternating float switch that alternates the lead operation of each pump. Upon reaching the factory predetermined high water level in the cast iron receiver, the float

switch will initiate the lead pump that will discharge the condensate to a remote boiler feed or other receiver.

The float switch will disengage the lead pump upon a predetermined factory set low water level in the cast iron receiver and mechanically alternate the second pump to operate as the lead pump for the next cycle. Float switch will be Square D or equal externally mounted; NEMA 1 design or as shown on the plans.

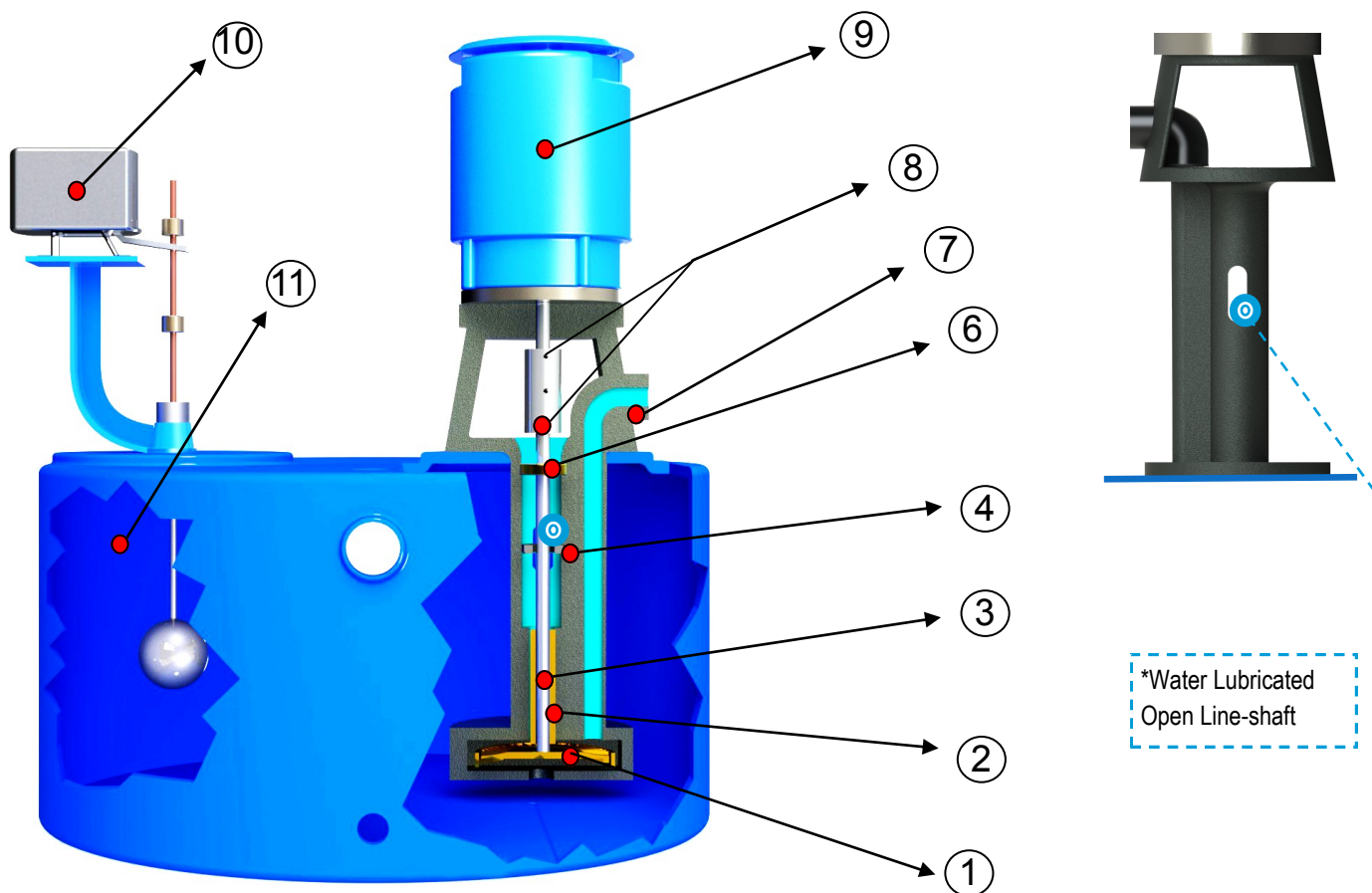
Pump motors and mechanical alternating float switch shall be pre-wired and connected to a UL listed duplex control panel of NEMA 1 (or as shown in the plans) construction and will include individual motors starters, disconnect switches, HOA switches, run lights and designed for automatic operation. The duplex control panel shall be mounted on the cast iron receiver and provided as a single functioning unit.

The pump manufacturer will test all system connections, prior to shipment, and paint the equipment in machine enamel finish.

Engineering Data: Material of Construction

M.1-VTC

Fig 1: Cross Sectional View

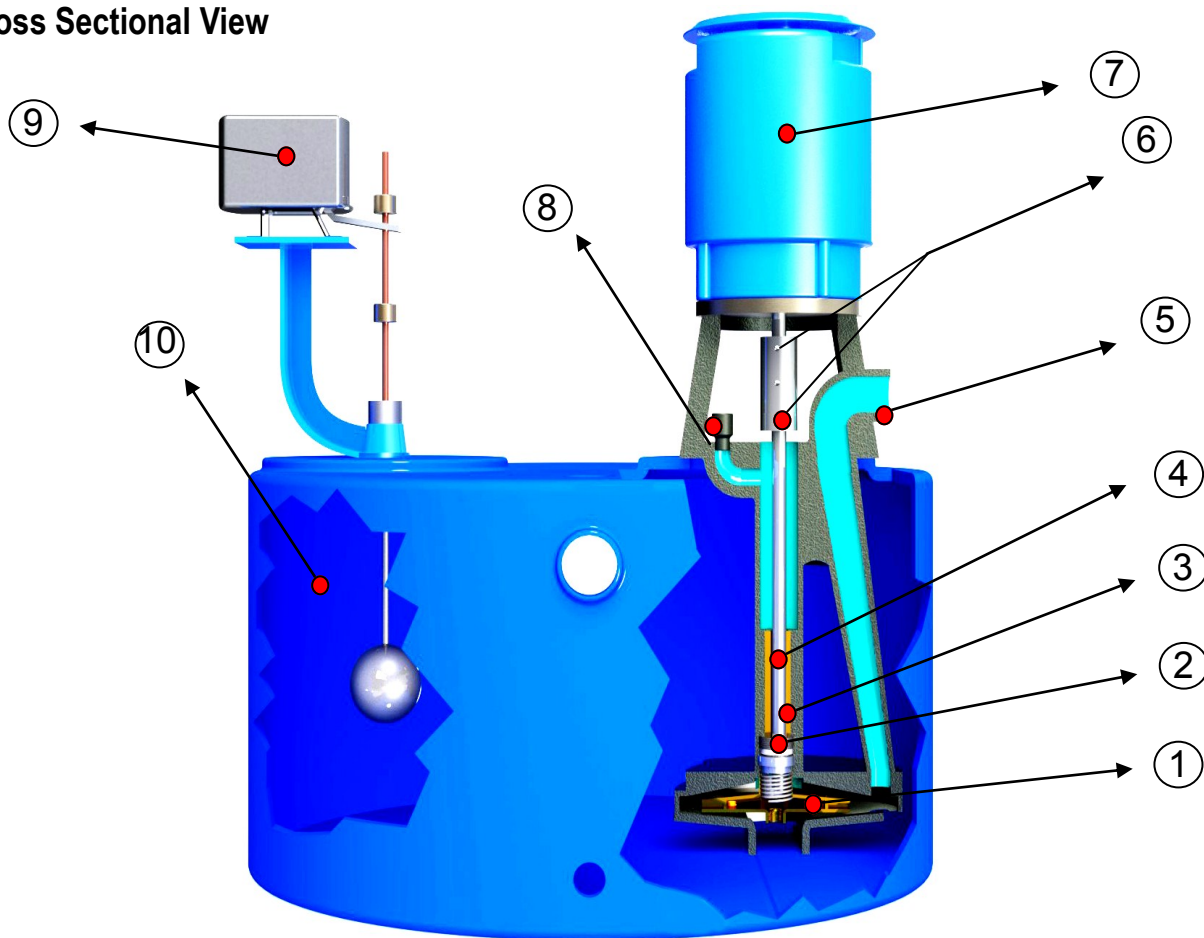


Item	Item No	Material	Description	Applications
Impeller	1	Bronze	Balanced/Trimmed	Condensate Service
Lower Bearing	2	Bronze	Water Lubricated	Bronze Application Reduces Shaft Deflection
Shaft	3	Steel	Provides power	Motor/pump shaft
Flinger	4	Rubber	Directs Water	Reduces Water Intrusion
Shaft Seal	6	Ceramic/Carbon	EPDM Elastomer	High Temperature
Pump Casing	7	Cast Iron	Receiver Mounted	Condensate Service
Set Screw	8	Steel	Coupling Adjustment	Coupling Alignment
Electric Motor	9	Steel	1 and 3 Phase (with 1.15 SF)	Class B Installation
Float Assembly	10	St Steel	Mechanical Alt Float Switch	High temp condensate use
Receiver	11	Cast Iron	Receiver/Tank	Vented Condensate Receiver

Engineering Data: Material of Construction

M.1-VCL

Fig 1: Cross Sectional View



Item	Item No	Material	Description	Applications
Impeller	1	Bronze	Balanced/Trimmed	Condensate Service
Mechanical Seal	2	Ceramic/Carbon	EPDM Elastomer	High Temperature
Lower Bearing	3	Bronze	Oil Lubricated	Maintains Shaft Alignment
Shaft	4	Steel	Provides power	Motor/pump shaft
Pump Casing	5	Cast Iron	Receiver Mounted	Condensate Service
Set Screws	6	Steel	Coupling Adjustment	Coupling Alignment
Electric Motor	7	Steel	1 and 3 Phase (with 1.15 SF)	Class B Installation
Oil Cup	8	Steel	Oil Reservoir	Provides Oil To Lower Bearing
Float Assembly	9	St Steel	Mech. Alt Float Switch	High temp condensate use
Receiver	10	Cast Iron	Receiver/Tank	Vented Condensate Receiver

Selection Table: VCL Series Simplex

ST.1-VCL/VTC

1,000-20,000 EDR 3500RPM: Simplex Condensate Return Selection Table

Sq.-Ft EDR	Pump Pressure psi	Pump Capacity GPM	HP Rating (ea.)	Receiver Capacity Gallons	Basic Order No CI Receiver
1000	10	1 1/2	1/3	10	VCL-110-2CI-1
2000		3	1/3	10	VCL-210-2CI-1
4000		6	1/3	10	VCL-410-2CI-1
6000		9	1/3	15	VCL-610-2CI-1
8000		12	1/3	15	VCL-810-2CI-1
10000		15	1/3	15	VCL-1010-2CI-1
15000		22 1/2	1/3	30	VCL-1510-2CI-1
20000		30	1/3	30	VCL-2010-2CI-1
1000	20	1 1/2	1/3	10	VCL-120-2CI-1
2000		3	1/3	10	VCL-220-2CI-1
4000		6	1/3	10	VCL-420-2CI-1
6000		9	1/3	15	VCL-620-2CI-1
8000		12	1/3	15	VCL-820-2CI-1
10000		15	1/3	15	VCL-1020-2CI-1
15000		22 1/2	1/2	30	VCL-1520-2CI-1
20000		30	3/4	30	VCL-2020-2CI-1
1000	30	1 1/2	3/4	10	VCL-130-2CI-1
2000		3	3/4	10	VCL-230-2CI-1
4000		6	3/4	10	VCL-430-2CI-1
6000		9	3/4	15	VCL-630-2CI-1
8000		12	3/4	15	VCL-830-2CI-1
10000		15	3/4	15	VCL-1030-2CI-1
15000		22 1/2	3/4	30	VCL-1530-2CI-1
20000		30	1	30	VCL-2030-2CI-1
1000	40	1 1/2	1	10	VCL-140-2CI-1
2000		3	1	10	VCL-240-2CI-1
4000		6	1	10	VCL-440-2CI-1
6000		9	1	15	VCL-640-2CI-1
8000		12	1	15	VCL-840-2CI-1
10000		15	1	15	VCL-1040-2CI-1
15000		22 1/2	1	30	VCL-1540-2CI-1
20000		30	1 1/2	30	VCL-2040-2CI-1
1000	50	1 1/2	1 1/2	10	VCL-150-2CI-1
2000		3	1 1/2	10	VCL-250-2CI-1
4000		6	1 1/2	10	VCL-450-2CI-1
6000		9	1 1/2	15	VCL-650-2CI-1
8000		12	1 1/2	15	VCL-850-2CI-1
10000		15	1 1/2	15	VCL-1050-2CI-1

Note: Selection Table is for simplex condensate return unit, for duplex unit refer to the “duplex selection table”.

Selection Table: VCL Series Duplex

ST.1-VCL/VTC

1,000-20,000 EDR 3500RPM: Duplex Condensate Return Selection Table

Sq.-Ft EDR	Pump Pressure psi	Pump Capacity GPM	HP Rating (ea.)	Receiver Capacity Gallons	Basic Order No CI Receiver
1000	10	1 1/2	1/3	15	VCL-110-2CI-2
2000		3	1/3	15	VCL-210-2CI-2
4000		6	1/3	15	VCL-410-2CI-2
6000		9	1/3	15	VCL-610-2CI-2
8000		12	1/3	15	VCL-810-2CI-2
10000		15	1/3	15	VCL-1010-2CI-2
15000		22 1/2	1/3	30	VCL-1510-2CI-2
20000		30	1/3	30	VCL-2010-2CI-2
1000	20	1 1/2	1/3	15	VCL-120-2CI-2
2000		3	1/3	15	VCL-220-2CI-2
4000		6	1/3	15	VCL-420-2CI-2
6000		9	1/3	15	VCL-620-2CI-2
8000		12	1/3	15	VCL-820-2CI-2
10000		15	1/3	15	VCL-1020-2CI-2
15000		22 1/2	1/2	30	VCL-1520-2CI-2
20000		30	3/4	30	VCL-2020-2CI-2
1000	30	1 1/2	3/4	15	VCL-130-2CI-2
2000		3	3/4	15	VCL-230-2CI-2
4000		6	3/4	15	VCL-430-2CI-2
6000		9	3/4	15	VCL-630-2CI-2
8000		12	3/4	15	VCL-830-2CI-2
10000		15	3/4	15	VCL-1030-2CI-2
15000		22 1/2	3/4	30	VCL-1530-2CI-2
20000		30	1	30	VCL-2030-2CI-2
1000	40	1 1/2	1	15	VCL-140-2CI-2
2000		3	1	15	VCL-240-2CI-2
4000		6	1	15	VCL-440-2CI-2
6000		9	1	15	VCL-640-2CI-2
8000		12	1	15	VCL-840-2CI-2
10000		15	1	15	VCL-1040-2CI-2
15000		22 1/2	1	30	VCL-1540-2CI-2
20000		30	1 1/2	30	VCL-2040-2CI-2
1000	50	1 1/2	1 1/2	15	VCL-150-2CI-2
2000		3	1 1/2	15	VCL-250-2CI-2
4000		6	1 1/2	15	VCL-450-2CI-2
6000		9	1 1/2	15	VCL-650-2CI-2
8000		12	1 1/2	15	VCL-850-2CI-2
10000		15	1 1/2	15	VCL-1050-2CI-2

Selection Table: VTC Series

ST.1-VCL/VTC

1,000-10,000 EDR 1750RPM: Simplex Condensate Return Selection Table

Sq.-Ft EDR	Pump Pressure psi	Pump Capacity GPM	HP Rating (ea.)	Receiver Capacity Gallons	Basic Order No. CI Receiver
1000	10	1 1/2	1/4	10	VTC-110-4CI-1
2000		3	1/4	10	VTC-210-4CI-1
4000		6	1/4	10	VTC-410-4CI-1
6000		9	1/4	10	VTC-610-4CI-1
8000		12	1/4	15	VTC-810-4CI-1
10000		15	1/3	15	VTC-1010-4CI-1
1000	20	1 1/2	1/4	10	VTC-120-4CI-1
2000		3	1/4	10	VTC-220-4CI-1
4000		6	1/4	10	VTC-420-4CI-1
6000		9	1/3	10	VTC-620-4CI-1
8000		12	1/3	15	VTC-820-4CI-1
10000		15	1/2	15	VTC-1020-4CI-1
1000	30	1 1/2	1/4	10	VTC-130-4CI-1
2000		3	1/4	10	VTC-230-4CI-1
4000		6	1/3	10	VTC-430-4CI-1
6000		9	1/2	10	VTC-630-4CI-1
8000		12	1/2	15	VTC-830-4CI-1
10000		15	3/4	15	VTC-1030-4CI-1
1000	40	1 1/2	1/3	10	VTC-140-4CI-1
2000		3	1/3	10	VTC-240-4CI-1
4000		6	1/2	10	VTC-440-4CI-1
6000		9	3/4	10	VTC-640-4CI-1
8000		12	3/4	15	VTC-840-4CI-1
10000		15	3/4	15	VTC-1040-4CI-1
1000	50	1 1/2	1/3	10	VTC-150-4CI-1
2000		3	1/3	10	VTC-250-4CI-1
4000		6	3/4	10	VTC-450-4CI-1
6000		9	3/4	10	VTC-650-4CI-1

Note: Selection Table is for simplex condensate return unit, for duplex unit refer to the “duplex selection table”.

Selection Table: VTC Series

ST.1-VCL/VTC

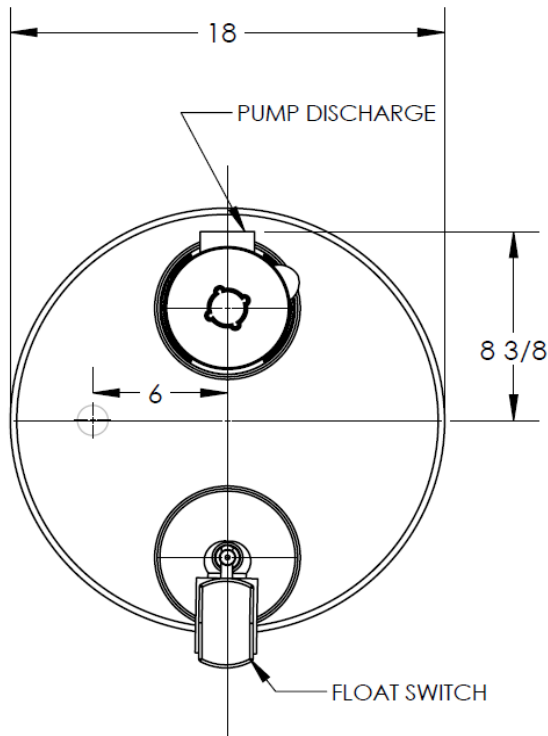
1,000-10,000 EDR 1750RPM: Duplex Condensate Return Selection Table

Sq.-Ft EDR	Pump Pressure psi	Pump Capacity GPM	HP Rating (ea.)	Receiver Capacity Gallons	Basic Order No. CI Receiver
1000	10	1 1/2	1/4	15	VTC-110-4CI-2
2000		3	1/4	15	VTC-210-4CI-2
4000		6	1/4	15	VTC-410-4CI-2
6000		9	1/4	15	VTC-610-4CI-2
8000		12	1/4	15	VTC-810-4CI-2
10000		15	1/3	15	VTC-1010-4CI-2
1000	20	1 1/2	1/4	15	VTC-120-4CI-2
2000		3	1/4	15	VTC-220-4CI-2
4000		6	1/4	15	VTC-420-4CI-2
6000		9	1/3	15	VTC-620-4CI-2
8000		12	1/3	15	VTC-820-4CI-2
10000		15	1/2	15	VTC-1020-4CI-2
1000	30	1 1/2	1/4	15	VTC-130-4CI-2
2000		3	1/4	15	VTC-230-4CI-2
4000		6	1/3	15	VTC-430-4CI-2
6000		9	1/2	15	VTC-630-4CI-2
8000		12	1/2	15	VTC-830-4CI-2
10000		15	3/4	15	VTC-1030-4CI-2
1000	40	1 1/2	1/3	15	VTC-140-4CI-2
2000		3	1/3	15	VTC-240-4CI-2
4000		6	1/2	15	VTC-440-4CI-2
6000		9	3/4	15	VTC-640-4CI-2
8000		12	3/4	15	VTC-840-4CI-2
10000		15	3/4	15	VTC-1040-4CI-2
1000	50	1 1/2	1/3	15	VTC-150-4CI-2
2000		3	1/3	15	VTC-250-4CI-2
4000		6	3/4	15	VTC-450-4CI-2
6000		9	3/4	15	VTC-650-4CI-2

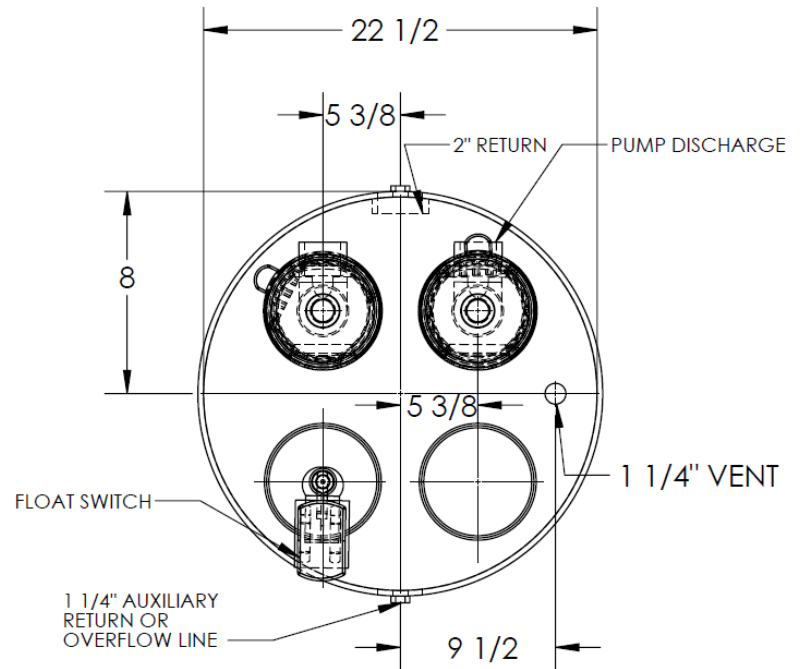
Dimensions: VCL/VTC Series (Round Configuration)

D.1-VCL/VTC

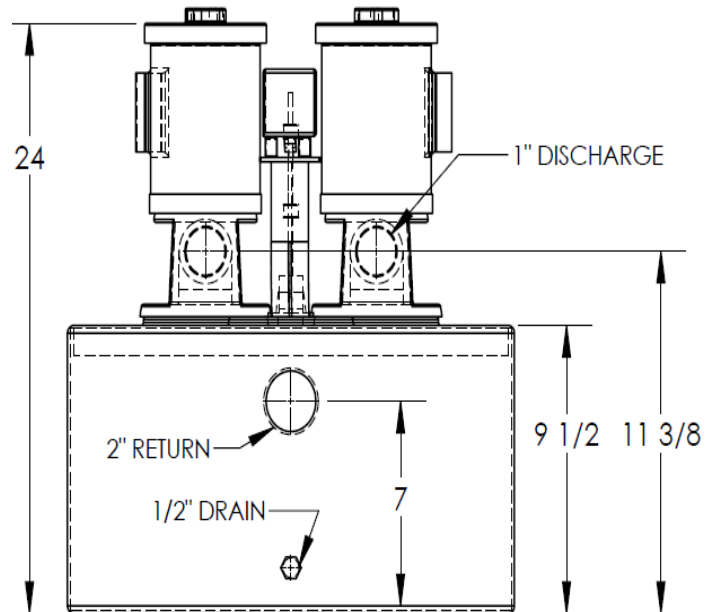
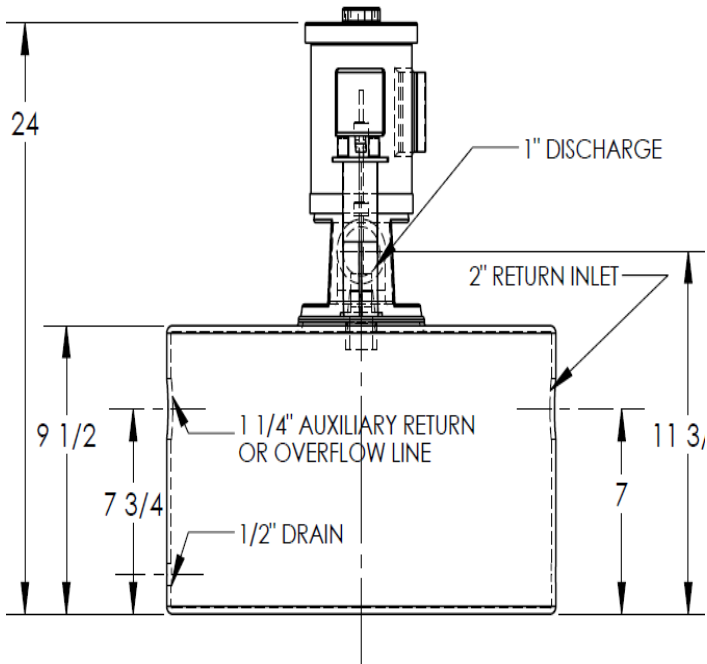
Simplex Unit with 10 gallon Receiver



Simplex or Duplex Unit with 15 gallon Receiver



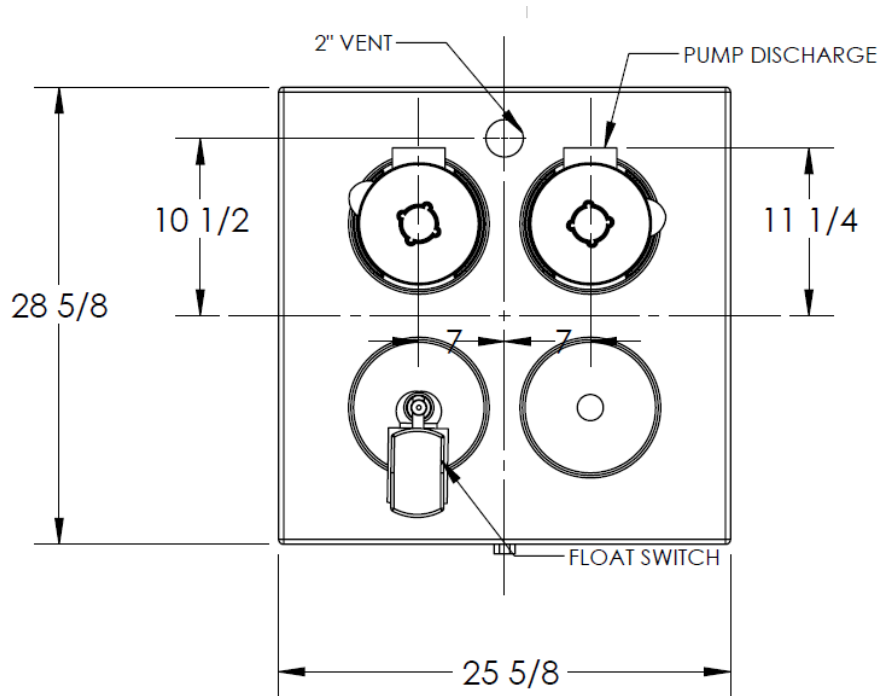
All dimensions are in inches



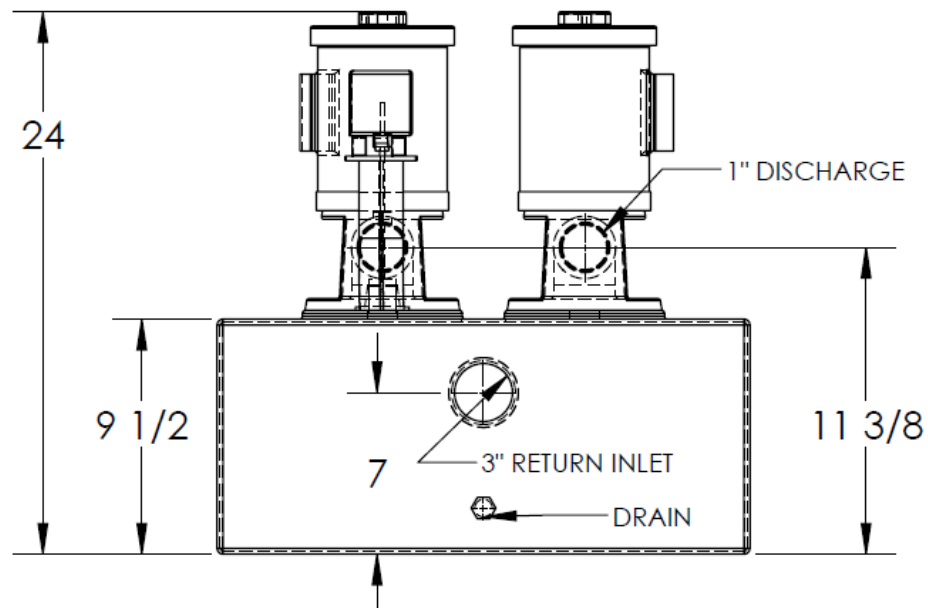
Dimensions: VCL/VTC Series (Square Configuration)

D.1-VCL/VTC

30 Gallon Cast Iron Receiver



All dimensions are in inches



Product Code: 1
CONDENSATE RETURN UNIT - VCL/VTC

SUBMITTAL DATA



Customer: _____

Purchase Order Number: _____

Project Name: _____

Project Location: _____

Equipment Number: _____

Tag Number: _____

Condensate Receiver Size: _____ GAL _____ SIMPLEX ☐ _____ DUPLEX ☐

Float Switch Type: _____

Control Panel: _____

Accessories: _____

Motor: _____ RPM _____ HP _____ VOLT _____ PH _____ CYC

_____ ODP ☐ _____ TEFC ☐ _____ OTHER ☐

Product Code: 1
Condensate Return Units-Series VCL/VTC

Installation, Operation and Maintenance Overview



Warning Symbol! This symbol used throughout the Operations manual draws the user's attention to safety instructions. When used the safety warning decal advises: ATTENTION! BE ALERT! YOUR SAFETY IS INVOLVED! FAILURE TO FOLLOW THESE INSTRUCTIONS MAY RESULT IN A SAFETY HAZARD!

Location of Installation: _____

Serial No: _____

Model No: _____

Table of Contents

1. Mechanical Components and Installation

- a. Pump Identification and Inspection
- b. Locating the Equipment
- c. Recommended Piping Connections
- d. Pump components

2. Electric Components and Installation

- a. Electrical Components
- b. Start-up Checklist
- c. Preparing Unit for Operation
- d. Pump and Motor Measurements

3. Operation Sequence

- a. Operation Sequence

4. Maintenance

- a. Pump Maintenance
- b. Replacement Parts and Kits

NOTE: SUBSTITUTION OF REPLACEMENT PARTS BY OTHER SUPPLIERS THAN FEDERAL PUMP OR SERVICE PROVIDERS NOT AUTHORIZED BY FEDERAL PUMP VOIDS ALL EQUIPMENT WARRANTY AND MAY LEAD TO EQUIPMENT MALFUNCTION. ENSURE ALL REPLACEMENT PARTS ARE FACTORY AUTHORIZED AND SERVICED BY FACTORY DESIGNATED REPRESENTATIVES!

These instructions cover the installation and maintenance of Federal Pump condensate return systems. By following the instructions, the life of the pumping unit can be extended.

1. Mechanical Components and Installation

(a) Pump Identification

Pump Identification and inspection: Immediately upon receipt of the condensate unit, inspect and check the unit for any shipment related damages. If damages are noticed, do not put the unit in operation. Report the damage to the transportation's shipping agent or other parties responsible. Each condensate unit is provided with a stainless steel nameplate that identifies the serial or model number of the unit. Refer to that model number within this manual when requesting service and replacement parts in the future.

(b) Locating Equipment

Upon receipt of the condensate pump unit, ensure the unit is installed in a dry area with ambient temperatures ranging from 60 degree F to 85 degree F and stored above floor level ensuring the condensate unit is not emerged in water due to any potential flooding.

If the unit is not stored but planned for immediate installation, ensure the unit is accessible for inspection and maintenance 360 degrees and provide clearance around the condensate unit for free air circulation; mount the unit on an elevated foundation well above wet or damp floors (3"-6" or as shown on the plans). In addition to floor level potential hazards, ensure the unit is not exposed to any above head dripping potential water intrusion into the electric motors, external switches and/or control panel. Locate the unit as shown on the construction documents (new or replacements) and ensure a well-qualified and licensed mechanic is involved in the installation.

(c) Recommended Piping Connections

The Federal Pump condensate unit generally is provided with a receiver tank, float switch(s), pump and electric motor combination and a system mounted control panel. Connections from the receiver tank to the pump are generally completed at the factory prior to shipment to the customer. If the piping from the receiver to the pump is missing or damaged, do not proceed with the installation until the damage is repaired. Connections to the condensate receiver include:

- a. Drain connections from the receiver to a separate drain.
- b. Connections from the discharge of the pump to its intended area of service.
- c. Vent pipe from the top of the condensate unit to a predetermined vent connection.
- d. In some cases, the condensate unit may have a make-up water line piped from a fresh water source to the condensate receiver.
- e. These connection should be made by a licensed contractor, certified in boiler or mechanical equipment installations, and authorized by local permitting agencies.

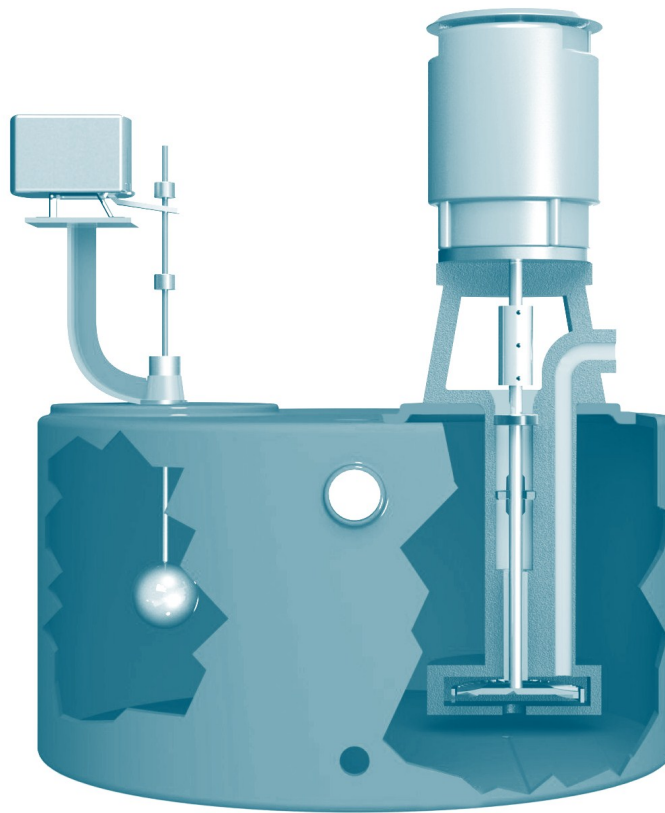
Piping connections should be made in accordance with all local building code requirements. Refer to your local building department inspectors for additional information. Piping provided by the installer should include pipe hangers located and sized accordingly to ensure there is no pipe strain transmitted to the pumps. Connections from each pump to the system piping should include individual isolating valves, check valves and other fittings as shown in the drawings.

(d) Pump Components

The Federal Pump condensate unit includes a number of electromechanical devices that should be identified prior to pressuring the system or prior to providing power to the system. Those devices may include:

- Condensate receiver tank with (2) pumps-duplex system; (1) pump for a simplex system.
- Float switch(s) for on/off automatic operation of the condensate pumps.
- Gauge glass for external view of the condensate level in the tank (optional)
- Pressure gages to measure pump discharge pressure. (optional)
- Thermometer to measure receiver liquid temperatures. (optional)
- Control panel wired to the system electric components. (optional)

Sample VTC Unit Shown



2. Electric Components and Installation



Prior to starting the unit, ensure each component is in sound condition and connected appropriately. Prior to any electric or water connections the installer needs to verify the electric power source (voltage and cycles) corresponds to the motor nameplate power requirements. The installer needs to ensure the pump rotates freely when turned by hand prior to any electrical connections.

Upon inspection of the condensate unit and verification that external connections are adequate for the intended use, the installer should proceed with the electrical inspection

(a) Electrical Components

The Federal Pump condensate unit is provided with electric motors, float switches and (in most cases) a receiver mounted control panel that has been pre-wired and pre-set by the factory. Check all connections to ensure they are tight and are not exposed to potential water flooding, leaks or damage. Upon inspection and approval of the electric connections between the motors, controller and float switch and pilot devices the installer is ready to complete the installation.



Electric connections: A certified electrician or other qualified mechanic will connect the electric power to the control panel disconnect switch and follow the wiring diagram provided in the control panel by the factory prior to shipment. Upon completion of the electric installation, the installer should measure the electric connections with appropriate amp gages or other devices to ensure the connections are appropriate and meet all local building codes.

(b) Start –UP Check List

- ☐ **Power is OFF! Disconnect switch(s) are in the OFF position and the H-O-A switch is in the “O” position**
- ☐ **All valves leading to and from the condensate unit are in the off position!**
- ☐ **All piping connections have been made as outlined in the engineer’s plans!**
- ☐ **All piping connections are tight!**
- ☐ **All electrical connections are tight!**
- ☐ **Pump is installed on elevated pad and not subject to any dripping water or other fluids!**
- ☐ **All switches are in place, not loose or broken!**
- ☐ **System is bolted down and grouted in place!**

(c) Preparing Unit for Operation

Upon completion of the electric connections, the installer should open the supply line to the condensate receiver, set the H-O-A switch in the “A” position, set the disconnect switch to the ON position, allow the receiver to meet a pre-determined level and witness activation of the float switch that will start the pump(s), draining the condensate from the receiver and terminate pump operation at a pre-determined low level in the receiver. The levels have been preset at the pump manufacturer’s factory. **INSTALLER TO ENSURE PUMPS ARE ROTATING IN THE PROPER DIRECTION AT INITIAL START-UP.**

(d) Pump and Motor Measurements

The installer should measure the amp draw within the control panel and compare to the electric motor specifications to ensure the unit is operating within the recommended and specified condition. In addition, it is recommended the installer check the discharge pressure of the pump to measure the pump performance to ensure the unit is operating within specified conditions.

3. Operation Sequence

(a) Operation Sequence

The condensate receiver and pumps are designed to start pump operation based upon the liquid level within the condensate receiver. Upon the liquid level reaching a pre-determined high level in the condensate receiver, the float switch will activate the lead pump that will pump the condensate from the receiver to a predetermined location. Once the liquid level drops to a pre-determined level, the float switch will automatically shut down the lead pump and alternate operation to the lag pump that will repeat the pump operation once the condensate level in the receiver reaches the predetermined high water level.

4. Maintenance

(a) Pump Maintenance

Annual or semi-annual inspection of the condensate unit should be completed by the maintenance personnel or with a certified Federal Pump repair service or by a certified Federal Pump local representative. Motor amp readings and pump discharge pressure readings should be recorded every 6 months and compared to original specified conditions. The user should manually review the installation and ensure any strainers leading to or from the pump system are cleaned, there is no rust or evidence of leaking from the condensate return unit and all electrical alarm and/or operating lights should be checked to ensure bulbs are working. The VCL/VTC condensate return units are vertical in-tank mounted pumps where the bearings are located at the lower end of the pump shaft. The **VCL series** are oil lubricated type bearings. The oil level should be monitored monthly. The **VTC series** include open line shaft water lubricated bearings where the condensate fluid provides the bearing flush. Each VCL/VTC pump includes a mechanical seal that prevents leaking of the fluid. During inspection should the operator observe leaking from the pump casing the mechanical seal should be changed.

(b) Replacement Parts and Kits

Federal Pumps and its local sales representative stock repair parts and kits to assist the end user should the condensate return unit require repair parts or overhaul. Many of these repair parts are assembled in kits to provide ease in over all maintenance. Contact your local Federal Pumps representative for additional information.

Catalog Sections: CCV Series

Catalog Section	Section Number
Product Information	P.1-CCV
Suggested Specs	S.1-CCV
Material of Construction	M.1-CCV
Selection Table	ST.1-CCV
Dimensions	D.1-CCV
O&M	OM.1-CCV
Submittal Sheet	SD.1-CCV
Price Sheets	PR.1-CCV

Fig 1: 25-120G Gal CCV

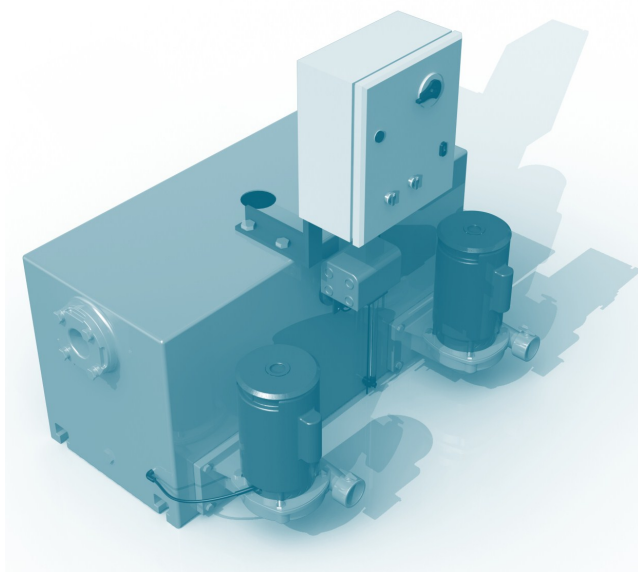
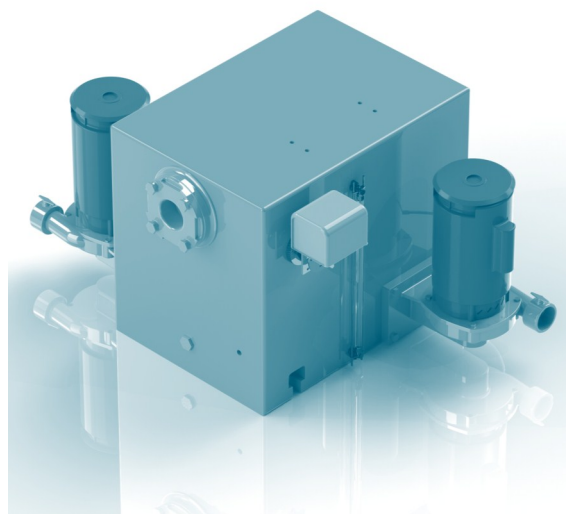


Fig 2: 15 Gal CCV Duplex



Product Information: CCV Condensate Return Units

P.1-CCV

Fig 1: 25-120G Gal CCV ISO VIEW

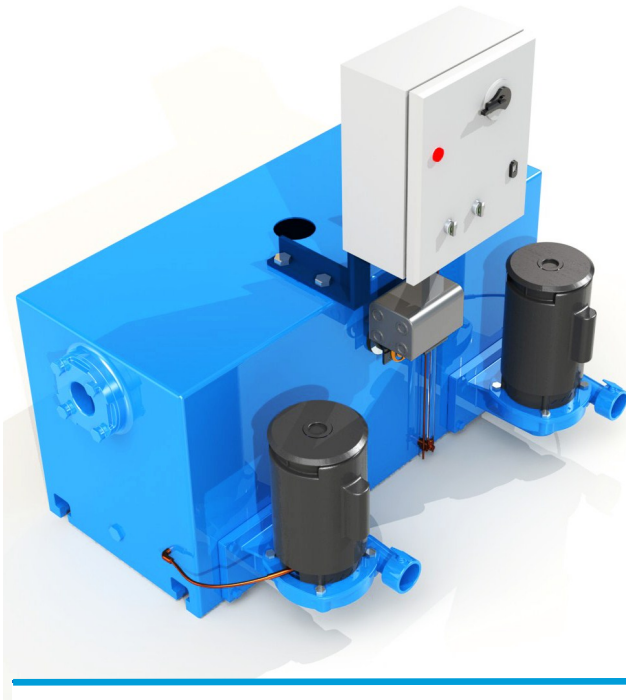
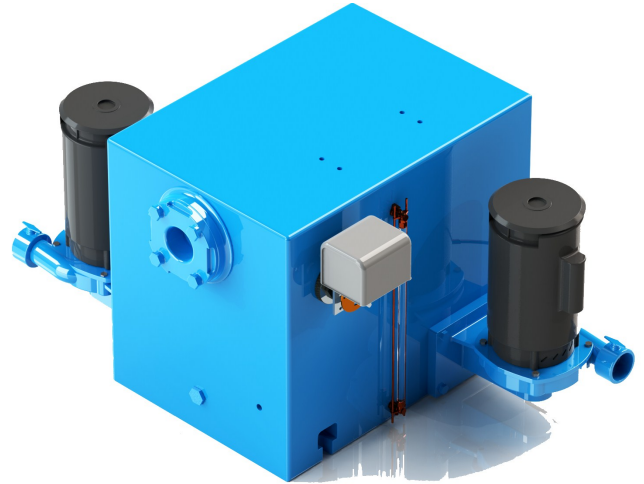


Fig 3: 15 Gal CCV Duplex ISO View



Cast Iron Receivers

The CCV series, sized to 100,000 EDR square feet, includes cast iron, receivers sized from 15 gallon to 120 gallon with pump flow and pressure ratings to 150 GPM at 80psi for each pump. Condensate return units are provided with cast Iron/bronze fitted pump construction, close coupled to electric motor and side-mounted to the receiver allowing back pull out design for repair and maintenance. Duplex units are provided with a mechanical alternating float switch that alternates pump operation. CCV Series is available in single pump (simplex) or two pump (duplex) systems.

- **MOTOR:** Drip-proof, ball bearing design available in single phase and 3 phase voltages.
- **PUMP:** The motor and rotating assembly are removable without disturbing piping connection. Maximum water temperature at the pump suction is 210°F. Maximum working pressure of 125 psi.
- **RECEIVER:** Single-piece cast iron rated for a maximum internal pressure of 5 psi. Designed for venting to atmosphere.
- **MODIFICATIONS:** Inlet strainer, gauge glass, thermometer, pump discharge pressure gauges, electrical control panels, and electric motors in TEFC and other motor enclosures.

Suggested Specifications: CCV

S.1-CCV

Duplex Condensate Return Units

Furnish and install as shown in the plans a Federal Pump Corporation Duplex Series: CCV, Condensate Return Unit with each pump rated as shown in the pump schedule. The entire unit including float switch and controls shall be factory assembled and pre-wired and supplied as a single operating unit.

Each duplex condensate return unit shall include (2) close coupled cast iron bronze fitted pumps directly connected to close coupled motors sized in accordance with the equipment schedule. Pumps shall be centerline discharge, top pull out design to permit removal of the motor and rotating assembly without disturbing discharge piping. Each pump shall include an enclosed bronze balanced impeller and mechanical shaft seal with copper venting line from the seal chamber to the receiver. Electric motors shall be ODP (Open Drip Proof) design or as shown in the equipment schedule.

Pumps will be designed to withstand maximum water temperature of 210 degrees F. Isolation valves located between the pump suction and receiver will be pre-mounted by the pump manufacturer that provide for the isolation and removal of the entire pump casing for future overhaul and prevent leaking from the receiver. System piping from pump discharge connections shall be provided by the installing contractor.

The receiver shall be of single-piece cast iron construction of the size shown in the equipment schedule. Receivers shall include drain and vent connection as shown in the plans. A single 1/2" diameter receiver gauge glass with isolating valves will be provided (shipped loose for field mounting by the installing contractor) that provides for the external view of condensate water level in the receiver. Contractor shall provide drainage connection from the condensate return receiver drain piped to an acceptable drain line.

The condensate return unit (s) will include a receiver mounted mechanical alternating float switch that alternates the lead operation of each pump. Upon reaching the factory predetermined high water level in the cast iron receiver, the float switch will initiate the lead pump that will discharge the condensate to a remote boiler feed or other receiver.

The float switch will disengage the lead pump upon a predetermined factory set low water level in the cast iron receiver and mechanically alternate the second pump to operate as the lead pump for the next cycle. Float switch will

be Square D or equal externally mounted; NEMA 1 design or as shown on the plans.

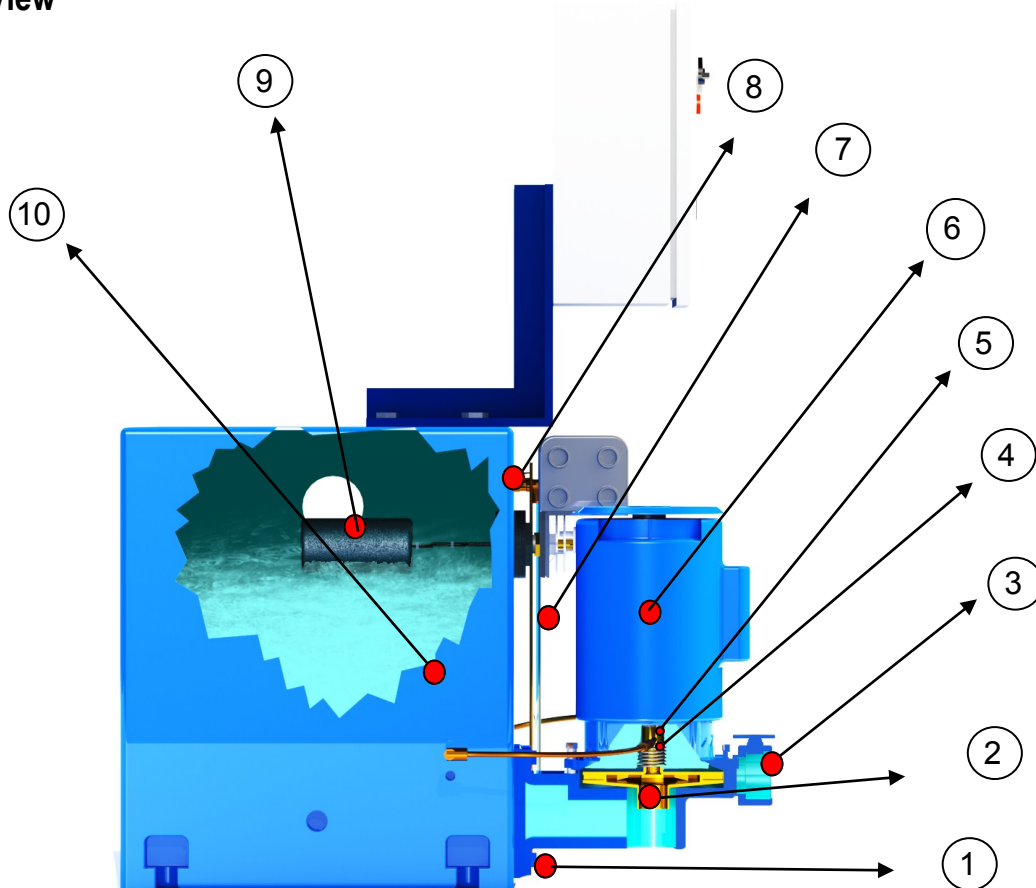
Pump motors and mechanical alternating float switch shall be pre-wired and connected to a duplex control panel of NEMA 1 (or as shown in the plans) construction and will include individual motors starters, disconnect switches, HOA switches, run lights and designed for automatic operation. The duplex control panel shall be mounted on the cast iron receiver and provided as a single functioning unit.

The pump manufacturer will test all system connections, prior to shipment, and paint the equipment in machine enamel finish.

Material of Construction: CCV Series

M.1-CCV

Fig 1: Cross Sectional View



Item	Item No	Material	Description	Rating	Applications
Bolts	1	Steel	Various	SAE 1045/ASTM A576	Bolted connections
Impeller	2	Bronze	Balanced/Trimmed	SAE 40/ASTM-B584	Condensate Service
Pump Casing	3	Cast Iron	Receiver Unit	A 48-Class 30	125lb rated pressure.
Shaft	4	Steel	Provides power	SAE 1045/ASTM A576	Motor/pump shaft
Mechanical Seal	5	Ceramic/Carbon	EPDM	210°F	Condensate Water
Electric Motor	6	Steel	1 and 3 Phase (with 1.15 SF)	ODP Standard	Class B Installation
Gauge Glass	7	Glass	Visual display of liquid	Clear Glass	Measures liquid level in receiver
Gauge Cocks	8	Steel	Isolating valves	SAE 1045/ASTM A576	Isolates gauge glass for removal
Float Switch	9	Steel/Brass	Mech. Alt Float Switch	316 St Steel Float	High temp condensate use.
Receiver	10	Cast Iron	Vented CI Receiver	A48-Class 30	Available in steel and Stainless Steel

Selection Table: CCV Series

ST.1-CCV

Type CCV-Selection Table
2,000-100,000 EDR
3500 RPM: Duplex Condensate Return Selection Table

Sq.-Ft EDR	Pump Pressure psi	Pump Series	Pump Capacity GPM	HP Rating (ea.)	Receiver Capacity Gallons	Product Selection CI Receiver (Note 1)
2000	10	CCF	3	1/3	15	CCV-210-2CI-2
4000		CCF	6	1/3	15	CCV-410-2CI-2
6000		CCF	9	1/3	15	CCV-610-2CI-2
8000		CCF	12	1/3	15	CCV-810-2CI-2
10000		CCF	15	1/3	15	CCV-1010-2CI-2
15000		CCF	22 1/2	1/3	25	CCV-1510-2CI-2
20000		CCF	30	1/3	25	CCV-2010-2CI-2
25000		CCF	37 1/2	1/3	35	CCV-2510-2CI-2
30000		CCF	45	1/3	35	CCV-3010-2CI-2
40000		CCF	60	1/2	45	CCV-4010-2CI-2
50000		CCF	75	3/4	70	CCV-5010-2CI-2
65000		CCF	97 1/2	1	70	CCV-6510-2CI-2
75000		CCF	112 1/2	1	70	CCV-7510-2CI-2
100000		CGF	150	1 1/2	120	CCV-10010-2CI-2
2000	15	CCF	3	1/3	15	CCV-215-2CI-2
4000		CCF	6	1/3	15	CCV-415-2CI-2
6000		CCF	9	1/3	15	CCV-6150-2CI-2
8000		CCF	12	1/3	15	CCV-815-2CI-2
10000		CCF	15	1/3	15	CCV-1015-2CI-2
15000		CCF	22 1/2	1/3	25	CCV-1515-2CI-2
20000		CCF	30	1/3	25	CCV-2015-2CI-2
25000		CCF	37 1/2	1/3	35	CCV-2515-2CI-2
30000		CCF	45	1/2	35	CCV-3015-2CI-2
40000		CCF	60	3/4	45	CCV-4015-2CI-2
50000		CCF	75	3/4	70	CCV-5015-2CI-2
65000		CCF	97 1/2	1 1/2	70	CCV-6515-2CI-2
75000		CCF	112 1/2	1 1/2	70	CCV-7515-2CI-2
100000		CGF	150	2	120	CCV-10015-2CI-2
2000	20	CCF	3	1/3	15	CCV-220-2CI-2
4000		CCF	6	1/3	15	CCV-420-2CI-2
6000		CCF	9	1/3	15	CCV-620-2CI-2
8000		CCF	12	1/3	15	CCV-820-2CI-2
10000		CCF	15	1/3	15	CCV-1020-2CI-2
15000		CCF	22 1/2	1/3	25	CCV-1520-2CI-2
20000		CCF	30	1/2	25	CCV-2020-2CI-2
25000		CCF	37 1/2	1/2	35	CCV-2520-2CI-2
30000		CCF	45	1/2	35	CCV-3020-2CI-2
40000		CCF	60	3/4	45	CCV-4020-2CI-2
50000		CCF	75	1	70	CCV-5020-2CI-2
65000		CCF	97 1/2	1 1/2	70	CCV-6520-2CI-2
75000		CCF	112 1/2	2	70	CCV-7520-2CI-2
100000		CGF	150	3	120	CCV-10020-2CI-2

Note1: For Simplex Unit change last digit in product selection from “-2” to “-1”.

Type CCV-Selection Table
2,000-100,000 EDR
3500 RPM: Duplex Condensate Return Selection Table

Sq.-Ft EDR	Pump Pressure psi	Pump Series	Pump Capacity GPM	HP Rating (ea.)	Receiver Capacity Gallons	Product Selection CI Receiver (Note1)
2000	30	CCF	3	1/2	15	CCV-230-2CI-2
4000		CCF	6	1/2	15	CCV-430-2CI-2
6000		CCF	9	1/2	15	CCV-630-2CI-2
8000		CCF	12	1/2	15	CCV-830-2CI-2
10000		CCF	15	1/2	15	CCV-1030-2CI-2
15000		CCF	22 1/2	1/2	25	CCV-1530-2CI-2
20000		CCF	30	3/4	25	CCV-2030-2CI-2
25000		CCF	37 1/2	3/4	35	CCV-2530-2CI-2
30000		CCF	45	3/4	35	CCV-3030-2CI-2
40000		CCF	60	1	45	CCV-4030-2CI-2
50000		CCF	75	1 1/2	70	CCV-5030-2CI-2
65000		CCF	97 1/2	2	70	CCV-6530-2CI-2
75000		CCF	112 1/2	3	70	CCV-7530-2CI-2
100000		CGF	150	5	120	CCV-10030-2CI-2
2000	40	CCF	3	3/4	15	CCV-240-2CI-2
4000		CCF	6	3/4	15	CCV-440-2CI-2
6000		CCF	9	3/4	15	CCV-640-2CI-2
8000		CCF	12	3/4	15	CCV-840-2CI-2
10000		CCF	15	3/4	15	CCV-1040-2CI-2
15000		CCF	22 1/2	3/4	25	CCV-1540-2CI-2
20000		CCF	30	1	25	CCV-2040-2CI-2
25000		CCF	37 1/2	1	35	CCV-2540-2CI-2
30000		CCF	45	1 1/2	35	CCV-3040-2CI-2
40000		CCF	60	1 1/2	45	CCV-4040-2CI-2
50000		CGF	75	2	70	CCV-5040-2CI-2
65000		CGF	97 1/2	3	70	CCV-6540-2CI-2
75000		CGF	112 1/2	5	70	CCV-7540-2CI-2
100000		CGF	150	7 1/2	120	CCV-10040-2CI-2
2000	50	CCF	3	1	15	CCV-250-2CI-2
4000		CGF	6	1	15	CCV-450-2CI-2
6000		CGF	9	1	15	CCV-650-2CI-2
8000		CGF	12	1	15	CCV-850-2CI-2
10000		CGF	15	1	15	CCV-1050-2CI-2
15000		CGF	22 1/2	1	25	CCV-1550-2CI-2
20000		CGF	30	1 1/2	25	CCV-2050-2CI-2
25000		CGF	37 1/2	2	35	CCV-2550-2CI-2
30000		CGF	45	2	35	CCV-3050-2CI-2
40000		CGF	60	3	45	CCV-4050-2CI-2
50000		CGF	75	3	70	CCV-5050-2CI-2
65000		CGF	97 1/2	5	70	CCV-6550-2CI-2
75000		CGF	112 1/2	5	70	CCV-7550-2CI-2
100000		CGF	150	7 1/2	120	CCV-10050-2CI-2

Note1: For Simplex Unit change last digit in product selection from "-2" to "-1".

Type CCV-Selection Table
2,000-100,000 EDR
3500 RPM: Duplex Condensate Return Selection Table

Sq.-Ft EDR	Pump Pressure psi	Pump Series	Pump Capacity GPM	HP Rating (ea.)	Receiver Capacity Gallons	Product Selection CI Receiver (Note 1)
2000	60	CGF	3	1 1/2	15	CCV-260-2CI-2
4000			6	1 1/2	15	CCV-460-2CI-2
6000			9	1 1/2	15	CCV-660-2CI-2
8000			12	1 1/2	15	CCV-860-2CI-2
10000			15	1 1/2	15	CCV-1060-2CI-2
15000			22 1/2	2	25	CCV-1560-2CI-2
20000			30	2	25	CCV-2060-2CI-2
25000			37 1/2	3	35	CCV-2560-2CI-2
30000			45	3	35	CCV-3060-2CI-2
40000			60	3	45	CCV-4060-2CI-2
50000			75	5	70	CCV-5060-2CI-2
65000			97 1/2	7 1/2	70	CCV-6560-2CI-2
75000			112 1/2	7 1/2	70	CCV-7560-2CI-2
100000			150	10	120	CCV-10060-2CI-2
2000	70	CGF	3	2	15	CCV-270-2CI-2
4000			6	2	15	CCV-470-2CI-2
6000			9	2	15	CCV-670-2CI-2
8000			12	2	15	CCV-870-2CI-2
10000			15	2	15	CCV-1070-2CI-2
15000			22 1/2	3	25	CCV-1570-2CI-2
20000			30	3	25	CCV-2070-2CI-2
25000			37 1/2	5	35	CCV-2570-2CI-2
30000			45	5	35	CCV-3070-2CI-2
40000			60	5	45	CCV-4070-2CI-2
50000			75	5	70	CCV-5070-2CI-2
65000			97 1/2	7 1/2	70	CCV-6570-2CI-2
75000			112 1/2	10	70	CCV-7570-2CI-2
100000			150	10	120	CCV-10070-2CI-2
2000	80	CGF	3	3	15	CCV-240-2CI-2
4000			6	3	15	CCV-440-2CI-2
6000			9	3	15	CCV-640-2CI-2
8000			12	3	15	CCV-840-2CI-2
10000			15	3	15	CCV-1040-2CI-2
15000			22 1/2	3	25	CCV-1540-2CI-2
20000			30	3	25	CCV-2040-2CI-2
25000			37 1/2	5	35	CCV-2540-2CI-2
30000			45	5	35	CCV-3040-2CI-2
40000			60	5	45	CCV-4040-2CI-2
50000			75	5	70	CCV-5040-2CI-2
65000			97 1/2	10	70	CCV-6540-2CI-2
75000			112 1/2	10	70	CCV-7540-2CI-2
100000			150	10	120	CCV-10040-2CI-2

Note1: For Simplex Unit change last digit in product selection from “-2” to “-1”.

Type CCV-Selection Table
2,000-100,000 EDR
1750 RPM: Duplex Condensate Return Selection Table

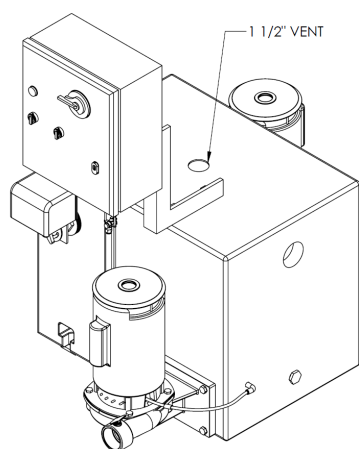
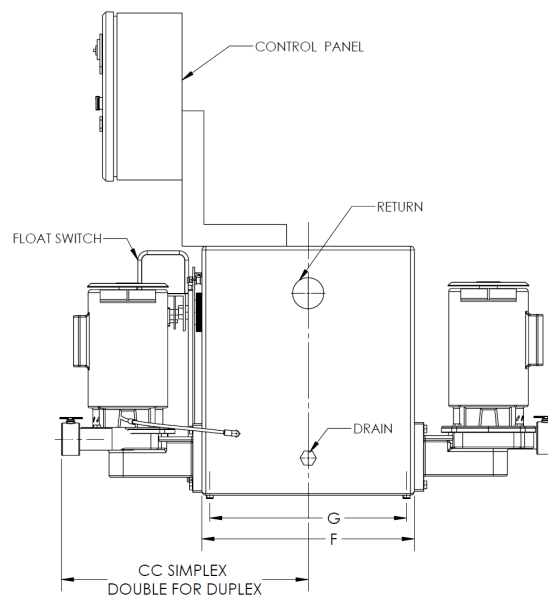
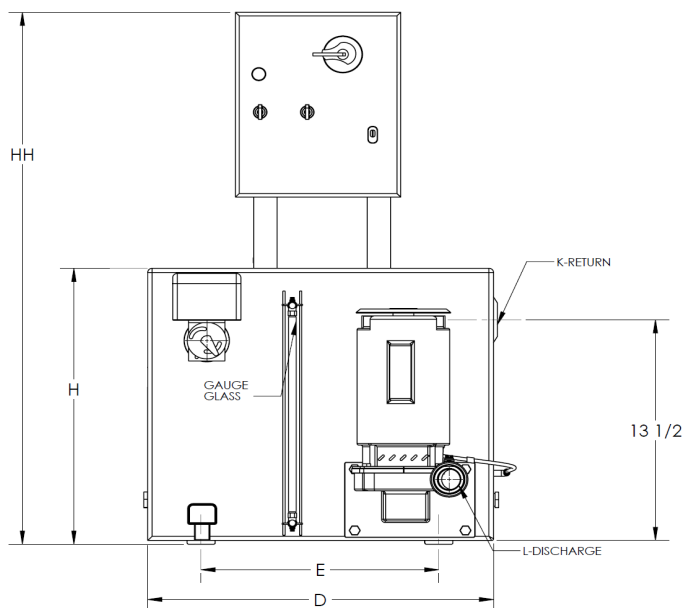
Sq.-Ft EDR	Pump Pressure psi	Pump Series	Pump Capacity GPM	HP Rating (ea.)	Receiver Capacity Gallons	Product Selection CI Receiver (Note 1)
2000	10	CGF	3	1/4	15	CCV-210-4CI-2
4000			6	1/4	15	CCV-410-4CI-2
6000			9	1/4	15	CCV-610-4CI-2
8000			12	1/4	15	CCV-810-4CI-2
10000			15	1/4	15	CCV-1010-4CI-2
15000			22 1/2	1/4	25	CCV-1510-4CI-2
20000			30	1/3	25	CCV-2010-4CI-2
25000			37 1/2	1/3	35	CCV-2510-4CI-2
30000			45	1/3	35	CCV-3010-4CI-2
40000			60	1/2	45	CCV-4010-4CI-2
50000			75	3/4	70	CCV-5010-4CI-2
65000			97 1/2	3/4	70	CCV-6510-4CI-2
75000			112 1/2	3/4	70	CCV-7510-4CI-2
100000			150	1	120	CCV-10010-4CI-2
2000	15	CGF	3	1/3	15	CCV-215-4CI-2
4000			6	1/3	15	CCV-415-4CI-2
6000			9	1/3	15	CCV-6150-4CI-2
8000			12	1/3	15	CCV-815-4CI-2
10000			15	1/3	15	CCV-1015-4CI-2
15000			22 1/2	1/3	25	CCV-1515-4CI-2
20000			30	1/2	25	CCV-2015-4CI-2
25000			37 1/2	1/2	35	CCV-2515-4CI-2
30000			45	3/4	35	CCV-3015-4CI-2
40000			60	3/4	45	CCV-4015-4CI-2
50000			75	1	70	CCV-5015-4CI-2
65000			97 1/2	1	70	CCV-6515-4CI-2
75000			112 1/2	1	70	CCV-7515-4CI-2
100000			150	1 1/2	120	CCV-10015-4CI-2
2000	20	CGF	3	1/2	15	CCV-220-4CI-2
4000			6	1/2	15	CCV-420-4CI-2
6000			9	1/2	15	CCV-620-4CI-2
8000			12	1/2	15	CCV-820-4CI-2
10000			15	1/2	15	CCV-1020-4CI-2
15000			22 1/2	1/2	25	CCV-1520-4CI-2
20000			30	3/4	25	CCV-2020-4CI-2
25000			37 1/2	3/4	35	CCV-2520-4CI-2
30000			45	1	35	CCV-3020-4CI-2
40000			60	1	45	CCV-4020-4CI-2
50000			75	1 1/2	70	CCV-5020-4CI-2
65000			97 1/2	1 1/2	70	CCV-6520-4CI-2
75000			112 1/2	1 1/2	70	CCV-7520-4CI-2
100000			150	2	120	CCV-10020-4CI-2

Note1: For Simplex Unit change last digit in product selection from “-2” to “-1”.

Dimensions: CCV Series

D.1-CCV

CCV:15 Gallon Receiver

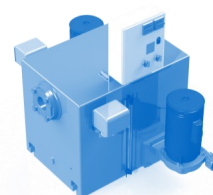
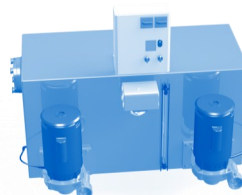


All Dimensions are measured in inches

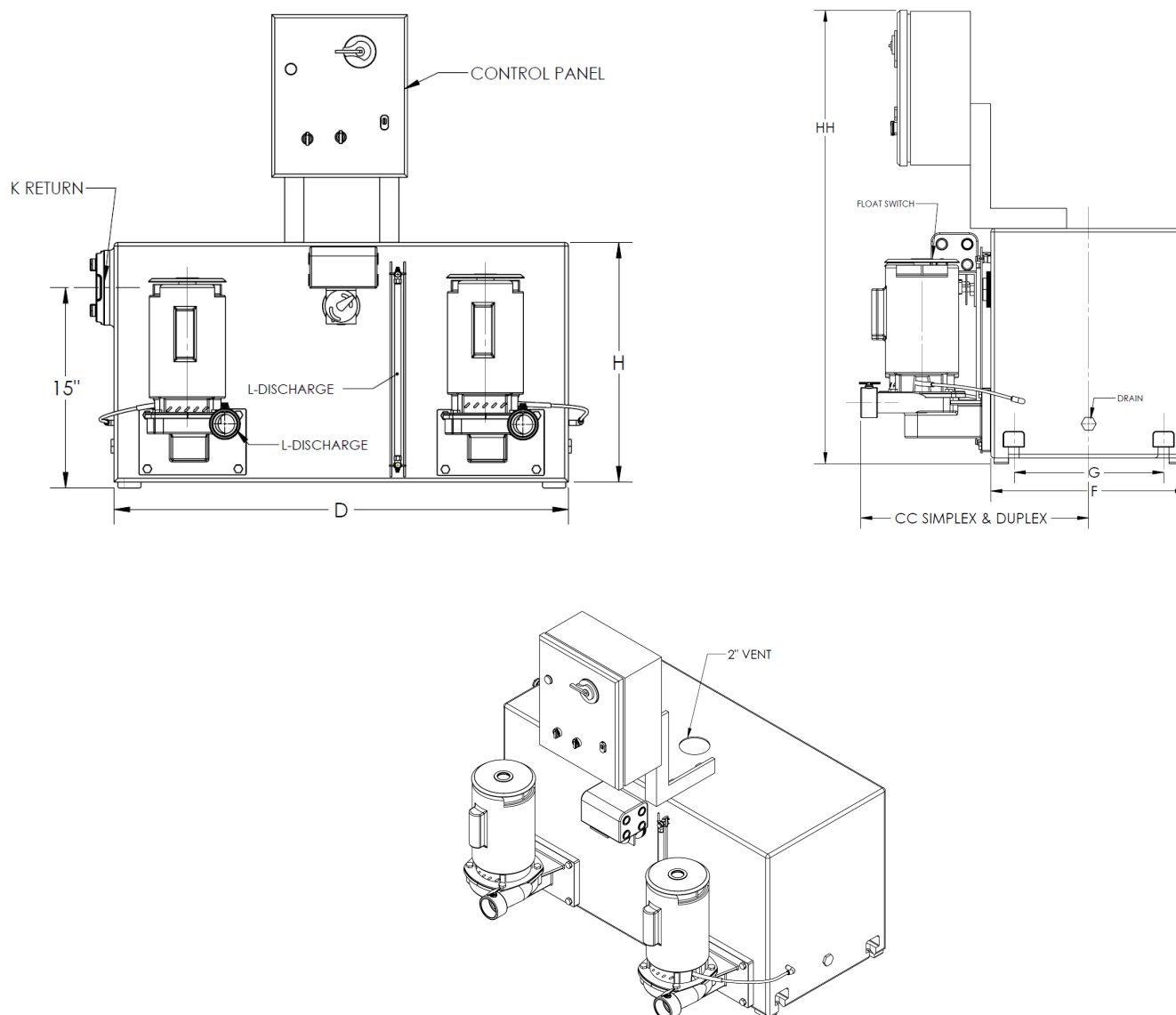
TANK CAP. GAL.	PUMP	CC	D	E	F	G	H	HH (MAX)	K	DRAIN
15	CC	17.5	19	13	13.63	12	16	34	2	0.75
15	CG	19.5	19	13	13.63	12	16	34	2	0.75

Fig 1: Simplex "-1"

Fig 2: Duplex "-2"



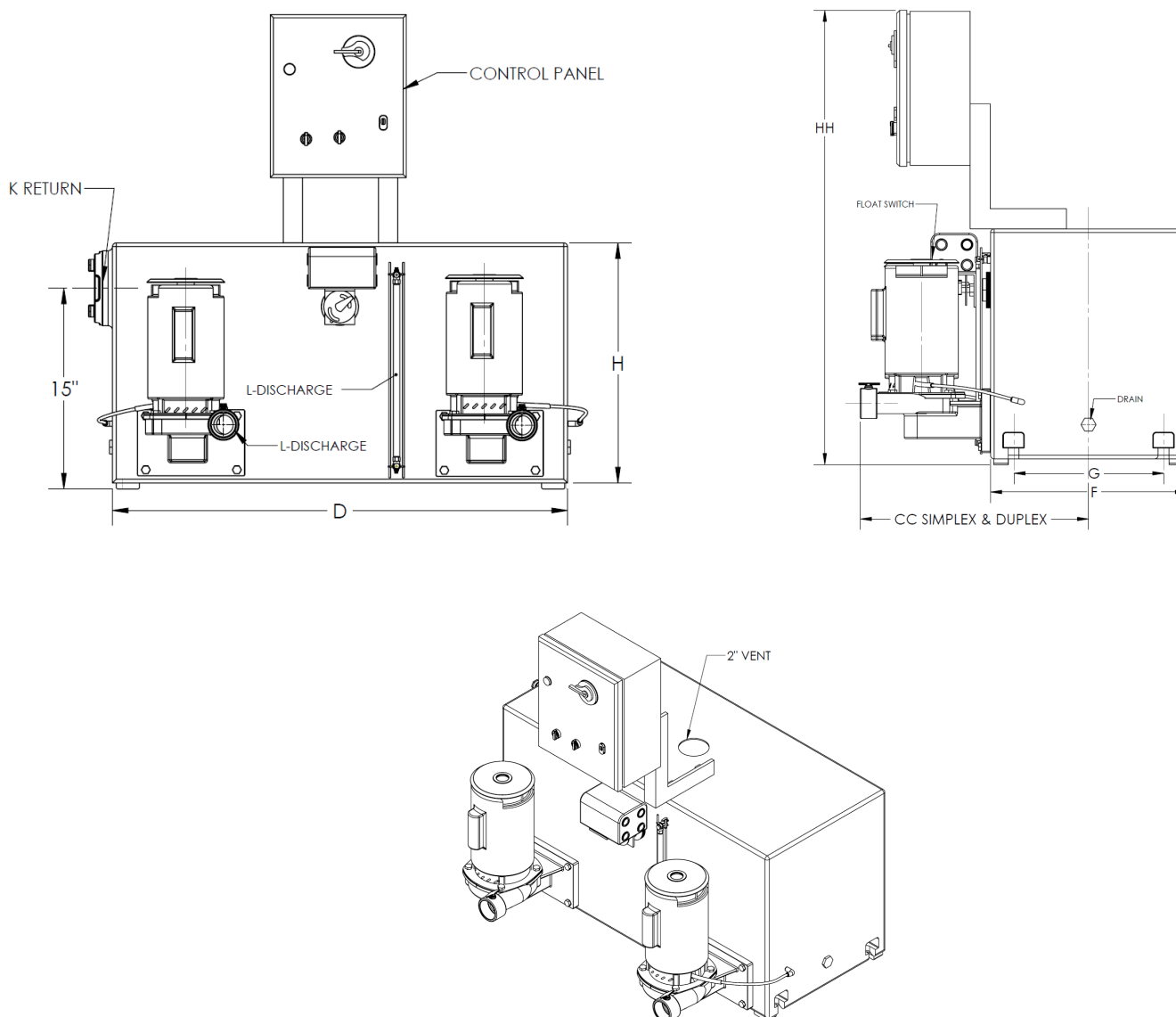
CCV: 25 Gallon Receiver



All Dimensions are measured in inches

TANK CAP. GAL.	PUMP	CC	D	E	D	E	F	G	H	HH (MAX)	K	DRAIN
25	CC	21.5	30.75	28.5	34.75	32.75	10.75	7	18.75	34	3	0.75
25	CG	24.5	30.75	28.5	34.75	32.75	10.75	7	18.75	34	3	0.75

CCV: 35 Gallon Receiver

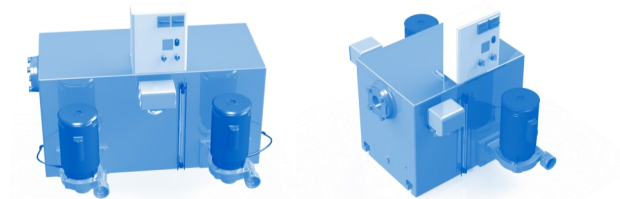


All Dimensions are measured in inches

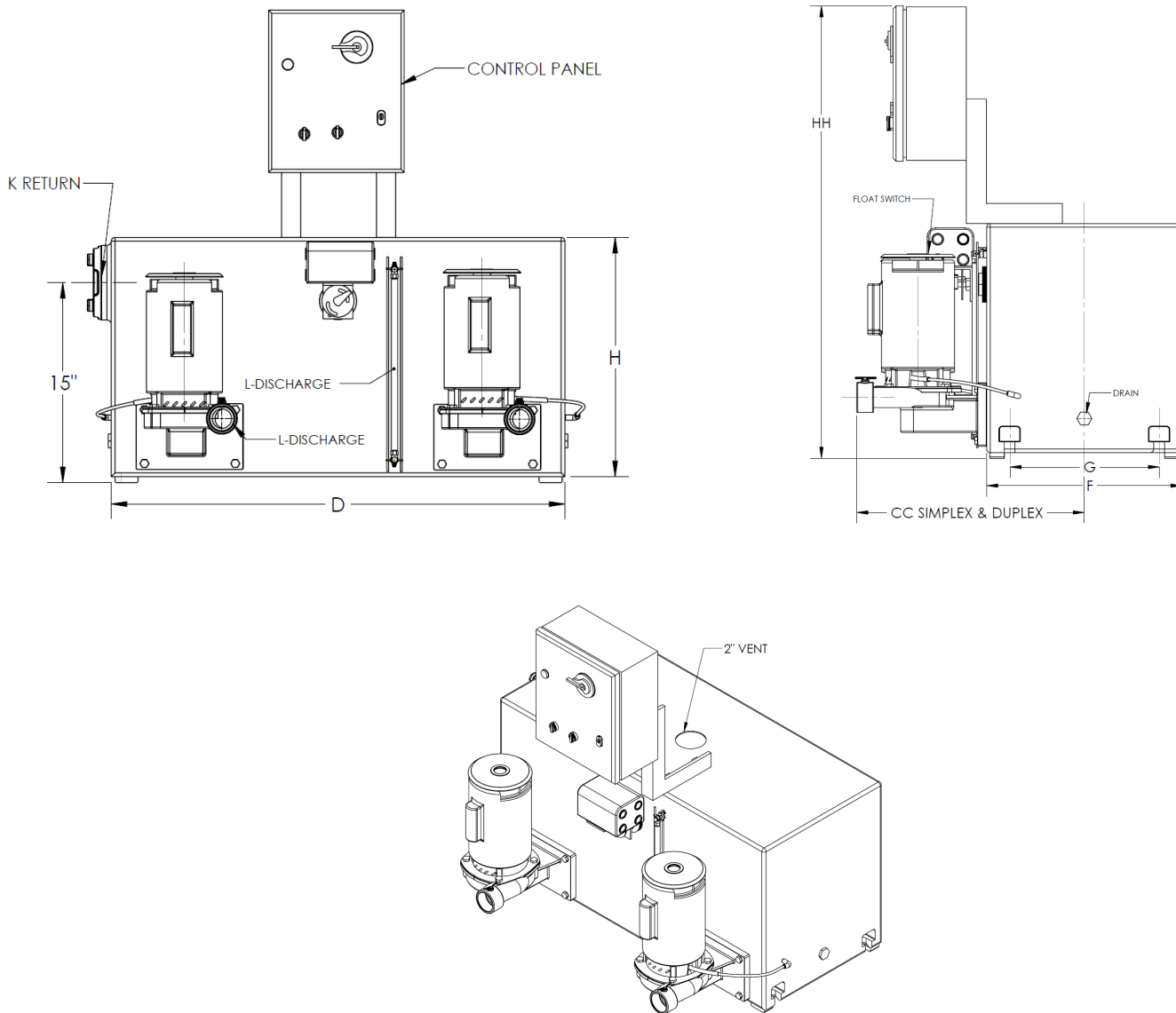
TANK CAP. GAL.	PUMP	CC	D	E	F	G	H	HH (MAX)	K	DRAIN
35	CC	26.5	30.75	28.5	15.75	12	18.75	34	3	0.75
35	CG	29.5	30.75	28.5	15.75	12	18.75	34	3	0.75

Fig 1: Simplex "-1"

Fig 2: Duplex "-2"



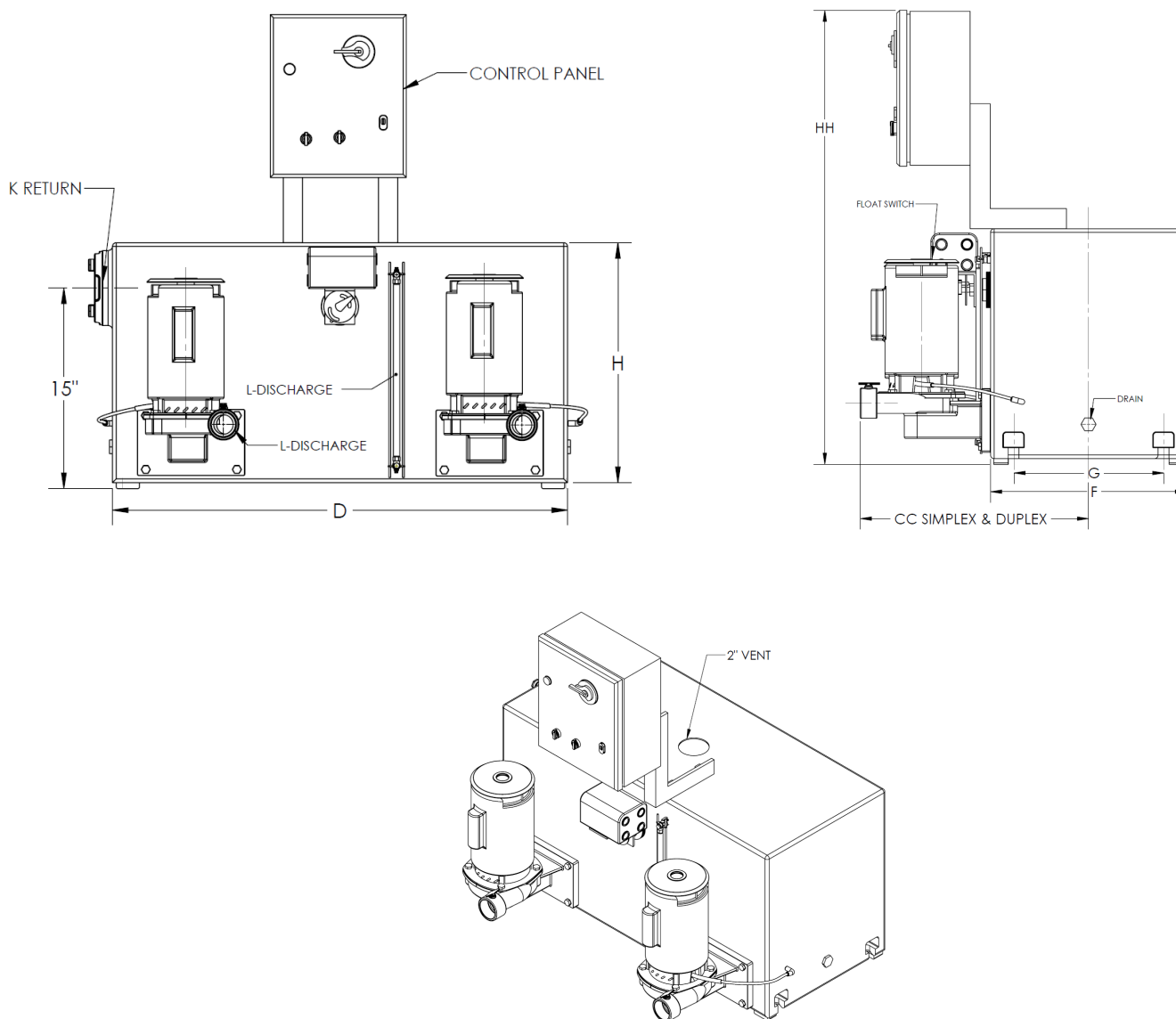
CCV: 45 Gallon Receiver



All Dimensions are measured in inches

TANK CAP. GAL.	PUMP	CC	D	E	F	G	H	HH (MAX)	K	DRAIN
45	CC	28.5	34.75	32.75	17.75	14	18.75	34	3	0.75
45	CG	31.5	34.75	32.75	17.75	14	18.75	34	3	0.75
45	CK	36	34.75	32.75	17.75	14	18.75	34	3	0.75
45	CKH	38	34.75	32.75	17.75	14	18.75	34	3	0.75

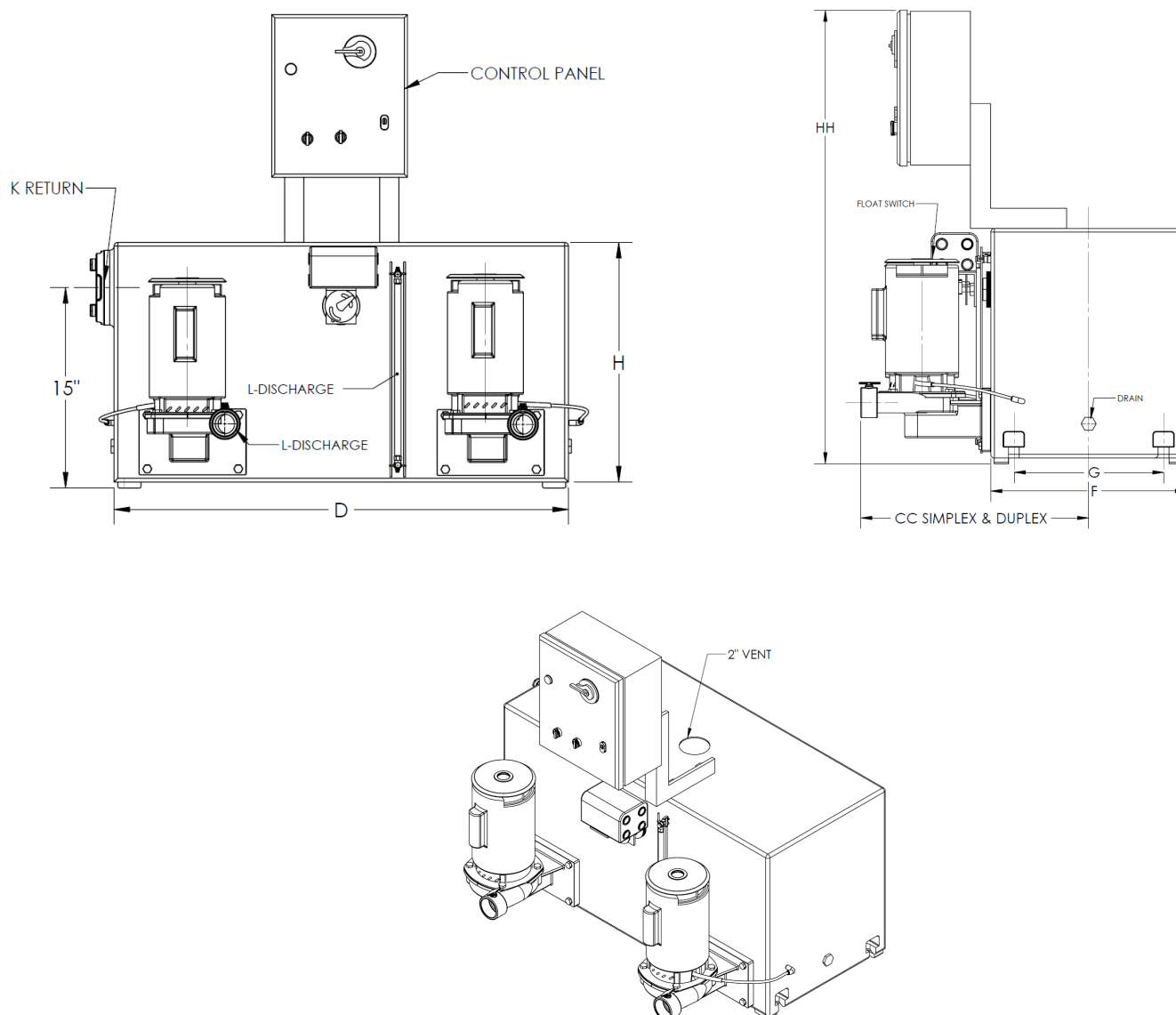
CCV: 70 Gallon Receiver



All Dimensions are measured in inches

TANK CAP. GAL.	PUMP	CC	D	E	F	G	H	HH (MAX)	K	DRAIN
70	CC	32.5	43.75	41.5	21.75	18	18.75	34	3	1.25
70	CG	35.5	43.75	41.5	21.75	18	18.75	34	3	1.25
70	CK	40	43.75	41.5	21.75	18	18.75	34	3	1.25
70	CKH	42	43.75	41.5	21.75	18	18.75	34	3	1.25

CCV: 120 Gallon Receiver

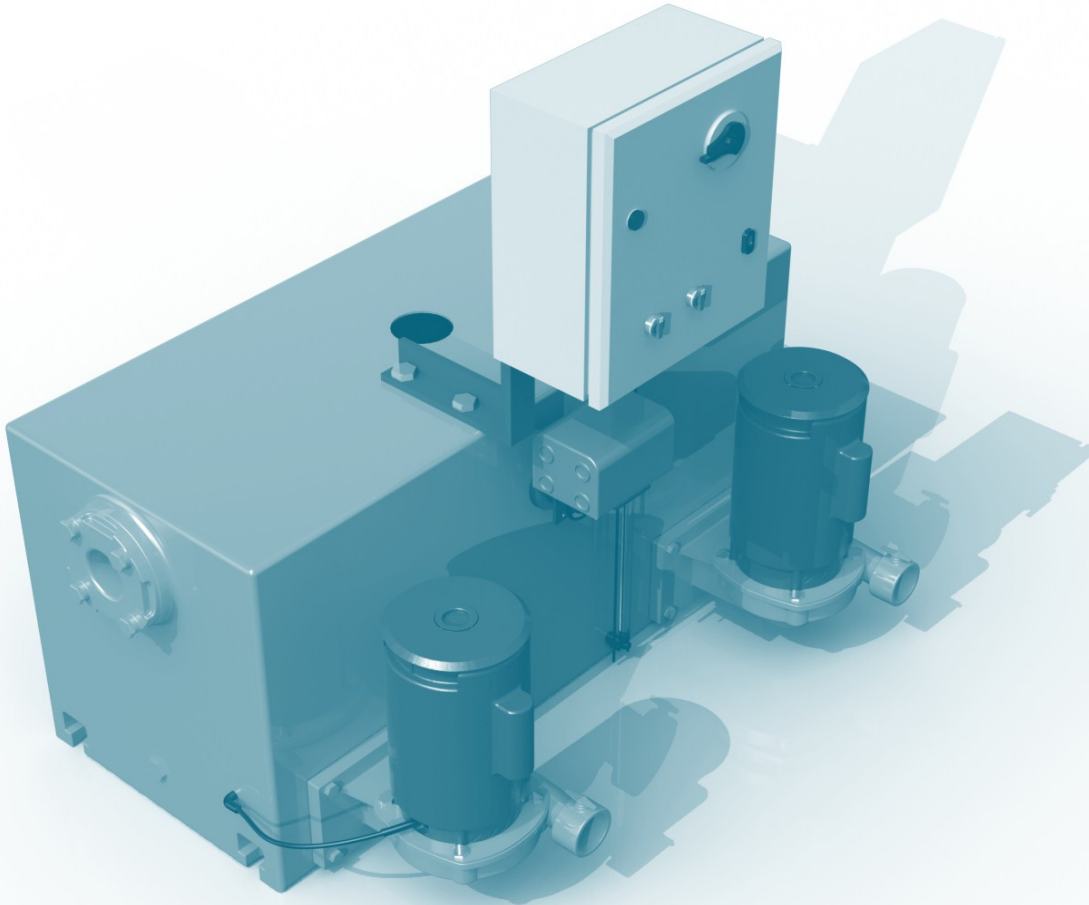


All Dimensions are measured in inches

TANK CAP. GAL.	PUMP	CC	D	E	D	E	F	G	H	HH (MAX)	K	DRAIN
120	CC	44.5	43.75	41.5	47.75	45.75	35.75	29	20.75	34	4	1.25
120	CG	47.5	43.75	41.5	47.75	45.75	35.75	29	20.75	34	4	1.25
120	CK	52	43.75	41.5	47.75	45.75	35.75	29	20.75	34	4	1.25
120	CKH	54	43.75	41.5	47.75	45.75	35.75	29	20.75	34	4	1.25

Product Code: 1
CONDENSATE RETURN UNIT - CCV

SUBMITTAL DATA



Customer: _____

Purchase Order Number: _____

Project Name: _____

Project Location: _____

Equipment Number: _____

Tag Number: _____

Condensate Receiver Size: _____ GAL _____ SIMPLEX ☐ _____ DUPLEX ☐

Float Switch Type: _____

Control Panel: _____

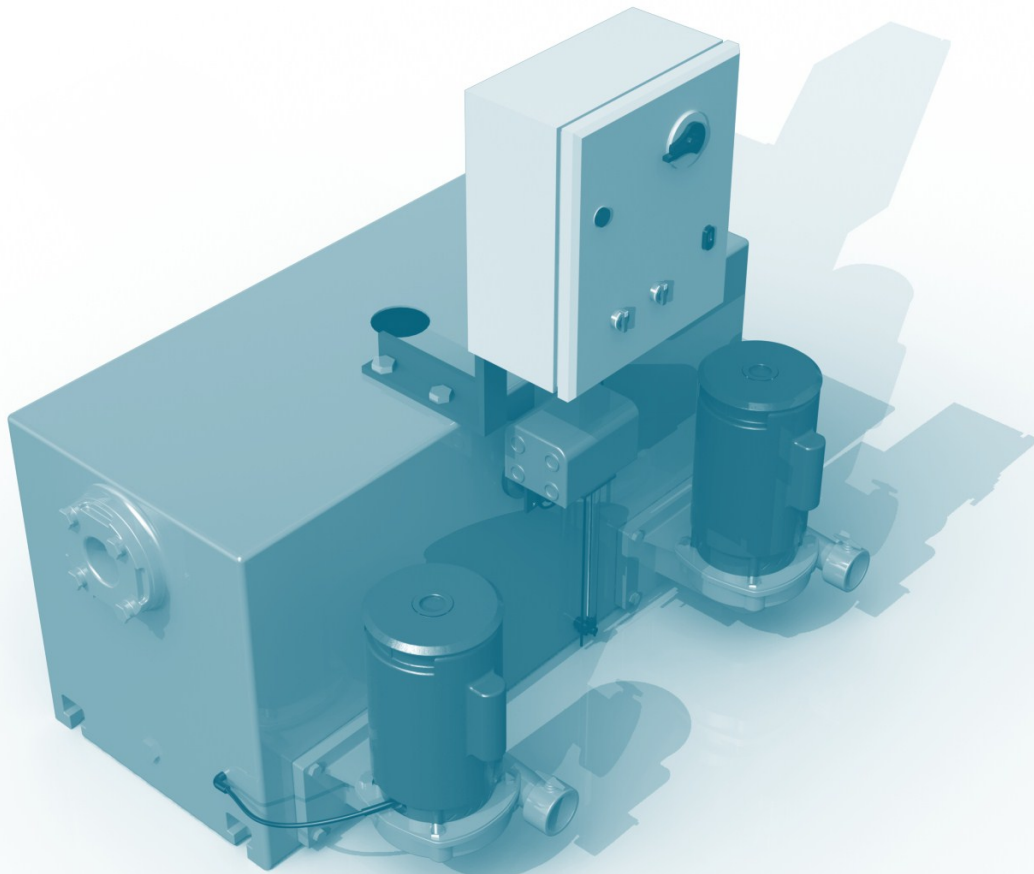
Accessories: _____

Motor: _____ RPM _____ HP _____ VOLT _____ PH _____ CYC

_____ ODP ☐ _____ TEFC ☐ _____ OTHER ☐

Product Code: 1
Condensate Return Units-Series CCV

Installation, Operation and Maintenance Overview



Warning Symbol! This symbol used throughout the Operations manual draws the user's attention to safety instructions. When used the safety warning decal advises: ATTENTION! BE ALERT! YOUR SAFETY IS INVOLVED! FAILURE TO FOLLOW THESE INSTRUCTIONS MAY RESULT IN A SAFETY HAZARD!

Location of Installation: _____

Serial No: _____

Model No: _____

Table of Contents

1. Mechanical Components and Installation

- a. Pump Identification and Inspection
- b. Locating the Equipment
- c. Recommended Piping Connections
- d. Pump components

2. Electric Components and Installation

- a. Electrical Components
- b. Start-up Checklist
- c. Preparing Unit for Operation
- d. Pump and Motor Measurements

3. Operation Sequence

- a. Operation Sequence

4. Maintenance

- a. Pump Maintenance
- b. Replacement Parts and Kits

NOTE: SUBSTITUTION OF REPLACEMENT PARTS BY OTHER SUPPLIERS THAN FEDERAL PUMP OR SERVICE PROVIDERS NOT AUTHORIZED BY FEDERAL PUMP VOIDS ALL EQUIPMENT WARRANTY AND MAY LEAD TO EQUIPMENT MALFUNCTION. ENSURE ALL REPLACEMENT PARTS ARE FACTORY AUTHORIZED AND SERVICED BY FACTORY DESIGNATED REPRESENTATIVES!

These instructions cover the installation and maintenance of Federal Pump condensate return systems. By following the instructions, the life of the pumping unit can be extended.

1. Mechanical Components and Installation

(a) Pump Identification

Pump Identification and inspection: Immediately upon receipt of the condensate unit, inspect and check the unit for any shipment related damages. If damages are noticed, do not put the unit in operation. Report the damage to the transportation's shipping agent or other parties responsible. Each condensate unit is provided with a stainless steel nameplate that identifies the serial or model number of the unit. Refer to that model number within this manual when requesting service and replacement parts in the future.

(b) Locating Equipment

Upon receipt of the condensate pump unit, ensure the unit is installed in a dry area with ambient temperatures ranging from 60 degree F to 85 degree F and stored above floor level ensuring the condensate unit is not emerged in water due to any potential flooding.

If the unit is not stored but planned for immediate installation, ensure the unit is accessible for inspection and maintenance 360 degrees and provide clearance around the condensate unit for free air circulation; mount the unit on an elevated foundation well above wet or damp floors (3"-6" or as shown on the plans). In addition to floor level potential hazards, ensure the unit is not exposed to any above head dripping potential water intrusion into the electric motors, external switches and/or control panel. Locate the unit as shown on the construction documents (new or replacements) and ensure a well-qualified and licensed mechanic is involved in the installation.

Once the condensate unit is mounted to the elevated pump pad; the units should be shimmed level and grouted with cement. Once the grouting cement has hardened, tighten down the "hold-down" bolts. Hold down bolts should be sized and located as shown in the plans or the product specifications provided with this unit.

(c) Recommended Piping Connections

The Federal Pump condensate unit generally is provided with a receiver tank, float switch(s), pump and electric motor combination and a system mounted control panel. Connections from the receiver tank to the pump are generally completed at the factory prior to shipment to the customer. If the piping from the receiver to the pump is missing or damaged, do not proceed with the installation until the damage is repaired. Connections to the condensate receiver include:

- a. Drain connections from the receiver to a separate drain.
- b. Connections from the discharge of the pump to its intended area of service.
- c. Vent pipe from the top of the condensate unit to a predetermined vent connection.
- d. In some cases, the condensate unit may have a make-up water line piped from a fresh water source to the condensate receiver.
- e. These connection should be made by a licensed contractor, certified in boiler or mechanical equipment installations, and authorized by local permitting agencies.

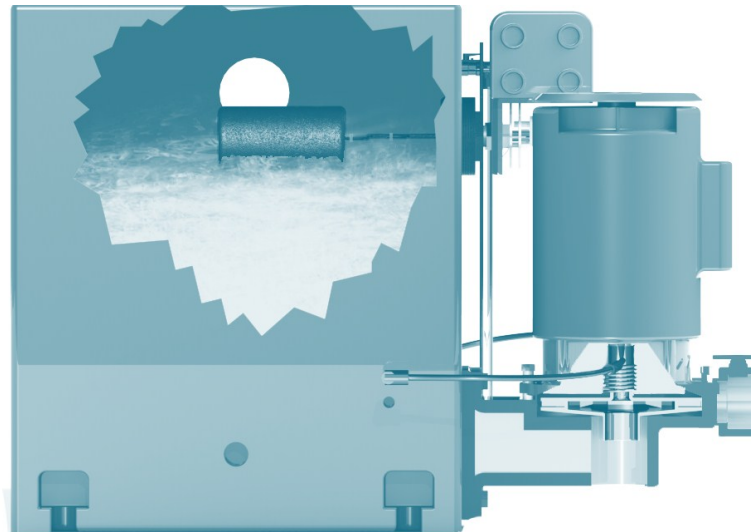
Piping connections should be made in accordance with all local building code requirements. Refer to your local building department inspectors for additional information. Piping provided by the installer should include pipe hangers located and sized accordingly to ensure there is no pipe strain transmitted to the pumps. Connections from each pump to the system piping should include individual isolating valves, check valves and other fittings as shown in the drawings.

(d) Pump Components

The Federal Pump condensate unit includes a number of electromechanical devices that should be identified prior to pressuring the system or prior to providing power to the system. Those devices may include:

- Condensate receiver tank with (2) pumps-duplex system; (1) pump for a simplex system
- Float switch(s) for on/off automatic operation of the condensate pumps.
- Gauge glass for external view of the condensate level in the tank (optional)
- Pressure gages to measure pump discharge pressure (optional)
- Thermometer to measure receiver liquid temperatures (optional)
- Control panel wired to the system electric components.

Sample 15 GAL CCV Unit Shown



2. Electric Components and Installation



Prior to starting the unit, ensure each component is in sound condition and connected appropriately. Prior to any electric or water connections the installer needs to verify the electric power source (voltage and cycles) corresponds to the motor nameplate power requirements. The installer needs to ensure the pump rotates freely when turned by hand prior to any electrical connections.

Upon inspection of the condensate unit and verification that external connections are adequate for the intended use, the installer should proceed with the electrical inspection

(a) Electrical Components

The Federal Pump condensate unit is provided with electric motors, float switches and (in most cases) a receiver mounted control panel that has been pre-wired and pre-set by the factory. Check all connections to ensure they are tight and are not exposed to potential water flooding, leaks or damage. Upon inspection and approval of the electric connections between the motors, controller and float switch and pilot devices the installer is ready to complete the installation.



Electric connections: A certified electrician or other qualified mechanic will connect the electric power to the control panel disconnect switch and follow the wiring diagram provided in the control panel by the factory prior to shipment. Upon completion of the electric installation, the installer should measure the electric connections with appropriate amp gages or other devices to ensure the connections are appropriate and meet all local building codes.

(b) Start –UP Check List

- ☐ **Power is OFF! Disconnect switch(s) are in the OFF position and the H-O-A switch is in the “O” position**
- ☐ **All valves leading to and from the condensate unit are in the off position!**
- ☐ **All piping connections have been made as outlined in the engineer’s plans!**
- ☐ **All piping connections are tight!**
- ☐ **All electrical connections are tight!**
- ☐ **Pump is installed on elevated pad and not subject to any dripping water or other fluids!**
- ☐ **All switches are in place, not loose or broken!**
- ☐ **System is bolted down and grouted in place!**

(c) Preparing Unit for Operation

Upon completion of the electric connections, the installer should open the supply line to the condensate receiver, set the H-O-A switch in the “A” position, set the disconnect switch to the ON position, allow the receiver to meet a pre-determined level and witness activation of the float switch that will start the pump(s), draining the condensate from the receiver and terminate pump operation at a pre-determined low level in the receiver. The levels have been preset at the pump manufacturer’s factory. **INSTALLER TO ENSURE PUMPS ARE ROTATING IN THE PROPER DIRECTION AT INITIAL START-UP.**

(d) Pump and Motor Measurements

The installer should measure the amp draw within the control panel and compare to the electric motor specifications to ensure the unit is operating within the recommended and specified condition. In addition, it is recommended the installer check the discharge pressure of the pump to measure the pump performance to ensure the unit is operating within specified conditions.

3. Operation Sequence

(a) Operation Sequence

The condensate receiver and pumps are designed to start pump operation based upon the liquid level within the condensate receiver. Upon the liquid level reaching a pre-determined high level in the condensate receiver, the float switch will activate the lead pump that will pump the condensate from the receiver to a predetermined location. Once the liquid level drops to a pre-determined level, the float switch will automatically shut down the lead pump and alternate operation to the lag pump that will repeat the pump operation once the condensate level in the receiver reaches the predetermined high water level.

4. Maintenance

(a) Pump Maintenance

Annual or semi-annual inspection of the condensate unit should be completed by the maintenance personnel or with a certified Federal Pump repair service or by a certified Federal Pump local representative. Motor amp readings and pump discharge pressure readings should be recorded every 6 months and compared to original specified conditions. The user should manually review the installation and ensure any strainers leading to or from the pump system are cleaned, there is no rust or evidence of leaking from the condensate return unit and all electrical alarm and/or operating lights should be checked to ensure bulbs are working. The CCV condensate return units are closed-coupled designed pumps where the bearings are located within the motor housing. These bearings are typically “grease-for-life” type enclosed bearings that do not have external grease connections. Each CCV pump includes a mechanical seal that prevents leaking of the fluid. During inspection should the operator observe leaking from the pump casing the mechanical seal should be changed.

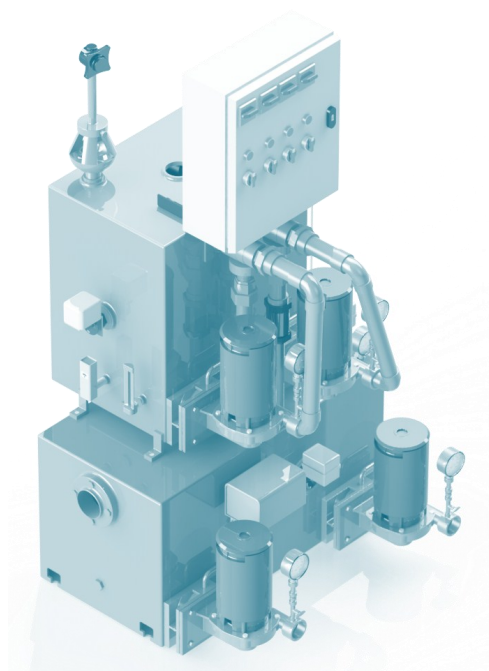
(b) Replacement Parts and Kits

Federal Pumps and its local sales representative stock repair parts and kits to assist the end user should the condensate return unit require repair parts or overhaul. Many of these repair parts are assembled in kits to provide ease in over all maintenance. Contact your local Federal Pumps representative for additional information.

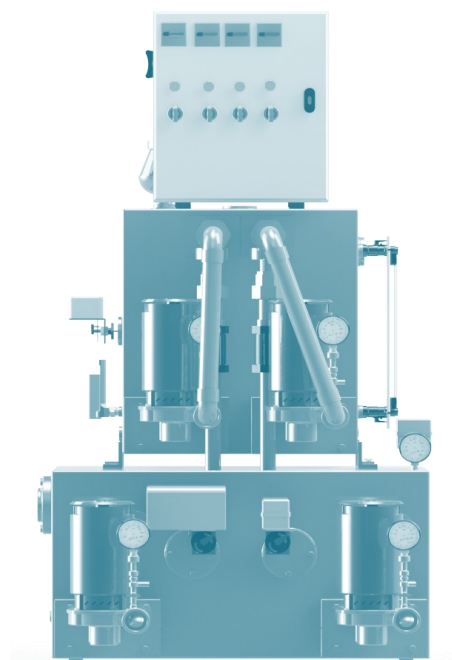
Catalog Sections: VCUD Series

Catalog Section	Section Number
Product Information	P.1-VCUD
Suggested Specs	S.1-VCUD
Material of Construction	M.1-VCUD
Selection Table	ST.1-VCUD
Dimensions	D.1-VCUD
Wiring Diagram	W.D-VCUD
Submittal Sheet	SD.1-VCUD
O&M	OM.1-VCUD
Price Sheets	PR.1-VCUD

VCUD - ISO VIEW



VCUD - Front View



Product Information: VCUD Condensate Return Units

P.1-VCUD

Fig 1: VCUD ISO View

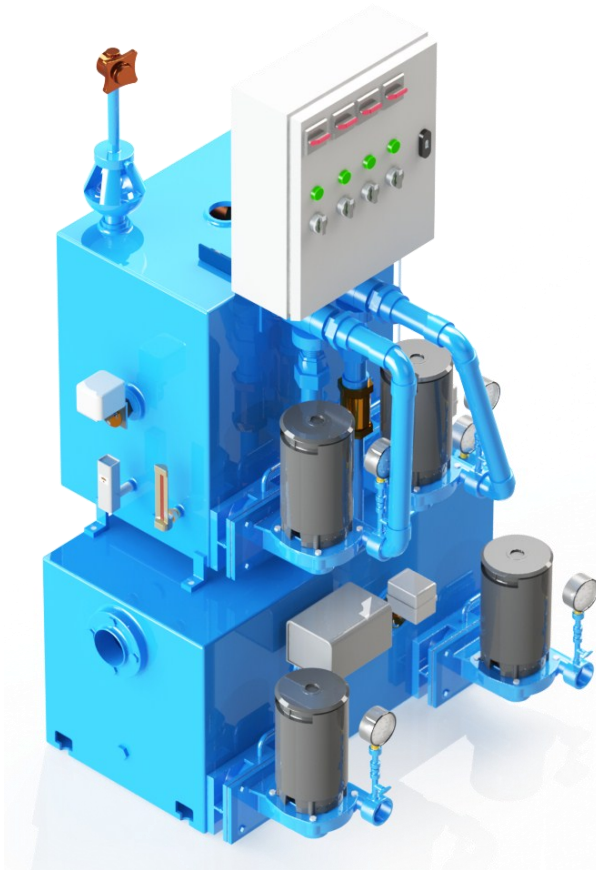


Fig 2: VCUD Front View



The VCUD series are designed for vacuum condensate service where the pump system provides a vacuum: drawing condensate into the receiver.

The innovative VCUD product design combine individually controlled water pumps mounted on a heavy gauge steel receiver (hurling tank) with independent air and water chamber systems. Water circulation through a factory designed venturi orifice system creates a controlled vacuum used to draw condensate from the system into the condensate receiver. This innovative design increases the efficiency of moving condensate from its source to the condensate receiver as compared to standard gravity fed systems. Condensate receivers are available from 35 to 120 Gallon capacity in cast iron construction.

Pumps are rated from 7.5 GPM to 45 GPM with discharge pressures to 60psi with motors sized to 5HP.

- **MOTOR:** Drip-proof, ball bearing design available in single phase and 3 phase voltages.
- **PUMP:** The motor and rotating assembly are removable without disturbing piping connection. Maximum water temperature at the pump suction is 210°F (available to 250°F).
- **RECEIVER:** Single-piece cast iron condensate with above mounted copper bearing steel hurling tank.
- **STANDARD FEATURES:** Gauge glass, thermometer, pump discharge pressure gauges, vacuum pressure switch, low water cut-off switch, high temperature limit switch, mechanical alternating switches, 120V solenoid water bronze make-up valve with air-gap fitting, individual pump isolating valves, factory mounted and wired, UL 508 listed, NEMA 1 control panel containing: individual fuse disconnect switches, across the line magnetic starters with thermal overload protection and under voltage protection, hand-off-auto selector switches, pump running pilot lights, 120V control circuit transformer, terminal strip.

Refer to factory for additional options.

Suggested Specifications: VCUD

S.1-VCUD

Vacuum Duplex Condensate Return Units Series VCUD

Furnish and install as shown in the plans a Federal Pump Corporation series VCUD Duplex Vacuum Condensate Return Unit with each pump rated as shown in the pump schedule. The entire unit including float switches, vacuum gauge, gauge glasses, low water cut off switch, high temp limit switch and associated system accessories shall be mounted and wired to a vacuum condensate control panel, factory assembled and supplied as a single operating unit. Pump manufacturer will provide single unit responsibility of the vacuum condensate unit and electrical controls.

Each duplex vacuum condensate return unit shall include (2) separate receivers, one designed for condensate collection and the second for vacuum generation (hurling tank) both assembled together to operate as a single unit. The condensate collection receiver shall be of cast iron construction and include (2) close coupled cast iron bronze fitted pumps directly connected to close coupled motors sized in accordance with the equipment schedule. Pumps shall be top pull out design to permit removal of the motor and rotating assembly without disturbing discharge piping. Each pump shall include an enclosed bronze balanced impeller and mechanical shaft seal with copper venting line from the seal chamber to the receiver. Electric motors shall be ODP (Open Drip Proof) design or as shown in the equipment schedule. Pumps will be designed to withstand maximum water temperature of 210°F. Isolation valves located between the pump suction and receiver will be provided pre-mounted by the pump manufacturer that provide for the isolation and removal of the entire pump casing for future overhaul and prevent leaking from the receiver. System piping from pump discharge connections shall be provided by the installing contractor.

The vacuum condensate return unit(s) will include a receiver mounted mechanical alternating float switch that alternates the lead operation of each pump. Upon reaching the factory predetermined high water level in the cast iron condensate receiver, the float switch will initiate the lead

pump that will discharge the condensate to a remote boiler feed or other receiver. The float switch will disengage the lead pump upon a predetermined factory set low water level in the cast iron receiver and mechanically alternate the second pump to operate as the lead pump for the next cycle. Float switch will be Square D or equal externally mounted; NEMA 1 design or as shown on the plans.

The vacuum chamber (hurling tank) shall be constructed of 5/8" steel reinforced tank mounted above the cast iron condensate receiver and include (2) close coupled cast iron bronze fitted pumps directly connected to close coupled motors sized in accordance with the equipment schedule. Pumps shall be top pull out design to permit removal of the motor and rotating assembly without disturbing discharge piping. Each pump shall include an enclosed bronze balanced impeller and mechanical shaft seal with copper venting line from the seal chamber to the receiver. Electric motors shall be ODP (Open Drip Proof) design or as shown in the equipment schedule. Pumps will be designed to withstand maximum water temperature of 210°F. Isolation valves located between the pump suction and receiver will be provided pre-mounted by the pump manufacturer that provide for the isolation and removal of the entire pump casing for future overhaul and prevent leaking from the receiver. Vacuum receiver will be provided with a Federal Pump venturi effect assembly piped from the vacuum pumps through isolated individual pump supply lines each provided with independent check valves. The venturi assembly will be supplied in bronze construction with stainless steel mesh and brass perforated end caps. Vacuum pumps will be sized to provide suitable flow rates through the venturi assembly to draw 8" Hg vacuum within the condensate tank drawing condensate from the supply lines to the condensate receiver.

Operation Sequence:

The vacuum condensate unit will provide a vacuum as specified, whose purpose is to draw condensate from the condensate return piping system to the condensate receiver.

Vacuum connections including piping and check valves extending from the vacuum receiver to the condensate receiver will provide a vacuum to the condensate receiver that will draw condensate from the piping system to the condensate receiver. The vacuum chamber mounted above the condensate receiver will circulate water thru a Federal Pump supplied venturi nozzle with integral stainless steel mesh filters with vacuum pumps sized as outlined in the equipment schedule. Upon a drop in condensate tank vacuum to 3" Hg, the system mounted vacuum switch will start the vacuum pump that will circulate water through the system mounted venturi nozzle creating a vacuum designed to draw condensate from the piping system. Increase in condensate liquid level within the condensate receiver will terminate (hurling pump) operation at specified vacuum conditions.

A solenoid water make-up valve located at the top of the vacuum receiver will be initiated by a high temperature limit switch that measures the water temperature in the vacuum receiver adding cold water to the circulating pump operation. In cases where systemic issues including failing steam traps or other issues increase condensate return temperature, the solenoid water make-up valve will open providing cold domestic water into the hurling tank to prevent high temperature condensate fluid circulation in the hurling tank typically caused by failed steam traps or other systemic issues system conditions. Excess water level in the hurling tank will be piped to drain.

System controls will include: Thermometer to measure water temperature within the system, vacuum switch to measure and control operation of the vacuum pumps, high temperature limit switch to operate make-up solenoid water valve, low water cut-off switch to cease operation if water levels remain low, individual pressure gages at each of the (4) pumps and mechanical alternating float switches located at the condensate and vacuum receiver areas. Each sensor and float switch will be assembled to the unit and wired to the system control panel provided as a single unit by the pump manufacturer.

The pump manufacturer will test each vacuum condensate unit prior to shipment. The test shall verify the condensate tank, once isolated from the system, is capable of

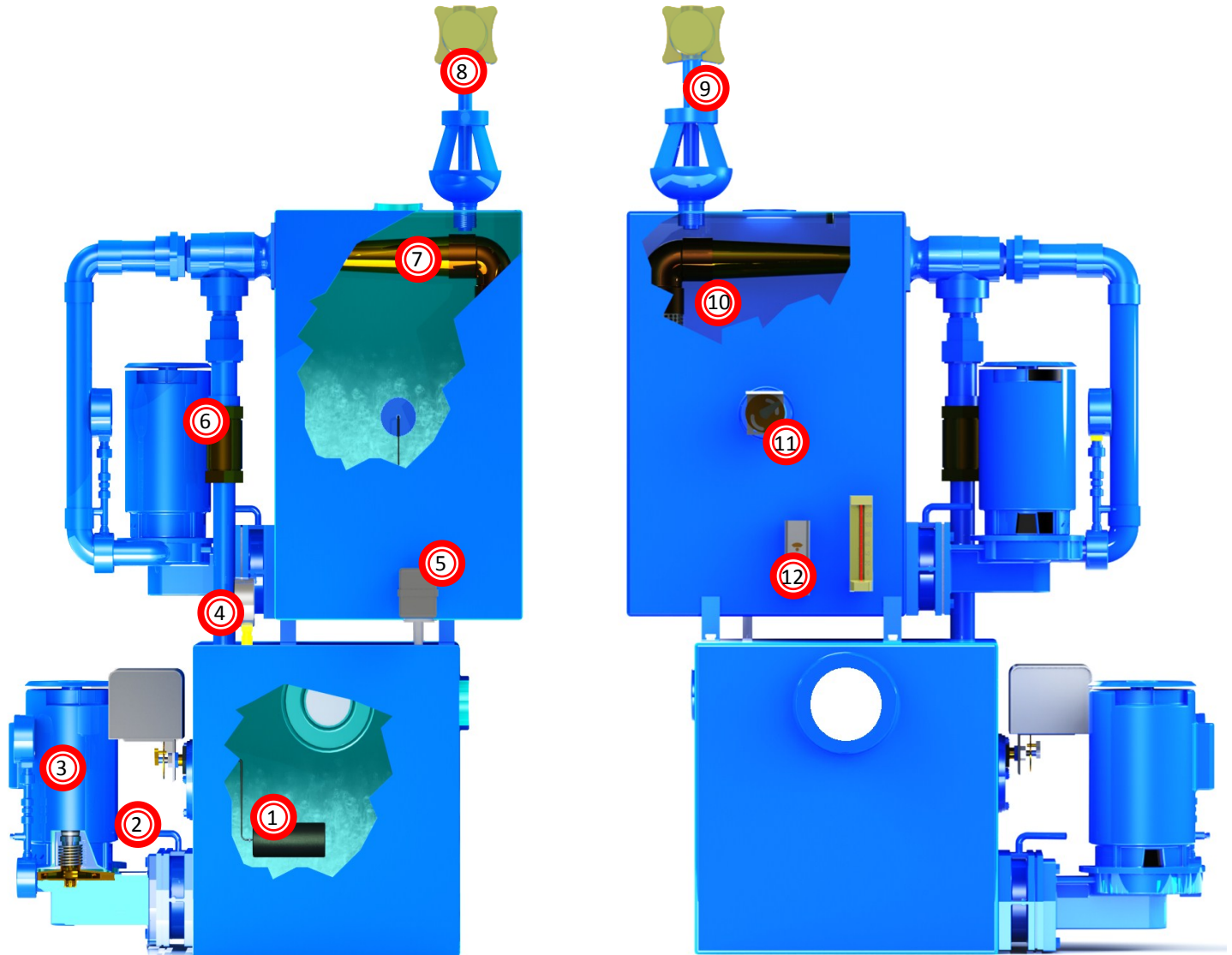
holding specified vacuum for a period of ten minutes.

Contractor will verify downstream steam traps or other sources of condensate are functioning effectively reducing the risk of higher temperature condensate returned to the vacuum condensate system.

Pump manufacturer representative will be available for start-up service and witness the operation of the vacuum condensate unit through 3 separate cycles. During the field start-up, the pump manufacturer's representative will verify all vacuum related connections are installed properly using a (smoke test). A smoldering or smoke like device will be placed at each connection within the vacuum condensate system to visually confirm the smoke is not drawn into the condensate receiver.

Material of Construction: VCUD Series

M.1-VCUD



Item	Item No	Material	Description	Rating	Applications
Float Switch	1	Steel/Brass	Mech. Alt Float Switch	316 St Steel Float	High temp condensate use.
Isolation Valve	2	Cast Iron/Steel	Pump Isolating Valve	100 psi	Isolates pump from receiver
Condensate Motor	3	Steel/Cast Iron	Condensate pump/Motor	210°F/175lb CWP	Condensate Pump/motor combination
Vacuum Supply Line	4	Steel	Vacuum Supply Line	125 psi	Supplies vacuum to condensate tank
Vacuum Switch	5	Steel	Adjustable	NEMA1-115V	Adjustable low/high limit Vacuum Switch
Check Valve	6	Bronze	Vacuum Check Valve	0-25" Hg	Provides vacuum check valve feature
Venturi	7	Brass/Stainless Steel	Venturi/Orifice Vacuum Assembly	100 psi	Provides for system vacuum
Solenoid Valve	8	Bronze	Make-up Valve	NEMA1-115V	Provides for cooling water in Hurling Tank
Air Gap	9	Cast Iron	Air gap fitting	30 psi	Provides air gap between water supply and condensate system
Hurling Tank	10	Copper Bearing Steel	Vented	ASTM A588	Creates System Vacuum
Float Switch	11	Stainless Steel	Low water cut-off switch	NEMA1-115V	Terminates operation on low water level
Aquastat	12	Steel	Temperature sensing element	NEMA1-115V	Tempering high temperature condensate

Selection Table: VCUD Series

ST.1-VCUD

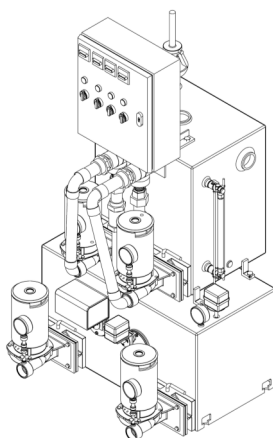
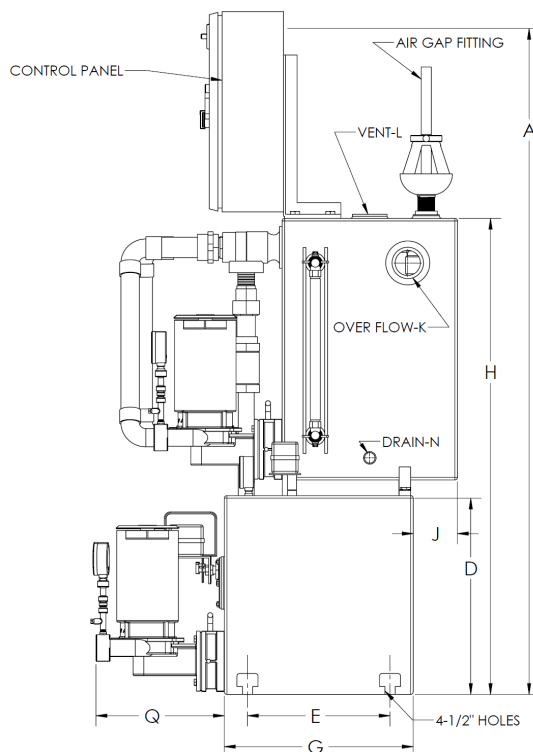
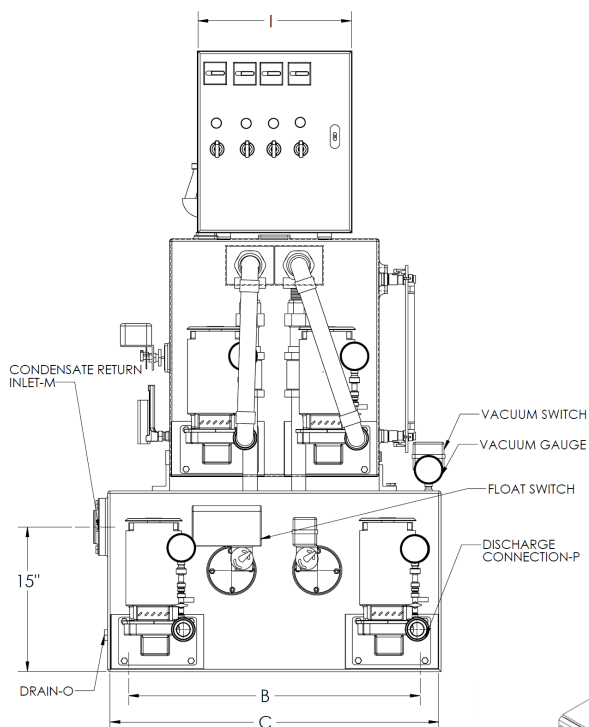
VCUD Condensate Table
10,000-65,000 EDR - 3500RPM Pumps

Sq.-Ft EDR	Pump Pressure psi	Pump Capacity GPM	HP rating Condensate Pump	Pump Model Condensate	Receiver Capacity-CI Gallons	Vacuum Rating at 5 1/2" Hg	Vacuum Pump HP 3500RPM	Vacuum Tank Size Steel	System No.
10,000	10	15	1/3	1.25CCF					VCUD-1010-2-CI-2
	15		1/2	1.25CCF					VCUD-1015-2-CI-2
	20		1/2	1.25CCF					VCUD-1020-2-CI-2
	25		3/4	1.25CCF	35	6	1	38	VCUD-1025-2-CI-2
	30		3/4	1.25CCF					VCUD-1030-2-CI-2
	40		1	1.25CCF					VCUD-1040-2-CI-2
	50		2	1.25CCF					VCUD-1050-2-CI-2
	60		3	1 CGF					VCUD-1060-2-CI-2
15,000	10	22 1/2	1/3	1.25CCF					VCUD-1510-2-CI-2
	15		1/2	1.25CCF					VCUD-1515-2-CI-2
	20		3/4	1.25CCF					VCUD-1520-2-CI-2
	25		3/4	1.25CCF	45	8	1	40	VCUD-1525-2-CI-2
	30		3/4	1.25CCF					VCUD-1530-2-CI-2
	40		1	1.25CCF					VCUD-1540-2-CI-2
	50		1 1/2	1 CGF					VCUD-1550-2-CI-2
	60		3	1 CGF					VCUD-1560-2-CI-2
20,000	10	30	1/3	1.25CCF					VCUD-2010-2-CI-2
	15		1/2	1.25CCF					VCUD-2015-2-CI-2
	20		3/4	1.25CCF					VCUD-2020-2-CI-2
	25		3/4	1.25CCF	45	12	1 1/2	40	VCUD-2025-2-CI-2
	30		1	1.25CCF					VCUD-2030-2-CI-2
	40		1 1/2	1.25CCF					VCUD-2040-2-CI-2
	50		2	1.25CCF					VCUD-2050-2-CI-2
	60		3	1 CGF					VCUD-2060-2-CI-2
30,000	10	45	1/2	1.25CCF					VCUD-3010-2-CI-2
	15		3/4	1.25CCF					VCUD-3015-2-CI-2
	20		3/4	1.25CCF					VCUD-3020-2-CI-2
	25		1	1.25CCF	45	14	3	40	VCUD-3025-2-CI-2
	30		1	1.25CCF					VCUD-3030-2-CI-2
	40		1 1/2	1.25CCF					VCUD-3040-2-CI-2
	50		3	1 CGF					VCUD-3050-2-CI-2
	60		5	1 CGF					VCUD-3060-2-CI-2
40,000	10	60	3/4	1.25CCF					VCUD-4010-2-CI-2
	15		3/4	1.25CCF					VCUD-4015-2-CI-2
	20		1	1.25CCF					VCUD-4020-2-CI-2
	25		1 1/2	1.25CCF	70	22	3	40	VCUD-4025-2-CI-2
	30		2	1.25CCF					VCUD-4030-2-CI-2
	40		3	1.25CCF					VCUD-4040-2-CI-2
	50		3	1.5CGF					VCUD-4050-2-CI-2
	60		5	1 CGF					VCUD-4060-2-CI-2
65,000	10	97 1/2	1	1 1/2 CCF					VCUD-6510-2-CI-2
	15		1 1/2	1 1/2 CCF					VCUD-6515-2-CI-2
	20		1 1/2	1 1/2 CCF					VCUD-6520-2-CI-2
	25		2	1 1/2 CCF	120	36	3	40	VCUD-6525-2-CI-2
	30		2	1 1/2 CCF					VCUD-6530-2-CI-2
	40		3	1 1/2 CCF					VCUD-6540-2-CI-2
	50		5	1 1/2 CCF					VCUD-6550-2-CI-2
	60		7 1/2	1 1/2 CCF					VCUD-6560-2-CI-2

Dimensions: VCUD Series

D.1-VCUD

VCUD Series: 35 Gallon

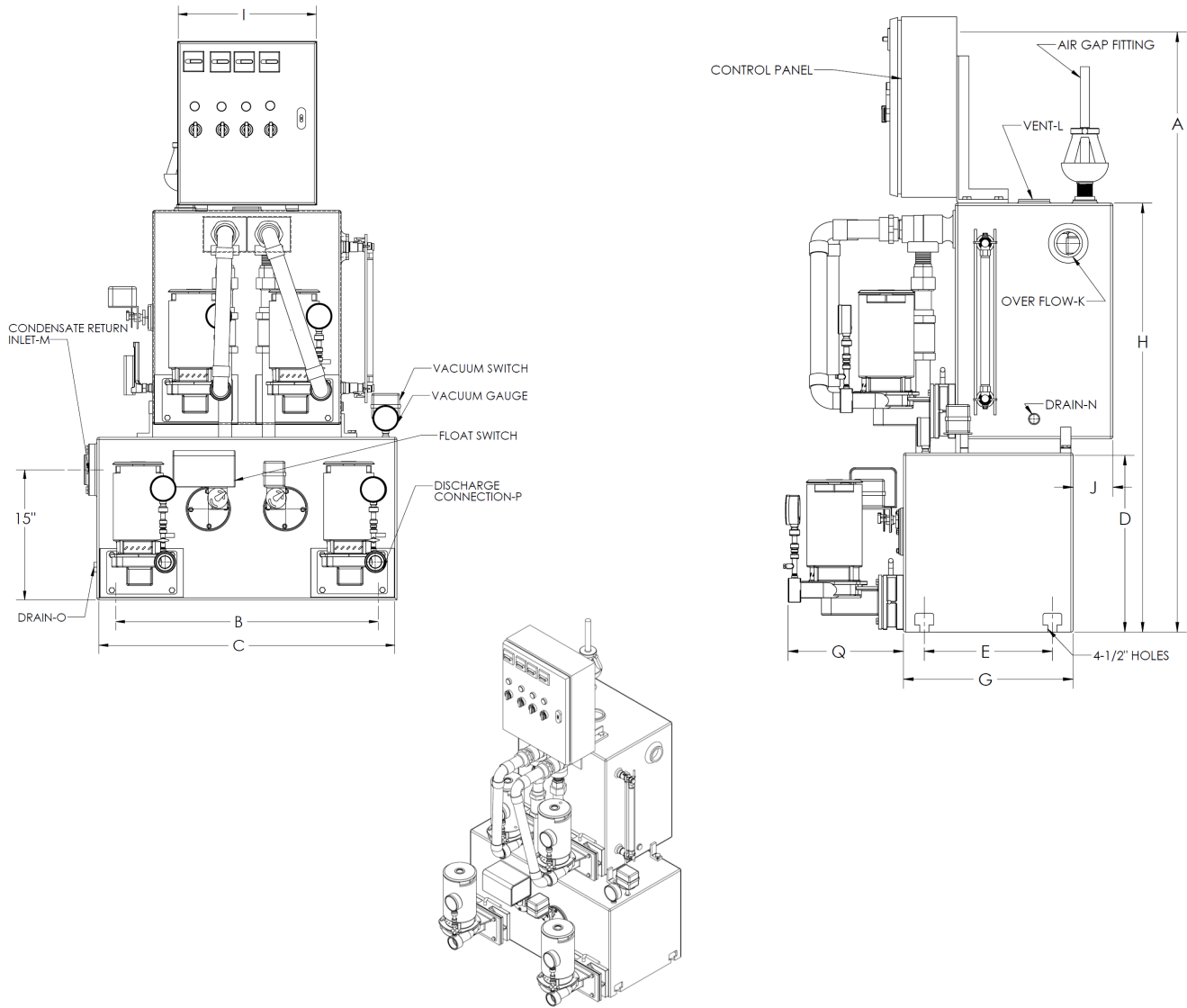


Receiver Size	A*	B	C	D	E	G	H*	I*	J	K	L	M	N	O
35 Gallon	63 1/4	28 1/2	30 3/4	18 3/4	12	15 3/4	42 1/4	20	6	2	2 1/2	3	3/4	3/4

Receiver Size	Pump Discharge Pressure psi	Pump Type	P	Q
35 Gallon	0-50	1.25 CCF	1 1/4 (NPT)	13 3/4
35 Gallon	51-60	1 CGF	1 (FLANGE)	16 3/4

*Note: Dimensions may vary based upon Motor HP and options selected.

VCUD Series: 45 Gallon

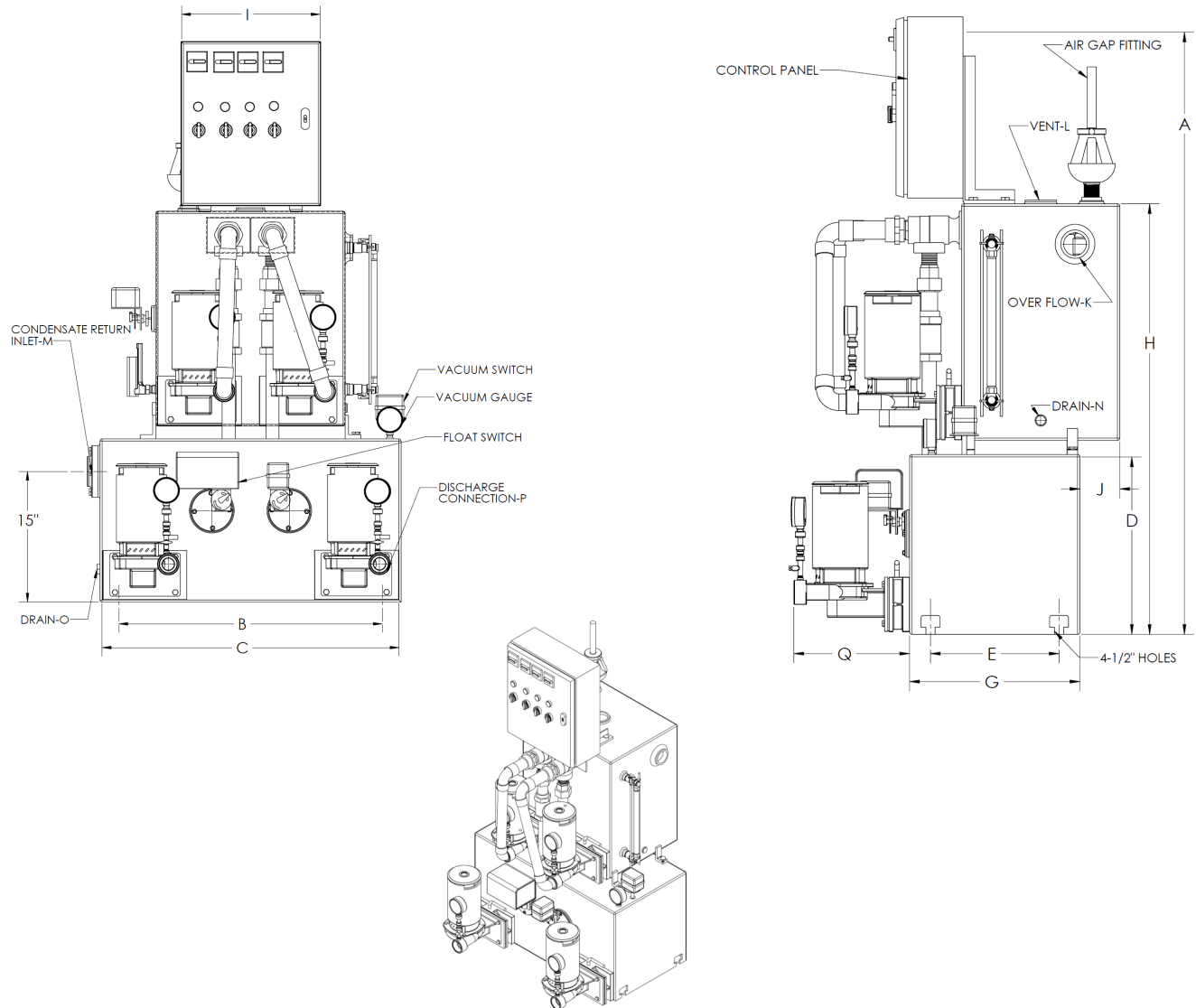


Receiver Size	A*	B	C	D	E	G	H*	I*	J	K	L	M	N	O
45 Gallon	67 1/4	32 3/4	34 3/4	18 3/4	14	17 3/4	46 1/4	20	4	2	2 1/2	3	3/4	3/4

Receiver Size	Pump Discharge Pressure psi	Pump Type	P	Q
45 Gallon	0-40	1.25 CCF	1 1/4 (NPT)	14
45 Gallon	41-60	1 CGF	1 (FLANGE)	17

*Note: Dimensions may vary based upon Motor HP and options selected.

VCUD Series: 70 Gallon

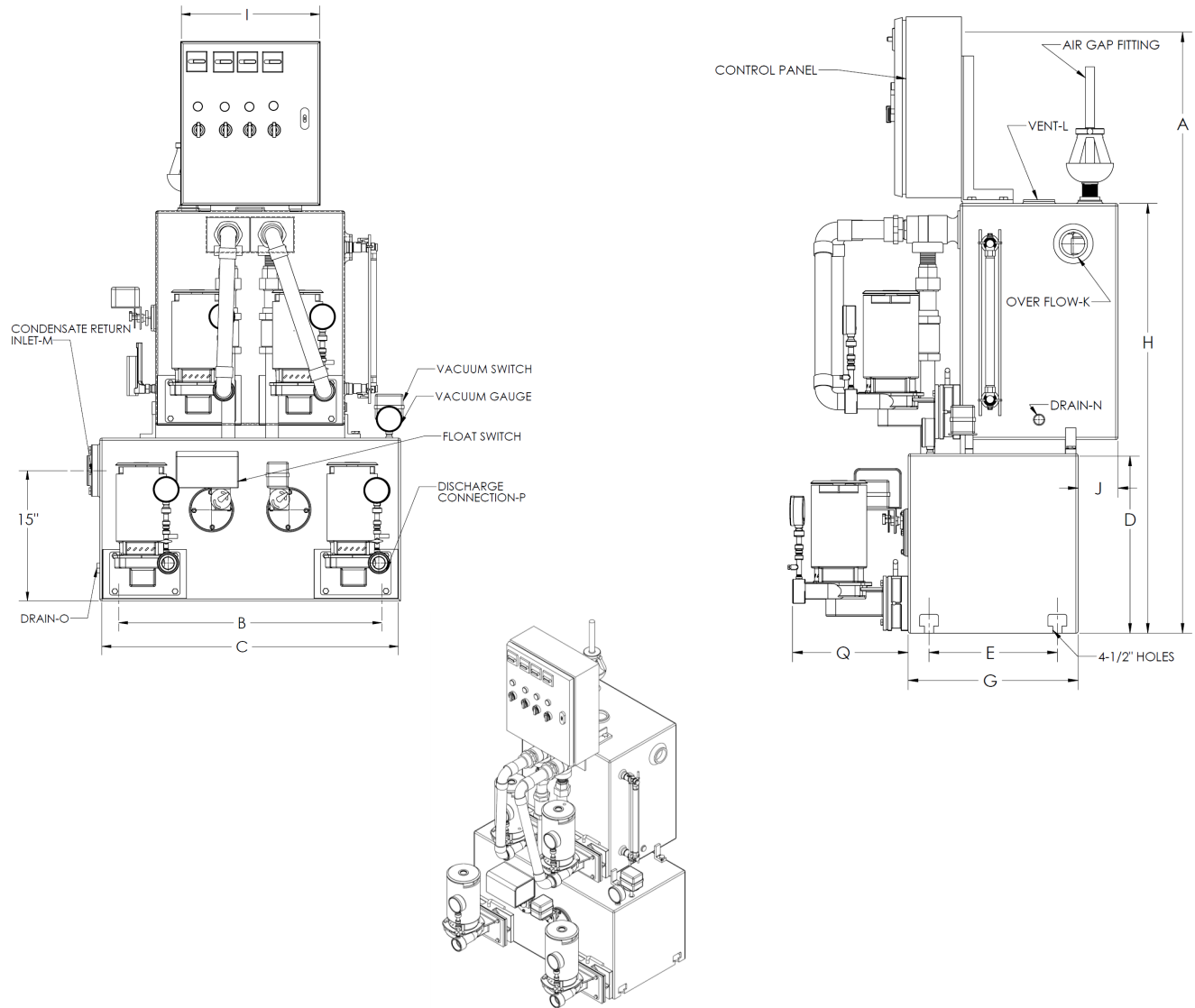


Receiver Size	A*	B	C	D	E	G	H*	I*	J	K	L	M	N	O
70 Gallon	67 1/4	41 1/2	43 3/4	18 3/4	18	21 3/4	46 1/4	20	0	2	2 1/2	3	1 1/4	1 1/4

Receiver Size	Pump Discharge Pressure psi	EDR	Pump Type	P	Q
70 Gallon	0-40	40,000	1.25 CCF	1 1/4	13 3/4
70 Gallon	41-50	40,000	1.5 CGF	1 1/2	16 3/4
70 Gallon	51-60	40,000	1 CGF	1	13 3/4
70 Gallon	0-60	65,000	1.5 CCF	1 1/2	13 3/4

*Note: Dimensions may vary based upon Motor HP and options selected.

VCUD Series: 120 Gallon



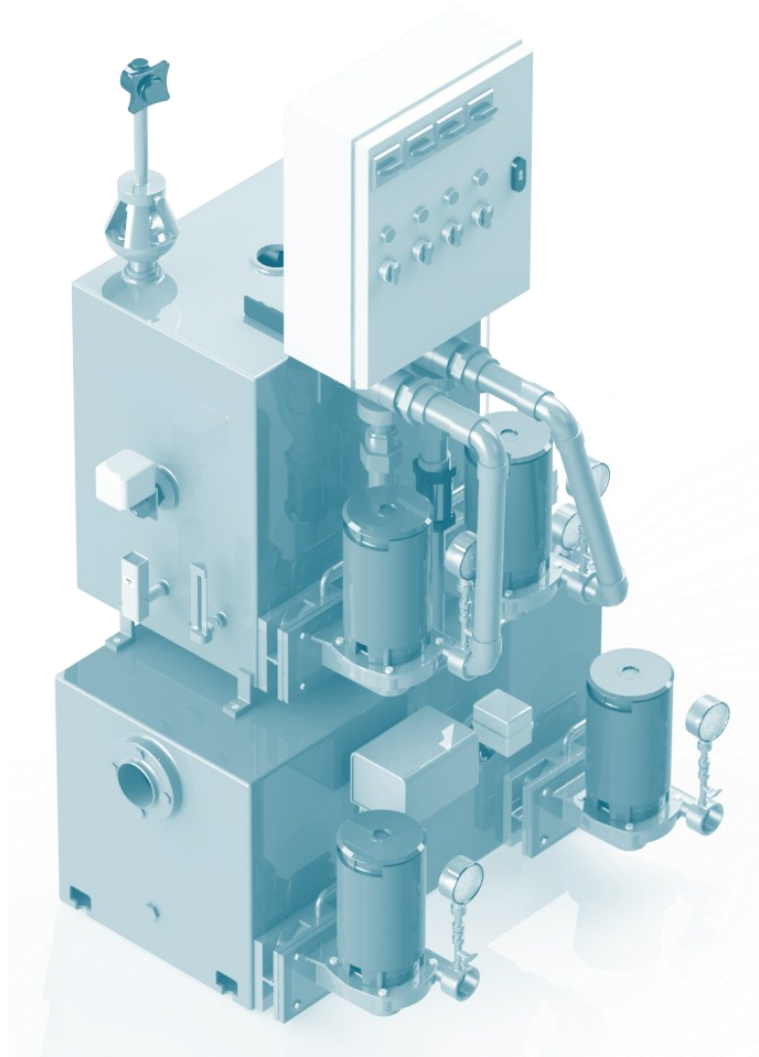
Receiver Size	A*	B	C	D	E	G	H*	I*	J	K	L	M	N	O
120 Gallon	69 1/4	41 1/2	43 3/4	20 3/4	29	32 3/4	48 1/4	20	0	2	2 1/2	4	1 1/4	1 1/4

Receiver Size	Pump Discharge Pressure psi	EDR	Pump Type	P	Q
120 Gallon	0-40	40,000	1.25 CCF	1 1/4	13 3/4
120 Gallon	41-50	40,000	1.5 CGF	1 1/2	16 3/4
120 Gallon	51-60	40,000	1 CGF	1	13 3/4
120 Gallon	0-60	65,000	1.5 CCF	1 1/2	13 3/4

*Note: Dimensions may vary based upon Motor HP and options selected.

Product Code: 1
Vacuum Condensate Units—VCUD

SUBMITTAL DATA



Customer: _____

Purchase Order Number: _____

Project Name: _____

Project Location: _____

Equipment Number: _____

Tag Number: _____

Condensate Receiver Size: _____

Float Switch Type: _____

Control Panel: _____

Accessories: _____

☐ Exterior Thermometer

☐ Gauge Glass

☐ Solenoid Make-Up Valve
with air gap

☐ Control Panel Mounted and Wired

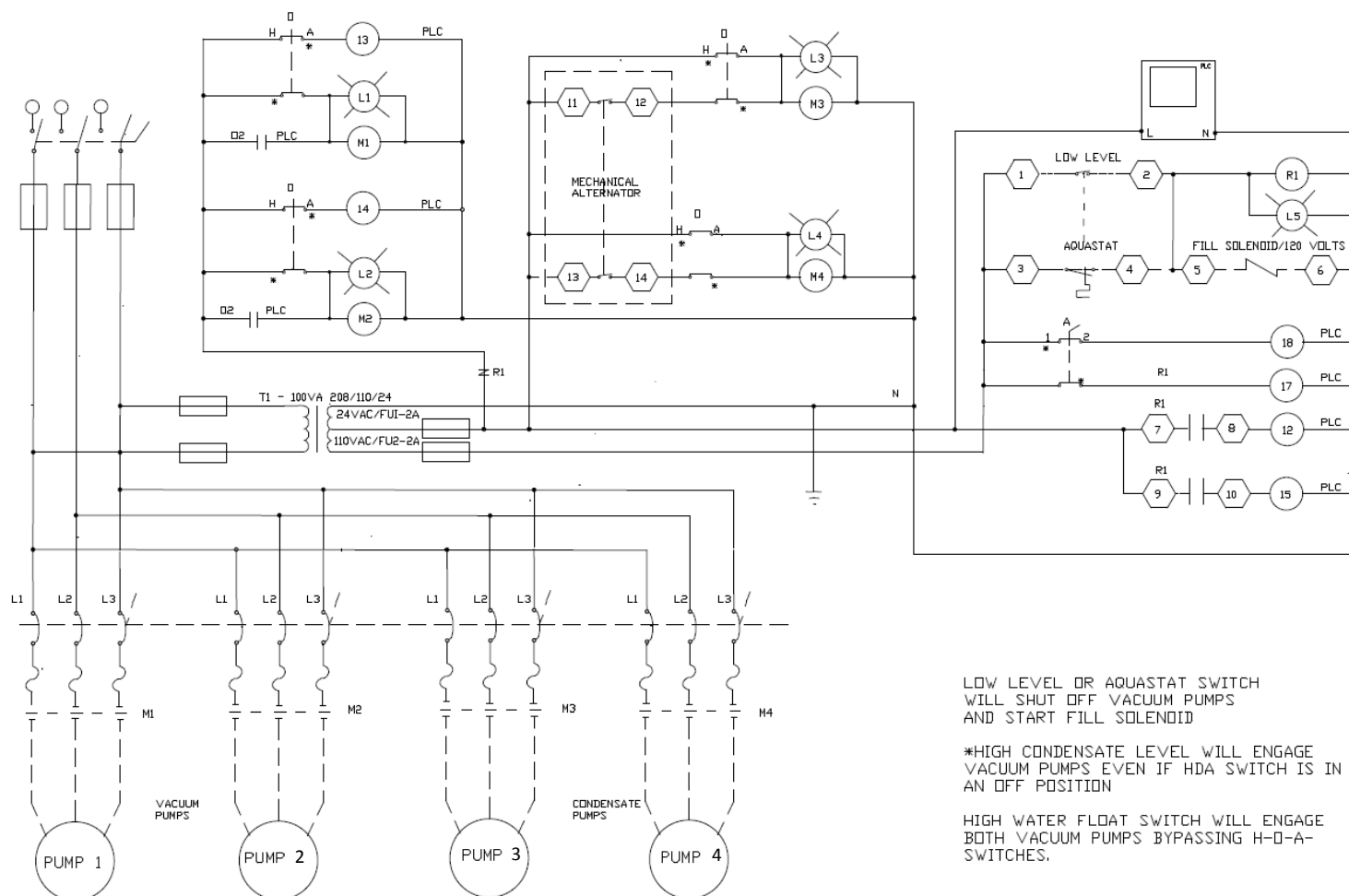
☐ High Temperature Limit Switch

☐ Pump Pressure Gauges

Wiring Diagram

W.D1-VCUD

Wiring Diagram Vacuum Condensate Units–VCUD

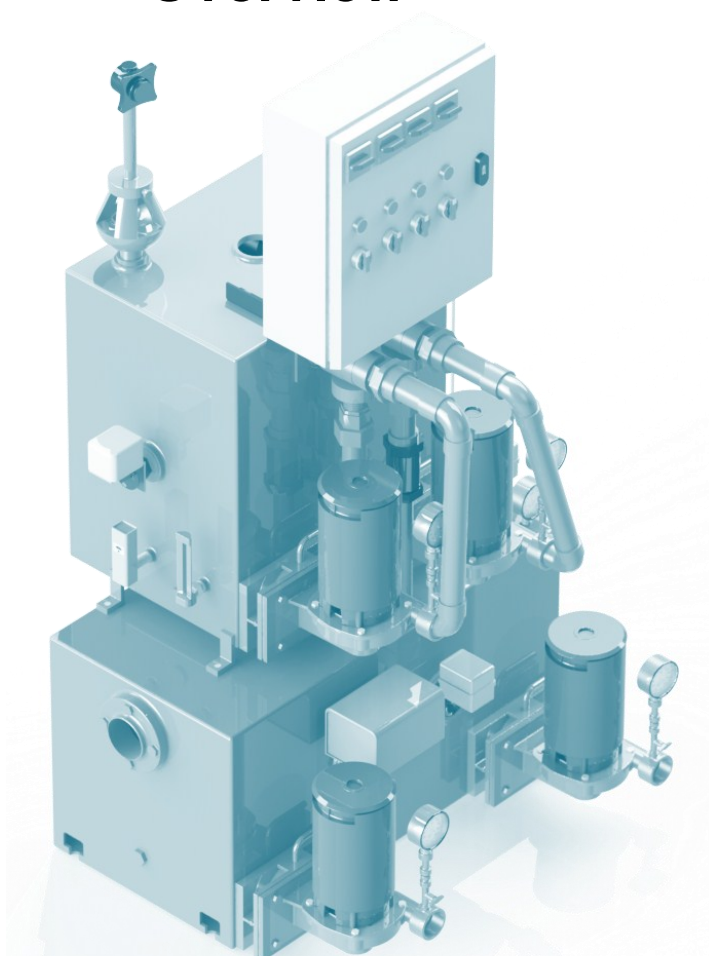


Item	HP	RPM
Condensate Pump 1		3500
Condensate Pump 2		3500
Vacuum Pump 1		3500
Vacuum Pump 2		3500

VOLTS
<input type="checkbox"/> 208
<input type="checkbox"/> 230
<input type="checkbox"/> 460

Product Code: 1
Vacuum Condensate Units-VCUD

Installation, Operation and Maintenance Overview



Warning Symbol! This symbol used throughout the Operations manual draws the user's attention to safety instructions. When used the safety warning decal advises: ATTENTION! BE ALERT! YOUR SAFETY IS INVOLVED! FAILURE TO FOLLOW THESE INSTRUCTIONS MAY RESULT IN A SAFETY HAZARD!

Table of Contents

1. Mechanical Components and Installation

- a. Pump Identification and inspection
- b. Locating the equipment
- c. Recommended piping connections
- d. Pump components
- e. Installation connections

2. Electric Components and Installation

- a. Electric motors
- b. Control Panel
- c. Float Switches and Pilot Devices

3. Start Up/Operation Sequence Check List

- a. Start Up check List
- b. Operation sequence

4. Maintenance

- a. Pump maintenance
- b. Electric motor maintenance
- c. Float switch and control
- d. Receiver Tank

NOTE: SUBSTITUTION OF REPLACEMENT PARTS BY OTHER SUPPLIERS THAN FEDERAL PUMP OR SERVICE PROVIDERS NOT AUTHORIZED BY FEDERAL PUMP VOIDS ALL EQUIPMENT WARRANTY AND MAY LEAD TO EQUIPMENT MALFUNCTION. ENSURE ALL REPLACEMENT PARTS ARE FACTORY AUTHORIZED AND SERVICED BY FACTORY DESIGNATED REPRESENTATIVES!

These instructions are provided as a guideline to support the installation and maintenance of Federal Pump Vacuum Condensate return systems. By following the instructions, the life of the pumping unit can be extended. The Vacuum Condensate Unit should be installed by licensed contractor.

1. Mechanical Components and Installation

Pump Identification and inspection: Immediately upon receipt of the condensate unit, inspect and check the unit for any shipment related damages. If damages are noticed, do not put the unit in operation. Report the damage to the transportation's shipping agent or other parties responsible. Each condensate unit is provided with a nameplate that identifies the serial or model number of the unit. Refer to that serial number when requesting service and replacement parts in the future.

Locating and storing the equipment: Upon receipt of the condensate pump unit, ensure the unit is installed in a dry area with ambient temperatures ranging from 60 degree F to 85 degree F and stored above floor level ensuring the condensate unit is not emerged in water due to any potential flooding. If the unit is not stored but planned for immediate installation, ensure the unit is accessible for inspection and maintenance 360 degrees and provide clearance around the condensate unit for free air circulation; mount the unit on an elevated foundation well above wet or damp floors (3"-6" or as shown on the plans). In addition to floor level potential hazards, ensure the unit is not exposed to any above head dripping potential water intrusion into the electric motors, external switches and/or control panel. Locate the unit as shown on the construction documents (new or replacements) and ensure a well-qualified and licensed mechanic is involved in the installation. Once the vacuum condensate unit is mounted to the elevated pump pad; the units should be shimmed level and grouted with cement. Once the grouting cement has hardened, tighten down the "hold-down" bolts. Hold down bolts should be sized and located as shown in the plans or the product specifications provided with this unit.

Recommended piping connections: The Federal Pump condensate unit generally is provided with a receiver tank, hurling (vacuum) tank, float switch(s), pump and electric motor combination and a system mounted control panel. Connections from the receiver tank to the pump are completed at the factory prior to shipment to the customer. If the piping from the receiver to the pump is missing or damaged, do not proceed with the installation until the damage is repaired. Connections to the condensate receiver include:

- a. Drain connections from the receiver to a separate drain.
- b. Connections from the discharge of the pump to its intended area of service.
- c. Vent pipe from the top of the condensate unit to a predetermined vent connection.
- d. The condensate unit has a make-up water solenoid valve which will require the contractor to connect to a fresh water source.
- e. These connection should be made by a licensed contractor, certified in boiler or mechanical equipment installations, and authorized by local permitting agencies.



Caution: DO NOT connect steam returns from equipment or common returns which carry high pressure steam directly to the vacuum return mains or to the vacuum pump. High pressure steam returns must be piped through a properly sized flash tank or economizer, prior to connecting them to the vacuum return mains. Return mains should be sloped downward to the vacuum condensate accumulator tank. Lift connections should not be used on return mains. If necessary to lift the condensate to a height greater than four (4) feet, several steps of lift connections should be used.

Piping connections should be made in accordance with all local building code requirements. Refer to your local building department inspectors for additional information. Piping provided by the installer should include pipe hangers located and sized accordingly to ensure there is no pipe strain transmitted to the pumps. Connections from each pump to the system piping should include individual isolating valves, check valves and other fittings as shown in the drawings.



Caution: DO NOT connect steam returns from equipment or common returns which carry high pressure steam directly to the vacuum return mains or to the vacuum pump. High pressure steam returns must be piped through a properly sized flash tank or economizer, prior to connecting them to the vacuum return mains. Return mains should be sloped downward to the vacuum condensate accumulator tank. Lift connections should not be used on return mains. If necessary to lift the condensate to a height greater than four (4) feet, several steps of lift connections should be used.

fig 1: Typical Piping Arrangement for Duplex Vacuum Condensate Unit

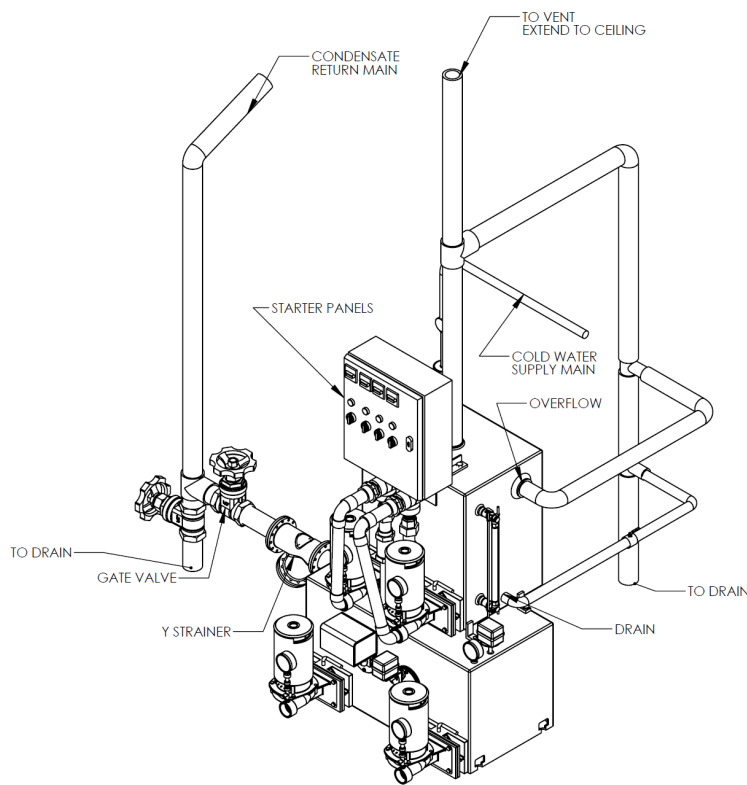
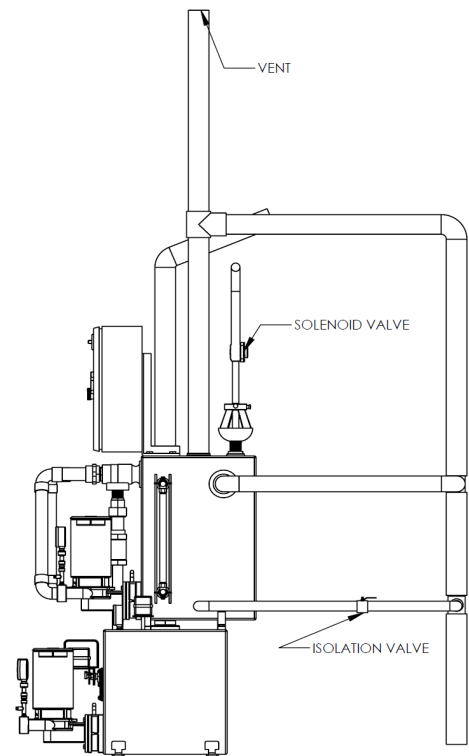


fig 2: Typical Piping Arrangement for Duplex Vacuum Condensate Unit



Pump and System components: The Federal Pump vacuum condensate unit includes a number of electromechanical devices that should be identified prior to pressuring the system or prior to providing power to the system. Those devices may include:

1. Lower condensate receiver tank with (2) pumps-duplex system; (1) pump for a simplex system
2. Float switch(s) for on/off automatic operation of the condensate pumps.
3. Gauge glass for external view of the condensate level in the tank (optional)
4. Pressure gages to measure pump discharge pressure (optional)
5. Thermometer to measure receiver liquid temperatures (optional)
6. Hurling tank that develops the vacuum with separate set of (2) circulating pumps.
7. Temperature and vacuum switches used for automatic operation of the system.
8. Low water level cut-out switch
9. Control panel wired to the system electric components.



Prior to starting the unit, ensure each component is in sound condition and connected appropriately. Prior to any electric or water connections the installer needs to verify the electric power source (voltage and cycles) corresponds to the motor nameplate power requirements. The installer needs to ensure the pump rotates freely when turned by hand prior to any electrical connections. ENSURE POWER TO THE VACUUM CONDENSATE UNIT IS SHUT OFF AT THE SOURCE PRIOR TO THE INITIAL INSPECTION OF THE UNIT AND DURING START-UP PROCEDURES.

Upon inspection of the condensate unit and verification that external connections are adequate for the intended use, the installer should proceed with the electrical inspection:

2. Electric components and installation: The Federal Pump condensate unit is provided with electric motors, float switches and (in most cases) a receiver mounted control panel that has been pre-wired and pre-set by the factory. Check all connections to ensure they are tight and are not exposed to potential water flooding, leaks or damage. Upon inspection and approval of the electric connections between the motors, controller and float switch and pilot devices the installer is ready to complete the installation.

- a. **Electric Motors:** The duplex vacuum condensate system includes (4) electric motors. (2) of the motors are associated with the condensate pump (lower tank system) and (2) of the motors are associated with the vacuum hurling tank located above the condensate tank. These motors are prewired by the pump manufacturer to the system control panel that controls the automatic operation of the system. Installer to check all wiring connections from the motors to the system control panel and ensure all connections is tight. Each motor should turn freely by hand and operate in a clockwise direction. When electric service is provided to the control panel, the installer should “bump test” the motors to ensure they are turning in a clockwise direction (when viewed from the backside of the motor) If the motor is turning in the wrong direction, on 3 phase current, interchange any 2 wires at the incoming line terminal block . Installer to ensure the system is located in a dry place, elevated 3-6” off the floor on its own “pad” and ensure there is no overhead leaking pipes or pipes that may have external condensate that may, in the future, provide water dripping conditions over the vacuum condensate system installation. If there is the possibility of overhead water or other fluids dripping or leaking onto the vacuum condensate system, the installer should cease initial start-up and remedy that potential concern.
- b. **Control Panel:** The vacuum condensate system has been provided with a factory designed and installed control panel that provides for automatic operation of the system. Control panels may vary from geographic region or may vary based upon the selection criteria. Refer to the pump manufacturer’s earlier submissions and wiring diagrams for the specific service and application for this unit. In general, however, the control panel includes starters, power disconnect switch, pilot run lights HOA switches that provide for the overall system control. The control panel has been pre-wired and connected to the electric motors, various control switches and ready to be wired to the power supply. Connect the power supply to the control panel and ensure the control panel disconnect switch, H-O-A switches are both in the ‘OFF’ position.



Electric connections: A certified electrician or other qualified mechanic will connect the electric power to the control panel disconnect switch and follow the wiring diagram provided in the control panel by the factory prior to shipment. Power from the source should remain in the off position during installation and start-up review! Do not provide power to the vacuum condensate unit until all preliminary start-up items mentioned in this operations and maintenance manual have been reviewed thoroughly by qualified and licensed installers well versed in electromechanical equipment installations.

- c. **System Switches:** The vacuum condensate unit has been provided with system switches that provide operating performance to the system controller to assist in its automatic operation. Those switches may vary by installation but generally include:
- ◇ **Condensate tank float switch:** The float switch mounted in the lower condensate tank measures the liquid level within the lower condensate tank and signals operation of the lead pump based upon pre-determined high water level in the condensate receiver tank. Once the tank level recedes, due to the pumping action, the float switch will terminate pump operation and automatically place the second pump in a lead position to start operation of the pumps when the level within the condensate receiver again rises to high level. This switch is referred to as a mechanical alternating float switch that automatically alternates the lead pump operation ensuring even wear and tear for the duplex pumps.
 - ◇ **Vacuum Switch:** The vacuum switch, located in the lower condensate receiver, measures the vacuum within the lower condensate receiver and signals the vacuum jet pumps (upper tank chamber) to automatic operation based upon the vacuum declining in the lower tank. Generally speaking the range of operation provides for the pumps to be started at 3"HG vacuum and terminate at 8" vacuum. These settings may vary by installation and should be reviewed against the previous approved submissions from the pump manufacturer prior to the installation of the equipment.
 - ◇ **Aquastat:** The system is provided with an aquastat (pre-set at 190°F) that measures the temperature of the condensate liquid and signals the operation of the system solenoid valve if temperature limits exceed the design conditions. The solenoid valve, installed in the upper hurling tank, provides cold water to the hurling tank reducing water temperature within design conditions. Continued operation of higher temperature condensate return may signal stem trap failure elsewhere in the system that needs to be addressed immediately.



HIGH WATER TEMPERATURE IN THE CONDENSATE SYSTEM MAY INDICATE DOWNSTREAM FAILURE OF STEAM TRAPS. EXCESSIVE TEMPERATURES THAT EXCEED 220 DEGREE F REQUIRE INSPECTION OF STEAM TRAPS OR OTHER SYSTEM CONDITIONS. IF SYSTEM CONDITIONS REMAIN AT HIGHER TEMPERATURES, THE SYSTEM WILL SHUT-DOWN AND SIGNAL HIGH WATER TEMPERATURE ALARMS. NOTE: FAILURE TO ADDRESS THOSE SYSTEM DOWNSTREAM ISSUES MAY DAMAGE THE PUMPING EQUIPMENT PERMANENTLY!

3. Start –UP Check List

- ☐ Power is off!
- ☐ All valves leading to and from the condensate unit are in the off position!
- ☐ All piping connections have been made as outlined in the engineer's plans!
- ☐ All piping connections are tight!
- ☐ All electrical connections are tight!
- ☐ Pump is installed on elevated pad and not subject to any dripping water or other fluids!
- ☐ All switches are in place, not loose or broken!
- ☐ System is bolted down and grouted in place!

System Piping: Open all valves from system piping to the vacuum condensate system.

- ◇ **Hurling tank:** Slowly open the water supply to the hurling tank (upper tank) and fill the hurling tank until the water level reaches ½ way level of the sight glass provided on the exterior of the hurling tank. Close off water supply. Open isolating valves from the hurling tank to the pumps mounted in the upper hurling tank and check for leaks.
- ◇ **Condensate tank:** Slowly open main fed line from the system to the condensate tank allowing the condensate tank to fill. Open the valves from the condensate tank to the pumps mounted on the condensate tank and check for leaks. Open discharge valves from the condensate pumps to system discharge and check for leaks.
- ◇ **Vacuum Switch:** Check the system vacuum gauge and ensure the set points are calibrated properly. Default factory settings are for low vacuum at 3"Hg to start pumps and high vacuum at 8" Hg to terminate pump operation.
- ◇ **Aquastat:** Check system settings for aquastat and ensure temperature setting is set for 190°F at minimum.
- ◇ **System Strainer:** The vacuum condensate pump should include an inlet strainer sized according to plans. Ensure the inlet strainer is free of all debris.
- ◇ **Vent connection:** Ensure hurling tank (upper tank) vent connections are in place and all valves open.
- ◇ **Power:** Energize system control panel. Open power disconnect switch from remote source and check electrical connections. Ensure disconnect switch and HOA switches on the vacuum condensate system are in the off position. Open system control panel and test for incoming power.



Upon completion of the electric installation, the installer should measure the electric connections with appropriate amp gages or other devices to ensure the connections are appropriate and meet all local building codes.

Upon completion of the electric connections, the installer will ensure the system controller door is closed and move the disconnect switch or switches from “off” position to “on” position and turn the HOA into hand position and “bump start” the pump motors ensuring they are rotating in the proper direction. Once the motor rotation is confirmed (operating in clockwise rotation when viewed from the motor end), the installer will place the HOA switch into “Auto” operation.

At this point the system has been energized and will automatically operate engaging the hurling tank pumps almost immediately responding to lack of vacuum in the lower condensate tanks. The installer should view the factory mounted vacuum switch and witness the increased vacuum in the lower tank. As the vacuum increases from 0” Hg to factory pre-set upper limit of 8”Hg, it is recommended to operate a “smoke test” where the use of a burning cigar may be employed and placed near every fitting to ensure the fittings are secure. If smoke from the cigar is drawn into the receiver, the installer should shut the system down, tighten all connections and re-energize the system.

Operation sequence:

The Federal Pump vacuum condensate unit has been designed to provide automatic operation of the entire system once system power and piping connections have been completed.

Basis of operation:

The vacuum condensate system has been designed to draw a vacuum in the range of 3-8” Hg (or as otherwise specified and pre-designed)

Lower Condensate Collection: The lower portion of the system includes the condensate receiver and pumps that are designed to start pump operation based upon the liquid level within the condensate receiver. Upon the liquid level reaching a pre-determined high level in the condensate receiver, the float switch will activate the lead pump that will pump the condensate from the receiver to a predetermined location. Once the liquid level drops to a pre-determined level, the float switch will automatically shut down the lead pump and alternate operation to the lag pump that will repeat the pump operation once the condensate level in the receiver reaches the predetermined high water level. The lower condensate receiver includes a vacuum connection from the hurling tank (mounted above the lower condensate receiver) that provides a vacuum in the condensate receiver designed to draw condensate from the system to the lower condensate receiver. This vacuum condition generally provides a 3”-8”Hg vacuum condition within the condensate receiver designed to draw condensate from the system to the receiver. The lower condensate receiver includes:

- Set of pumps (Duplex system)
- Mechanical Alternating Float switch (automatic operation of the lower condensate pumps)
- Isolation valves between the pumps and the condensate tanks that provide for pump maintenance.
- Individual pump pressure switches that provide indication of pump pressure ratings.
- Tank mounted thermometer that provides indication of condensate temperature.
- Gauge glass that provides external indication of liquid level in the condensate receiver.
- Vacuum switch that initiates or terminates accumulator tank pumps that develop system vacuum.
- High temperature alarm switch that signals unusually high condensate return temperatures and initiates cool water make up solenoid valve to reduce condensate temperatures.



Installer to ensure all downstream steam traps are in proper working order. Steam traps that are not in proper working condition may allow the transmission of higher temperature condensate to the vacuum condensate system causing for system failure or indication of high temperature condensate signaling failed steam trap operation. Federal Pump has designed a solenoid make-up valve that introduces cooled water to the system to assist in offsetting increased condensate return temperatures due to failing steam traps and may result in purging high temperature water to drain due to failed steam traps. Condensate return water in excess of 210 degrees F may signal this condition.

Upper Unit: Hurling Tank: The fabricated steel tank located above the cast iron condensate collection tank has been designed to induce a vacuum in the lower condensate tank by pumping water through a venturi (mounted inside the hurling tank) whose purpose is to create a vacuum in the condensate tank inducing condensate flow to the lower condensate receiver.

Federal Pump has preset the vacuum pressure switch to initiate hurling tank pump operation when the vacuum drops to 3"Hg signaling the pumps located in the Upper Hurling Tank to initiate operation and draw the desired vacuum. The hurling tank includes (2) pumps designed to operate in a similar lead-lad fashion as designed for the lower condensate pumps. Increasing flow through the fixed venturi by operating both hurling tank mounted pumps increases the vacuum due to increased flow through the fixed venturi and orifice.

A vacuum feed line extending from the hurling tank to the lower condensate tank provides the vacuum to the lower condensate tank thus driving total system operation.

4. Maintenance

Annual system maintenance is recommended for the Vacuum Condensate Systems.

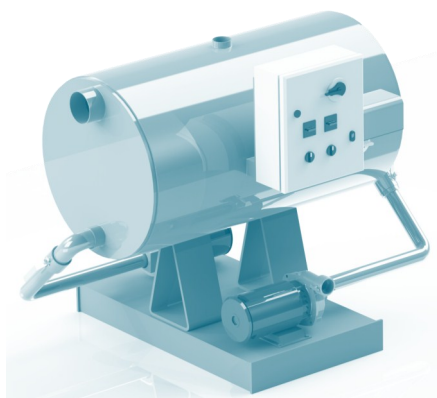
1. Clean out all strainers that lead to and from the vacuum condensate unit. Ensure all vent lines are clear from obstruction.
2. Review each pump/motor combination at least twice a year and check for any small leaks. These leaks may require changing the mechanical seals.
3. Each Federal Pump is provided with enclosed bearings that do not require greasing. Refer to Federal Pump local sales and service center for replacement parts kits.
4. Maintenance mechanic should review the system at least twice a year to ensure pumps are alternating properly, ensure there are no leaks in the condensate tanks and ensure condensate liquid temperatures are below 220 degree F.
5. System related issues including failed steam traps or other system design issues will affect the life of the vacuum condensate unit. Ensure system valves, piping and other components are operating properly.

Use only Authorized Federal Pump replacements parts to ensure warranty and extended product life.

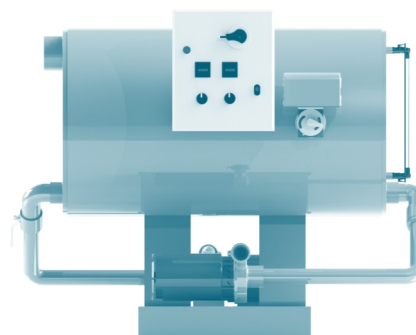
Catalog Sections: CCH Series

Catalog Section	Section Number
Product Information	P.1-CCH
Suggested Specs	S.1-CCH
Material of Construction	M.1-CCH
Selection Table	ST.1-CCH
Dimensions	D.1-CCH
O&M	OM.1-CCH
Price Sheets	PR.1-CCH

CCH ISO



CCH FRONT



Product Information: CCH Condensate Return Units

P.1-CCH

Fig 1: CCH ISO View

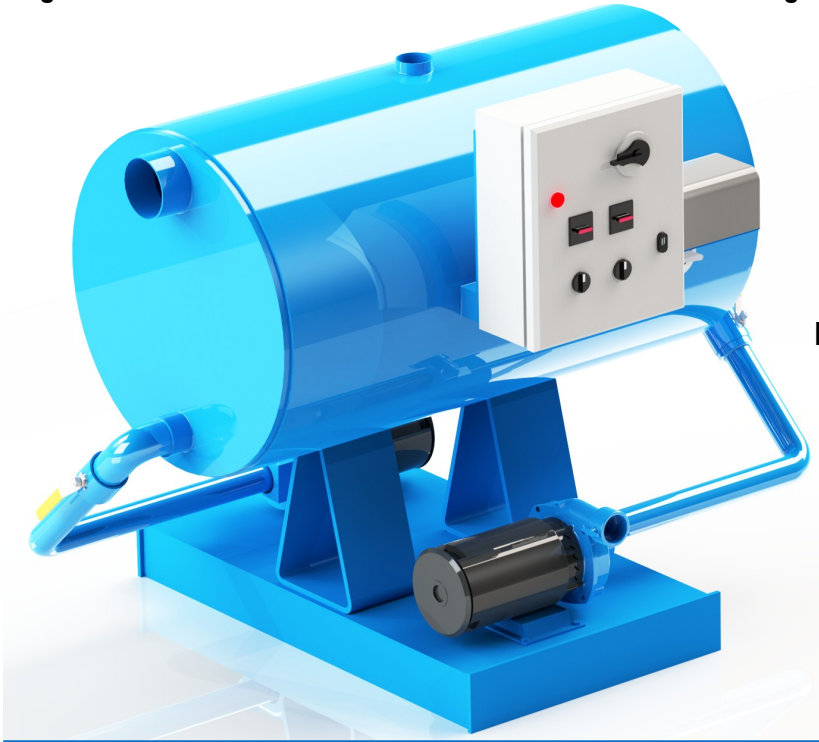


Fig 2: CCH Front View

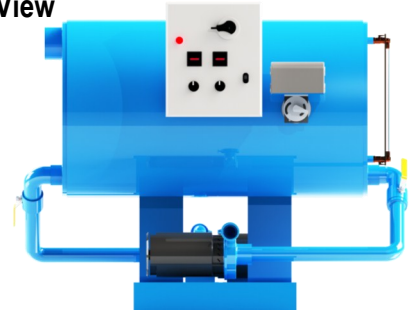
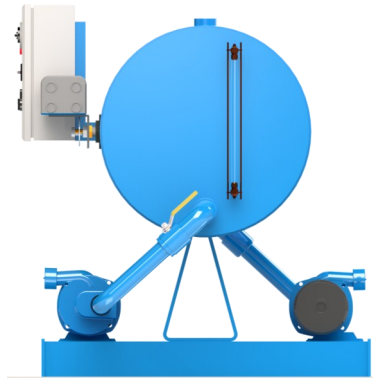


Fig 3: CCH Side View



Heavy Fabricated Steel—14 to 150 gallon Receiver

The CCH series are designed for Condensate Return applications to 150,000 SQ. EDR where NPSH requirements may require an elevated tank. System provided with: fabricated steel Receiver, CI bronze fitted pumps, ODP motors, NEMA 1 MECH alternating float switch.

Pump capacity range to **225 GPM at 80 psi**. Motor HP ratings to 15 HP. **Fractional motors provided single phase as standard.**

- **MOTOR:** Drip-proof, ball bearing design. Units are available with 3500 RPM motors.
- **PUMP:** Bronze fitted, close-coupled, centrifugal design, with bronze sleeve fully protecting the shaft. Mechanical shaft seals are standard. Maximum water temperature at pump suction is 210°F.
- **TANK:** Heavy duty fabricated steel—14 through 150 gallon capacity as standard. Larger sizes available upon request
- **FLOAT SWITCH:** Single mechanical alternating float switch for duplex unit.
- **RECEIVER:** Heavy welded steel construction, designed for vented operation.
- **MODIFICATIONS:** Inlet strainer, gauge glass, thermometer, pump discharge pressure gauges, electrical control panels, and electric motors in TEFC and other motor enclosures.

Suggested Specifications: CCH

S.1-CCH

Suggested Specifications for Architects, Engineers and Product Users Series CCH

Furnish and install as shown in the plans a Federal Pump Corporation Series CCH Duplex Condensate Return Unit with each pump rated as shown in the pump schedule. The entire unit including float switch and controls shall be factory assembled and pre-wired and supplied as a single operating unit.

Each duplex condensate return unit shall include (2) cast iron bronze fitted pumps connected to motors sized in accordance with the equipment schedule. Pumps shall be rated to 125lb construction at 210 degree F. Each pump shall include an enclosed bronze balanced impeller and mechanical shaft seal with copper venting line from the seal chamber to the receiver. Electric motors shall be ODP (Open Drip Proof) design or as shown in the equipment schedule. Pumps will be designed to withstand maximum water temperature of 210 degrees F. Isolation valves located between the pump suction and receiver will be provided pre-mounted by the pump manufacturer that provide for the isolation and removal of the entire pump casing for future overhaul and prevent leaking from the receiver. System piping from pump discharge connections shall be provided by the installing contractor.

The receiver shall be constructed of welded steel of the size shown in the equipment schedule. Receivers shall include a drain and vent connection of size as shown in the plans. A single 1/2 " diameter receiver sight glass with isolating valves will be provided for the external view of condensate water level in the receiver. Contractor shall provide drainage connection from the condensate return receiver drain piped to an acceptable drain line.

The condensate return unit(s) will include a receiver mounted mechanical alternating float switch that alternates the lead operation of each pump. Upon reaching the factory predetermined high water level in the cast iron receiver, the

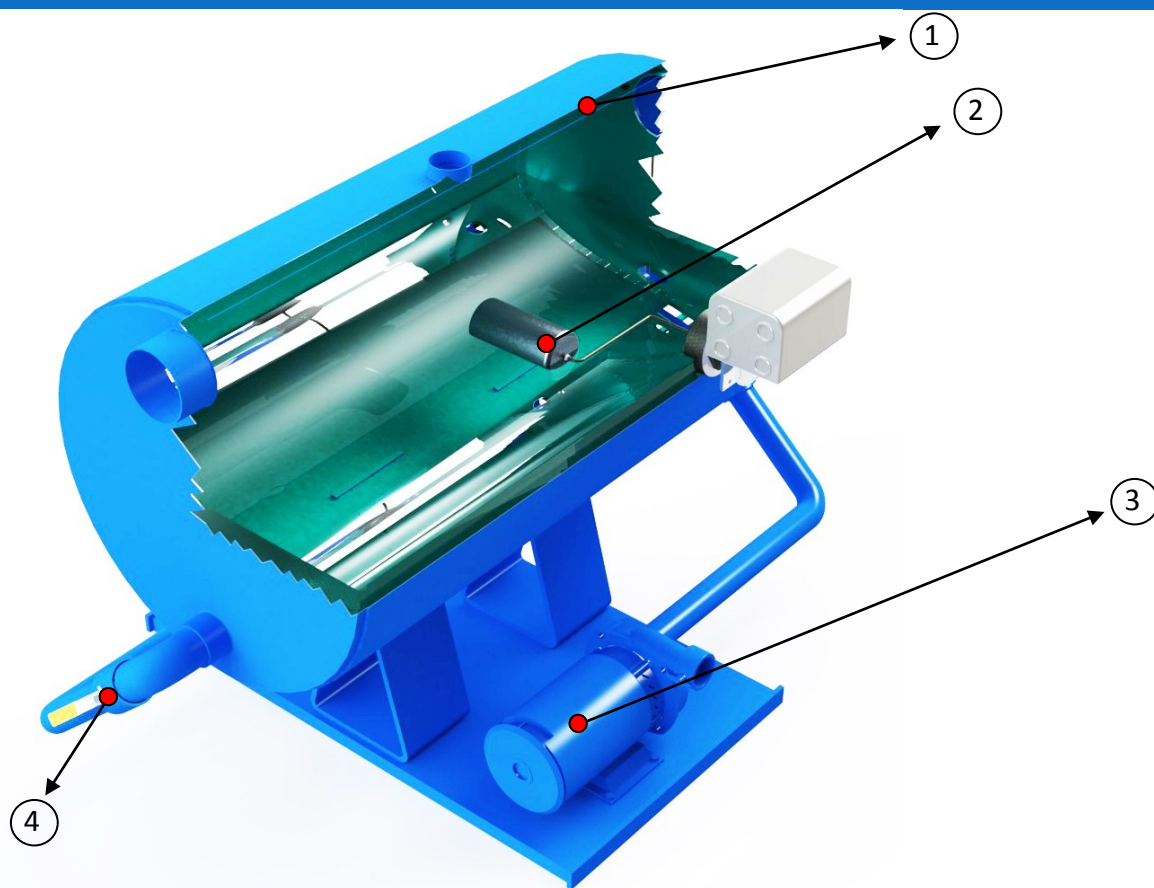
float switch will initiate the lead pump that will discharge the condensate to a remote boiler feed or other receiver. The float switch will disengage the lead pump upon a predetermined factory set low water level in the cast iron receiver and mechanically alternate the second pump to operate as the lead pump for the next cycle. Float switch will be Square D or equal externally mounted; NEMA 1 design or as shown on the plans.

Pump motors and mechanical alternating float switch shall be pre-wired and connected to a duplex control panel of NEMA 1 (or as shown in the plans) construction and will include individual motors starters, disconnect switches, HOA switches, run lights and designed for automatic operation. The duplex control panel shall be mounted on the cast iron receiver and provided as a single functioning unit.

The pump manufacturer will test all system connections, prior to shipment, and paint the equipment in machine enamel finish. The pump manufacturer's representative will be available for startup on site and ensure operating and maintenance manuals have been provided to the maintenance personnel.

Material of Construction: CCH

M.1-CCH



Item	Item No	Material	Description	Rating	Applications
Receiver	1	Steel	Condensate Tank	10 psi	Stores Condensate Return
Float Switch	2	Steel/Brass	Mech. Alt Float Switch	316 St Steel Float	High Temp Condensate Use.
Condensate Motor	3	Steel/Cast Iron	Condensate pump/Motor	210°F/175lb CWP	Condensate Pump/Motor Combination
Isolation Valve	4	Cast Iron/Steel	Pump Isolating Valve	100 psi	Isolates Pump from Receiver

3500 RPM: CCH Selection Table

Sq.-Ft EDR	Pump Pressure psi	Pump Capacity GPM	Pump Series	HP Rating (ea.)	Receiver Capacity Gallons	Product Selection
2000	10	3	CC	1/3	14	CCH-210-2S
4000		6	CC	1/3	14	CCH-410-2S
6000		9	CC	1/3	14	CCH-610-2S
8000		12	CC	1/3	14	CCH-810-2S
10000		15	CC	1/3	14	CCH-1010-2S
15000		22 1/2	CC	1/3	26	CCH-1510-2S
20000		30	CC	1/3	26	CCH-2010-2S
25000		37 1/2	CC	1/3	33	CCH-2510-2S
30000		45	CC	1/3	33	CCH-3010-2S
40000		60	CC	1/2	45	CCH-4010-2S
50000		75	CC	3/4	63	CCH-5010-2S
65000		97 1/2	CC	1	63	CCH-6510-2S
75000		112 1/2	CC	1	100	CCH-7510-2S
100000		150	CG	1 1/2	100	CCH-10010-2S
150000		225	CG	3	150	CCH-15010-2S
2000	15	3	CC	1/3	14	CCH-215-2S
4000		6	CC	1/3	14	CCH-450-2S
6000		9	CC	1/3	14	CCH-615-2S
8000		12	CC	1/3	14	CCH-815-2S
10000		15	CC	1/3	14	CCH-1015-2S
15000		22 1/2	CC	1/3	26	CCH-1515-2S
20000		30	CC	1/3	26	CCH-2015-2S
25000		37 1/2	CC	1/3	33	CCH-2515-2S
30000		45	CC	1/2	33	CCH-3015-2S
40000		60	CC	3/4	45	CCH-4015-2S
50000		75	CC	3/4	63	CCH-5015-2S
65000		97 1/2	CC	1 1/2	63	CCH-6515-2S
75000		112 1/2	CC	1 1/2	100	CCH-7515-2S
100000		150	CG	2	100	CCH-10015-2S
150000		225	CG	3	150	CCH-15015-2S
2000	20	3	CC	1/3	14	CCH-220-2S
4000		6	CC	1/3	14	CCH-420-2S
6000		9	CC	1/3	14	CCH-620-2S
8000		12	CC	1/3	14	CCH-820-2S
10000		15	CC	1/3	14	CCH-1020-2S
15000		22 1/2	CC	1/3	26	CCH-1520-2S
20000		30	CC	1/2	26	CCH-2020-2S
25000		37 1/2	CC	1/2	33	CCH-2520-2S
30000		45	CC	1/2	33	CCH-3020-2S
40000		60	CC	3/4	45	CCH-4020-2S
50000		75	CC	1	63	CCH-5020-2S
65000		97 1/2	CC	1 1/2	63	CCH-6520-2S
75000		112 1/2	CC	2	100	CCH-7520-2S
100000		150	CG	3	100	CCH-10020-2S
150000		225	CG	3	150	CCH-15020-2S
2000	30	3	CC	1/2	14	CCH-230-2S
4000		6	CC	1/2	14	CCH-430-2S
6000		9	CC	1/2	14	CCH-630-2S
8000		12	CC	1/2	14	CCH-830-2S
10000		15	CC	1/2	14	CCH-1030-2S
15000		22 1/2	CC	1/2	26	CCH-1530-2S
20000		30	CC	3/4	26	CCH-2030-2S
25000		37 1/2	CC	3/4	33	CCH-2530-2S
30000		45	CC	3/4	33	CCH-3030-2S
40000		60	CC	1	45	CCH-4030-2S
50000		75	CC	1 1/2	63	CCH-5030-2S
65000		97 1/2	CC	2	63	CCH-6530-2S
75000		112 1/2	CC	3	100	CCH-7530-2S
100000		150	CG	5	100	CCH-10030-2S
150000		225	CG	5	150	CCH-15030-2S

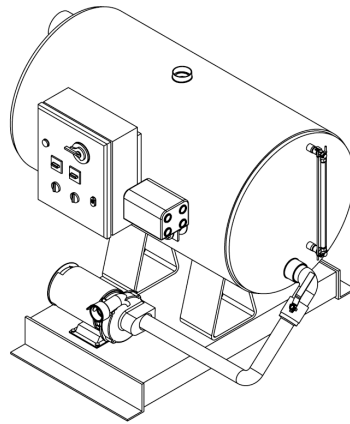
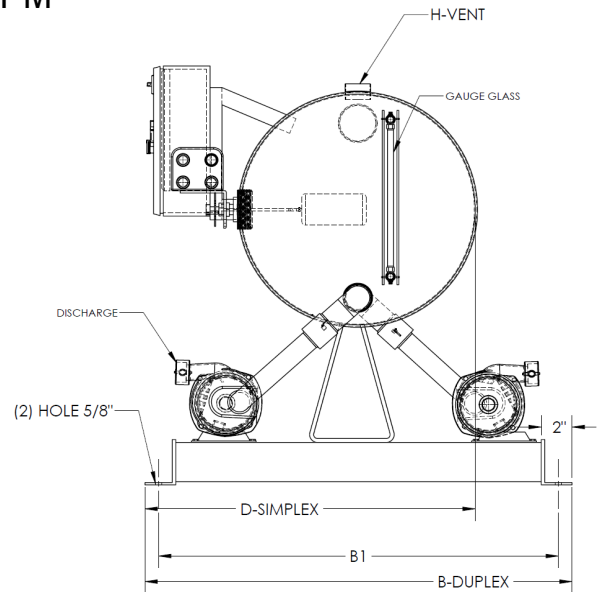
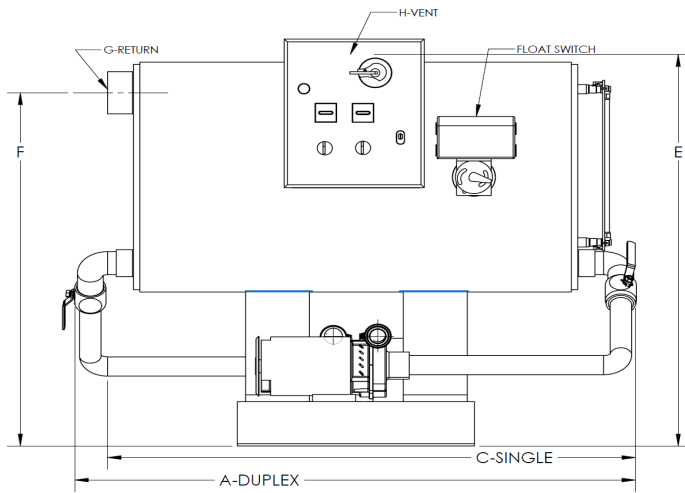
Sq.-Ft EDR	Pump Pressure psi	Pump Capacity GPM	Pump Series	HP Rating (ea.)	Receiver Capacity Gallons	Basic Order No (Steel Receiver)
2000	40	3	CC	3/4	14	CCH-240-2S
4000		6	CC	3/4	14	CCH-440-2S
6000		9	CC	3/4	14	CCH-640-2S
8000		12	CC	3/4	14	CCH-840-2S
10000		15	CC	3/4	14	CCH-1040-2S
15000		22 1/2	CC	3/4	26	CCH-1540-2S
20000		30	CC	1	26	CCH-2040-2S
25000		37 1/2	CC	1	33	CCH-2540-2S
30000		45	CC	1 1/2	33	CCH-3040-2S
40000		60	CC	1 1/2	45	CCH-4040-2S
50000		75	CG	2	63	CCH-5040-2S
65000		97 1/2	CG	3	63	CCH-6540-2S
75000		112 1/2	CG	5	100	CCH-7540-2S
100000		150	CG	7 1/2	100	CCH-10040-2S
150000		225	CG	5	150	CCH-15040-2S
2000	50	3	CC	1	14	CCH-250-2S
4000		6	CC	1	14	CCH-450-2S
6000		9	CC	1	14	CCH-650-2S
8000		12	CC	1	14	CCH-850-2S
10000		15	CC	1	14	CCH-1050-2S
15000		22 1/2	CC	1	26	CCH-1550-2S
20000		30	CC	1 1/2	26	CCH-2050-2S
25000		37 1/2	CC	2	33	CCH-2550-2S
30000		45	CC	2	33	CCH-3050-2S
40000		60	CG	3	45	CCH-4050-2S
50000		75	CG	3	63	CCH-5050-2S
65000		97 1/2	CG	5	63	CCH-6550-2S
75000		112 1/2	CG	5	100	CCH-7550-2S
100000		150	CG	7 1/2	100	CCH-10050-2S
150000		225	CG	7 1/2	150	CCH-15050-2S
2000	60	3	CC	1 1/2	14	CCH-260-2S
4000		6	CC	1 1/2	14	CCH-460-2S
6000		9	CC	1 1/2	14	CCH-660-2S
8000		12	CG	1 1/2	14	CCH-860-2S
10000		15	CG	1 1/2	14	CCH-1060-2S
15000		22 1/2	CG	2	26	CCH-1560-2S
20000		30	CG	2	26	CCH-2060-2S
25000		37 1/2	CG	3	33	CCH-2560-2S
30000		45	CG	3	33	CCH-3060-2S
40000		60	CG	3	45	CCH-4060-2S
50000		75	CG	5	63	CCH-5060-2S
65000		97 1/2	CG	5	63	CCH-6560-2S
75000		112 1/2	CG	7 1/2	100	CCH-7560-2S
100000		150	CG	10	100	CCH-10060-2S
150000		225	CG	10	150	CCH-15060-2S
2000	70	3	CG	2	14	CCH-270-2S
4000		6	CG	2	14	CCH-470-2S
6000		9	CG	2	14	CCH-670-2S
8000		12	CG	2	14	CCH-870-2S
10000		15	CG	2	14	CCH-1070-2S
15000		22 1/2	CG	3	26	CCH-1570-2S
20000		30	CG	3	26	CCH-2070-2S
25000		37 1/2	CG	5	33	CCH-2570-2S
30000		45	CG	5	33	CCH-3070-2S
40000		60	CG	5	45	CCH-4070-2S
50000		75	CG	5	63	CCH-5070-2S
65000		97 1/2	CG	7 1/2	63	CCH-6570-2S
75000		112 1/2	CG	10	100	CCH-7570-2S
100000		150	CG	10	100	CCH-10070-2S
150000		225	CG	15	150	CCH-15070-2S

Sq.-Ft EDR	Pump Pressure psi	Pump Capacity GPM	Pump Series	HP Rating (ea.)	Receiver Capacity Gallons	Basic Order No (Steel Receiver)
2000	80	3	CG	3	14	CCH-280-2S
4000		6	CG	3	14	CCH-480-2S
6000		9	CG	3	14	CCH-680-2S
8000		12	CG	3	14	CCH-880-2S
10000		15	CG	3	14	CCH-1080-2S
15000		22 1/2	CG	3	26	CCH-1580-2S
20000		30	CG	3	26	CCH-2080-2S
25000		37 1/2	CG	5	33	CCH-2580-2S
30000		45	CG	5	33	CCH-3080-2S
40000		60	CG	5	45	CCH-4080-2S
50000		75	CG	5	63	CCH-5080-2S
65000		97 1/2	CG	10	63	CCH-6580-2S
75000		112 1/2	CG	10	100	CCH-7580-2S
100000		150	CG	10	100	CCH-10080-2S
150000		225	CG	15	150	CCH-15080-2S

Dimensions: CCH Series

D.1-CCH

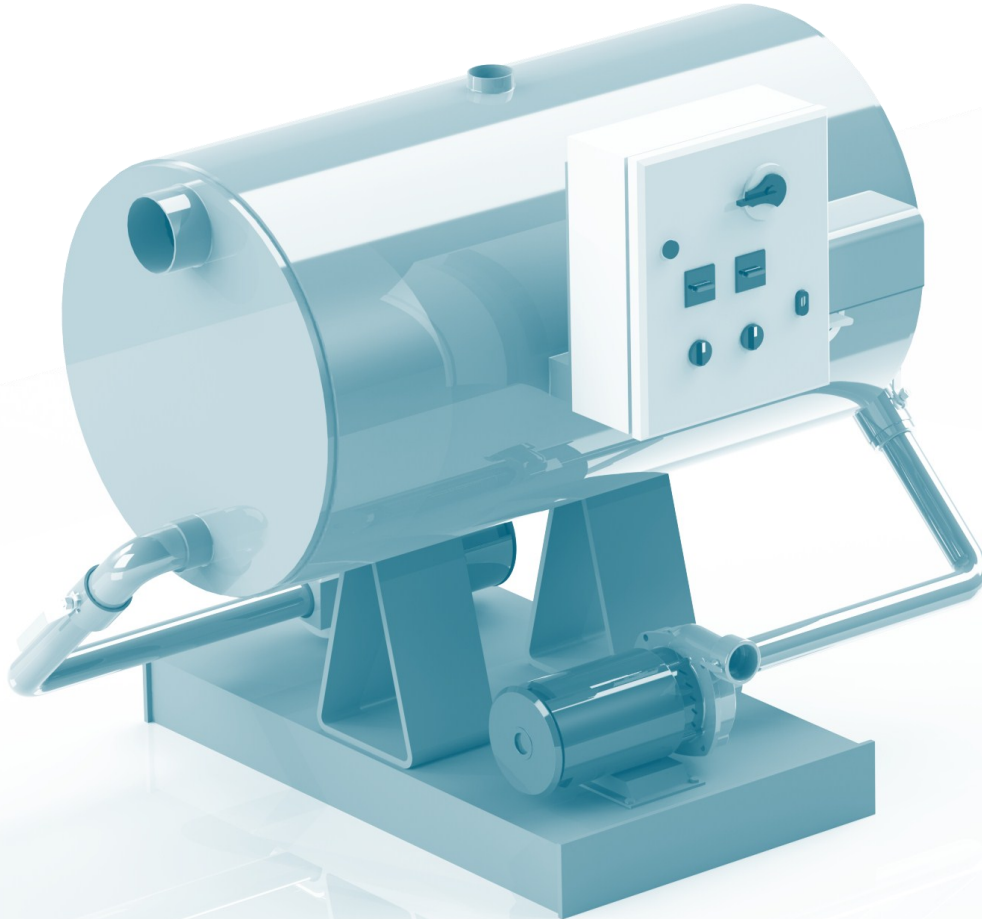
CCH: 3500 RPM



MODEL NO.	TANK CAP (GAL)	TANK DIA.	TANK SHELL SIZE	PUMP	A	B	B1	C	D	E	F	G	H	DRAIN
210-1080	14	14	14X18	CC CG	29	29 35	27 33	26	22 25	25 27	22 24	2	1	1
1510-2080 2510-3080 4010-4080	26 33 45	18	18X24 18X38 18X36	CC CG	37 41	29 35	27 33	32 37	24 27	29 31	26 28	2 3	1 1	1 1
5010-6580	63	22	22X36	CC CG	50	29 35	27 33	46	26 29	33 35	30 32	3	1 1/4	1
7510-10080	100	24	24X48	CC CG	66	29 35	27 33	59	27 30	36 38	32 34	4	1 1/4	1
15010-15080	150	30	30X48	CC CG	68	29 35	27 33	61	30 33	42 44	38 40	4	1 1/2	1 1/4

Product Code: 1
Condensate Return Units-Series-CCH

Installation, Operation and Maintenance Overview



Warning Symbol! This symbol used throughout the Operations manual draws the user's attention to safety instructions. When used the safety warning decal advises: ATTENTION! BE ALERT! YOUR SAFETY IS INVOLVED! FAILURE TO FOLLOW THESE INSTRUCTIONS MAY RESULT IN A SAFETY HAZARD!

Location of Installation: _____

Serial No: _____

Model No: _____

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- a. Operation Sequence

4. Maintenance

- a. Pump Maintenance
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NOTE: SUBSTITUTION OF REPLACEMENT PARTS BY OTHER SUPPLIERS THAN FEDERAL PUMP OR SERVICE PROVIDERS NOT AUTHORIZED BY FEDERAL PUMP VOIDS ALL EQUIPMENT WARRANTY AND MAY LEAD TO EQUIPMENT MALFUNCTION. ENSURE ALL REPLACEMENT PARTS ARE FACTORY AUTHORIZED AND SERVICED BY FACTORY DESIGNATED REPRESENTATIVES!

These instructions cover the installation and maintenance of Federal Pump condensate return systems. By following the instructions, the life of the pumping unit can be extended.

1. Mechanical Components and Installation

(a) Pump Identification

Pump Identification and inspection: Immediately upon receipt of the condensate unit, inspect and check the unit for any shipment related damages. If damages are noticed, do not put the unit in operation. Report the damage to the transportation's shipping agent or other parties responsible. Each condensate unit is provided with a stainless steel nameplate that identifies the serial or model number of the unit. Refer to that model number within this manual when requesting service and replacement parts in the future.

(b) Locating Equipment

Upon receipt of the condensate pump unit, ensure the unit is installed in a dry area with ambient temperatures ranging from 60 degree F to 85 degree F and stored above floor level ensuring the condensate unit is not emerged in water due to any potential flooding.

If the unit is not stored but planned for immediate installation, ensure the unit is accessible for inspection and maintenance 360 degrees and provide clearance around the condensate unit for free air circulation; mount the unit on an elevated foundation well above wet or damp floors (3"-6" or as shown on the plans). In addition to floor level potential hazards, ensure the unit is not exposed to any above head dripping potential water intrusion into the electric motors, external switches and/or control panel. Locate the unit as shown on the construction documents (new or replacements) and ensure a well-qualified and licensed mechanic is involved in the installation.

Once the condensate unit is mounted to the elevated pump pad; the units should be shimmed level and grouted with cement. Once the grouting cement has hardened, tighten down the "hold-down" bolts. Hold down bolts should be sized and located as shown in the plans or the product specifications provided with this unit.

(c) Recommended Piping Connections

The Federal Pump condensate unit generally is provided with a receiver tank, float switch(s), pump and electric motor combination and a system mounted control panel. Connections from the receiver tank to the pump are generally completed at the factory prior to shipment to the customer. If the piping from the receiver to the pump is missing or damaged, do not proceed with the installation until the damage is repaired. Connections to the condensate receiver include:

- a. Drain connections from the receiver to a separate drain.
- b. Connections from the discharge of the pump to its intended area of service.
- c. Vent pipe from the top of the condensate unit to a predetermined vent connection.
- d. In some cases, the condensate unit may have a make-up water line piped from a fresh water source to the condensate receiver.
- e. These connection should be made by a licensed contractor, certified in boiler or mechanical equipment installations, and authorized by local permitting agencies.

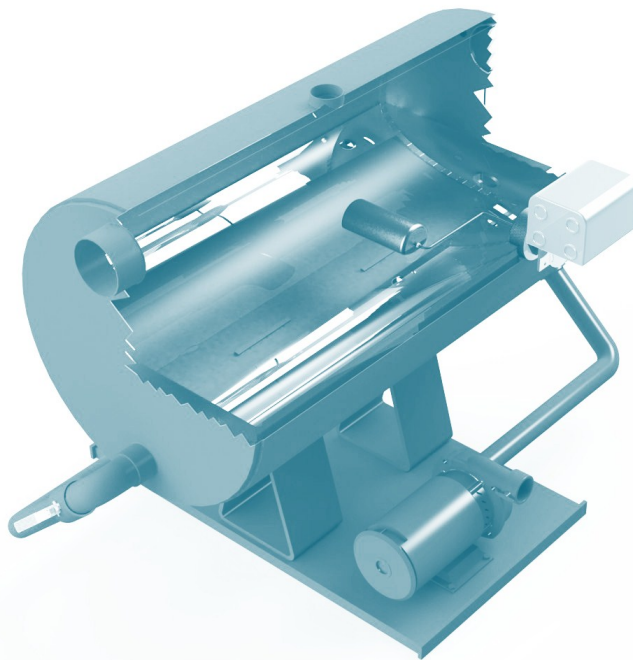
Piping connections should be made in accordance with all local building code requirements. Refer to your local building department inspectors for additional information. Piping provided by the installer should include pipe hangers located and sized accordingly to ensure there is no pipe strain transmitted to the pumps. Connections from each pump to the system piping should include individual isolating valves, check valves and other fittings as shown in the drawings.

(d) Pump Components

The Federal Pump condensate unit includes a number of electromechanical devices that should be identified prior to pressuring the system or prior to providing power to the system. Those devices may include:

- Condensate receiver tank with (2) pumps-duplex system; (1) pump for a simplex system
- Float switch(s) for on/off automatic operation of the condensate pumps.
- Gauge glass for external view of the condensate level in the tank (optional)
- Pressure gages to measure pump discharge pressure (optional)
- Thermometer to measure receiver liquid temperatures (optional)
- Control panel wired to the system electric components.

Sample CCH Unit Shown



2. Electric Components and Installation



Prior to starting the unit, ensure each component is in sound condition and connected appropriately. Prior to any electric or water connections the installer needs to verify the electric power source (voltage and cycles) corresponds to the motor nameplate power requirements. The installer needs to ensure the pump rotates freely when turned by hand prior to any electrical connections.

Upon inspection of the condensate unit and verification that external connections are adequate for the intended use, the installer should proceed with the electrical inspection

(a) Electrical Components

The Federal Pump condensate unit is provided with electric motors, float switches and (in most cases) a receiver mounted control panel that has been pre-wired and pre-set by the factory. Check all connections to ensure they are tight and are not exposed to potential water flooding, leaks or damage. Upon inspection and approval of the electric connections between the motors, controller and float switch and pilot devices the installer is ready to complete the installation.



Electric connections: A certified electrician or other qualified mechanic will connect the electric power to the control panel disconnect switch and follow the wiring diagram provided in the control panel by the factory prior to shipment. Upon completion of the electric installation, the installer should measure the electric connections with appropriate amp gages or other devices to ensure the connections are appropriate and meet all local building codes.

(b) Start –UP Check List

- ☐ **Power is OFF! Disconnect switch(s) are in the OFF position and the H-O-A switch is in the “O” position**
- ☐ **All valves leading to and from the condensate unit are in the off position!**
- ☐ **All piping connections have been made as outlined in the engineer’s plans!**
- ☐ **All piping connections are tight!**
- ☐ **All electrical connections are tight!**
- ☐ **Pump is installed on elevated pad and not subject to any dripping water or other fluids!**
- ☐ **All switches are in place, not loose or broken!**
- ☐ **System is bolted down and grouted in place!**

(c) Preparing Unit for Operation

Upon completion of the electric connections, the installer should open the supply line to the condensate receiver, set the H-O-A switch in the “A” position, set the disconnect switch to the ON position, allow the receiver to meet a pre-determined level and witness activation of the float switch that will start the pump(s), draining the condensate from the receiver and terminate pump operation at a pre-determined low level in the receiver. The levels have been preset at the pump manufacturer’s factory. **INSTALLER TO ENSURE PUMPS ARE ROTATING IN THE PROPER DIRECTION AT INITIAL START-UP.**

(d) Pump and Motor Measurements

The installer should measure the amp draw within the control panel and compare to the electric motor specifications to ensure the unit is operating within the recommended and specified condition. In addition, it is recommended the installer check the discharge pressure of the pump to measure the pump performance to ensure the unit is operating within specified conditions.

3. Operation Sequence

(a) Operation Sequence

The condensate receiver and pumps are designed to start pump operation based upon the liquid level within the condensate receiver. Upon the liquid level reaching a pre-determined high level in the condensate receiver, the float switch will activate the lead pump that will pump the condensate from the receiver to a predetermined location. Once the liquid level drops to a pre-determined level, the float switch will automatically shut down the lead pump and alternate operation to the lag pump that will repeat the pump operation once the condensate level in the receiver reaches the predetermined high water level.

4. Maintenance

(a) Pump Maintenance

Annual or semi-annual inspection of the condensate unit should be completed by the maintenance personnel or with a certified Federal Pump repair service or by a certified Federal Pump local representative. Motor amp readings and pump discharge pressure readings should be recorded every 6 months and compared to original specified conditions. The user should manually review the installation and ensure any strainers leading to or from the pump system are cleaned, there is no rust or evidence of leaking from the condensate return unit and all electrical alarm and/or operating lights should be checked to ensure bulbs are working. The CCH condensate return units are closed-coupled designed pumps where the bearings are located within the motor housing. These bearings are typically “grease-for-life” type enclosed bearings that do not have external grease connections. Each CCH pump includes a mechanical seal that prevents leaking of the fluid. During inspection should the operator observe leaking from the pump casing the mechanical seal should be changed.

(b) Replacement Parts and Kits

Federal Pumps and its local sales representative stock repair parts and kits to assist the end user should the condensate return unit require repair parts or overhaul. Many of these repair parts are assembled in kits to provide ease in over all maintenance. Contact your local Federal Pumps representative for additional information.

