



SHIPCO® DEFENDER SERIES™

Revised 01/14

Type LP, EC, EC-P, EMV, EMH Condensate and Boiler Feed Units



Type EC & EC-P



Type LP



*Type EMH D&P
Type ECH D&P*



*Type EMV D&P
Type ECV D&P*

PRIDE • QUALITY • CRAFTSMANSHIP

CONDENSATE UNITS

Purpose of a Condensate Unit

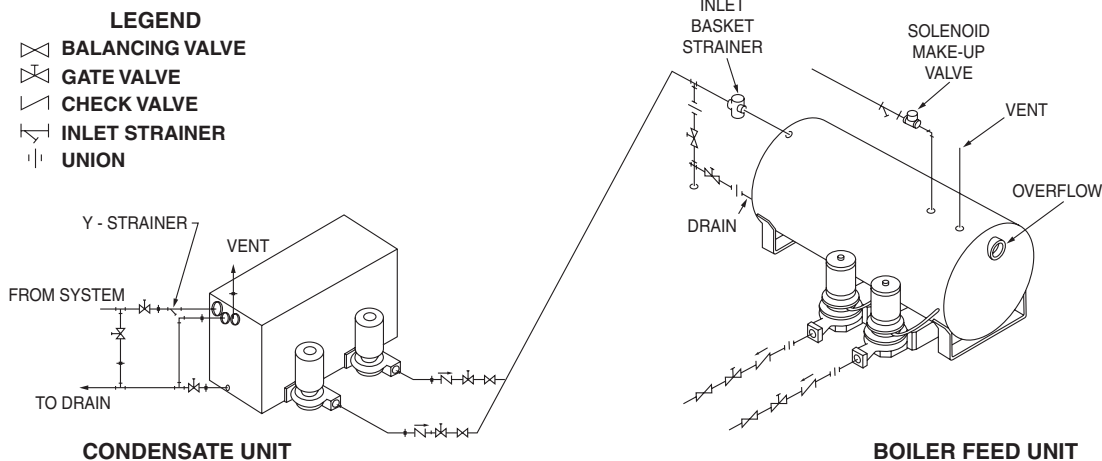
Condensate pumps are used to return condensed liquid from a steam system to collect and move condensate (water) from point A to point B as quickly as possible. The pumping unit consists of a 3/16" thick welded steel receiver or a cast iron receiver with a 20-year warranty against corrosion failure. The pumping unit also consists of an industry-standard electric motor, which is close coupled to a bronze-fitted centrifugal pump. This pump is controlled by a float switch assembly to start and stop the pump.

As condensate flows by gravity or from other pumping units to this receiver tank, the receiver fills with water. The float on the float switch assembly then rises, where it energizes (starts) the motor on the pump. Once started, the pump will continue to run until the water level drops below the bottom position of the float switch. There it will de-energize and shut off the pump. This cycle is repeated as often as necessary to meet the requirements of the system.

SHIPCO® Defender Series™ condensate units are available in either simplex (single pump) or duplex (two pumps) arrangements. Duplex units are supplied with a mechanical alternator float switch assembly, which will alternate pumps after each cycle for even usage, and longer life. The mechanical alternator also provides back-up automatically if the first pump fails, or the first pump cannot handle the system load.

Optional Bronze suction isolation valves can be furnished to aid in repair or routine maintenance, enabling the pump and motor assembly to be removed without interruption to the system. A blank flange should be installed on the isolation valve if the pump is removed for an extended period.

Inlet wye or basket strainers are also an option to keep dirt and debris from entering the unit.



Condensate Sizing

Selection is based on Gallons Per Minute (GPM), receiver size, and Pounds Per Square In. Gauge (PSIG).

Determine GPM

The condensing rate for 1,000 square ft EDR is .5 GPM. Condensate pumps are sized at three times the condensing rate. (See chart.)

EDR Sq. Ft.	Boiler HP	BTU/HR (1,000's)	Steam Lbs/Hr	Condensing Rate GPM	*Pumping Rate 3x Condensing Rate
1000	7.17	240	247.30	.5	1.5
2000	14.34	480	494.60	1	3
4000	28.68	960	989.20	2	6
8000	57.36	1920	1978.40	4	12
10000	71.70	2400	2473.00	5	15
12000	86.04	2880	2967.60	6	18
15000	107.55	3600	3709.50	7.5	22.5
20000	143.40	4800	4946.00	10	30

* Upon proper application, units can be sized at 2 times the condensing rate.

Determine Receiver Size

The receivers are sized to allow for approximately a one-minute gross storage capacity. The condensate return pumps need to run for approximately a one-minute period to prolong the life of the motors in intermittent operation. The pumping rate, GPM, should approximately equal the receiver size in gallons.

Determine PSIG

The pump PSIG is determined by the amount of vertical rise, pipe friction loss, valve loss, back pressure in the line, and a safety margin of approximately 5 PSIG. These values added together are normally expressed in feet of head. To convert to pounds per square inch gauge, or PSIG, 2.31 feet of head = 1 PSIG; therefore 23.1 ft/2.31 ft/lb = 10 PSIG. For conversion, see chart.

Feet of Head	PSIG	Feet of Head	PSIG
2.31	1	57.7	25
11.55	5	69.30	30
23.10	10	92.40	40
34.65	15	115.50	50
46.2	20		

Feet of head/2.31 ft/lb = PSIG

Condensate Specifications

- Bronze fitted pump with bronze impeller and bronze wearing ring.
- Mechanical seal designed for 250 degrees Fahrenheit temperatures.
- Industry standard, 56J frame, open drip-proof motor designed for continuous operation. Ball bearings are vacuum degassed steel. Stainless steel motor shaft, 3500 RPM, 115/230 volt single phase.
- Heavy duty Square D float switch with stainless steel rod & float.
- Receiver with low inlets for gravity returns.
- Receiver Cast Iron
 - Close-grained cast iron receivers with 20-year warranty against corrosion failure. Available in sizes of 6, 10, 15, and 25 gallons for simplex units. Available in sizes of 15 and 25 gallons for duplex units.
- Receiver Steel
 - 3/16"-thick welded steel receivers. Simplex available in sizes of 7-1/2, 15, and 21 gallons. Duplex sizes are 15 and 21 gallons.
- Optional bronze suction isolation valves, which allow pump and motor servicing without draining system.
- Optional inlet basket or wye strainer so as to prevent dirt and debris from entering pump.

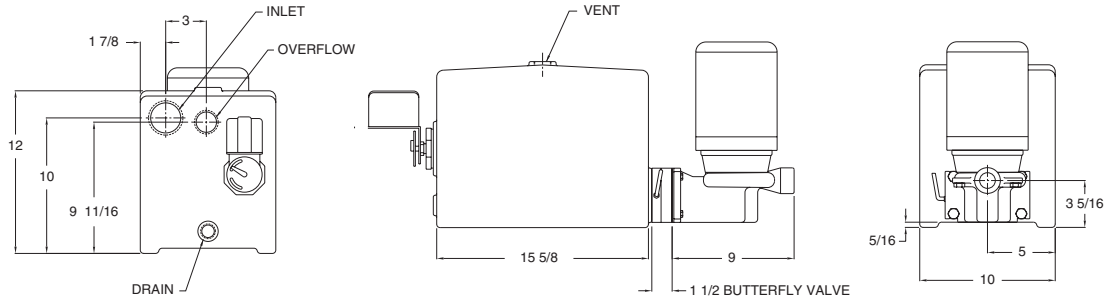
Condensate Selection Charts

TYPE EC								TYPE EC-P								
SINGLE PHASE, 3500 RPM, O.D.P. ONLY								SINGLE PHASE, 3500 RPM, O.D.P. ONLY								
PUMP GPM	PUMP PSIG	PUMP TYPE	PUMP HP	DISCH. SIZE INCHES	REC. SIZE	SIMPLEX CATALOG NUMBER	DUPLEX CATALOG NUMBER	PUMP GPM	PUMP PSIG	PUMP TYPE	PUMP HP	DISCH. SIZE INCHES	REC. SIZE	SIMPLEX CATALOG NUMBER	REC. SIZE	DUPLEX CATALOG NUMBER
9	20	110	1/3	3/4	6	60 EC	—	9	20	110	1/3	3/4	6	60 EC-P	—	—
9	25	110	1/2	3/4	6	60 EC-25	—	9	25	110	1/2	3/4	6	60 EC-P-25	—	—
9	30	106	1/2	3/4	6	60 EC-30	—	9	30	116	3/4	3/4	6	60 EC-P-30	—	—
9	40	106	3/4	3/4	6	60 EC-40	—	12	20	110	1/2	3/4	10	**80 EC-P	—	—
12	20	110	1/3	3/4	10	80 EC	—	12	25	110	3/4	3/4	10	**80 EC-P-25	—	—
12	25	110	1/2	3/4	10	80 EC-25	—	12	30	116	3/4	3/4	10	**80 EC-P-30	—	—
12	30	106	1/2	3/4	10	80 EC-30	—	15	20	110	1/2	3/4	15	120 EC-P	15	120ECD-P
12	40	106	3/4	3/4	10	80 EC-40	—	15	25	116	3/4	3/4	15	120 EC-P-25	15	120ECD-P-25
15 or 18	20	110	1/3	3/4	15	120 EC	120 ECD	15	30	116	1	3/4	15	120 EC-P-30	15	120ECD-P-30
15	25	110	1/2	3/4	15	120 EC-25	120 ECD-25	22	20	116	3/4	1-1/2	25	180 EC-P	25	180ECD-P
15 or 18	30	106	1/2	3/4	15	120 EC-30	120 ECD-30	22	25	116	3/4	1-1/2	25	180 EC-P-25	25	180ECD-P-25
15 or 18	40	106	3/4	3/4	15	120 EC-40	120 ECD-40	22	30	116	1	1-1/2	25	180 EC-P-30	25	180ECD-P-30
18	20	110	1/3	3/4	25	150 EC	150 ECD									
18	30	106	1/2	3/4	25	150 EC-30	150 ECD-30									
18	40	106	3/4	3/4	25	150 EC-40	150 ECD-40									
22-1/2	20	110	1/2	1	25	180 EC	180 ECD									
22-1/2	30	106	3/4	1	25	180 EC-30	180 ECD-30									

Type EC Dimension Prints

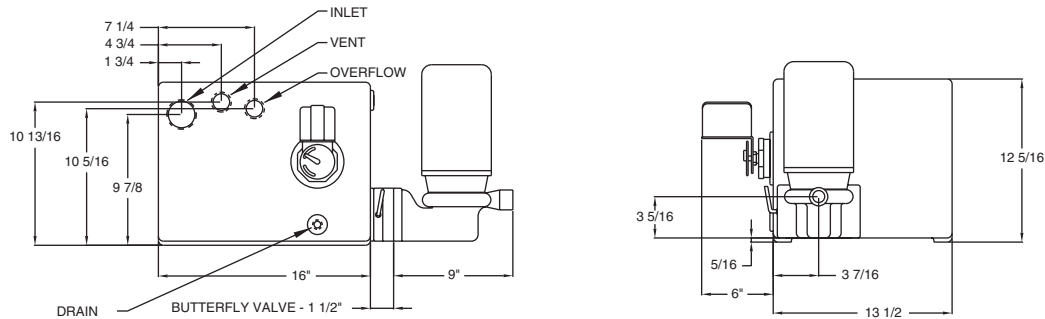
6 GALLON CAST IRON RECEIVER

INLET – 2" NPT • OVERFLOW – 1 $\frac{1}{4}$ " NPT
VENT – 1" NPT • DRAIN – $\frac{3}{4}$ " NPT



10 GALLON CAST IRON RECEIVER

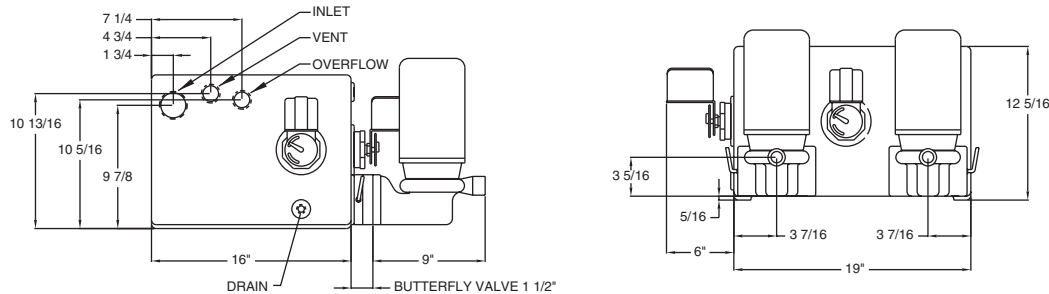
INLET – 2" NPT • OVERFLOW – 1 $\frac{1}{4}$ " NPT
VENT – 1 $\frac{1}{4}$ " NPT • DRAIN – $\frac{1}{2}$ " NPT



NOTE: Inlet may be located 7" up from floor if specified. This will reduce the capacity of the receiver to 6 gallon. **This option must be noted on each order.**

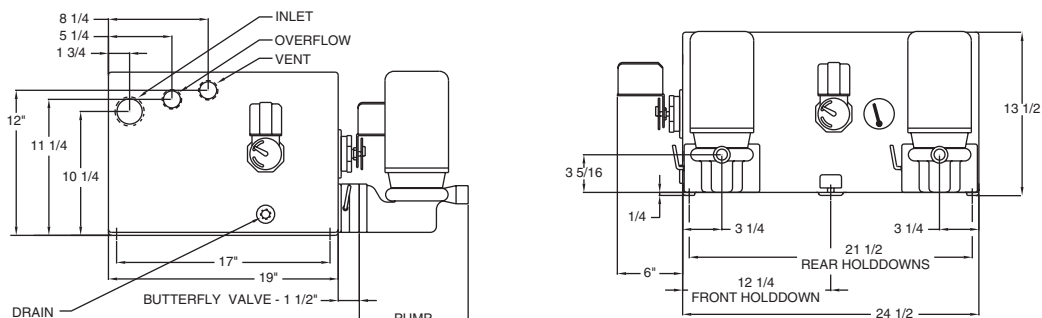
15 GALLON CAST IRON RECEIVER

INLET – 2" NPT • OVERFLOW – 1 $\frac{1}{4}$ " NPT
VENT – 1 $\frac{1}{4}$ " NPT • DRAIN – $\frac{1}{2}$ " NPT



25 GALLON CAST IRON RECEIVER

INLET – 2" NPT • OVERFLOW – 1 $\frac{1}{4}$ " NPT
VENT – 1 $\frac{1}{4}$ " NPT • DRAIN – $\frac{1}{2}$ " NPT



Condensate Selection Charts

TYPE LP

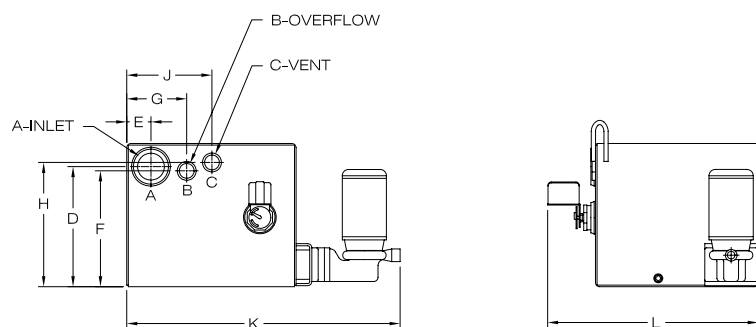
SINGLE PHASE, 3500 RPM, O.D.P. ONLY

PUMP GPM	PUMP PSIG	PUMP TYPE	PUMP HP	DISCH. SIZE INCHES	REC. SIZE	SIMPLEX CATALOG NUMBER	DUPLEX CATALOG NUMBER
12	20	110	1/3	3/4	7-1/2	80 LP	—
12	25	110	1/2	3/4	7-1/2	80 LP-25	—
12	30	106	1/2	3/4	7-1/2	80 LP-30	—
12	40	106	3/4	3/4	7-1/2	80 LP-40	—
15 or 18	20	110	1/3	3/4	15	120 LP	120 LPD
15	25	110	1/2	3/4	15	120 LP-25	120 LPD-25
15 or 18	30	106	1/2	3/4	15	120 LP-30	120 LPD-30
15 or 18	40	106	3/4	3/4	15	120 LP-40	120 LPD-40
18	20	110	1/3	3/4	21	150 LP	150 LPD
18	30	106	1/2	3/4	21	150 LP-30	150 LPD-30
18	40	106	3/4	3/4	21	150 LP-40	150 LPD-40
22-1/2	20	110	1/2	1	21	180 LP	180 LPD
22-1/2	30	106	3/4	1	21	180 LP-30	180 LPD-30

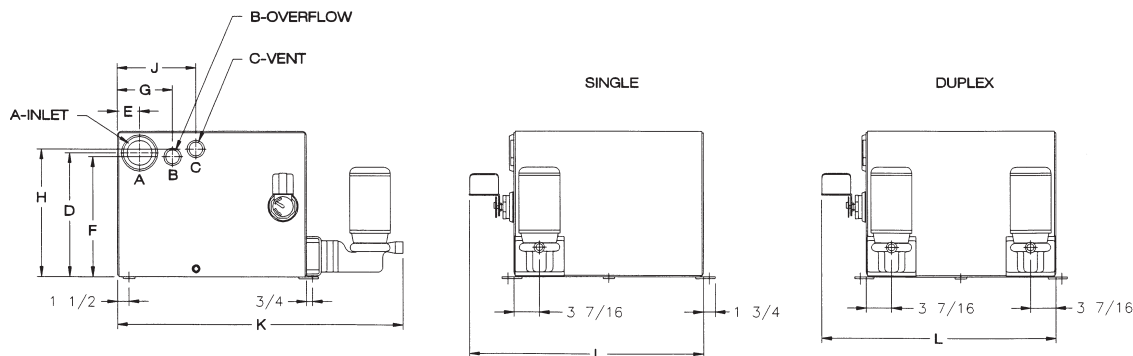
Type LP Dimension Prints

Welded Black Steel Receiver

SINGLE — 7½ GAL. ONLY



SINGLE & DUPLEX — 15 GAL., 21 GAL.



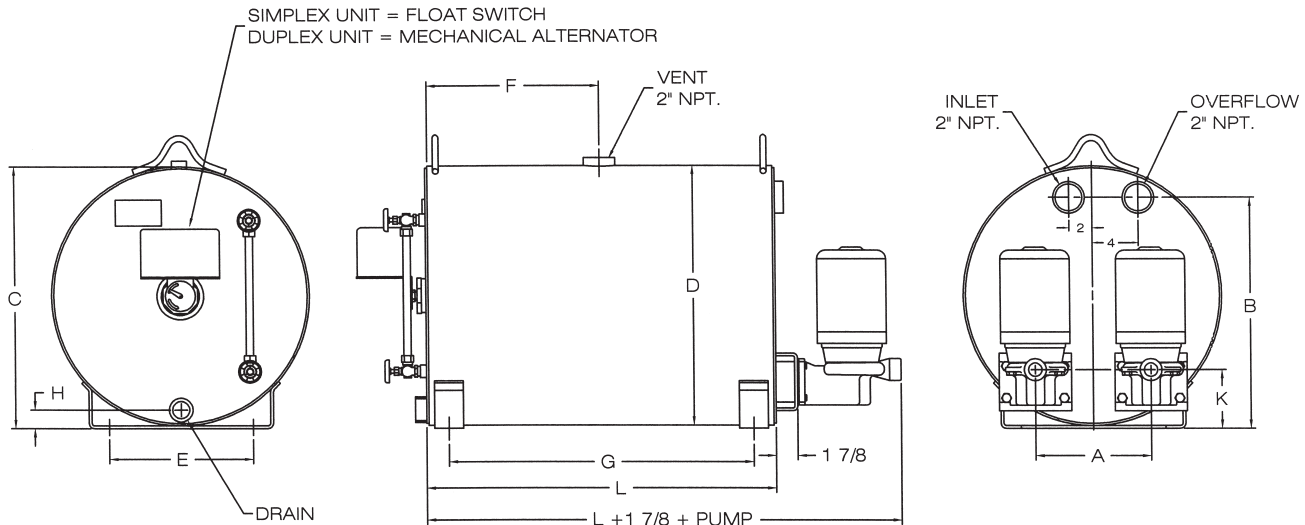
GAL.	SIZE	A	B	C	D	E	F	G	H	J	K	L
7½	12¼ x 12¼ x 12¼	2	1¼	1¼	10⅛	1¾	9⅛	4¾	10⅝	7¼	23⅛	20
15	16 x 16 x 13	2	1¼	1¼	10⅞	1¾	10⅛	4¾	11⅜	7¼	26⅞	24
21	18¼ x 18¼ x 15¼	2	1¼	1¼	13⅜	1¾	13⅞	4¾	13⅞	7¼	29⅞	26

CATALOG SELECTIONS FOR ECH UNITS MODEL D PUMPS

HP	GPM	PSIG	DISCH. SIZE	PUMP TYPE	49 GAL. RECEIVER	71 GAL. RECEIVER	117 GAL. RECEIVER	147 GAL. RECEIVER	183 GAL. RECEIVER	209 GAL. RECEIVER	292 GAL. RECEIVER
1/3	18	20	3/4	110	49ECH18-20	71ECH18-20	117ECH18-20	147ECH18-20	183ECH18-20	209ECH18-20	292ECH18-20
1/2	15	25	3/4	110	49ECH15-25	71ECH15-25	117ECH15-25	147ECH15-25	183ECH15-25	209ECH15-25	292ECH15-25
1/2	18	30	3/4	106	49ECH18-30	71ECH18-30	117ECH18-30	147ECH18-30	183ECH18-30	209ECH18-30	292ECH18-30
3/4	18	40	3/4	106	49ECH18-40	71ECH18-40	117ECH18-40	147ECH18-40	183ECH18-40	209ECH18-40	292ECH18-40
1/2	22-1/2	20	1	110	49ECH22-20	71ECH22-20	117ECH22-20	147ECH22-20	183ECH22-20	209ECH22-20	292ECH22-20
3/4	22-1/2	25	1	106	49ECH22-25	71ECH22-25	117ECH22-25	147ECH22-25	183ECH22-25	209ECH22-25	292ECH22-25
3/4	22-1/2	30	1	106	49ECH22-30	71ECH22-30	117ECH22-30	147ECH22-30	183ECH22-30	209ECH22-30	292ECH22-30
1	22-1/2	40	1	106	49ECH22-40	71ECH22-40	117ECH22-40	147ECH22-40	183ECH22-40	209ECH22-40	292ECH22-40
3/4	30	20	1	110	49ECH30-20	71ECH30-20	117ECH30-20	147ECH30-20	183ECH30-20	209ECH30-20	292ECH30-20
3/4	30	25	1	106	49ECH30-25	71ECH30-25	117ECH30-25	147ECH30-25	183ECH30-25	209ECH30-25	292ECH30-25
1	30	30	1	106	49ECH30-30	71ECH30-30	117ECH30-30	147ECH30-30	183ECH30-30	209ECH30-30	292ECH30-30
1-1/2	30	40	1	106	49ECH30-40	71ECH30-40	117ECH30-40	147ECH30-40	183ECH30-40	209ECH30-40	292ECH30-40

CATALOG SELECTIONS FOR ECH-P UNITS MODEL P PUMPS

HP	GPM	PSIG	DISCH. SIZE	PUMP TYPE	49 GAL. RECEIVER	71 GAL. RECEIVER	117 GAL. RECEIVER	147 GAL. RECEIVER	183 GAL. RECEIVER	209 GAL. RECEIVER	292 GAL. RECEIVER
1/3	9	20	3/4	110	49ECH-P9-20	71ECH-P9-20	117ECH-P9-20	147ECH-P9-20	183ECH-P9-20	209ECH-P9-20	292ECH-P9-20
1/2	9	25	3/4	110	49ECH-P9-25	71ECH-P9-25	117ECH-P9-25	147ECH-P9-25	183ECH-P9-25	209ECH-P9-25	292ECH-P9-25
3/4	9	30	3/4	116	49ECH-P9-30	71ECH-P9-30	117ECH-P9-30	147ECH-P9-30	183ECH-P9-30	209ECH-P9-30	292ECH-P9-30
1/2	12	20	3/4	110	49ECH-P12-20	71ECH-P12-20	117ECH-P12-20	147ECH-P12-20	183ECH-P12-20	209ECH-P12-20	292ECH-P12-20
3/4	12	25	3/4	110	49ECH-P12-25	71ECH-P12-25	117ECH-P12-25	147ECH-P12-25	183ECH-P12-25	209ECH-P12-25	292ECH-P12-25
3/4	12	30	3/4	116	49ECH-P12-30	71ECH-P12-30	117ECH-P12-30	147ECH-P12-30	183ECH-P12-30	209ECH-P12-30	292ECH-P12-30
1/2	15	20	3/4	110	49ECH-P15-20	71ECH-P15-20	117ECH-P15-20	147ECH-P15-20	183ECH-P15-20	209ECH-P15-20	292ECH-P15-20
3/4	15	25	3/4	116	49ECH-P15-25	71ECH-P15-25	117ECH-P15-25	147ECH-P15-25	183ECH-P15-25	209ECH-P15-25	292ECH-P15-25
1	15	30	3/4	116	49ECH-P15-30	71ECH-P15-30	117ECH-P15-30	147ECH-P15-30	183ECH-P15-30	209ECH-P15-30	292ECH-P15-30
3/4	22	20	1-1/2	116	49ECH-P22-20	71ECH-P22-20	117ECH-P22-20	147ECH-P22-20	183ECH-P22-20	209ECH-P22-20	292ECH-P22-20
3/4	22	25	1-1/2	116	49ECH-P22-25	71ECH-P22-25	117ECH-P22-25	147ECH-P22-25	183ECH-P22-25	209ECH-P22-25	292ECH-P22-25
1	22	30	1-1/2	116	49ECH-P22-30	71ECH-P22-30	117ECH-P22-30	147ECH-P22-30	183ECH-P22-30	209ECH-P22-30	292ECH-P22-30



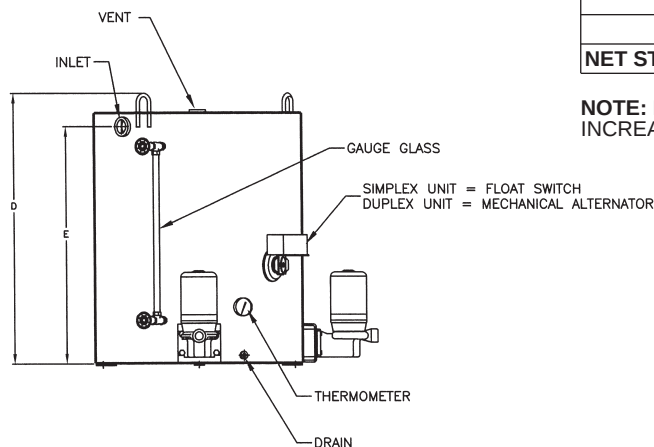
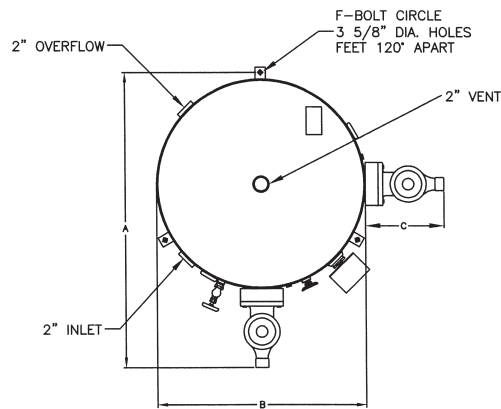
Rec Size D & L	Gallon	A	B	C	E	F	G	H	K			DRAIN
		116,110,106							116	110	106	
22 x 30	49	10	19-7/16	22-1/4	14-1/2	15	26-1/2	1-13/16	5-5/8	4-3/8	5-7/16	1
24 x 36	71	10	21-1/2	24-1/4	16-1/2	18	32-1/2	1-13/16	5-5/8	4-3/8	5-7/16	1
24 x 60	117	10	21-1/2	24-1/4	16-1/2	30	56-1/2	1-13/16	5-11/16	4-7/16	5-1/2	1-1/2
30 x 48	147	10	27-3/4	30-1/4	22-1/2	24	44-1/2	1-13/16	5-3/16	4-1/16	5-1/8	1-1/2
30 x 60	183	10	27-3/4	30-1/4	22-1/2	30	56-1/2	1-13/16	5-3/16	4-1/16	5-1/8	1-1/2
32 x 60	209	12	29-3/4	32-1/4	24-1/2	30	56-1/2	1-13/16	5-3/16	4-1/16	5-1/8	2
32 x 84	292	12	29-3/4	32-1/4	24-1/2	42	80	1-13/16	5-3/16	4-1/16	5-1/8	2

CATALOG SELECTIONS FOR ECV MODEL D PUMPS

HP	GPM	PSIG	DISCH. SIZE	PUMP TYPE	RECEIVER NUMBER 30	RECEIVER NUMBER 50	RECEIVER NUMBER 100	RECEIVER NUMBER 200
1/3	18	20	3/4	110	30ECV18-20	50ECV18-20	100ECV18-20	200ECV18-20
1/2	15	25	3/4	110	30ECV15-25	50ECV15-25	100ECV15-25	200ECV15-25
1/2	18	30	3/4	106	30ECV18-30	50ECV18-30	100ECV18-30	200ECV18-30
3/4	18	40	3/4	106	30ECV18-40	50ECV18-40	100ECV18-40	200ECV18-40
1/2	22-1/2	20	1	110	30ECV22-20	50ECV22-20	100ECV22-20	200ECV22-20
3/4	22-1/2	25	1	106	30ECV22-25	50ECV22-25	100ECV22-25	200ECV22-25
3/4	22-1/2	30	1	106	30ECV22-30	50ECV22-30	100ECV22-30	200ECV22-30
1	22-1/2	40	1	106	30ECV22-40	50ECV22-40	100ECV22-40	200ECV22-40
3/4	30	20	1	110	30ECV30-20	50ECV30-20	100ECV30-20	200ECV30-20
3/4	30	25	1	106	30ECV30-25	50ECV30-25	100ECV30-25	200ECV30-25
1	30	30	1	106	30ECV30-30	50ECV30-30	100ECV30-30	200ECV30-30
1	30	40	1	106	30ECV30-40	50ECV30-40	100ECV30-40	200ECV30-40

CATALOG SELECTIONS FOR ECV-P MODEL P PUMPS

HP	GPM	PSIG	DISCH. SIZE	PUMP TYPE	RECEIVER NUMBER 30	RECEIVER NUMBER 50	RECEIVER NUMBER 100	RECEIVER NUMBER 200
1/3	9	20	3/4	110	30ECV-P9-20	50ECV-P9-20	100ECV-P9-20	200ECV-P9-20
1/2	9	25	3/4	110	30ECV-P9-25	50ECV-P9-25	100ECV-P9-25	200ECV-P9-25
3/4	9	30	3/4	116	30ECV-P9-30	50ECV-P9-30	100ECV-P9-30	200ECV-P9-30
1/2	12	20	3/4	110	30ECV-P12-20	50ECV-P12-20	100ECV-P12-20	200ECV-P12-20
3/4	12	25	3/4	110	30ECV-P12-25	50ECV-P12-25	100ECV-P12-25	200ECV-P12-25
3/4	12	30	3/4	116	30ECV-P12-30	50ECV-P12-30	100ECV-P12-30	200ECV-P12-30
1/2	15	20	3/4	110	30ECV-P15-20	50ECV-P15-20	100ECV-P15-20	200ECV-P15-20
3/4	15	25	3/4	116	30ECV-P15-25	50ECV-P15-25	100ECV-P15-25	200ECV-P15-25
1	15	30	3/4	116	30ECV-P15-30	50ECV-P15-30	100ECV-P15-30	200ECV-P15-30
3/4	22	20	1-1/2	116	30ECV-P22-20	50ECV-P22-20	100ECV-P22-20	200ECV-P22-20
3/4	22	25	1-1/2	116	30ECV-P22-25	50ECV-P22-25	100ECV-P22-25	200ECV-P22-25
1	22	30	1-1/2	116	30ECV-P22-30	50ECV-P22-30	100ECV-P22-30	200ECV-P22-30



RECEIVER NO.	30	50	100	200
TANK DIMENSIONS	18-7/8 x 24	18-7/8 x 36	30 x 36	38 x 36
A	30-1/2	30-1/2	41-5/8	49-5/8
B	20-3/4	20-3/4	31-7/8	39-7/8
C				
106 & 110 PUMP	9	9	9	9
C				
116 PUMP	12	12	12	12
D	26 3/4	38-3/4	38-3/4	38-3/4
E				
INLET & OVERFLOW	22-3/16	34-3/16	34-3/16	34-3/16
F				
INLET	20-3/8	20-3/8	31-1/2	39-1/2
F				
OVERFLOW	2"	2"	2"	2"
F				
VENT	2"	2"	2"	2"
F				
DRAIN	3/4"	1"	1-1/2"	2"
F				
NET STORAGE GAL.	20	33	66	132

NOTE: IF ORDERING A SUCTION ISOLATION VALVE B DIMENSION WILL INCREASE BY 1-1/2".

BOILER FEED UNITS

Purpose of a Boiler Feed Unit

Boiler feed pumps are used to feed water to a boiler. The boiler level controller activates the pump on the boiler feed unit. When the water level drops in the boiler, a switch or switches on the boiler cause the pump, or pumps, to run adding water until level in the boiler is satisfied. The boiler feed unit consists of a 3/16"-thick welded steel receiver, an industry standard electric motor which is close-coupled to a bronze fitted centrifugal pump, a water level gauge glass assembly, and a mechanical float operated make-up valve assembly as standard. The mechanical water make-up assembly allows city water to enter the receiver when the fluid level and float drops sufficiently to open the valve. This mechanism is adjustable for different water levels. (For maximum supply pressure up to 50 PSIG.)

SHIPCO® Defender Series™ boiler feed units are available in either simplex (single pump), duplex (two pumps), triplex (three pumps), or quadruplex (four pumps) arrangements. All simplex units are equipped so that a second pump may be added, if desired at a later time.

Optional bronze suction isolation valves can be furnished to aid in repairs or routine maintenance, enabling the pump and motor assembly to be removed, without interruption to the system. A blank flange should be installed on the isolation valve if the pump is removed for an extended period.

Inlet wye and basket strainers are an option to keep dirt and debris from entering the pump.

An optional dial thermometer can be furnished to check the temperature of the water in the boiler feed tank.

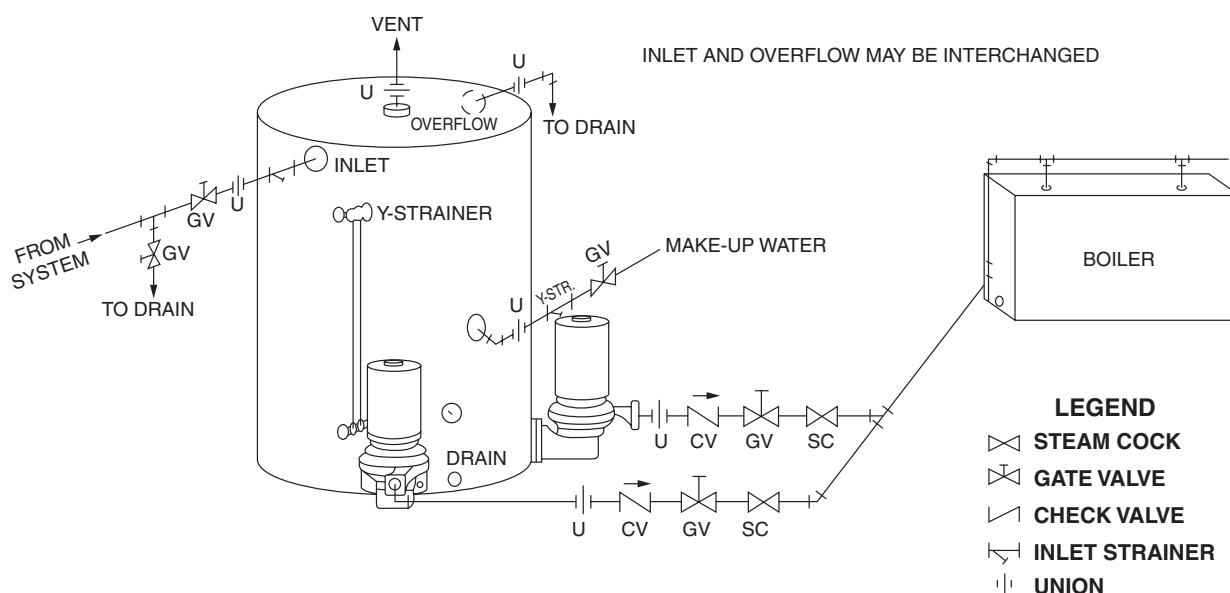
An optional preheat assembly with a steam temperature regulator and control valve can be furnished to heat the water in the boiler feed tank to reduce thermal shock of cold water going to the boiler.

The mechanical make-up water valve can be replaced with an electrical solenoid valve and float switch assembly. The solenoid valve and float switch is recommended for inlet pressures exceeding 50 PSIG. A pressure relief valve is recommended for inlet pressures exceeding 75 PSIG.

An optional control panel may be furnished to handle the motor load. The boiler level switches are normally limited to 1/3 HP single phase motor amp draw (single phase motors 1/2 HP and larger usually must utilize a control panel because the boiler level controller cannot handle the amp draw). All three phase pumps must utilize a control panel because three phase motors have no built-in thermal overload protection.

NOTE: Since the float switches controlling these pumps are on the boiler, there must be two switches on the boiler for automatic standby pumping capability.

Typical Piping Diagram EMH, EMV



Boiler Feed Sizing

Selection is based on GPM, receiver size, and PSIG.

Determine GPM

The evaporation rate of one boiler horsepower is .069 gallons per minute. Boiler feed pumps are sized at a rate of 1.5 to 2 times this evaporation rate. Boilers are usually rated in boiler horsepower. However, some may be rated in square ft EDR or lbs/hr. See chart for sizing pumps at 2 times evaporation rate and for conversion equivalents.

(Conversion Equivalents)

One boiler horsepower equals
.069 GPM or 33,475 BTU
or 34.5 lbs/hr or 139.4 Sq Ft EDR.

Pump Sizing Chart

* Values are rounded

Boiler HP	EDR Sq Ft	Steam lbs/hr	BTU/Hr (1,000's)	Evaporation Rate GPM	*Pumping Rate 2x Evaporation Rate
10	1394	345	335	.69	2
20	2788	690	670	1.38	3
30	4182	1035	1005	2.07	5
40	5576	1380	1340	2.76	6
50	6970	1725	1675	3.45	7
60	8364	2070	2010	4.14	9
70	9758	2415	2345	4.83	10
80	11,152	2760	2680	5.52	12
100	13,940	3450	3350	6.90	14
120	16,728	4140	4020	8.28	17
140	19,516	4830	4690	9.66	20
160	22,304	5520	5360	11.04	22.5
180	25,092	6210	6030	12.42	25
200	27,880	6900	6700	13.80	28

Determine Receiver Size

Generally a boiler feed unit should be sized at one gallon gross storage per one system boiler horsepower. This is equivalent to approximately 15 minutes of gross storage. System boiler horsepower is defined as the total possible load of all boilers being fed by the boiler feed unit. For example: Qty (2) 100 HP boilers would have a system load of 200 HP if both boilers ran at one time, for even only a few minutes, because you must size based on the worst-case condition.

The selection of the receiver size may vary based on the characteristics of the system. For example, if the piping served by the boiler is in a heating system extending over a considerable area, the amount of time required for the condensate return will be slow. Under such conditions, it is advisable to select a receiver of larger capacity. If the piping is concentrated in a high office building on a small ground area, experience dictates that the condensate returns quickly, and a smaller receiver size may be chosen. A system with a large percent of make-up (no returns) may accommodate a smaller receiver size.

The main rule of thumb is one gallon gross storage per one system boiler horsepower, or roughly 15 minutes. This is to avoid high quality water going down the drain.

Determine PSIG

Generally low pressure boilers run at .5 to 15 PSIG. Therefore, a discharge pump pressure of 20 PSIG should be adequate. Boiler feed units are usually near the boilers they feed. To be safe you should determine the amount of vertical rise + friction loss in pipe + valve loss + feed valve loss (if any) + back pressure in line (boiler operating pressure) + a safety margin of approximately 5 PSIG. The amount of these values, or these values added together are normally expressed in feet of head.

To convert to pounds per square inch or PSIG, 2.31 feet of head = 1 PSIG. For conversion see chart.

Feet of head/2.31 ft/lb = PSIG

Feet of Head	PSIG	Feet of Head	PSIG
2.31	1	57.7	25
11.55	5	69.30	30
23.10	10	92.40	40
34.65	15	115.50	50
46.2	20		

Boiler Feed Specifications

- Bronze fitted pump with bronze impeller and bronze wearing ring.
- Mechanical seal designed for 250 degrees Fahrenheit temperature.
- Industry standard, 56J frame, open drip-proof motor designed for continuous operation. Ball bearings are prelubricated and shielded. Stainless steel motor shaft. 3500 RPM, 115/230 volt single phase or three phase.
- 3/16"-thick welded steel receivers. Horizontal style 49, 71, 117, 147, 183, and 209 gallons or vertical style 50, 100, and 200 gallons. All simplex units have a blank pad, to convert to a duplex style if desired.
- Gauge glass assembly for viewing water level in tank.
- Heavy duty mechanical make-up assembly for supply pressure up to 50 PSIG.
- Optional dial thermometer to register water temperature.
- Optional inlet wye or basket strainers to keep dirt and debris from entering our pump.
- Optional electric solenoid valve and float switch assembly in lieu of mechanical make-up valve.
- Optional control panel to handle the motor current as the boiler level switches are limited to 1/3 HP single phase amp draw.
- Optional bronze suction isolation valves to allow pump and motor servicing without draining system.

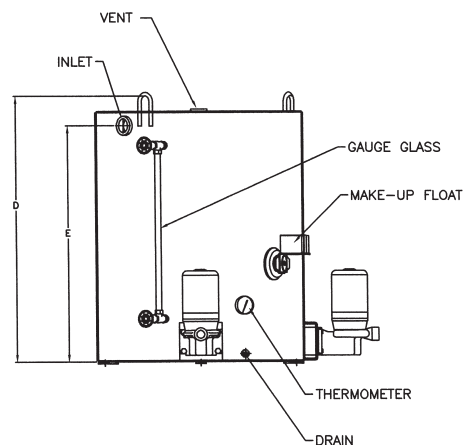
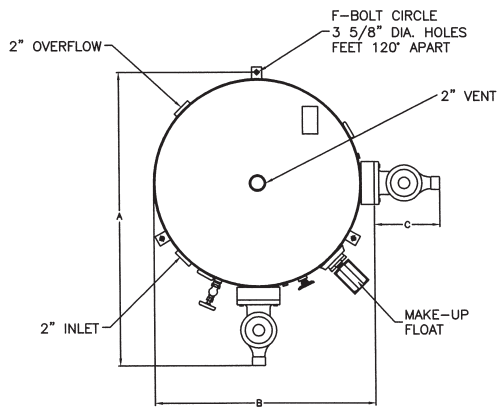
Boiler Feed Selection Charts

CATALOG SELECTIONS FOR EMV MODEL D PUMPS

HP	GPM	PSIG	DISCH. SIZE	PUMP TYPE	RECEIVER NUMBER 30	RECEIVER NUMBER 50	RECEIVER NUMBER 100	RECEIVER NUMBER 200
1/3	18	20	3/4	110	30EMV18-20	50EMV18-20	100EMV18-20	200EMV18-20
1/2	15	25	3/4	110	30EMV15-25	50EMV15-25	100EMV15-25	200EMV15-25
1/2	18	30	3/4	106	30EMV18-30	50EMV18-30	100EMV18-30	200EMV18-30
3/4	18	40	3/4	106	30EMV18-40	50EMV18-40	100EMV18-40	200EMV18-40
1/2	22-1/2	20	1	110	30EMV22-20	50EMV22-20	100EMV22-20	200EMV22-20
3/4	22-1/2	25	1	106	30EMV22-25	50EMV22-25	100EMV22-25	200EMV22-25
3/4	22-1/2	30	1	106	30EMV22-30	50EMV22-30	100EMV22-30	200EMV22-30
1	22-1/2	40	1	106	30EMV22-40	50EMV22-40	100EMV22-40	200EMV22-40
3/4	30	20	1	110	30EMV30-20	50EMV30-20	100EMV30-20	200EMV30-20
3/4	30	25	1	106	30EMV30-25	50EMV30-25	100EMV30-25	200EMV30-25
1	30	30	1	106	30EMV30-30	50EMV30-30	100EMV30-30	200EMV30-30
1	30	40	1	106	30EMV30-40	50EMV30-40	100EMV30-40	200EMV30-40

CATALOG SELECTIONS FOR EMV-P MODEL P PUMPS

HP	GPM	PSIG	DISCH. SIZE	PUMP TYPE	RECEIVER NUMBER 30	RECEIVER NUMBER 50	RECEIVER NUMBER 100	RECEIVER NUMBER 200
1/3	9	20	3/4	110	30EMV-P9-20	50EMV-P9-20	100EMV-P9-20	200EMV-P9-20
1/2	9	25	3/4	110	30EMV-P9-25	50EMV-P9-25	100EMV-P9-25	200EMV-P9-25
3/4	9	30	3/4	116	30EMV-P9-30	50EMV-P9-30	100EMV-P9-30	200EMV-P9-30
1/2	12	20	3/4	110	30EMV-P12-20	50EMV-P12-20	100EMV-P12-20	200EMV-P12-20
3/4	12	25	3/4	110	30EMV-P12-25	50EMV-P12-25	100EMV-P12-25	200EMV-P12-25
3/4	12	30	3/4	116	30EMV-P12-30	50EMV-P12-30	100EMV-P12-30	200EMV-P12-30
1/2	15	20	3/4	110	30EMV-P15-20	50EMV-P15-20	100EMV-P15-20	200EMV-P15-20
3/4	15	25	3/4	116	30EMV-P15-25	50EMV-P15-25	100EMV-P15-25	200EMV-P15-25
1	15	30	3/4	116	30EMV-P15-30	50EMV-P15-30	100EMV-P15-30	200EMV-P15-30
3/4	22	20	1-1/2	116	30EMV-P22-20	50EMV-P22-20	100EMV-P22-20	200EMV-P22-20
3/4	22	25	1-1/2	116	30EMV-P22-25	50EMV-P22-25	100EMV-P22-25	200EMV-P22-25
1	22	30	1-1/2	116	30EMV-P22-30	50EMV-P22-30	100EMV-P22-30	200EMV-P22-30



RECEIVER NO.	30	50	100	200
TANK DIMENSIONS	18-7/8 x 24	18-7/8 x 36	30 x 36	38 x 36
A	30-1/2	30-1/2	41-5/8	49-5/8
B	20-3/4	20-3/4	31-7/8	39-7/8
C	9	9	9	9
106 & 110 PUMP				
C	12	12	12	12
116 PUMP				
D	26 3/4	38-3/4	38-3/4	38-3/4
E	22-3/16	34-3/16	34-3/16	34-3/16
INLET & OVERFLOW				
F	20-3/8	20-3/8	31-1/2	39-1/2
INLET	2"	2"	2"	2"
OVERFLOW	2"	2"	2"	2"
VENT	2"	2"	2"	2"
DRAIN	3/4"	1"	1-1/2"	2"
NET STORAGE GAL.	20	33	66	132

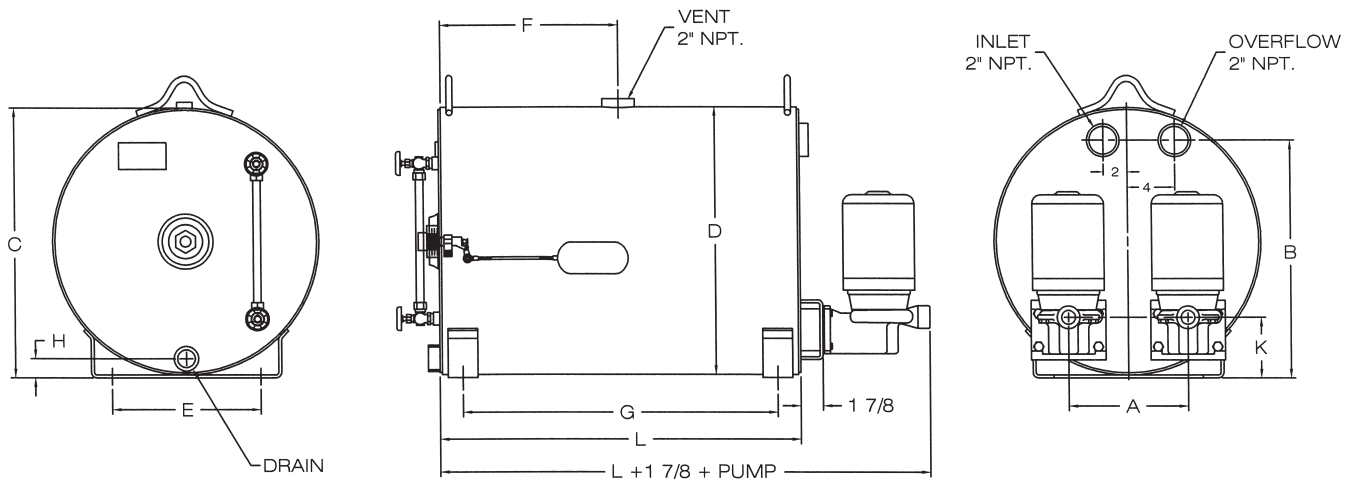
NOTE: IF ORDERING A SUCTION ISOLATION VALVE B DIMENSION WILL INCREASE BY 1-1/2".

CATALOG SELECTIONS FOR EMH MODEL D PUMPS

HP	GPM	PSIG	DISCH. SIZE	PUMP TYPE	49 GAL. RECEIVER	71 GAL. RECEIVER	117 GAL. RECEIVER	147 GAL. RECEIVER	183 GAL. RECEIVER	209 GAL. RECEIVER	292 GAL. RECEIVER
1/3	18	20	3/4	110	49EMH18-20	71EMH18-20	117EMH18-20	147EMH18-20	183EMH18-20	209EMH18-20	292EMH18-20
1/2	15	25	3/4	110	49EMH15-25	71EMH15-25	117EMH15-25	147EMH15-25	183EMH15-25	209EMH15-25	292EMH15-25
1/2	18	30	3/4	106	49EMH18-30	71EMH18-30	117EMH18-30	147EMH18-30	183EMH18-30	209EMH18-30	292EMH18-30
3/4	18	40	3/4	106	49EMH18-40	71EMH18-40	117EMH18-40	147EMH18-40	183EMH18-40	209EMH18-40	292EMH18-40
1/2	22-1/2	20	1	110	49EMH22-20	71EMH22-20	117EMH22-20	147EMH22-20	183EMH22-20	209EMH22-20	292EMH22-20
3/4	22-1/2	25	1	106	49EMH22-25	71EMH22-25	117EMH22-25	147EMH22-25	183EMH22-25	209EMH22-25	292EMH22-25
3/4	22-1/2	30	1	106	49EMH22-30	71EMH22-30	117EMH22-30	147EMH22-30	183EMH22-30	209EMH22-30	292EMH22-30
1	22-1/2	40	1	106	49EMH22-40	71EMH22-40	117EMH22-40	147EMH22-40	183EMH22-40	209EMH22-40	292EMH22-40
3/4	30	20	1	110	49EMH30-20	71EMH30-20	117EMH30-20	147EMH30-20	183EMH30-20	209EMH30-20	292EMH30-20
3/4	30	25	1	106	49EMH30-25	71EMH30-25	117EMH30-25	147EMH30-25	183EMH30-25	209EMH30-25	292EMH30-25
1	30	30	1	106	49EMH30-30	71EMH30-30	117EMH30-30	147EMH30-30	183EMH30-30	209EMH30-30	292EMH30-30
1	30	40	1	106	49EMH30-40	71EMH30-40	117EMH30-40	147EMH30-40	183EMH30-40	209EMH30-40	292EMH30-40

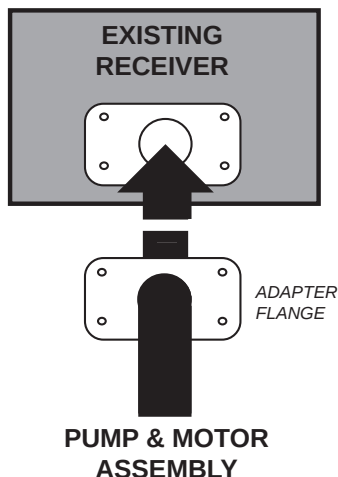
CATALOG SELECTIONS FOR EMH-P MODEL P PUMPS

HP	GPM	PSIG	DISCH. SIZE	PUMP TYPE	49 GAL. RECEIVER	71 GAL. RECEIVER	117 GAL. RECEIVER	147 GAL. RECEIVER	183 GAL. RECEIVER	209 GAL. RECEIVER	292 GAL. RECEIVER
1/3	9	20	3/4	110	49EMH-P9-20	71EMH-P9-20	117EMH-P9-20	147EMH-P9-20	183EMH-P9-20	209EMH-P9-20	292EMH-P9-20
1/2	9	25	3/4	110	49EMH-P9-25	71EMH-P9-25	117EMH-P9-25	147EMH-P9-25	183EMH-P9-25	209EMH-P9-25	292EMH-P9-25
3/4	9	30	3/4	116	49EMH-P9-30	71EMH-P9-30	117EMH-P9-30	147EMH-P9-30	183EMH-P9-30	209EMH-P9-30	292EMH-P9-30
1/2	12	20	3/4	110	49EMH-P12-20	71EMH-P12-20	117EMH-P12-20	147EMH-P12-20	183EMH-P12-20	209EMH-P12-20	292EMH-P12-20
3/4	12	25	3/4	110	49EMH-P12-25	71EMH-P12-25	117EMH-P12-25	147EMH-P12-25	183EMH-P12-25	209EMH-P12-25	292EMH-P12-25
3/4	12	30	3/4	116	49EMH-P12-30	71EMH-P12-30	117EMH-P12-30	147EMH-P12-30	183EMH-P12-30	209EMH-P12-30	292EMH-P12-30
1/2	15	20	3/4	110	49EMH-P15-20	71EMH-P15-20	117EMH-P15-20	147EMH-P15-20	183EMH-P15-20	209EMH-P15-20	292EMH-P15-20
3/4	15	25	3/4	116	49EMH-P15-25	71EMH-P15-25	117EMH-P15-25	147EMH-P15-25	183EMH-P15-25	209EMH-P15-25	292EMH-P15-25
1	15	30	3/4	116	49EMH-P15-30	71EMH-P15-30	117EMH-P15-30	147EMH-P15-30	183EMH-P15-30	209EMH-P15-30	292EMH-P15-30
3/4	22	20	1-1/2	116	49EMH-P22-20	71EMH-P22-20	117EMH-P22-20	147EMH-P22-20	183EMH-P22-20	209EMH-P22-20	292EMH-P22-20
3/4	22	25	1-1/2	116	49EMH-P22-25	71EMH-P22-25	117EMH-P22-25	147EMH-P22-25	183EMH-P22-25	209EMH-P22-25	292EMH-P22-25
1	22	30	1-1/2	116	49EMH-P22-30	71EMH-P22-30	117EMH-P22-30	147EMH-P22-30	183EMH-P22-30	209EMH-P22-30	292EMH-P22-30



Rec Size D & L	Gallon	A 116,110,106	B	C	E	F	G	H	K			DRAIN
									116	110	106	
22 x 30	49	10	19-7/16	22-1/4	14-1/2	15	26-1/2	1-13/16	5-5/8	4-3/8	5-7/16	1
24 x 36	71	10	21-1/2	24-1/4	16-1/2	18	32-1/2	1-13/16	5-5/8	4-3/8	5-7/16	1
24 x 60	117	10	21-1/2	24-1/4	16-1/2	30	56-1/2	1-13/16	5-11/16	4-7/16	5-1/2	1-1/2
30 x 48	147	10	27-3/4	30-1/4	22-1/2	24	44-1/2	1-13/16	5-3/16	4-1/16	5-1/8	1-1/2
30 x 60	183	10	27-3/4	30-1/4	22-1/2	30	56-1/2	1-13/16	5-3/16	4-1/16	5-1/8	1-1/2
32 x 60	209	12	29-3/4	32-1/4	24-1/2	30	56-1/2	1-13/16	5-3/16	4-1/16	5-1/8	2
32 x 84	292	12	29-3/4	32-1/4	24-1/2	42	80	1-13/16	5-3/16	4-1/16	5-1/8	2

COMPATIBILITY



ADAPTER FLANGE (If Required)

AURORA	SDPF00249
DUNHAM BUSH	SDPF00159
ECONOMY	SDPF00182
FEDERAL	SDPF00168
ITT DOMESTIC*	NONE REQUIRED on most models
ITT HOFFMAN*	NONE REQUIRED on most models
NASH	SDPF00034
SKIDMORE	SDPF00245
STERLING	SDPF00167
WEIMAN	SDPF00210
OTHER	Measure Bolt Pattern

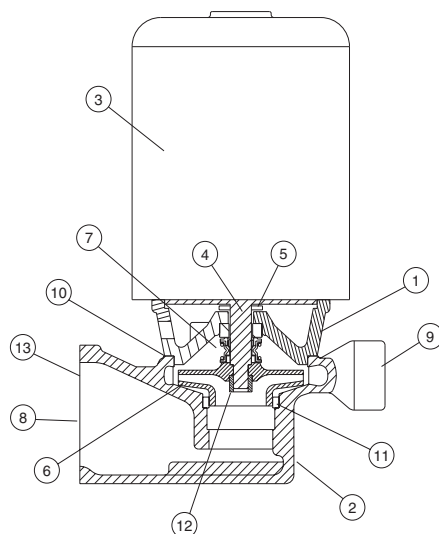
*Registered trademark ITT Domestic & ITT Hoffman

Standard Pump—2³/₄" Vertical x 5" Horizontal
Bolt Hole Center to Center Pattern

PARTS LIST

— VERTICAL —

Model D • Type 110 • 56J Frame Motor



DESCRIPTION	PART NO.	QUANTITY REQUIRED
1. Pump Head.....	SDPH00020	1
2. Pump Case	SDPC00030	1
3. Motor		1
4. Motor Shaft.....		1
5. Water Slinger	SDWS99999	1
6. Impeller	SDPI00010	1
7. Mechanical Seal 5/8".....	SDPS00067	1
8. Pump Suction		1
9. Pump Discharge		1
10. Head Gasket	SDPG03828	1
11. Case Wearing Ring	SDPWR0031	1
12. Impeller Lock Nut.....	S3333234	1
13. Suction Housing Gasket....	SDPG03830	1
14. Capscrews 3/8 x 3-1/4	FTRCP-5HZ-0038C-03250-2	3
15. Capscrews 3/8 x 3-1/2	FTRCP-5HZ-0038C-03500-2	1

LIMITED WARRANTY OF CAST IRON RECEIVERS

A SHIPCO® cast iron receiver is under warranty for 20 years from date of shipment against corrosion failure when installed according to the manufacturer's recommendations. In the event of failure due to corrosion, SHIPCO® will replace the cast iron receiver free of charge. Transportation charge will be prepaid to any location within the continental U.S.A., Canada, or Mexico.

All other indirect or consequential charges, including labor charges for replacing the cast iron receiver, are disallowed. Shippensburg Pump Co., Inc. hereby disclaims all implied warranties of merchantability and fitness for a particular purpose.

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