



Condensate Return and Boiler Feed Pumps "V" Series

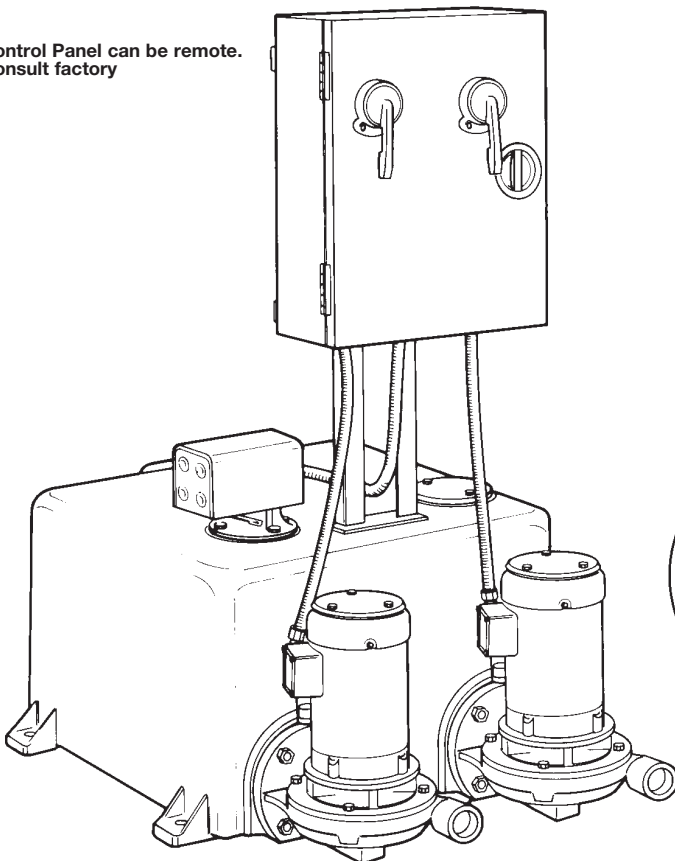
Description

Thermaflo Condensate pumps are used in low pressure heating systems to collect and quickly return condensate to the boiler feed unit. Their pump-ing action is controlled by the water level in the receiver. Simplex units consist of an electric motor close-coupled to a centrifugal pump mounted on a cast iron or welded steel storage receiver with a float operated pump control. Multiple pump units are used when greater pumping capacity or back-up pump protection is required.

Boiler feed pumps are used to pump and precisely control the condensate and makeup water required by the boiler(s) in low pressure steam applications. Pumping action is controlled by the fluid level in the boiler. They consist of a cast iron or welded steel storage receiver equipped with a makeup valve and one or more close-coupled centrifugal pumps.

Thermaflo V series pumping systems are available in simplex, duplex, triplex or quadruplex configurations from 1,000 to 100,000 sq. ft. EDR capacities. Discharge pressures from 10-40 psi are available on units equipped with 1750 rpm motors; 20-75 psi on 3500 rpm units. True 2 ft. net positive suction head pumps are available.

Control Panel can be remote.
Consult factory



Receivers

Cast iron, Steel and 304 Stainless Steel rectangular receivers are available with 15 to 300 gallon capacities.

Heavy duty, welded, rust resistant, copper bearing steel receivers are available in rectangular or cylindrical configurations with capacities ranging from 21 to 1,000 gallons.

Centrifugal Pumps

Four centrifugal models are available in a large selection of sizes to meet your specific application requirements: VC, VJ, VE, VA and VN.

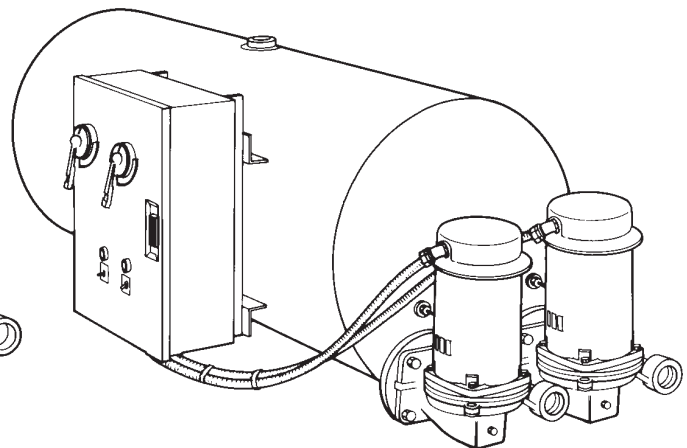
The pumps are bolted directly to the receiver to provide a compact efficient design. Their close-coupled, centrifugal design with bronze enclosed type impeller assures smooth, efficient water passage. A mechanical seal, rated to a maximum temperature of 250°F, is vented to the receiver to assure adequate lubrication at all times.

An advanced impeller and volute design make many of the pumps excellent for applications requiring a true 2 ft Net Positive Suction Head (NPSH) and can pump 210F condensate. These units are identified with shaded areas in the selection tables. The simple, reliable single stage construction eliminates the need for additional impellers and parts used in other low NPSH pumps. Contact Thermaflo for Application Assistance

Designed for long-life, low maintenance and reliable service, the pumps are easily serviceable if necessary. Parts subject to normal wear are readily accessible. Impeller and mechanical seal can be serviced without disturbing piping or electrical connections.

All pumps are close-coupled to heavy duty, ball bearing open drip proof electric motors. Fractional horsepower single phase motors have built-in thermal overload protection.

To help you determine the appropriate pump type for your application, specifications for each of the four types are described in the next paragraphs. Refer to selection tables for additional pumping system performance data.



Local regulation may restrict the use of this product below the conditions quoted. Limiting conditions refer to standard connections only.

In the interests of development and improvement of the product, we reserve the right to change the specification.

Thermaflo Inc. 2880 Fair Avenue Newberry, South Carolina
Made in USA Heat Transfer, Steam and Condensate Products

Condensate Return and Boiler Feed Pumps "V" Series

VC Pumps

1/3 through 15 hp
 1750 rpm—discharge pressures are 10, 15 or 20 psi
 3500 rpm—discharge pressures are 30 to 75 psi
 Motor types available: Open drip proof (ODP)
 Totally enclosed fan cooled (TEFC)
 Explosion proof
 Single phase, 115/230 V, 60 Hz
 Three phase, 208 or 230/460 V, 60 Hz

VJ Pumps

1/2 through 2 hp
 3500 rpm—discharge pressures are 15, 20, 30, 40 or 50 psi
 Motor types available: Open drip proof (ODP)
 Totally enclosed fan cooled (TEFC)
 Single phase, 115/230 V, 60 Hz
 Three phase, 200V, 60 Hz
 Three phase, 230/460 V, 60 Hz

VE Pumps

3/4 through 2 hp
 1750 rpm—discharge pressures are 20, 25 or 30 psi
 Motor types available: Open drip proof (ODP)
 Totally enclosed fan cooled (TEFC)
 Explosion proof
 Single phase, 115/230 V, 60 Hz
 Three phase, 200 V, 60 Hz
 Three phase, 230/460 V, 60 Hz

VA Pumps

3, 5 or 7 1/2 hp
 1750 rpm—discharge pressures are 30 or 40 psi
 Motor types available: Open drip proof (ODP)
 Totally enclosed fan cooled (TEFC)
 Explosion proof
 Three phase, 200 V, 60 Hz
 Three phase, 230/460 V, 60 Hz

VN Pumps

1/2 thru 7 1/2 hp
 3450 rpm—discharge pressures are 20 to 60 psi
 Motor types available: Open drip proof (ODP)
 Totally enclosed fan cooled (TEFC)
 Explosion proof
 Single phase, 115/230 V, 60 Hz
 Three phase, 230/460 V, 60 Hz

Accessories and Optional Equipment

Boiler Feed Pumps—Standard Equipment

- Float operated makeup valve
- Gauge glass and thermometer tappings

Boiler Feed Pumps—Optional Equipment

- Control Panels NEMA 1,4,4X, and 12 and BACNet
- Thermometer
- Makeup feeders—external type, or reverse acting float switch and solenoid valve type
- Electronic Modulating
- Magnesium corrosion inhibitor
- Suction isolation valves—butterfly type
- Inlet strainers—"Y" or basket type
- Gauge glass
- Three valve bypass and inlet strainer assembly for solenoid make-up valve
- Feedwater preheaters
- Discharge pressure gauges
- Discharge check valves
- Discharge gate valves
- Corrosion resistant receiver linings

Accessories and Optional Equipment

Condensate Pumps—Standard Equipment

- Simplex units have opening blanked-off for addition of a second pump at a later date
- One float switch (simplex units)
- Mechanical alternator (duplex units)—equalizes running time between the two pumps and provides emergency back-up in case of excessive condensate return or a pump failure
- Receiver tapping for gauge glass and thermometer

Condensate Pumps—optional equipment

- Control Panels (standard mounted to receiver, remote option available Bacnet Options)
- Thermometer
- Two float switches (duplex units)
- Suction isolation valves—butterfly type
- Inlet strainers—"Y" or basket type
- Gauge glass
- Magnesium corrosion inhibitor
- Corrosion resistant receiver linings
- Discharge pressure gauges
- Discharge check valves
- Discharge gate valves

Ordering Codes

	VE	SS	M	1	7-1/2
Series and pump type _____					
VC					
VJ					
VE					
VA					
VN					
Receiver type _____					
S = cast iron					
SS = welded steel					
M = boiler feed unit _____					
(omit for condensate return unit)					
Capacity, Sq Ft E.D.R. _____					
1 = 1,000					
2 = 2,000					
4 = 4,000					
6 = 6,000					
8 = 8,000					
10 = 10,000					
15 = 15,000					
20 = 20,000					
25 = 25,000					
30 = 30,000					
40 = 40,000					
50 = 50,000					
65 = 65,000					
80 = 80,000					
100 = 100,000					
Discharge Pressure, psig _____					
1 = 10					
1-1/2 = 15					
2 = 20					
2-1/2 = 25					
3 = 30					
4 = 40					
5 = 50					
6 = 60					
7-1/2 = 75					
Higher Discharge Pressures are available contact Thermaflo					



Pump Sizing Selection Tables "V" Series

Capacity Sq. Ft. E.D.R.	Capacity G.P.M.	Dish Press. psig	1750 R.P.M. Units			3500 R.P.M. Units			* Receiver Size (condensate units)			
			Catalog No.	Motor H.P.	Dish. Size	Catalog No.	Motor H.P.	Dish. Size	Cast Iron		Steel	
									Capacity	Return Size	Capacity	Return Size
1,000	1-1/2	10	VCS - 11	1/3	1-1/4"				15 or 21	2"	21	2-1/2"
		15	VCS - 11-1/2	1/3	1-1/4"	VJS - 11-1/2	1/2	1-1/4"				
		20	VCS - 12	1/3	1-1/4"	VJS - 12	1/2	1-1/4"				
		30				VCS - 13	3/4	1-1/4"				
						VJS - 13	1/2	1-1/4"				
		40				VCS - 14	1	1-1/4"				
						VJS - 14	3/4	1-1/4"				
		50				VCS - 15	1-1/2	1-1/4"				
				VJS - 15	1	1-1/2"						
				VCS - 16	2	1-1/4"						
					VCS - 17-1/2	3	1-1/4"					
2,000	3	10	VCS - 21	1/3	1-1/4"				15 or 21	2"	21	2-1/2"
		15	VCS - 21-1/2	1/3	1-1/4"	VJS - 21-1/2	1/2	1-1/4"				
		20	VCS - 22	1/3	1-1/4"	VJS - 22	1/2	1-1/4"				
		30				VCS - 23	3/4	1-1/4"				
						VJS - 23	1/2	1-1/4"				
		40				VCS - 24	1	1-1/4"				
						VJS - 24	3/4	1-1/4"				
		50				VCS - 25	1-1/2	1-1/4"				
				VJS - 25	1	1-1/2"						
				VCS - 26	2	1-1/4"						
					VCS - 27-1/2	3	1-1/4"					
4,000	6	10	VCS - 41	1/3	1-1/4"				15 or 21	2"	21	2-1/2"
		15	VCS - 41-1/2	1/3	1-1/4"	VJS - 41-1/2	1/2	1-1/4"				
		20	VCS - 42	1/2	1-1/4"	VJS - 42	1/2	1-1/4"				
		30				VCS - 43	3/4	1-1/4"				
						VJS - 43	1/2	1-1/4"				
		40				VCS - 44	1	1-1/4"				
						VJS - 44	3/4	1-1/4"				
		50				VCS - 45	1-1/2	1-1/4"				
				VJS - 45	1-1/2	1-1/2"						
				VCS - 46	2	1-1/4"						
					VCS - 47-1/2	3	1-1/4"					
6,000	9	10	VCS - 61	1/3	1-1/4"				21	2"	21	2-1/2"
		15	VCS - 61-1/2	1/3	1-1/4"	VJS - 61-1/2	1/2	1-1/4"	21	2"	21	2-1/2"
		20	VCS - 62	1/2	1-1/4"	VJS - 62/VNS-62	1/2	1-1/4"	21	2"	21	2-1/2"
		25	VES - 62-1/2	3/4	1-1/2"				21	2"	21	2-1/2"
		30	VES - 63	1	1-1/2"	VCS - 63/VNS-63	3/4	1-1/4"	21	2"	21	2-1/2"
						VJS - 63	1/2	1-1/4"	21	2"	21	2-1/2"
		40	VAS - 64	3	2"	VCS - 64/VNS-64	1, 1-1/2	1-1/4"	45	2-1/2"	21	2-1/2"
						VJS - 64	3/4	1-1/4"	21	2"	21	2-1/2"
						VCS - 65	1-1/2	1-1/4"	21	2"	21	2-1/2"
						VJS - 65	1-1/2	1-1/2"	21	2"	21	2-1/2"
				VCS - 66	2	1-1/4"	21	2"	21	2-1/2"		
				VCS - 67-1/2	3	1-1/4"	21	2"	21	2-1/2"		
8,000	12	10	VCS - 81	1/3	1-1/4"				21	2"	21	2-1/2"
		15	VCS - 81-1/2	1/3	1-1/4"	VJS - 81-1/2	1/2	1-1/4"	21	2"	21	2-1/2"
		20	VCS - 82	1/2	1-1/4"	VJS - 82	1/2	1-1/4"	21	2"	21	2-1/2"
		25	VES - 82-1/2	3/4	1-1/2"				21	2"	21	2-1/2"
		30	VES - 83	1	1-1/2"	VCS - 83	3/4	1-1/4"	21	2"	21	2-1/2"
						VJS - 83	1/2	1-1/4"	21	2"	21	2-1/2"
		40	VAS - 84	3	2"	VCS - 84	1	1-1/4"	45	2-1/2"	21	2-1/2"
						VJS - 84	1	1-1/4"	21	2"	21	2-1/2"
						VCS - 85	1-1/2	1-1/4"	21	2"	21	2-1/2"
						VJS - 85	1-1/2	1-1/2"	21	2"	21	2-1/2"
				VCS - 86	2	1-1/4"	21	2"	21	2-1/2"		
				VCS - 87-1/2	3	1-1/4"	21	2"	21	2-1/2"		

Designates 2 Ft. NPSH Capability * Consult Thermaflo on Feedwater Tank Sizing 10 Minutes of Storage Recommended

Pump Sizing Selection Tables

"V" Series

Capacity Sq. Ft. E.D.R.	Capacity G.P.M.	Dish Press. psig	1750 R.P.M. Units			3500 R.P.M. Units			* Receiver Size (condensate units)			
			Catalog No.	Motor H.P.	Dish Size	Catalog No.	Motor H.P.	Dish Size	Cast Iron		Steel	
									Return Capacity	Size	Return Capacity	Size
10,000	15	10	VCS - 101	1/3	1-1/4"				21	2"	21	2-1/2"
		15	VCS - 101-1/2	1/2	1-1/4"	VJS - 101-1/2	1/2	1-1/4"	21	2"	21	2-1/2"
		20	VCS - 102	1/2	1-1/4"	VJS - 102/VNS-102	1/2, 3/4	1-1/4"	21	2"	21	2-1/2"
		25	VES - 102-1/2	3/4	1-1/2"				21	2"	21	2-1/2"
		30	VES - 103	1-1/2	1-1/2"	VCS - 103/VNS-103	3/4	1-1/4"	21	2"	21	2-1/2"
						VJS - 103	3/4	1-1/4"	21	2"	21	2-1/2"
		40	VAS - 104	3	2"				45	2-1/2"	21	2-1/2"
						VCS - 104/VNS-104	1, 1-1/2	1-1/4"	21	2"	21	2-1/2"
						VJS - 104	1	1-1/4"	21	2"	21	2-1/2"
						VCS - 105	1-1/2	1-1/4"	21	2"	21	2-1/2"
				VJS - 105	1-1/2	1-1/2"	21	2"	21	2-1/2"		
				VCS - 106	2	1-1/4"	21	2"	21	2-1/2"		
				VCS - 107-1/2	3	1-1/4"	21	2"	21	2-1/2"		
15,000	22-1/2	10	VCS - 151	1/3	1-1/2"				21	2"	21	2-1/2"
		15	VCS - 151-1/2	1/2	1-1/4"	VJS - 151-1/2	1/2	1-1/4"	21	2"	21	2-1/2"
		20	VES - 152	3/4	1-1/2"	VJS - 152/VNS-152	1/2	1-1/4"	21	2"	21	2-1/2"
		25	VES - 152-1/2	1	1-1/2"				21	2"	21	2-1/2"
		30	VES - 153	1-1/2	1-1/2"	VCS - 153/VNS-153	1	1-1/4"	21	2"	21	2-1/2"
						VJS - 153	3/4	1-1/4"	21	2"	21	2-1/2"
		40	VAS - 154	3	2"				45	2-1/2"	21	2-1/2"
						VCS - 154/VNS-154	1-1/2	1-1/4"	21	2"	21	2-1/2"
						VJS - 154	1	1-1/4"	21	2"	21	2-1/2"
						VCS - 155	2	1-1/4"	21	2"	21	2-1/2"
				VJS - 155	1-1/2	1-1/2"	21	2"	21	2-1/2"		
				VCS - 156	3	1-1/4"	21	2"	21	2-1/2"		
				VCS - 157-1/2	3	1-1/4"	21	2"	21	2-1/2"		
20,000	30	10	VCS - 201	1/3	1-1/2"				45	2-1/2"	45	3"
		15	VCS - 201-1/2	1/2	1-1/4"	VJS - 201-1/2	1/2	1-1/4"				
		20	VES - 202	3/4	1-1/2"	VJS - 202/VNS-202	3/4	1-1/4"				
		25	VES - 202-1/2	1	1-1/2"							
		30	VES - 203	1-1/2	1-1/2"	VCS - 203/VNS-203	1-1/2, 1	1-1/4"				
						VJS - 203	1	1-1/4"				
		40	VAS-204	3	2"	VCS - 204/VNS-204	1-1/2, 2	1-1/4"				
						VJS - 204	1-1/2	1-1/2"				
						VCS - 205	2	1-1/4"				
						VJS - 205	1-1/2	1-1/2"				
				VCS - 206	3	1-1/4"						
				VCS - 207-1/2	5	1-1/4"						
25,000	37-1/2	10	VCS - 251	1/2	1-1/2"				45	2-1/2"	45	3"
		15	VCS - 251-1/2	3/4	1-1/2"	VJS - 251-1/2	3/4	1-1/4"				
		20	VES - 252	3/4	1-1/2"	VJS - 252	3/4	1-1/4"				
		25	VES - 252-1/2	1-1/2	1-1/2"							
		30	VES - 253	1-1/2	1-1/2"	VCS - 253	1-1/2	1-1/4"				
						VJS - 253	1	1-1/4"				
		40	VAS - 254	3	2"	VCS - 254	2	1-1/4"				
						VJS - 254	1-1/2	1-1/2"				
						VCS - 255	3	1-1/2"				
						VCS - 256	3	1-1/4"				
				VCS - 257-1/2	5	1-1/4"						
30,000	45	10	VCS - 301	1/2	1-1/2"				45	2-1/2"	45	3"
		15	VCS - 301-1/2	3/4	1-1/2"	VJS - 301-1/2	1	1-1/4"				
		20	VES - 302	1	1-1/2"	VJS - 302/VNS-302	1	1-1/4"				
		25	VES - 302-1/2	1-1/2	1-1/2"							
		30	VES - 303	1-1/2	1-1/2"	VCS - 303/VNS-303	1-1/2	1-1/4"				
						VJS - 303	1-1/2	1-1/2"				
		40	VAS - 304	3	2"	VCS - 304/VNS-304	2, 3	1-1/4", 2				
						VJS - 304	2	1-1/2"				
						VCS - 305/VNS-305	3, 5	1-1/2", 2				
						VCS - 306/VNS-306	3	1-1/4", 2				
				VCS - 307-1/2	7-1/2	1-1/2"						

Designates 2 Ft. NPSH Capability

Pump Sizing Selection Tables

"V" Series

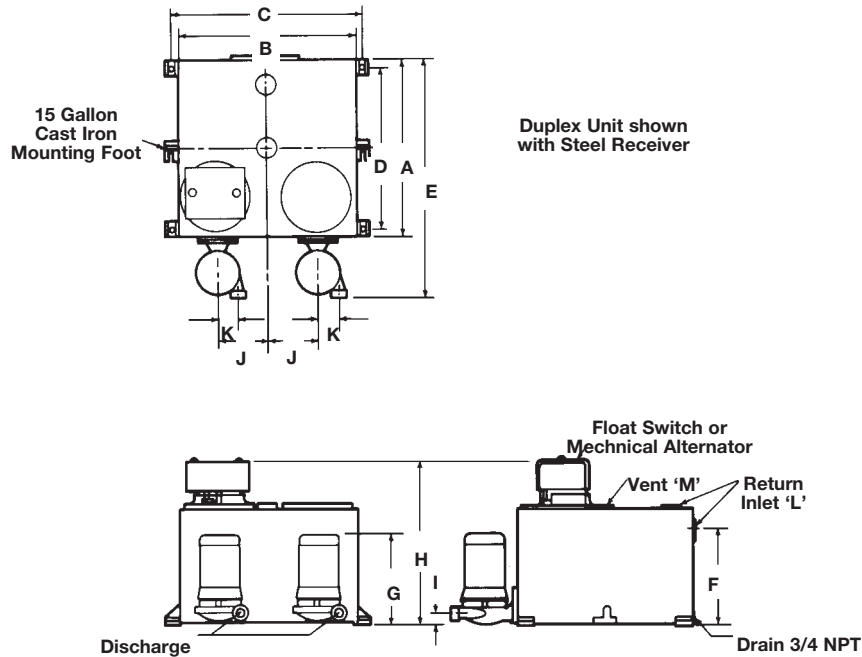
Capacity Sq. Ft. E.D.R.	Capacity G.P.M.	Dish Press. psig	1750 R.P.M. Units			3500 R.P.M. Units			* Receiver Size (condensate units)			
			Catalog No.	Motor H.P.	Dish Size	Catalog No.	Motor H.P.	Dish Size	Cast Iron		Steel	
									Capacity	Return Size	Capacity	Return Size
40,000	60	10	VCS - 401	3/4	1-1/2"				65	3"	65	3"
		15	VCS - 401-1/2	1	1-1/2"	VJS - 401-1/2	1-1/2	1-1/2"	65	3"	65	3"
		20	VES - 402	1-1/2	1-1/2"	VJS - 402/VNS-402	1-1/2	1-1/2", 2"	65	3"	65	3"
		25	VES - 402-1/2	1-1/2	1-1/2"				65	3"	65	3"
		30	VES - 403	2	1-1/2"	VCS - 403/VNS-403	2, 3	1-1/2", 2"	65	3"	65	3"
						VJS - 403	1-1/2	1-1/2"	65	3"	65	3"
		40	VAS - 404	5	2"	VCS - 404/VNS-404	3	1-1/2", 2"	65	3"	65	3"
		50				VCS - 405/VNS-405	5	1-1/2", 2"	65	3"	65	3"
		60				VCS - 406/VNS-406	5	1-1/2", 2"	65	3"	65	3"
		75				VCS - 407-1/2	7-1/2	1-1/2"	65	3"	65	3"
50,000	75	10	VCS - 501	1	2"				65	3"	65	3"
		15	VCS - 501-1/2	1-1/2	2"	VJS - 501-1/2	1-1/2	1-1/2"	65	3"	65	3"
		20	VES - 502	1-1/2	1-1/2"	VJS - 502/VNS-502	1-1/2, 2	1-1/2", 2"	65	3"	65	3"
		25	VES - 502-1/2	2	1-1/2"				65	3"	65	3"
		30	VAS - 503	3	1-1/2"	VCS - 503/VNS-503	3	1-1/2", 2"	65	3"	65	3"
						VJS - 503	2	1-1/2"				
		40	VAS - 504	5	2"	VCS - 504/VNS-504	3	1-1/2", 2"	65	3"	65	3"
		50				VCS - 505/VNS-505	5	1-1/2", 2"	65	3"	65	3"
60,000	90	20										
		30				VNS-602	2	2"				
		40				VNS-603	3	2"				
		50				VNS-604	5	2"	110	5"	110	4"
		60				VNS-605	7-1/2	2"				
65,000	97-1/2	10	VCS - 651	1-1/2	2"							
		15	VCS - 651-1/2	1-1/2	2"	VJS - 651-1/2	2	1-1/2"				
		20	VES - 652	2	1-1/2"	VJS - 652	2	1-1/2"				
		30	VAS - 653	3	2"	VCS - 653	3	2"	110	5"	110	4"
		40	VAS - 654	5	2"	VCS - 654	5	2"				
		50				VCS - 655	5	2"				
		60				VCS - 656	7-1/2	2"				
80,000	120	10	VCS - 801	1-1/2	2"							
		15	VCS - 801-1/2	2	2"							
		20				VCS - 802	3	1-1/2"				
		30	VAS - 803	5	2"	VCS - 803	5	2"	110	5"	110	4"
		40	VAS - 804	5	2"	VCS - 804	5	2"				
		50				VCS - 805	7-1/2	2"				
100,000	150	10	VCS - 1001	1-1/2	2"							
		15				VCS - 1001-1/2	2	2"				
		20				VCS - 1002	5	2"				
		30	VAS - 1003	5	3"	VCS - 1003	5	2"	110	5"	110	4"
		40	VAS - 1004	5	3"	VCS - 1004	5	2"				
		50				VCS - 1005	7-1/2	2"				

Designates 2 Ft. NPSH Capability



Pump Dimensions "V" Series

VC, VJ, VN, & VE Pumps with Rectangular Cast Iron or Steel/304L Stainless Steel Receivers

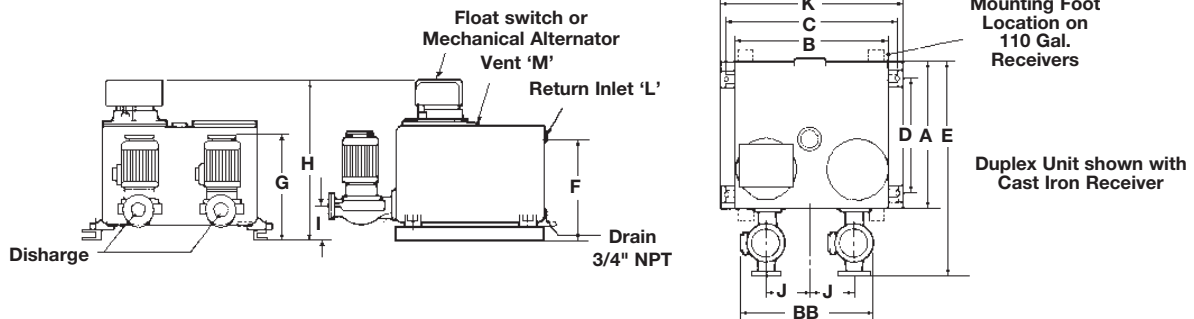


Dimensions (nominal) in inches & millimeters

Capacity sq. ft. E,D,R.	Receiver Capacity gal.	A	B	C	D	E	F	G	H	I	J	K	L	M
Cast Iron Receiver														
1,000 to 4,000	15	15 381	17.5 445	19.5 495	∅	28 711	13 330	16-19 406-483	22 559	4 102	5.25 133	4 102	2 -	1 -
1,000 to 15,000	21	21 533	22.75 578	26 660	14.75 375	34 864	10.25 260	16-21 406-533	19.5 495	4 102	6 152	4 102	2 -	1-1/4 -
20,000 to 30,000	45	26 660	26.75 679	28.75 730	20 508	39 991	15 381	16-21 406-533	23.75 603	4 102	7.5 190	4 102	2-1/2 -	1-1/2 -
40,000 to 50,000	65	28.5 724	28.5 724	30.75 781	22.75 578	41.5 1054	19.5 495	16-21 406-533	29 737	4.75 121	7.5 190	4 102	3 -	2 -
65,000 to 100,000	110	30 762	36.25 921	42 1067	32 813	44 1118	19.5 495	18-28 457-711	28.5 724	4 102	7.5 190	4 102	5 -	2 -
Steel or 304L Stainless Steel Receiver														
1,000 to 15,000	21	18 457	24 610	26.4 671	16.1 409	31 781	9 229	16-19 406-483	19 483	4 102	6 152	4 102	2-1/2 -	1-1/4 -
20,000 to 30,000	45	24 610	24 610	26.4 671	22.1 561	37 940	15.5 394	16-21 406-533	25 635	4 102	6 152	4 102	3 -	1-1/2 -
40,000 to 50,000	65	24 610	24 610	26.4 671	22.1 561	37 940	21.5 546	16-21 406-533	30.5 775	4 102	6 152	4 102	3 -	2 -
65,000 to 100,000	110	30.5 775	42.5 1080	45 1143	25 635	44.5 1130	17 432	18-28 457-711	27 686	4 102	11 279	4 102	4 -	2 -

Pump Dimensions "V" Series

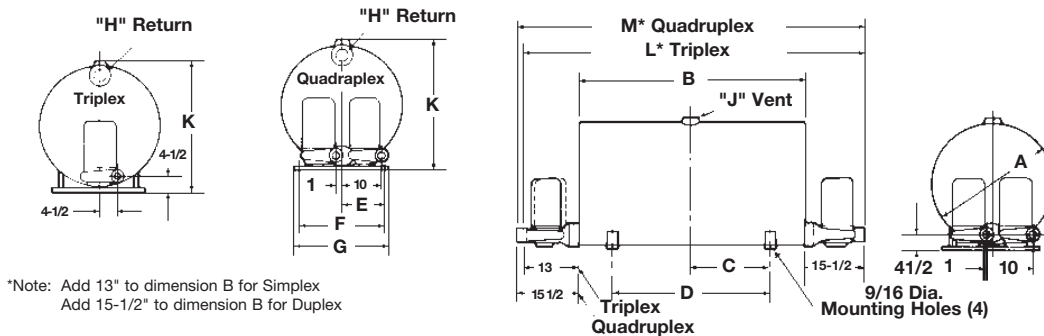
VA Pumps with Rectangular Cast Iron or Steel Receivers



Dimensions (nominal) in inches & millimeters

Capacity sq. ft. E.D.R.	Receiver Capacity gal.	A	B	C	D	E	F	G	H	I	J	K	L	M	BB
Cast Iron Receiver															
1,000 to 30,000	45	26	26.75	28.75	20	47	18	28.75	26.75	7	7.5	31.75	2-1/2	1-1/2	28
40,000 to 50,000	65	28.5	28.5	30.75	22.75	49.5	22.5	28.75	32	7	7.5	33.5	3	2	28
65,000 to 100,000	110	30	42	36.25	32	51	22.5	27.5	31.5	7	7.5	42	5	2	34
Steel Receiver															
1,000 to 15,000	21	18	24	26.4	16.1	39	12.75	28.75	21	7	7.5	28.4	2-1/2	1-1/4	-
20,000 to 30,000	45	24	24	26.4	22.1	45	18.5	28.75	28	7	7.5	28.4	3	1-1/2	28
40,000 to 50,000	65	24	24	26.4	22.1	45	24.5	28.75	33	7	7.5	28.4	3	2	28
65,000 to 100,000	110	30	42.5	45	25	51	20	27.5	30	7	11	47	4	2	41

VC, VJ, VN, and VE Pumps with Cylindrical Steel Receivers



*Note: Add 13" to dimension B for Simplex
Add 15-1/2" to dimension B for Duplex

Dimensions (nominal) in inches & millimeters

Capacity sq. ft. E.D.R.	Receiver Capacity gal.	A	B	C	D	E	F	G	H	J	K	L	M
25,000	49	22	30	10.5	21	7.5	15	17	2-1/2	1-1/4	23.5	58.5	61
40,000	71	24	36	13.5	27	8	16	18	3	1-1/2	25.5	64.5	67
65,000	117	24	60	15	30	8	16	18	4	2	25.5	88.5	91
165,000	209	32	60	24	48	14	28	30	5	2	33.5	88.5	91
165,000	260	36	60	24	48	14	28	30	5	2	37.5	88.5	91
295,000	370	36	84	28	56	14	28	30	5	2	37.5	112.5	115
400,000	500	42	84	28	56	14	28	30	5	2	43.5	112.5	115
600,000	750	48	96	28	56	19	38	40	5	2	49.5	124.5	127
800,000	1000	48	132	33	66	19	38	40	5	2	49.5	160.5	163



Control Panels

550 Series and 700 Series

AVAILABLE TYPES

Series 550

Enclosure: Nema Type 1 ONLY

Controls: 2 starters with 3rd leg overload protection
Reset button in cover

Series 700

Enclosure: Nema Type 1.

Controls: 2, 3 or 4 starters, each with 3rd leg overload protection and reset button on starters.
Numbered terminal strip

OPTIONAL EXTRAS

Series 550

Controls: 3 Position Selector Switch Hand-Off-Auto or Lead-Off Lag, or
Test-Off-Auto High High Level BMS Relay Contact
Pilot Light(s) Red or Green
230 V Max. Use 700 Series if voltage exceeds 230 V.

Series 700

Enclosure: Nema 1, 2, 3, 4X or 12. NEMA 7 or 9 Explosion Proof, consult factory.

Controls: 1 Disconnect per panel with Cover Interlock with provisions for padlock

1-Fuse Block per starter or—

1-Circuit Breaker per starter

Fused Control Circuit Transformer, 110 Volt Secondary.

1-Electric Alternator per panel (duplex models only)

Relays— as required.

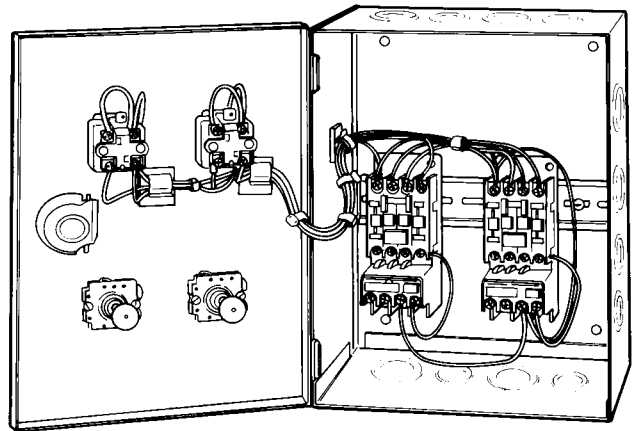
Selector Switches on cover, 1 per starter labeled:

- Hand-Off-Auto
- Lead-Off-Lag
- Boiler No. 1-Off-Boiler No. 2
- Pump No. 1-Off-Pump No. 2
- Test-Off-Auto (spring loaded to off)

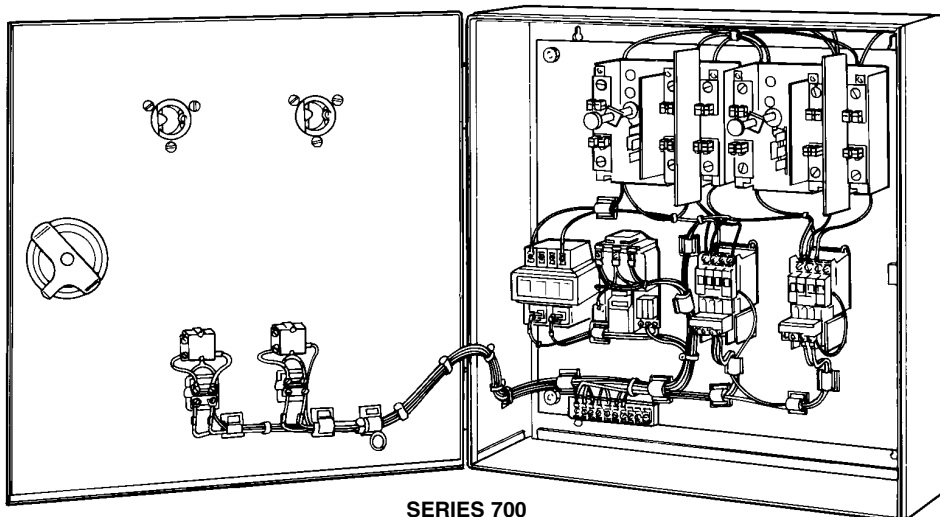
Pilot Lights on cover - 1 per starter

(Green for standard pumps; red for stand by pumps.)

Alarm bell with silencing switch - 1 per panel



SERIES 550



SERIES 700

V Series Control Panels

550 Series and 700 Series

NEMA ENCLOSURES

Enclosures For Inside Non-Hazardous Locations

Provides Protection Against	Type of Enclosure			
	1	2*	4*	12*
Accidental contact with enclosed equipment	yes	yes	yes	yes
Falling dirt	yes	yes	yes	yes
Falling liquids and light splashing		yes	yes	yes
Dust lint fibers and flyings			yes	yes
Hosedown and splashing water			yes	
Oil and coolant seepage			yes	yes
Oil and coolant spraying and splashing				
Corrosive agents				
Occasional submersion				

**These enclosures may be ventilated. However Type 1 may not provide protection against small particles of falling dirt when ventilation is provided in the enclosure top; and Type 12, if ventilated, will not be dust-tight*

TYPE 1 - GENERAL PURPOSE INDOOR

Nonventilated Enclosures

Type 1 enclosures are intended for use indoors primarily to prevent accidental contact of personnel with the enclosed equipment in areas where unusual service conditions do not exist. In addition, they provide protection against falling dirt. Enclosures which are intended to be flush mounted in building walls shall have provision to align the device with the flush plate and to compensate for the thickness of the wall.

Type 2 enclosures are intended for use indoors to protect the enclosed equipment against falling non-corrosive liquids and falling dirt. They shall have provision for drainage. If provision is made for the entrance of conduit at the top, it shall consist of a conduit hub or the equivalent. When completely and properly installed, these enclosures shall prevent entrance of dripping liquid at a higher level than the lowest live part within the enclosure.

Type 12 enclosures are intended for use indoors to protect the enclosed equipment against fibers, flyings, lint, dust and dirt and light splashing, seepage, dripping and external condensation of non corrosive liquids. There shall be no holes through the enclosure and no conduit knockouts or conduit openings, except that oiltight and dust-tight mechanisms may be mounted through holes in the enclosure when provided with oil-resistant gaskets. Doors shall be provided with oil-resistant gaskets. In addition, enclosures for combination controllers shall have hinged doors which swing horizontally and require a tool to open.

TYPE 4X WATERTIGHT & DUSTTIGHT INDOOR & OUTDOOR

Type 4X corrosion resistant enclosures are intended for use indoors or outdoors to protect the enclosed equipment against splashing water, seepage of water, falling or hose-directed water, and severe external condensation. They are sleet-resistant but not sleet-(ice) proof. They shall have conduit hubs or equivalent provision for watertight connection at the conduit entrance and mounting means external to the equipment cavity.

ENCLOSURES FOR HAZARDOUS LOCATIONS- GENERAL

The term "explosion proof" has been so loosely applied that NEMA deprecates its use. As defined by the "National Electrical Code," the term "explosion proof" applies only to Type 7 and 10 enclosures which, when properly installed and maintained, are designed to contain an internal explosion without causing external hazard. The term should not be applied to Type 8 enclosures which are designed to prevent an explosion through the use of oil-immersed equipment or to Type 9 enclosures which are designed to prevent an explosion by excluding explosive amounts of hazardous dust.

EXPLOSION PROOF - NONVENTILATED ENCLOSURES

Type 7 enclosures are intended for use indoors in the atmosphere and locations defined as Class I and Group A, B, C or D in the "National Electrical Code." The letter or letters A, B, C or D which indicate the gas or vapor atmospheres in the hazardous location shall appear as a suffix to the designation "Type 7" to give the complete NEMA designation and correspond to Class 1, Group A, B, C or D, respectively, as defined in the "National Electrical Code." These enclosures shall be designed in accordance with the requirements of Underwriters Laboratories, Inc, "Industrial Control Equipment for Use in Hazardous Locations," UL 698. and shall be marked to show the Class and Group letter designations.

Type 9 enclosures are intended for use indoors in the atmospheres defined as Class II and Group E, F or G in the "National Electrical Code." The letter or letters E, F or G which indicate the dust atmospheres in the hazardous location shall appear as a suffix to the designation "Type 9" to give the complete NEMA designation and correspond to Class II, Group E, F or G, respectively, as defined in the "National Electrical Code." These enclosures shall prevent the ingress of explosive amounts of hazardous dust. If gaskets are used, they shall be mechanically attached and of a noncombustible, nondeteriorating, vermin-proof material.





INSTALLATION AND MAINTENANCE INSTRUCTIONS

VCS, VJS, VES, VNS and VAS

CONDENSATE-BOILER FEED PUMPS

KEEP THESE INSTRUCTIONS NEAR THE PUMP FOR USE OF OPERATOR

WARNING

Before attempting examination or repairs to pump, open the disconnect switch to electric motor, to prevent accidental running of pump motor. Starting motor during examination or repair activities could damage pump and may cause personal injury. An electrical shock from contact with live wires or cords can be fatal.

Before opening conduit box of electric motor, be certain that the current to the motor is shut off. An electrical shock from contact with live motor leads can be fatal.

Let the unit cool to ambient temperature before servicing, as severe burns can result from contact.

INSTALLATION INSTRUCTIONS

Locating Pump:

Install unit in a clean, dry well-ventilated and drained location for inspection and care. The top of the pump receiver should be below the lowest return since it is best to keep the return lines dry. This unit must be placed so the condensate flows into the receiver by gravity, otherwise returns will be wet and the system will not free itself of air.

Piping:

Connect returns to inlet of receiver with a gate valve in each return and a union or flange joint next to the receiver. Provide a drain from sewer from each return. Connect discharge of pump to boiler with a union, swing check valve and a gate valve; with the swing check valve as close to the pump as is possible. If discharge pipe is longer than 50 feet, increase piping to next size larger. Piping must be of correct length to prevent any pipe strain upon the unit.

Wiring:

The electrical connections between the motor, float switch and automatic starter (if furnished) are made at the factory. Connect the electric service to the float switch or automatic starter using conduit and wire sizes as required by local power companies. Provide a fused main line switch in motor circuit. CAUTION: The motor is wired and connected at the factory to operate on the voltage specified. If voltage is other than originally specified, consult motor manufacturer's instructions accompanying unit for proper wiring. Where a polyphase motor is furnished with only a float switch, IT WILL BE NECESSARY TO INSTALL A SUITABLE PHASE PROTECTOR SWITCH IN THE MOTOR CIRCUIT TO PREVENT MOTOR BURNOUTS SHOULD A SINGLE PHASE CONDITION OCCUR.

Fuses:

Be sure fuses are installed and comply in size with National Electrical Code recommendations. When a fuse blows out it indicates that something is wrong either in the motor, pump, switch, fuse rating or electric service. Do not replace fuse until the cause for its blowing out has been determined. If a thermal cut-out is used, an element with a maximum tripping current rating 50% greater than motor nameplate Amps. may be selected. Condensate boiler feed pumps are only operating intermittently and therefore it is permissible.

OPERATING INSTRUCTIONS

CAUTION: New or repaired heating systems should be operated several days with the returns open to sewer until water appears clear, in order to thoroughly flush and clean the lines and prevent clogging of the pump when it is put in operation.

This pump is equipped with a mechanical shaft seal instead of the conventional type of packing. Be sure therefore, that pump receiver is filled with water or condensate before starting, because the mechanical seal will be damaged if run dry.

LUBRICATION: None required for pump proper. However, the vertical motor is ball bearing type with pre-sealed and lubricated bearings, and no immediate lubrication is necessary. Required lubrication depends upon service pump is subjected to and cleanliness of location. Normal lubrication-at the start of each heating season or every 1500 hours of operations whichever comes first. DO NOT over lubricate. Use LUCAS 500F Red Grease

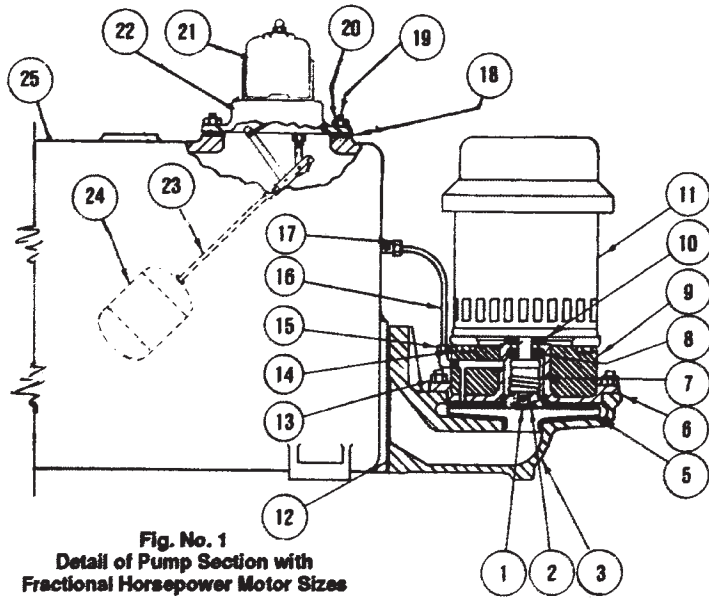


Fig. No. 1
Detail of Pump Section with
Fractional Horsepower Motor Sizes

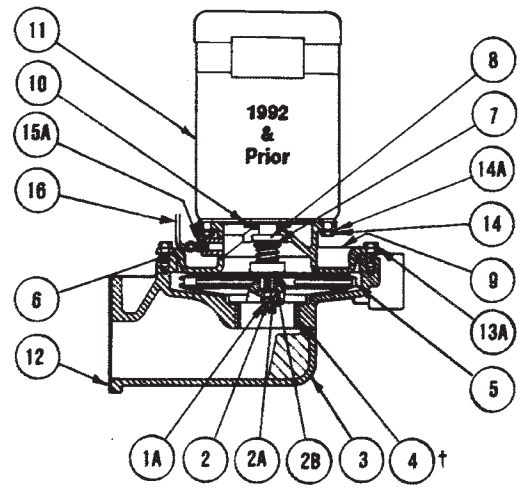


Fig. No. 2
Detail of Pump Section
VES Series

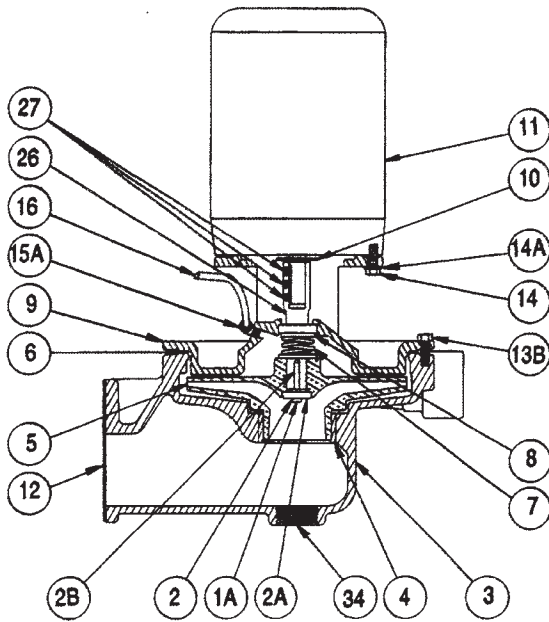


Fig. No. 3
Detail of Pump Section
VES Series beginning 1993

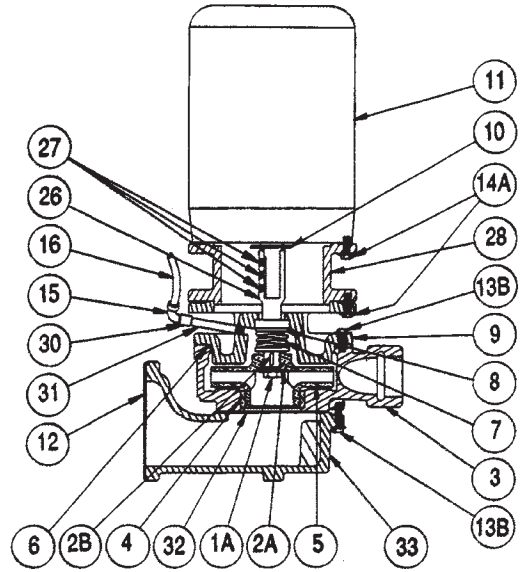


Fig. No. 4
Detail of VNS Pump

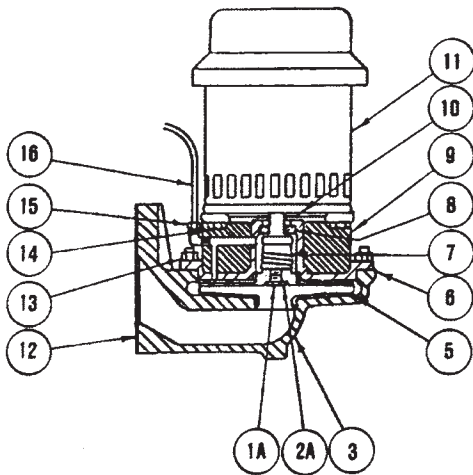


Fig. No. 5
Detail of Pump Section with
Integral Horsepower Motor Sizes

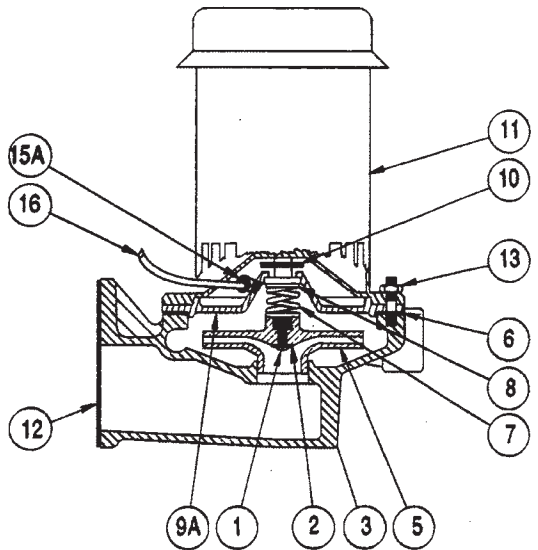


Fig. No. 6
Detail of Pump Section
VJS All Sizes

PARTS LIST

1. Impeller Lock Nut – Bronze 30	15 Vent Line Fitting – Elbow
1A Impeller Lock Screw – Stainless Steel 10	15A Vent Line Fitting (Seal Plate)
2 Impeller Lockwasher – Bronze	16 Pump Vent Line
2A Impeller Retaining Collar – Bronze	17 Vent
2B Impeller Key	18 Gasket – Float Switch
3 Pump Housing – C.I.	19* Hex Head Cap Screw (C.I. Only) 4 Reg.
4+ Wear ring – Bronze	20* Hex Nut – Float Switch (Steel Only) 4 Reg.
5 Centrifugal impeller	21 Float Switch Only
6 Gasket/O-Ring – Pump Housing to Motor Bracket	22 Float Switch and Linkage Assembly Complete with Ball and Rod
7 Rotating Seal Assembly with S.S. Sprint	23 Float Rod
8 Ceramic Seal Seat and Vibration Ring	24 Float Ball
9 Motor Bracket – C.I.	25 Receiver
9A Seal Plate – C.I.	26 Extension Shaft
10 Water Slinger – Neoprene	27 Set Screws
11 Electric Motor	28 Stand-Off Bracket
12 Gasket – Receiver to Pump Housing	30* Coupling – Black Pipe
13* Hex Nut and Stud Bolt	31* Pipe Nipple –Vent Extension
13A* Hex Head Cap Screw	32 Gasket – Suction Adapter
13B* Hex Head Cap Screw w/Flat Washer	33 Suction Adapter
14* Hex Head Cap Screw	34* Pipe Plug – Drain
14A* Hex Head Cap Screw w/Flat Washer	

*May be purchased locally
+ VES and VNS only

INSPECTION BEFORE STARTING UNIT FOR FIRST TIME

1. Check motor shaft and be sure it rotates freely. If shaft is tight, inspect pump end and motor for foreign matter clogging pump or lodging in motor.
2. Check voltage supply and be sure it is same as motor on pump, or same as wiring connections made at factory.
3. Be sure piping connections to pump have been made as per instructions and that air vent pipe from receiver is open to atmosphere.
4. Be sure that the engineering characteristics of the complete pump are identical to the capacity, discharge pressure and other requirements of the system.
5. Be sure that the float in the receiver is free to operate float switch.

Starting: Open valves in discharge and return lines, close valves in drain lines and close fused knife switch. If an automatic starter with selector switch is installed, be sure selector switch button is in “Auto” position.

INSPECTION AFTER STARTING

1. With vent pipe open to atmosphere, air and vapor can escape as fast as condensation flows into receiver. If vent is not open, or restricted, receiver will not fill.
2. Be sure pump and motor rotate in proper direction. Correct direction of rotation is CLOCKWISE when looking at top of motor. (If rotation is reversed, refer to motor instruction card and change proper leads.)
3. Check motor bearings for overheating.
4. Check float switch to see that it starts and stops motor as receiver fills and empties.
5. Check all piping connections for leaks.
6. Observe operation of unit closely for several hours after first starting and at regular intervals for several days. A new unit is frequently stiff as bearings are tight and therefore should be watched to check performance.

SERVICE AND CARE OF UNIT

1. **Inspection:** To insure best operation of unit, make a systematic inspection at least once a week.
2. **Cleanliness:** Keep the interior and exterior of motor and automatic switches free from moisture, oil and dirt. If necessary, use compressed air for blowing out dirt. Occasionally drain and flush pump receiver to remove sediment and pipe scale.
3. **Motor Bearings:** Prevent excessive heating and wear of ball bearings by proper lubrication (frequency of lubrication to be determined by application and cleanliness of location). When bearings are worn and unit becomes noisy, replace worn bearings immediately so as not to injure other rotating parts.
4. **Automatic Switches:** Occasionally examine contacts of automatic switches and see that they make a full firm contact and break the circuit quickly. Be sure all terminal connections are tight and not corroded.
5. **Mechanical Shaft Seal:** Occasionally examine water slinger Part No. 10 on motor shaft and look for water leakage. Any leakage will also be visible on Part No. 9 motor bracket. Leakage indicates that the seal surfaces are worn and Parts No.7 and 8 will need replacing. (For proper procedure in replacing these parts, refer to instructions under Disassembly of Pump.) CAUTION: NEVER OPERATE PUMP WHEN RECEIVER IS EMPTY, BECAUSE THE SEAL WILL BE DAMAGED IF RUN DRY.
6. **Shutting Down:** At end of heating season, open main line switch, close valves in return line and discharge piping, and drain receiver and pump. If necessary, cover electric motor and automatic switches to protect them against dirt, oil and moisture.
7. **Caution:** Never operate pump when receiver is empty or expose it to freezing temperature when filled with water.

REMOVING THERMAFLO PUMP AND MOTOR UNIT

No return piping or pump discharge piping need be disturbed to remove pump and motor unit, simply proceed as follows:

1. Loosen or remove vent line fitting Part No. 15 and swing tube vent line away from pump.
2. Disconnect wiring and flexible conduit at motor terminal box and swing tube vent line away from pump.
3. Remove nuts No. 13 or hex. head cap screw No. 13A or 13B and lift motor and pump unit from pump housing No. 3 for inspection or repair.

DISMANTLING PUMP AND MOTOR UNIT

FOR VJS PUMP UNIT proceed as follows:

1. Remove drip cover from top end of motor and receiver plug for center of motor top end-bell. Note slot in top end of motor shaft (or two flats on motor shaft if it extends above end-bell.). Use either a heavy wide blade screwdriver, or open end wrench to hold motor shaft securely.
2. Remove No. 1 impeller locknut with socket head wrench by turning locknut COUNTERCLOCKWISE. Also remove bronze lockwasher No. 2.
3. Still holding motor shaft securely, remove No. 5 impeller by turning COUNTERCLOCKWISE. Impeller hub is threaded and screws onto threaded motor shaft.
4. Remove No. 7 rotating seal assembly with spring by sliding along motor shaft. Spring seats against impeller hub.
5. Remove No. 9A seal plate carefully over motor shaft.
6. Water slinger No. 10 is now visible and can be removed.

FOR VCS, VES and VNS UNITS proceed as follows:

1. Insert blade of screwdriver in one of the peripheral vane openings of impeller to keep shaft from turning. With another screwdriver or socket head wrench remove No. 1A impeller lock screw by turning COUNTERCLOCKWISE. Impeller lock screw may be slotted round head type or hexagon head type. Also remove lockwasher No. 2, if used.
2. Remove No. 2A impeller retaining collar and with two (2) screwdriver blades 180° apart and between impeller No. 5 and bracket No. 9, pry impeller from motor shaft. The impeller hub has a straight bore and motor shaft is straight with a key and keyway. Remove key No. 2B in motor shaft.
3. Remove No. 7 rotating seal assembly with spring by sliding along motor shaft. Spring seats against impeller hub.
4. Remove No. 14 hex. cap screws, holding bracket to motor, and remove bracket No. 9 from motor.
5. Water slinger No. 10 is now visible and can be removed.

REPLACING MECHANICAL SHAFT SEAL AND REASSEMBLING PUMP

1. Pump and motor unit must be completely dismantled as indicated above.
2. Remove No. 8 ceramic stationary seal seat and rubber vibration ring from motor bracket No. 9 or seal plate 9A
3. Be sure counter-bore in bracket No. 9 or 9A is perfectly clean before inserting new ceramic seat and ring.
4. Use a light oil on the entire diameter of vibration ring and press it together with the ceramic seat into the machined bore of bracket No. 9. Press as far as it will go and be sure it is in proper position with seat surface at a perfect 90° angle with respect to motor shaft. Use caution so as NOT to SCRATCH or MAR lapped surfaces of ceramic seat.
5. Slide No. 9 motor bracket over motor shaft and replace screws No. 14. (Seal plate No. 9A for VJS pumps – No. 14 HHCS N/A).
6. Use light oil on lower end of motor shaft and slip rotating seal assembly No. 7 onto motor shaft as far as it will go. CAUTION: Be careful not to SCRATCH or MAR lapped surface of carbon ring.
7. Insert seal spring and be sure it seats properly against shaft seal.
8. VJS PUMP UNIT: Hold top end of motor shaft with screwdriver or open end wrench and screw impeller No. 5 COUNTERCLOCKWISE onto motor shaft until it is tight. The seal spring will center itself on hub of impeller and it will be properly compressed for seal compression.
9. Replace lockwasher No. 2 and locknut No. 1 and turn locknut COUNTERCLOCKWISE until tight.
- 8A. VCS, VES and VNS PUMP UNITS: Replace impeller key in motor shaft and replace impeller on shaft. With impeller in proper place, the inside hub will be almost flush with end of motor shaft and seal spring will have proper compression.
- 9A. Insert screwdriver blade in one of the impeller peripheral openings to keep it from turning, and replace No. 2A retaining collar, lockwasher No. 2 (if used) and No. 1A locking screw. Tighten impeller locking screw by turning COUNTERCLOCKWISE.
10. Replace gasket/O-ring No. 6 and set pump and motor unit onto pump housing No. 3 and replace stud nuts No.13 or hex. head screws No. 13A or 13B and tighten securely.
11. Replace tube vent line No. 16 and tighten fittings No. 15.
12. Reconnect wiring and flexible conduit at motor terminal box and unit is now ready for operation. (Check rotation.)
13. CAUTION: NEVER RUN PUMP WITH RECEIVER EMPTY, BECAUSE BOTH ELEMENTS OF MECHANICAL SHAFT SEAL WILL BE DAMAGED.

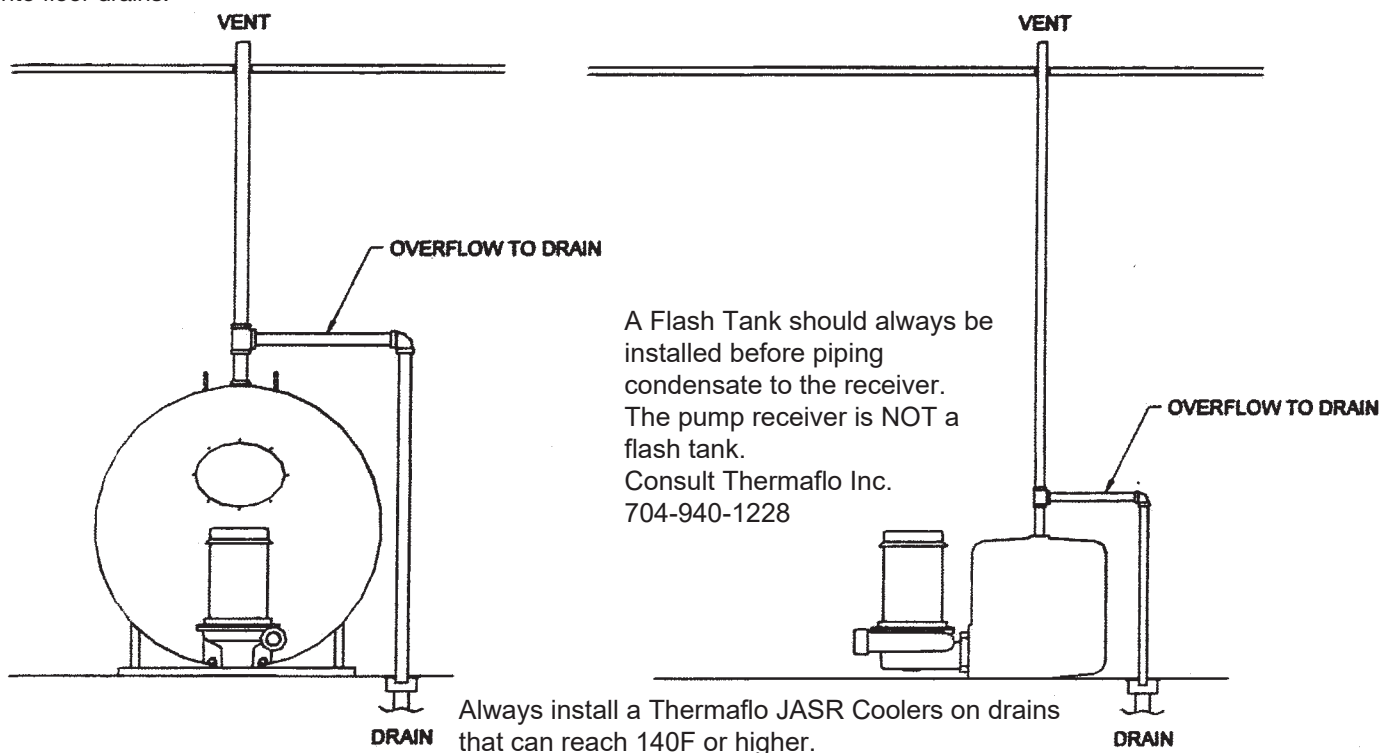
OVERFLOWS AND VENTS

Proper installation of overflow and vent piping is critical to the success of your installation. The tank you have purchased is not a pressure vessel and properly locating the overflow and vent piping will help prevent damage to the tank.

The purpose of the overflow is to provide a path for the tank contents to escape the tank in the event of flooding caused by mechanical or electrical failure. An overflow should extend no higher than one foot above the top of the tank, because each additional foot of height in the overflow adds about ½ psi to the pressure in the vessel. Overflows typically are directed into floor drains.

The purpose of the vent is to maintain atmospheric pressure on top of the liquid in the tank (that is, to prevent pressurization by the process). There is no limit to the height of the vent, since it is only carrying air at low velocity. Tall vents should be supported from above to ensure stability and to reduce weight load on the tank.

Some tanks have separate vent and overflow ports, while others have a single port that must serve both purposes. See the figure below for the proper method for plumbing vent and overflow to a single port. **Never reduce pipe size on vent or overflow lines.**



RETURN LINE STRAINER

Use of a strainer in the return to the receiver is recommended. The strainer collects solids of a certain size, and removes them from the condensate. Strainers typically have access

covers that allow removal of the strainer basket or screen for cleaning. The proper location of the strainer is in the condensate return line near its entry point to the tank.