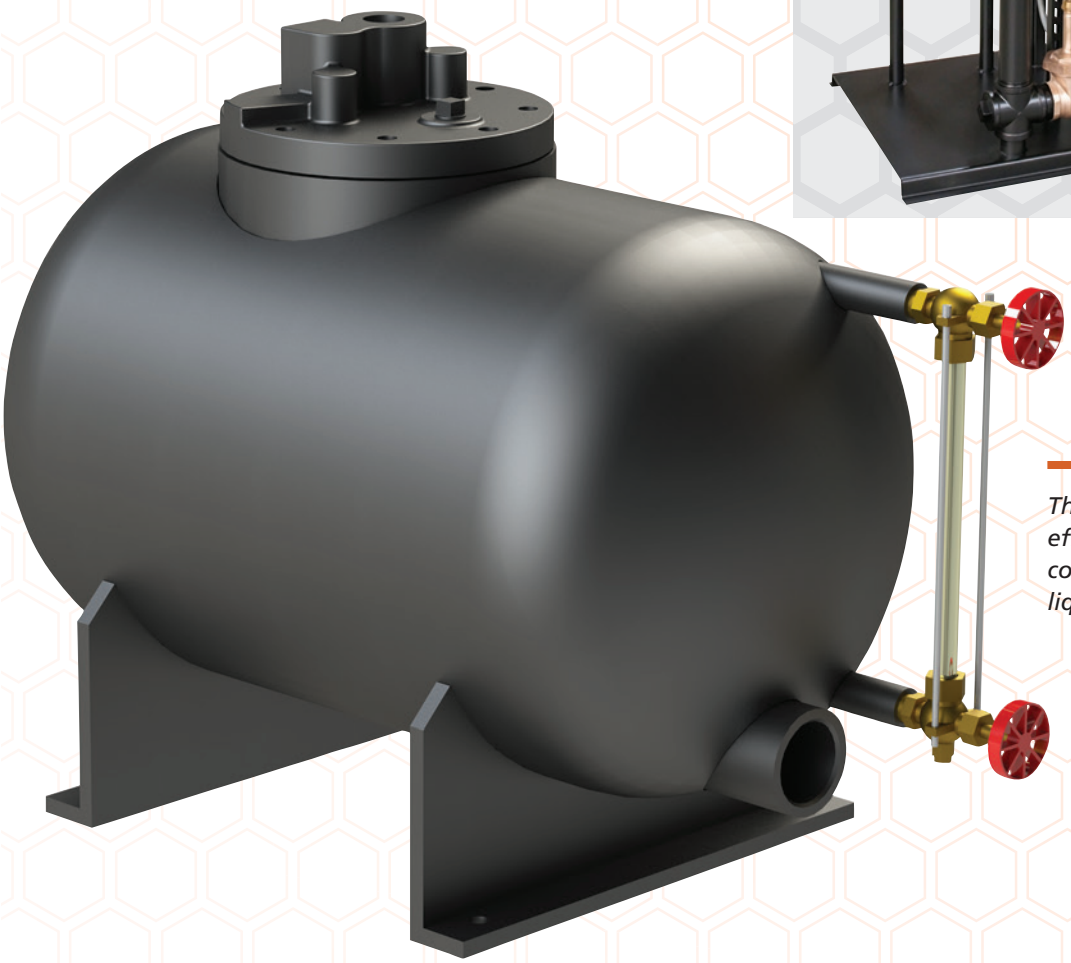
KĀDANT

FLUID HANDLING

Liqui-Mover® Pumps

Pressured-Powered Pump Catalog



The more reliable and efficient way to pump condensate and other liquids.

Liqui-Mover® Pumps

Efficiently and effectively draining condensate from steam equipment and returning it to the boiler is essential for optimal plant performance. To achieve this, the condensate pump must move condensate under all operating conditions, including vacuum.

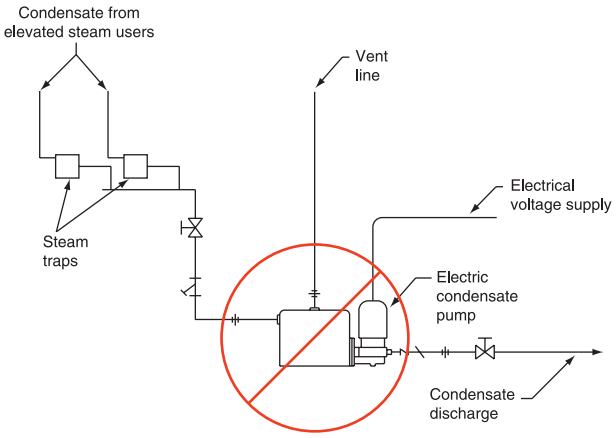
The condensate pump must handle flash steam, with minimal or no external cooling required. Flash steam can contain up to 20% of the heat energy used to generate the steam in the boiler. Not only is this heat energy lost if allowed to flash to atmosphere, but the water and boiler chemicals are also lost.

Kadant Johnson has been manufacturing Liqui-Mover condensate pumps since 1934. The Liqui-Mover pump is an energy-efficient way to pump or lift liquids. Liqui-Mover pumps perform the same function as conventional electric centrifugal pumps but with fewer moving parts. Liqui-Mover pumps have the ability to handle high temperature condensate and flash steam without pump cavitation. Additional condensate cooling equipment is not required.

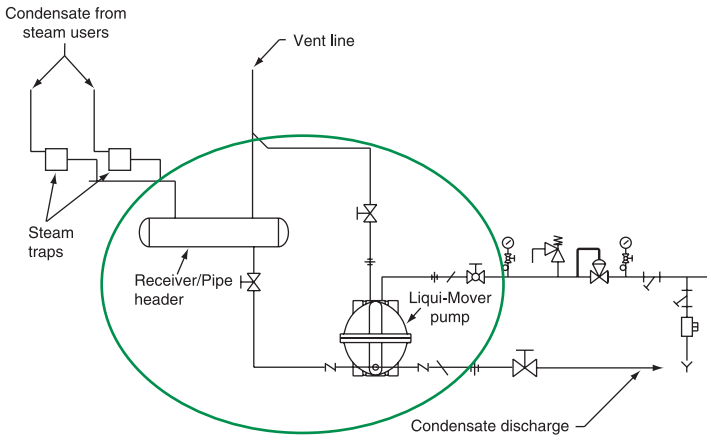
The Liqui-Mover pump is available with either a float free level control with capacities up to 90,000 pph (180 gpm) or a non-electric, float level control with capacities up to 14,600 pph (29 gpm). The simple design and compact footprint make Liqui-Mover pumps easy to integrate into new and existing systems, easy to install, and ideally suited for pumping liquids in a variety of areas, including hazardous and wet environments. Pumps are available to work with existing receivers or skid packaged with a receiver.

The Ideal Pump for Steam Condensate Service

- Ability to handle high temperature condensate and flash steam
- Energy efficiency
- High service availability
- Low maintenance requirements
- Proven performance and reliability



Electric Centrifugal Condensate Pump



Liqui-Mover Condensate Pump

Pump Selection Guide

Model	Maximum Capacity (pph)	Check Valve Size	PMA* (psig)	TMA* (°F)	Pump Body Material	Page Number
Float Free Pumps						
LMHT-1600 Low-Profile Series	4,145	1" x 1"	150	650	Fabricated steel 150 psig ASME "U" stamped	6
	9,438	1½" x 1½"	150	650	Fabricated steel 150 psig ASME "U" stamped	
	14,216	2" x 2"	150	650	Fabricated steel 150 psig ASME "U" stamped	
	17,440	3" x 2"	150	650	Fabricated steel 150 psig ASME "U" stamped	
LMV-1600	3,885	1" x 1"	150	650	Fabricated steel 150 psig ASME "U" stamped	8
	8,638	1½" x 1½"	150	650	Fabricated steel 150 psig ASME "U" stamped	
	12,413	2" x 2"	150	650	Fabricated steel 150 psig ASME "U" stamped	
	15,800	3" x 2"	150	650	Fabricated steel 150 psig ASME "U" stamped	
LMH-110	33,956	4"	150	500	Fabricated steel 150 psig ASME "U" stamped	12
LMH-150	57,238	6"	150	500	Fabricated steel 150 psig ASME "U" stamped	12
LMH-200	89,712	6"	150	500	Fabricated steel 150 psig ASME "U" stamped	12
Float Operated Pumps						
LMHT-500 Low Profile Series	2,350	1" x 1"	200	400	ASTM A395 Class 60 ductile iron	16
LMHT-1600 Low Profile Series	3,450	1" x 1"	150	650	Fabricated steel 150 psig ASME "U" stamped	18
	7,865	1½" x 1½"	150	650	Fabricated steel 150 psig ASME "U" stamped	
	11,840	2" x 2"	150	650	Fabricated steel 150 psig ASME "U" stamped	
	14,530	3" x 2"	150	650	Fabricated steel 150 psig ASME "U" stamped	
LMV-1600 Series	3,237	1" x 1"	150	650	Fabricated steel 150 psig ASME "U" stamped	20
	7,198	1½" x 1½"	150	650	Fabricated steel 150 psig ASME "U" stamped	
	10,344	2" x 2"	150	650	Fabricated steel 150 psig ASME "U" stamped	
	13,668	3" x 2"	150	650	Fabricated steel 150 psig ASME "U" stamped	

Consult factory for other pressure vessel ratings and materials.
*PMA = Maximum allowable pressure
*TMA = Maximum allowable temperature

Above capacities are based on:

- Single pump tank
- Steam as motive pumping pressure
- Maximum fill head (distance between receiver/reservoir and pump tank)
- Motive pressure being 20 psig higher than static back pressure
- 210°F condensate temperature

Float Free Series

Kadant Johnson has been manufacturing Liqui-Mover Float Free™ pumps since 1934. Liqui-Mover pumps are the energy-saving, highly-efficient way to pump or lift liquids. Liqui-Mover pumps perform the same function as a conventional electric centrifugal pump, but with only three moving parts. The three moving parts are the inlet and outlet check valves and the externally mounted 3-way motive valve. Fewer moving parts equal more uptime and less maintenance manpower and inventory expense.

Liqui-Mover pumps have the ability to handle high temperature condensate and flash steam without pump cavitation. Many electric centrifugal condensate pumps are limited to temperatures below 210° F. Liqui-Mover pumps do not require any additional condensate cooling equipment.

The operation of the Float Free pump is by means of a 2-probe conductance level control system that senses the level of the condensate in the pump tank. An externally mounted 3-way motive valve allows either steam, or another compatible inert gas, to push the condensate out of the pump tank and into the condensate return line. The 3-way motive valve can be either solenoid operated or pneumatic operated. Electrical cost is just a few cents an hour.

Float Free Pump Features Include:

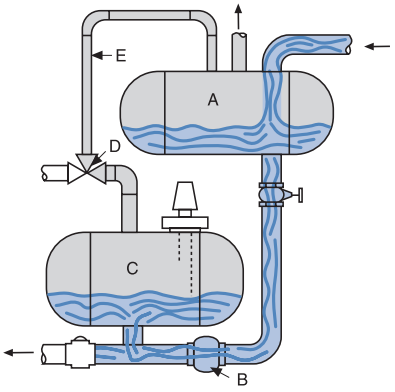
- No springs to fail
- No floats to collapse
- No pivot points or linkage to wear
- Proven system reliability
- Capacities up to 180,000 pph (360 gpm)
- 150 psig ASME labeled steel tanks standard (higher ratings available)
- Modular construction available for ease of installation
- Pump and PumpTrap™ models available
- Custom designs and configurations
- Available with or without receiver, simplex or duplex pumps, stand-by motive valve, alarms, cycle counter, and insulation
- Float Free pump retrofits available to replace drop-in float mechanisms

How Does It Measure Up?	Electric Centrifugal Condensate Pump	Float Free Condensate Pump
Temperature limit > 200°F	No	Yes
Energy efficiency	Sized with 2:1 safety factor	Sized for actual incoming load
Condensate cooling required	Yes	No
Damaged by flash steam	Yes	No
Electric power required	Yes	Yes
Maintenance requirements	Seal kits, motors, float switches, impellers	High maintenance items eliminated

Float Free Series Liqui-Mover Pumps

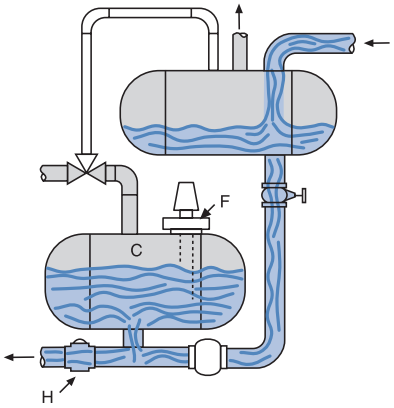
The Float Free series Liqui-Mover pump moves condensate and other fluids using steam or other pressurized inert gases – without motors, pumps, rotors, or floats.

Stage 1: Fill Stage



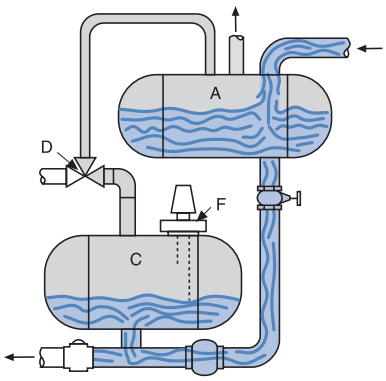
Fluid flows from the receiving chamber (A) through the inlet check valve (B) into the pump tank (C). The 3-way valve (D) is opened between the pump tank and the receiving chamber, equalizing the pressure between them through the equalizing line (E).

Stage 2: Pump Stage



When the level control (F) senses that the pump tank is full, the 3-way valve energizes to admit the motive pressure into the pump tank (C). The motive pressure forces the fluid past the discharge check valve (H) and out the discharge line.

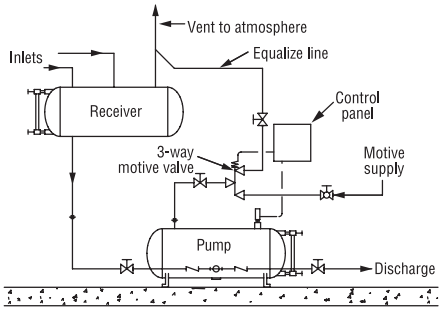
Stage 3: Equalize Stage



Once the level control (F) senses the pump tank has emptied, the 3-way valve (D) de-energizes, shutting off the motive pressure, and opening the vent port in the valve. This allows the pump tank (C) and the receiving chamber (A) to equalize in pressure.

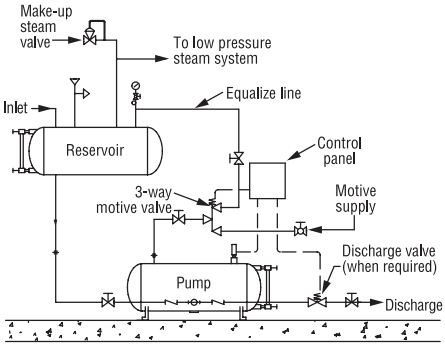
Types of Systems

Open System



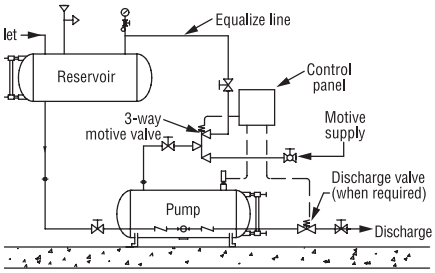
An open system is intended for use with mixed return pressures; this design requires no supplemental cooling of condensate.

Flash System



A flash system is for applications requiring flash steam – such as high-pressure processing equipment – the receiver in this design acts as a flash tank.

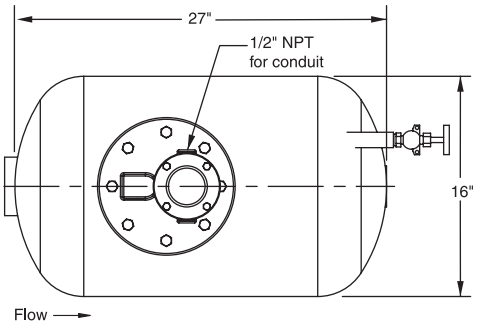
Closed (PumpTrap) System

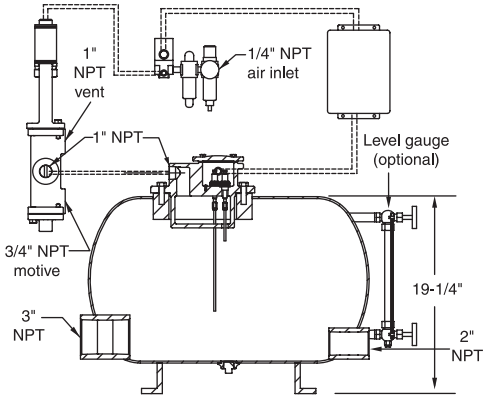


A closed system is for single steam users. There is no BTU energy loss from flashing.

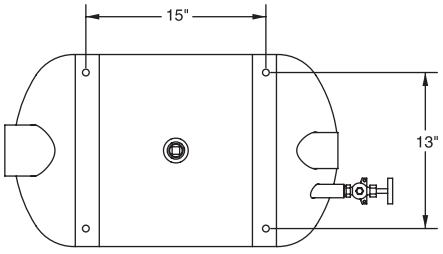
LMHT-1600 Series

Horizontal Profile





Pneumatic valve shown. Solenoid valve available.



Material Specifications

Part	Material
Pump tank	ASME code stamped 150 psig Shell and heads – carbon steel SA-414 G Flange ring – carbon steel SA-106C
Float Free level control	Mounting flange – ductile iron SA-395
3-way valve	Body – ductile iron Valves and seats – stainless steel
Check valves	Stainless steel, spring assisted non-slam
Gauge glass	Bronze valves with redline glass and brass guard rods

Available Options

- Level gauge glass
- Pressure gauge
- Drain piping
- Insulation jacket
- Cycle counter
- ASME labeled receiver/reservoir

Features

- Low profile design
- Capacity up to 17,440 pph
- No springs or linkages
- Various NEMA classifications available

Benefits

- Compact installation
- Large capacity for application flexibility
- Wear and corrosion resistant
- Greater reliability
- Installation flexibility

Note: Engineering drawings are available on request.

LMHT-1600 Float Free Sizing Chart

Fill Head	Total Static Back Pressure (psig)	LMHT-1610		LMHT-1615		LMHT-1620		LMHT-1632	
		pph	GPM	pph	GPM	pph	GPM	pph	GPM
12″	10	3,636	7.3	8,580	17.2	12,924	25.8	15,852	31.7
	20	3,612	7.2	8,472	16.9	12,624	25.2	15,336	30.7
	30	3,504	7.0	8,256	16.5	12,144	24.3	14,640	29.3
	40	3,420	6.8	7,836	15.7	11,292	22.6	13,500	27.0
	50	3,276	6.6	7,128	14.3	9,948	19.9	11,736	23.5
	60	3,036	6.1	6,144	12.3	8,208	16.4	9,396	18.8
	70	2,724	5.4	5,016	10.0	6,336	12.7	7,056	14.1
	80	2,400	4.8	3,924	7.8	4,704	9.4	5,100	10.2
	90	2,016	4.0	2,976	6.0	3,420	6.8	3,624	7.2
	100	1,644	3.3	2,232	4.5	2,484	5.0	2,592	5.2
Check valve size – inlet		1″		1.5″		2″		3″	
Check valve size – outlet		1″		1.5″		2″		2″	
Gallons pumped per cycle		12		12		12		12	

Note: Above based on steam as the motive pressure.

Above based on motive pressure being 20 psig higher than total static back pressure.

Total static back pressure is the maximum height the fluid is pumped up, plus the discharge line pressure.

Fill head is the distance between top of the pump tank to the bottom of the receiver.

For multiple pumps, multiply above capacity by number of pumps to be used.

Consumption (Approximate)

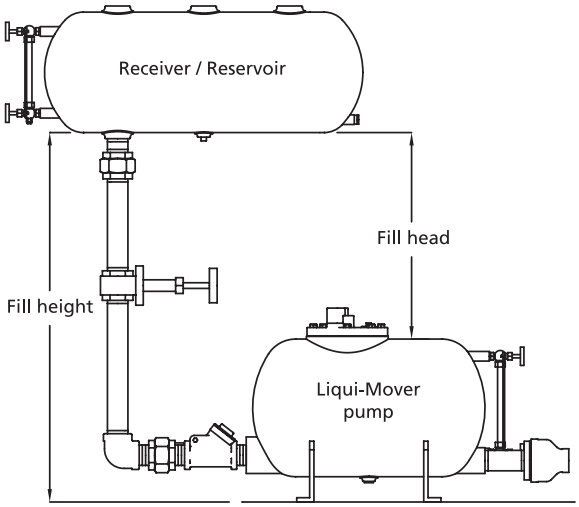
Steam	3 lb/1000 lb liquid pumped
Air	2.5 cubic feet/cycle

Capacity Conversion Factors for Other Fill Heads

Fill Head	LMHT-1610	LMHT-1615	LMHT-1620	LMHT-1632
6″	0.91	0.92	0.94	0.93
12″	1.00	1.00	1.00	1.00
18″	1.07	1.06	1.04	1.04
24″	1.14	1.10	1.07	1.07
36″	1.14	1.10	1.10	1.10

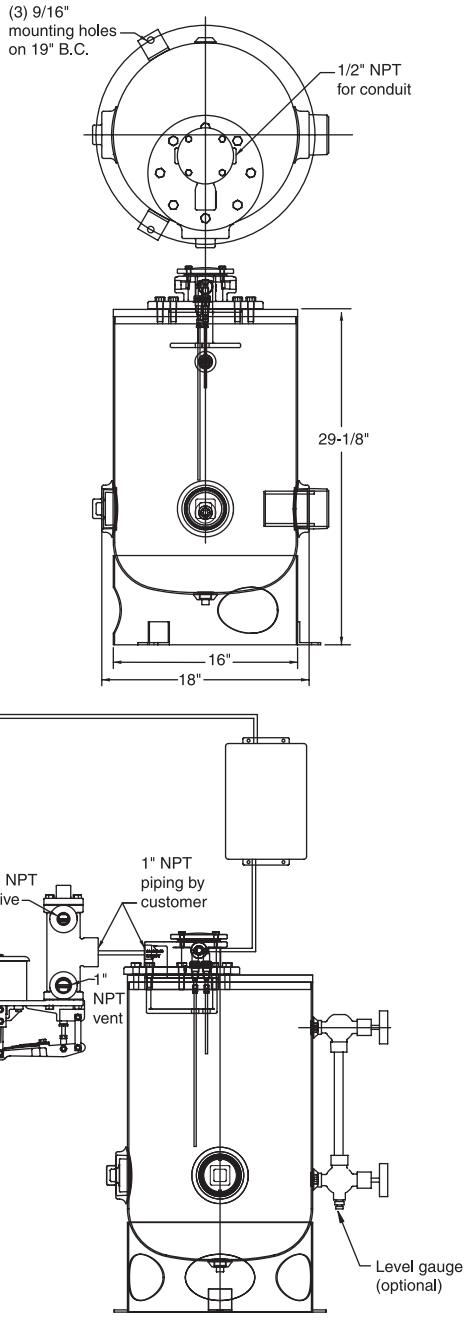
Fill Height (from grade to bottom of receiver/reservoir to achieve desired fill head)

Fill Head	Fill Height
6″	25″
12″	31″
18″	37″
24″	43″
36″	55″



LMV-1600 Series

Vertical Profile



Solenoid valve shown. Pneumatic valve available.

Material Specifications

Part	Material
Pump tank	ASME code stamped 150 psig Shell and heads – carbon steel SA-414 G Flange ring – carbon steel SA-106C
Float Free level control	Mounting flange – ductile iron SA-395
3-way valve	Body – ductile iron Valves and seals – stainless steel
Check valves	Stainless steel, spring assisted non-slam
Gauge glass	Bronze valves with redline glass and brass guard rods

Available Options

- Level gauge glass
- Pressure gauge
- Drain piping
- Insulation jacket
- Cycle counter
- ASME labeled receiver/reservoir

Features

- Small footprint
- Multiple inlet connections
- Capacity up to 15,800 pph
- No springs or linkages
- Various NEMA classifications available

Benefits

- Compact installation
- Large capacity for application flexibility
- Wear and corrosion resistant
- High reliability
- Installation flexibility

Note: Engineering drawings are available on request.

LMV-1600 Float Free Sizing Chart

Fill Head	Total Static Back Pressure (psig)	LMV-1610		LMV-1615		LMV-1620		LMV-1632	
		pph	GPM	pph	GPM	pph	GPM	pph	GPM
12″	10	3,400	6.8	7,640	15.3	11,390	22.8	15,050	30.1
	20	3,370	6.7	7,510	15.0	11,120	22.2	14,520	29.0
	30	3,320	6.6	7,270	14.5	10,640	21.3	13,760	27.5
	40	3,220	6.4	6,800	13.6	9,720	19.4	12,320	24.6
	50	3,040	6.1	6,040	12.1	8,280	16.6	10,260	20.5
	60	2,760	5.5	5,020	10.0	6,540	13.1	7,820	15.6
	70	2,410	4.8	3,950	7.9	4,870	9.7	5,590	11.2
	80	2,020	4.0	3,000	6.0	3,500	7.0	3,900	7.8
	90	1,640	3.3	2,230	4.5	2,500	5.0	2,700	5.4
	100	1,290	2.6	1,660	3.3	1,790	3.6	1,900	3.8
Check valve size – inlet		1″		1.5″		2″		3″	
Check valve size – outlet		1″		1.5″		2″		2″	
Gallons pumped per cycle		7.5		7.5		7.5		7.5	

Note: Above based on steam as the motive pressure.

Above based on motive pressure being 20 psig higher than total static back pressure.

Total static back pressure is the maximum height the fluid is pumped up, plus the discharge line pressure.

Fill head is the distance between top of the pump tank to the bottom of the receiver.

For multiple pumps, multiply above capacity by number of pumps to be used.

Consumption (Approximate)

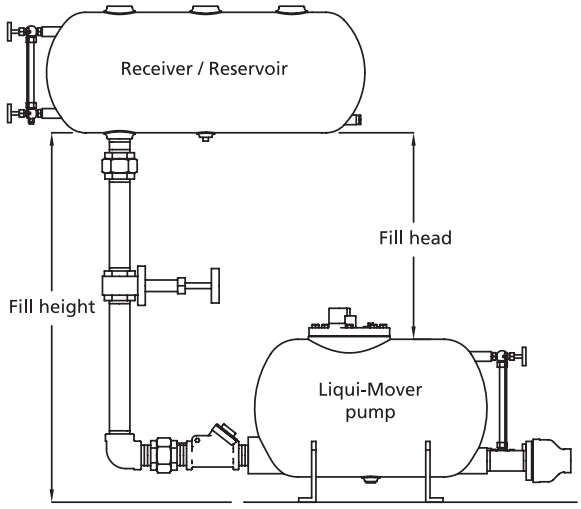
Steam	3 lb/1000 lb liquid pumped
Air	1.5 cubic feet/cycle

Capacity Conversion Factors for Other Fill Heads

Fill Head	LMV-1610	LMV-1615	LMV-1620	LMV-1632
6″	0.91	0.93	0.95	0.93
12″	1.00	1.00	1.00	1.00
18″	1.07	1.06	1.04	1.03
24″	1.14	1.10	1.07	1.05
36″	1.14	1.13	1.09	1.07

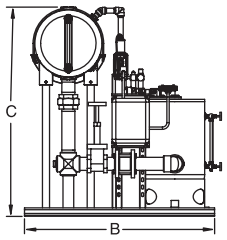
Fill Height (from grade to bottom of receiver/reservoir to achieve desired fill head)

Fill Head	Fill Height
6″	25″
12″	31″
18″	37″
24″	43″
36″	55″

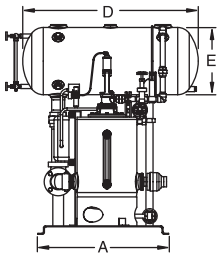


Packaged Systems

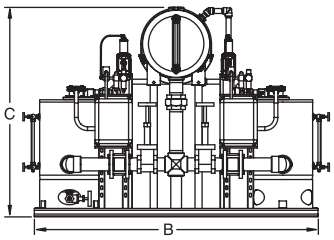
The Kadant Johnson packaged Liqui-Mover pump is a non-electric packaged pump that can handle fluid temperatures up to 365°F. There are no rotating seals or packing to leak. Cavitation is impossible. Steam, plant compressed air, or other inert gases are used to operate the pump.



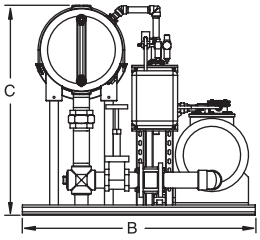
LMV-1600 simplex pump



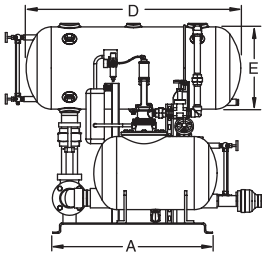
LMV-1600 simplex and duplex pump



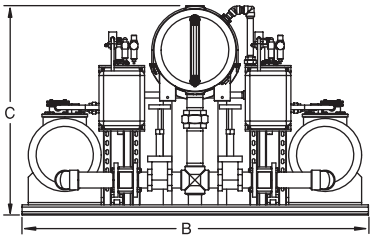
LMV-1600 duplex pump



LMHT-1600 simplex pump



LMHT-1600 simplex and duplex pump



LMHT-1600 duplex pump

Features

- Skid-mounted
- No rotating parts
- Single trade installation
- Custom engineered

Benefits

- Quick installation
- Wear and corrosion resistant
- Greater reliability
- Reduced operating costs
- Operating flexibility

Model	A	B	C	D	E	Receiver Capacity (gal.)
LMV-16XX-LRSP-1	35″	51″	62″	47″	18″	47
LMV-16XX-LRSP-2	35″	76″	62″	47″	18″	47
LMHT-16XX-LRSP-1	35″	51″	52″	47″	18″	47
LMHT-16XX-LRSP-2	35″	76″	52″	47″	18″	47

Note:

1. Dimension C based on 12″ fill head.
2. Other multiple pump configurations available.

Note: Engineering drawings are available on request.

LRSP Sizing Chart

Fill Head	Back Pressure (psig)	LMV-1610	LMHT-1610	LMV-1615	LMHT-1615	LMV-1620	LMHT-1620	LMV-1632	LMHT-1632
		pph	pph	pph	pph	pph	pph	pph	pph
12″	10	3,400	3,640	7,640	8,580	11,390	12,920	15,050	15,850
	20	3,370	3,610	7,510	8,470	11,120	12,620	14,520	15,340
	30	3,320	3,500	7,270	8,260	10,640	12,140	13,760	14,640
	40	3,220	3,420	6,800	7,840	9,720	11,290	12,320	13,500
	50	3,040	3,280	6,040	7,130	8,280	9,950	10,260	11,740
	60	2,760	3,040	5,020	6,140	6,540	8,210	7,820	9,400
	70	2,410	2,720	3,950	5,020	4,870	6,340	5,590	7,060
	80	2,020	2,410	3,000	3,920	3,500	4,700	3,900	5,100
	90	1,640	2,020	2,230	2,980	2,500	3,420	2,700	3,620
	100	1,290	1,640	1,660	2,230	1,790	2,480	1,900	2,590
Check valve size – inlet		1″	1″	1.5″	1.5″	2″	3″	3″	3″
Check valve size – outlet		1″	1″	1.5″	1.5″	2″	3″	2″	2″
Gallons pumped per cycle		7.5	12.0	7.5	12.0	7.5	12.0	7.5	12.0

Note: Above based on steam as the motive pressure.
For multiple pumps, multiply above capacity by number of pumps to be used.
For Gallons per Minute, divide above capacities by 500.
Fill head is the distance between top of the pump tank to the bottom of the receiver/reservoir.
Above based on motive pressure being 20 psig higher than total static back pressure.
Total static back pressure equals vertical lift plus return line pressure.

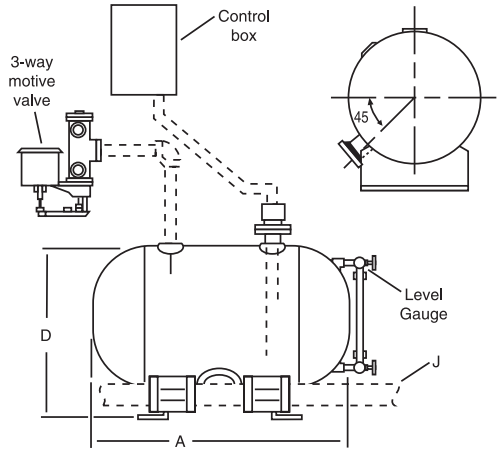
Capacity Conversion Factors for Other Fill Heads

Fill Head	LMV-1610	LMHT-1610	LMV-1615	LMHT-1615	LMV-1620	LMHT-1620	LMV-1632	LMHT-1632
6″	0.91	0.91	0.93	0.92	0.95	0.94	0.93	0.93
12″	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
18″	1.07	1.07	1.06	1.06	1.04	1.04	1.03	1.04
24″	1.14	1.14	1.10	1.10	1.07	1.07	1.05	1.07
36″	1.14	1.14	1.13	1.10	1.09	1.10	1.09	1.10

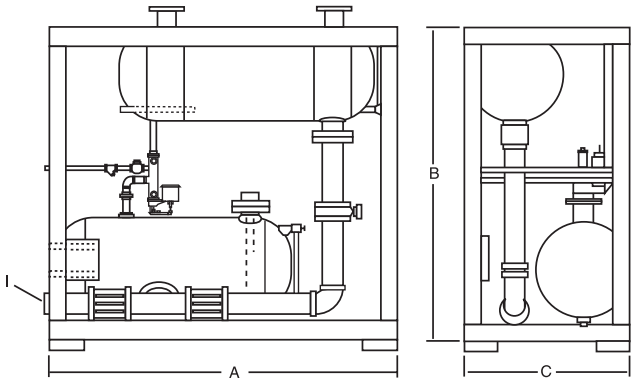
Material of Construction

Part Description	LMV-1600 Material	LMHT-1600 Material
Receiver Tank	ASME code stamped 150 psig Shell and heads – carbon steel SA-414 G	ASME code stamped 150 psig Shell and heads – carbon steel SA-414 G
Pump Tank	ASME code stamped 150 psig Shell and bottom head – carbon steel SA-414G Flat head top – carbon steel SA-516-70	ASME code stamped 150 psig Shell and heads – carbon steel SA-414 G Flange ring – carbon steel SA-106 C
Float Free Level Control	Mounting flange – ductile iron SA-395	Mounting flange – ductile iron SA-395
Piping	Carbon steel A53 – schedule 40	Carbon steel A53 – schedule 40
Fittings	Malleable iron 150# threaded	Malleable iron 150# threaded
Isolation Valves	Bronze B62	Bronze B62
Skid	Carbon steel AISI 1015	Carbon steel AISI 1015
3-Way Valves	Body – ductile iron Valves and seats – stainless steel	Body – ductile iron Valves and seats – stainless steel
Check Valves	Stainless steel, spring-assisted non-slam	Stainless steel, spring-assisted non-slam
Gauge Glass	Bronze valves with redline glass and brass guard rods	Bronze valves with redline glass and brass guard rods

Custom Pumps



Model	Dimensions (in inches)		
	A	D	J
LMH-110-L000	56	32.6	4
LMH-150-L000	66	40.5	6
LMH-200-L000	60	51	6



Model	Dimensions (in Inches)			
	A	B	C	I
LMH-110-LRFP	73.5	82	43.4	4
LMH-150-LRFP	108	91	57	6
LMH-200-LRFP	138.75	111.5	62.75	6

Above based on 24" fill head. *All connections are NPT except as noted.*

Material Specifications

Part	Material
Pump/receiver chamber	Fabricated steel ASME code stamped 150 psig
3-way valve solenoid operated or 3-way valve cylinder operated (not shown)	Ductile iron body with stainless steel trim
Frame/piping	Steel/black iron
Inlet/discharge check valve	Cast iron with bronze trim – flanged
Gauge glass assembly	Bronze with redline gauge glass

Available Options

- Stand-by motive valve
- Pressure gauge
- Drain piping
- Insulation
- Cycle counter
- ASME labeled receiver/reservoir
- High/low alarm

Level Control Options

- Type ERS uses long and short electrodes to sense liquid levels, and actuates the 3-way solenoid valve.
- Type ERC uses long and short electrodes to sense liquid levels, and actuates a 3-way cylinder-operated valve by means of a pilot valve.

Note: Engineering drawings are available on request.

LMH Sizing Chart

Fill Head	Back Pressure (psig)	LMH-110	LMH-150	LMH-200
		pph	pph	pph
12″	10	18,970	36,691	57,508
	20	18,240	35,280	55,296
	30	17,693	34,222	53,637
	40	17,510	33,869	53,084
	50	17,328	33,516	52,531
	60	17,146	33,163	51,978
	70	16,963	32,810	51,425
	80	16,781	32,458	50,872
	90	16,598	32,105	50,319
	100	16,416	31,752	49,766
Check valve size		4″	6″	6″
Gallons pumped per cycle		67.6	115.5	180.0

Note: Above based on steam as the motive pressure.
Multiply above capacities by 1.5 when pumping with compressed air (open system only).
For Gallons per Minute, divide above capacities by 500.
Fill head is the distance between top of the pump tank to the bottom of the receiver/reservoir.
Above based on motive pressure being 20 psig higher than total static back pressure.
Total static back pressure equals vertical lift plus return line pressure.

Capacity Conversion Factors for Other Fill Heads

Fill Head	LMH-110	LMH-150	LMH-200
6″	0.91	0.81	0.81
12″	1.00	1.00	1.00
18″	1.06	1.06	1.06
24″	1.18	1.17	1.17
36″	1.43	1.36	1.36
48″	1.61	1.56	1.56
60″	1.79	1.56	1.56

Fill Height (from grade to bottom of receiver/reservoir to achieve desired fill head)

	Fill Height		
Fill Head	LMH-110	LMH-150	LMH-200
6″	39″	47″	57″
12″	45″	53″	63″
18″	51″	59″	69″
24″	57″	65″	75″
36″	69″	77″	87″

Material of Construction

Part Description	L000 Material	LRFP Material
Receiver Tank	–	ASME code stamped 150 psig Shell and heads – carbon steel SA-414 G
Pumping Tank	ASME code stamped 150 psig Shell and bottom head – carbon steel SA-414G Flat head top – carbon steel SA-516-70	ASME code stamped 150 psig Shell and heads – carbon steel SA-414 G Flange ring – carbon steel SA-106 C
Electrode Holder	Mounting flange – ductile iron SA-395	Ductile iron body and cap Stainless steel and ceramic electrode plugs Brass electrode rods
Piping	–	Carbon steel A53 – Schedule 40
Fittings	Malleable iron 150# threaded	Malleable iron 150# threaded
Isolation Valves	–	Bronze B62
Frame	–	Carbon steel AISI 1015
3-Way Valves	Ductile iron body with stainless steel valves and seats	Ductile iron body with stainless steel valves and seats
Check Valves	As specified	As specified
Gauge Glass	Bronze valves with redline glass and brass guard rods	Bronze valves with redline glass and brass guard rods

Consult your Kadant Johnson representative or the factory for application verification.

Float Operated Series

Float operated Liqui-Mover pumps perform the same function as a conventional electric centrifugal pump, but without the need of electricity. There are three moving parts: the inlet and outlet check valves and the float level mechanism. Fewer moving parts equal more uptime and less maintenance manpower and inventory expense.

Liqui-Mover pumps have the ability to handle high temperature condensate and flash steam without pump cavitation. Many electric centrifugal condensate pumps are limited to temperatures below 210° F. Liqui-Mover pumps do not require any additional condensate cooling equipment.

Float operated Liqui-Mover pumps use a non-electric snap-acting mechanism powered by a float that rises and falls with the level of the condensate in the pump tank. The non-electric level control makes this Liqui-Mover pump ideal for pumping condensate from all types of heating and process equipment in almost any environment.

Float Operated Liqui-Mover Pumps

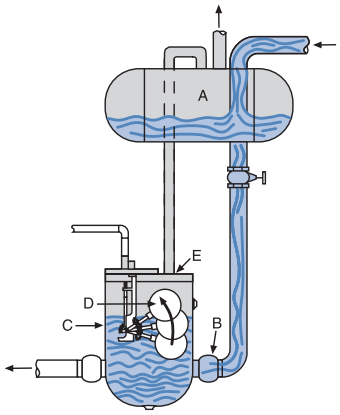
- No electricity
- No motors, starters, seals, or impellers
- Good for general, wet, and explosive environments
- Proven system reliability
- Capacities up to 14,530 pph (29 gpm) for simplex pump
- 150 psig ASME labeled steel tanks standard (higher ratings available)
- Modular construction available for ease of installation
- Pump and PumpTrap™ models available
- Custom designs and configurations
- Available with or without receiver, simplex or multiplex pumps, alarms, cycle counter, and insulation
- Upgrade retrofit mechanisms available to replace other manufacturers' drop-in float mechanisms

How Does It Measure Up?	Electric Centrifugal Condensate Pump	Float Operated Condensate Pump
Temperature limit > 200°F	No	Yes
Energy efficiency	Sized with 2:1 safety factor	Sized for actual incoming load
Condensate cooling	Yes	No
Damaged by flash system	Yes	No
Electric power required	Yes	No
Maintenance requirements	Seal kits, motors, float switches, impellers	High maintenance items eliminated

Float Series Liqui-Mover Pumps

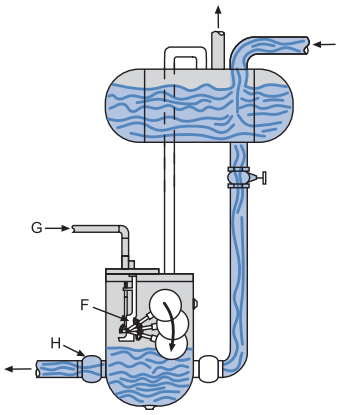
The Float series Liqui-Mover pump moves condensate and other fluids using steam or other inert gases under pressure – without motors, pumps, rotors, or electricity.

Stage 1: Fill Stage



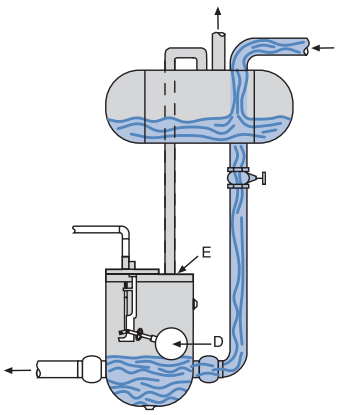
Fluid flows from the receiving chamber (A) through an inlet check valve (B) into the pump tank (C), raising a float (D). The vent port (E) is opened to equalize pressure between the receiving chamber and pump tank.

Stage 2: Pump Stage



When the float reaches its highest level, it triggers a linkage (F) that closes the vent port and opens the motive pressure valve (G) to admit the motive pressure into the pump tank. The motive pressure forces the fluid past the discharge check valve (H) and out the discharge line.

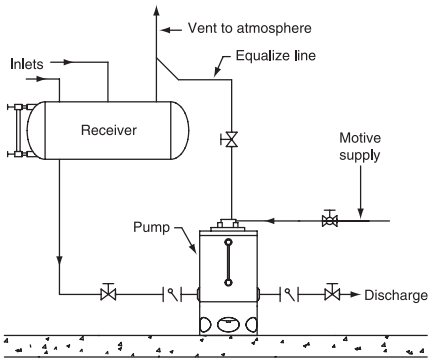
Stage 3: Equalize Stage



Once the float (D) reaches its lowest position, the linkage shuts off the motive pressure port, and opens the vent port (E). Excess pressure is vented to the receiver, equalizing pressure between the two tanks.

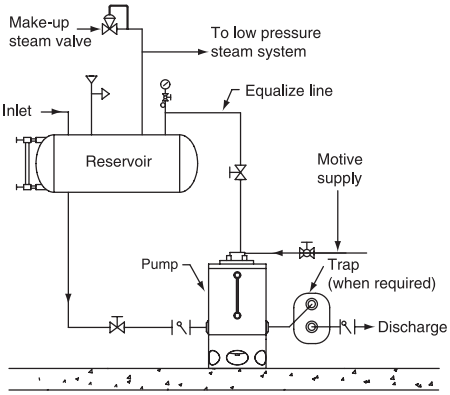
Types of Systems

Open System



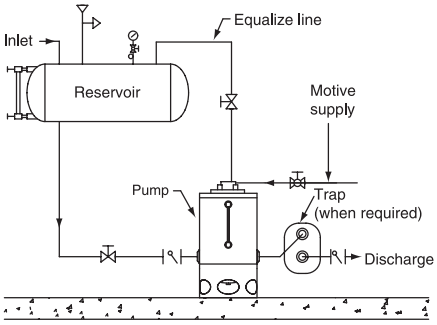
An open system is intended for use with mixed return pressures, this design requires no supplemental cooling of condensate.

Flash System



A flash system is for applications requiring flash steam – such as high-pressure processing equipment – the receiver in this design acts as a flash tank.

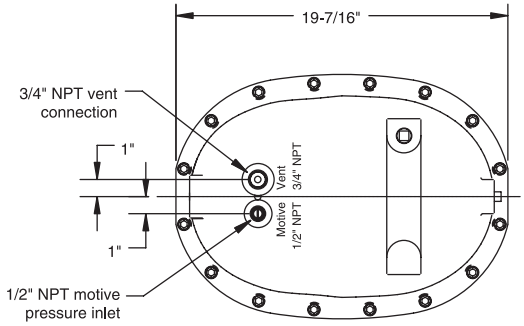
Closed (PumpTrap) System



A closed system is for single steam users. There is no BTU energy loss from flashing.

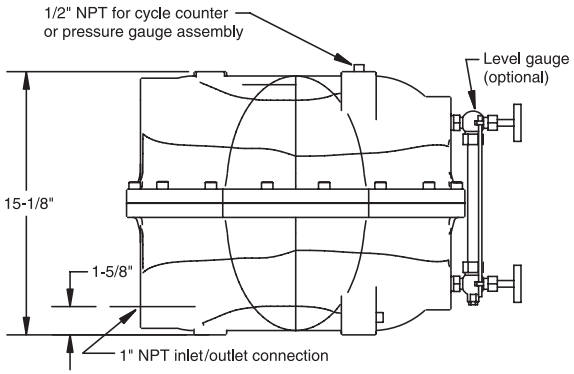
LMHT-500 Series

Low-profile, high-pressure



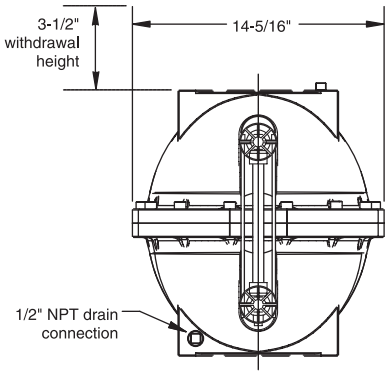
Material Specifications

Part	Material
Pump tank	ASME rated 200 psig Tank top and bottom – ductile iron SA-395 CL 60 SHCS – carbon steel SA-574
Float mechanism	Support frame – 4140 chrome moly Float, valves, springs, and linkage – stainless steel
Check valves	Stainless steel spring assisted non-slam
Gauge glass	Bronze valves with redline glass and brass guard rods



Available Options

- Level gauge glass
- Pressure gauge
- Drain piping
- Insulation jacket
- Cycle counter
- ASME labeled receiver/reservoir



Features

- Capacity up to 2,350 pph
- Single check valve connection
- Single trade installation
- Explosion proof – intrinsically safe
- Stainless steel float mechanism

Benefits

- Compact installation
- High-pressure, long-operating life
- Ideal for light load applications
- Fast and reliable installation

Note: Engineering drawings are available on request.

LMHT-500 Float Operated Sizing Chart

Total Static Back Pressure (psig)	Fill Head 6"		Fill Head 12"		Fill Head 18"		Fill Head 24"		Fill Head 36"	
	Inlet Check: 1"		Inlet Check: 1"		Inlet Check: 1"		Inlet Check: 1"		Inlet Check: 1"	
	pph	GPM	pph	GPM	pph	GPM	pph	GPM	pph	GPM
10	1,722	3.4	2,100	4.2	2,268	4.5	2,394	4.8	2,352	4.7
20	1,509	3.0	1,840	3.7	1,987	4.0	2,098	4.2	2,061	4.1
30	1,337	2.7	1,630	3.3	1,760	3.5	1,858	3.7	1,826	3.7
40	1,205	2.4	1,470	2.9	1,588	3.2	1,676	3.4	1,646	3.3
50	1,099	2.2	1,340	2.7	1,447	2.9	1,528	3.1	1,501	3.0
60	1,000	2.0	1,220	2.4	1,318	2.6	1,391	2.8	1,366	2.7
70	927	1.9	1,130	2.3	1,220	2.4	1,288	2.6	1,266	2.5
80	861	1.7	1,050	2.1	1,134	2.3	1,197	2.4	1,176	2.4
90	804	1.6	980	2.0	1,058	2.1	1,117	2.2	1,098	2.2
100	754	1.5	920	1.8	994	2.0	1,049	2.1	1,030	2.1

Note: For multiple pumps, multiply above capacities by the number of pumps.

Capacities based on motive steam pressure being 20 psig higher than total static back pressure.

Total static back pressure equals vertical lift plus return line pressure.

Fill head is the distance from top of pump tank to bottom of receiver/reservoir.

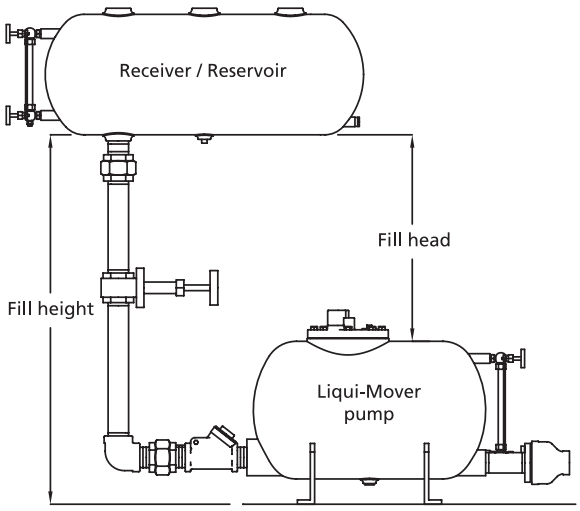
Volume pumped per cycle is 3.4 gallons.

Fill Height (from grade to bottom of receiver/reservoir to achieve desired fill head)

Fill Head	Fill Height
6"	21"
12"	27"
18"	33"
24"	39"
36"	51"

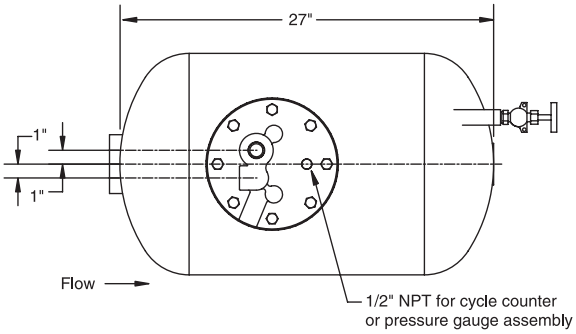
Consumption (Approximate)

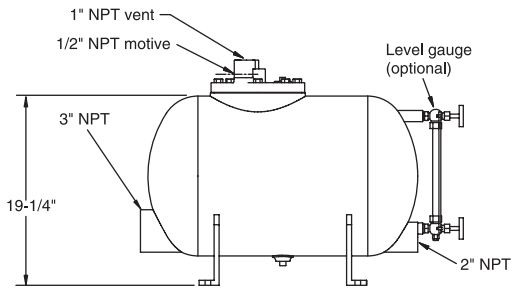
Steam	1.5 lb/1000 lb liquid pumped
Air	0.75 cubic feet/cycle

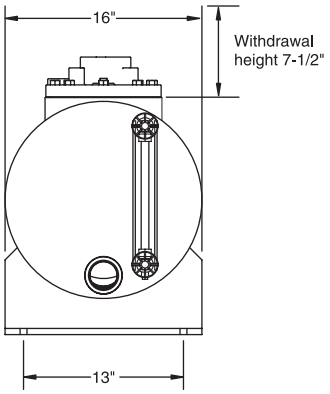


LMHT-1600 Series

Low-profile, high-capacity







Material Specifications

Part	Material
Pump tank	ASME code stamped 150 psig Shell and heads – carbon steel SA-414 G Flange ring – carbon steel SA-106C
Float mechanism	Mounting flange – cast iron SA-278 Support frame – 4140 chrome moly Float, valves, springs, and linkage – stainless steel
Check valves	Stainless steel, spring assisted non-slam
Gauge glass	Bronze valves with redline glass and brass guard rods

Available Options

- Level gauge glass
- Pressure gauge
- Drain piping
- Insulation jacket
- Cycle counter
- ASME labeled receiver/reservoir

Features

- Single trade installation
- Capacity up to 14,530 pph
- Stainless steel float mechanism
- Open coil spring design
- Explosion proof – intrinsically safe

Benefits

- Compact installation
- Large capacity for application flexibility
- Wear and corrosion resistant
- Greater reliability
- Installation flexibility

Note: Engineering drawings are available on request.

LMHT-1600 Float Operated Sizing Chart

Fill Head	Total Static Back Pressure (psig)	LMHT-1610		LMHT-1615		LMHT-1620		LMHT-1632	
		pph	GPM	pph	GPM	pph	GPM	pph	GPM
12″	10	3,030	6.1	7,150	14.3	10,770	21.5	13,210	26.4
	20	3,010	6.0	7,060	14.1	10,520	21.0	12,780	25.6
	30	2,920	5.8	6,880	13.8	10,120	20.2	12,200	24.4
	40	2,850	5.7	6,530	13.1	9,410	18.8	11,250	22.5
	50	2,730	5.5	5,940	11.9	8,290	16.6	9,780	19.6
	60	2,530	5.1	5,120	10.2	6,840	13.7	7,830	15.7
	70	2,270	4.5	4,180	8.4	5,280	10.6	5,880	11.8
	80	2,000	4.0	3,270	6.5	3,920	7.8	4,250	8.5
	90	1,680	3.4	2,480	5.0	2,850	5.7	3,020	6.0
	100	1,370	2.7	1,860	3.7	2,070	4.1	2,160	4.3
Check valve size – inlet		1″		1.5″		2″		3″	
Check valve size – outlet		1″		1.5″		2″		2″	
Gallons pumped per cycle		12		12		12		12	

Note: Above based on steam as the motive pressure.

Capacities based on motive steam pressure being 20 psig higher than total static back pressure.

Total static back pressure equals vertical lift plus return line pressure.

Fill head is the distance between top of the pump tank to the bottom of the receiver/reservoir.

For multiple pumps, multiply above capacity by number of pumps to be used.

Consumption (Approximate)

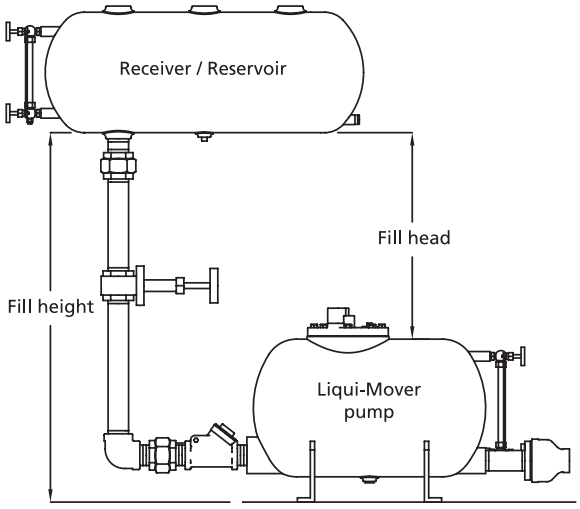
Steam	13 lb/1000 lb liquid pumped
Air	2.5 cubic feet/cycle

Capacity Conversion Factors for Other Fill Heads

Fill Head	LMHT-1610	LMHT-1615	LMHT-1620	LMHT-1632
6″	0.91	0.92	0.94	0.93
12″	1.00	1.00	1.00	1.00
18″	1.07	1.06	1.04	1.04
24″	1.14	1.10	1.07	1.07
36″	1.14	1.10	1.10	1.10

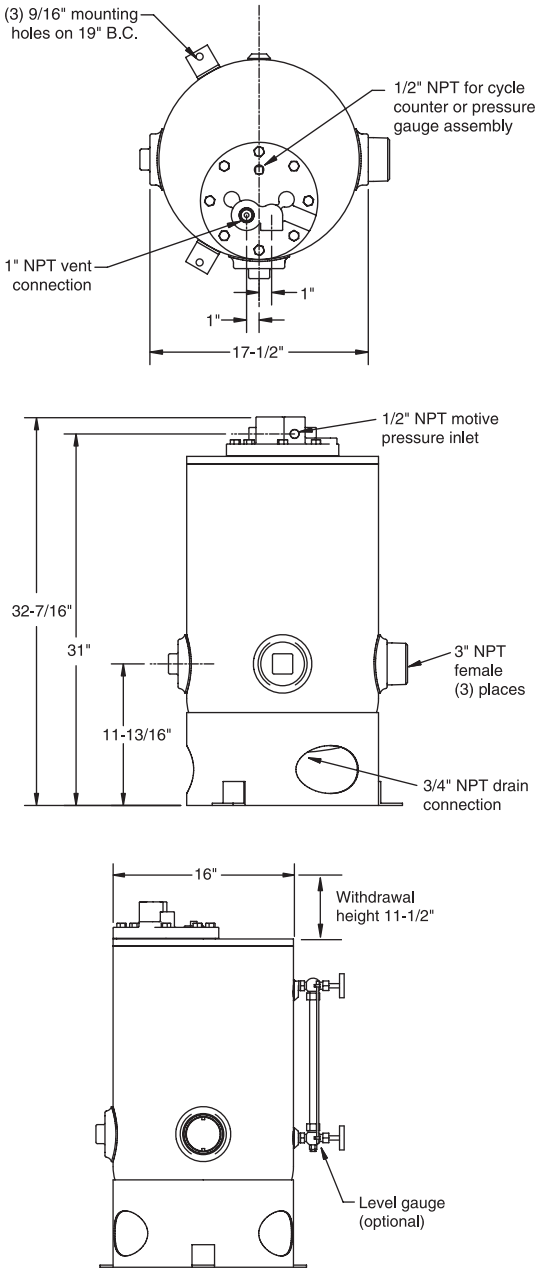
Fill Height (from grade to bottom of receiver/reservoir to achieve desired fill head)

Fill Head	Fill Height
6″	25″
12″	31″
18″	37″
24″	43″
36″	55″



LMV-1600 Series

Vertical profile



Material Specifications

Part	Material
Pump tank	ASME code stamped 150 psig Shell and bottom head – carbon steel SA-414 G Flat head top – carbon steel SA-516-70
Float mechanism	Mounting flange – cast iron SA-278 Support frame – 4140 chrome moly Float, valves, springs, and linkage – stainless steel
Check valves	Stainless steel, spring assisted non-slam
Gauge glass	Bronze valves with redline glass and brass guard rods

Available Options

- Level gauge glass
- Pressure gauge
- Drain piping
- Insulation jacket
- Cycle counter
- ASME labeled receiver/reservoir

Features	Benefits
• Small footprint	• Compact installation
• Multiple inlet connections	• Installation and piping flexibility
• Capacity up to 13,420 pph	• High capacity units
• Stainless steel float mechanism	• Wear and corrosion resistant
• Open coil spring design	• Greater reliability

Note: Engineering drawings are available on request.

LMV-1600 Float Operated Sizing Chart

Fill Head	Total Static Back Pressure (psig)	LMV-1610		LMV-1615		LMV-1620		LMV-1632	
		pph	GPM	pph	GPM	pph	GPM	pph	GPM
12″	10	2,840	5.7	6,370	12.7	9,490	19.0	12,540	25.1
	20	2,810	5.6	6,260	12.5	9,270	18.5	12,100	24.2
	30	2,770	5.5	6,060	12.1	8,870	17.7	11,470	22.9
	40	2,680	5.4	5,670	11.3	8,100	16.2	10,270	20.5
	50	2,530	5.1	5,030	10.1	6,900	13.8	8,550	17.1
	60	2,300	4.6	4,180	8.4	5,450	10.9	6,520	13.0
	70	2,010	4.0	3,290	6.6	4,060	8.1	4,660	9.3
	80	1,680	3.4	2,500	5.0	2,920	5.8	3,250	6.5
	90	1,370	2.7	1,860	3.7	2,080	4.2	2,250	4.5
	100	1,080	2.2	1,380	2.8	1,490	3.0	1,580	3.2
Check valve size – inlet		1″		1.5″		2″		3″	
Check valve size – outlet		1″		1.5″		2″		2″	
Gallons pumped per cycle		7.5		7.5		7.5		7.5	

Note: Above based on steam as the motive pressure.

Capacities based on motive steam pressure being 20 psig higher than total static back pressure.

Total static back pressure equals vertical lift plus return line pressure.

Fill head is the distance between top of the pump tank to the bottom of the receiver/reservoir.

For multiple pumps, multiply above capacity by number of pumps to be used.

Consumption (Approximate)

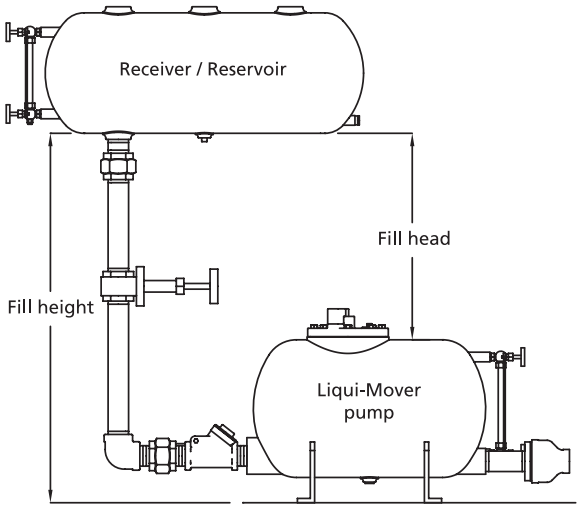
Steam	3 lb/1000 lb liquid pumped
Air	1.5 cubic feet/cycle

Capacity Conversion Factors for Other Fill Heads

Fill Head	LMV-1610	LMV-1615	LMV-1620	LMV-1632
6″	0.91	0.93	0.95	0.93
12″	1.00	1.00	1.00	1.00
18″	1.07	1.06	1.04	1.03
24″	1.14	1.11	1.07	1.05
36″	1.14	1.13	1.09	1.07

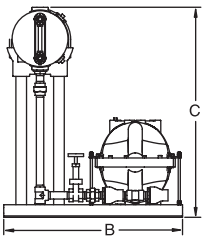
Fill Height (from grade to bottom of receiver/reservoir to achieve desired fill head)

Fill Head	Fill Height
6″	35″
12″	41″
18″	47″
24″	53″
36″	65″

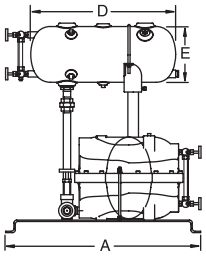


Packaged Systems

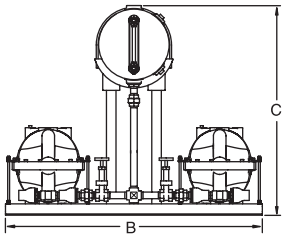
The Kadant Johnson packaged Liqui-Mover pump is a non-electric packaged pump that can handle fluid temperatures up to 365°F. There are no rotating seals or packing to leak. Cavitation is impossible. Steam, plant compressed air, or other compatible gases are used to operate the pump.



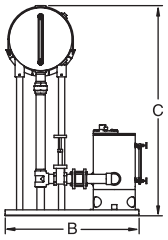
LMHT-500 simplex pump



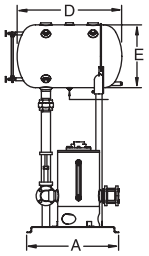
LMHT-500 simplex and duplex pump



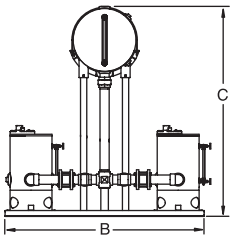
LMHT-500 duplex pump



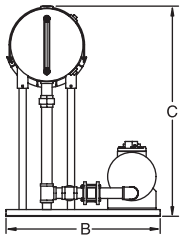
LMV-1600 simplex pump



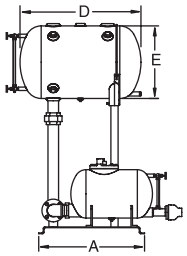
LMV-1600 simplex and duplex pump



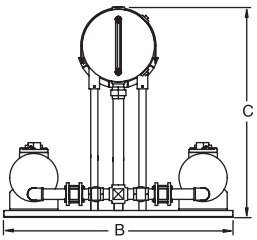
LMV-1600 duplex pump



LMHT-1600 simplex pump



LMHT-1600 simplex and duplex pump



LMHT-1600 duplex pump

Features

- Skid-mounted
- Non-electric
- No rotating parts
- Single trade installation
- Custom engineered

Benefits

- Quick installation
- Wear and corrosion resistant
- Greater reliability
- Reduced operating costs
- Operating flexibility

Model	A	B	C	D	E	Receiver Capacity (gal.)
LMHT-5XX-LRSM-FSA-1	35″	32″	39.5″	26″	10″	7.5
LMHT-5XX-LRSM-FSA-2	35″	51″	44″	37″	14″	22.5
LMV-16XX-LRSM-FSA-1	35″	51″	62″	47″	18″	47
LMV-16XX-LRSM-FSA-2	35″	76″	62″	47″	18″	47
LMHT-16XX-LRSM-FSA-1	35″	51″	52″	47″	18″	47
LMHT-16XX-LRSM-FSA-2	35″	76″	52″	47″	18″	47

Note: Engineering drawings are available on request.

LRSM Sizing Chart

Fill Head	Back Pressure (psig)	LMHT-510	LMV-1610	LMHT-1610	LMV-1615	LMHT-1615	LMV-1620	LMHT-1620	LMV-1630	LMHT-1632
		pph	pph	pph	pph	pph	pph	pph	pph	pph
12″	10	2,100	2,840	3,030	6,370	7,150	9,490	10,770	12,540	13,210
	20	1,840	2,810	3,010	6,260	7,060	9,270	10,520	12,100	12,780
	30	1,630	2,770	2,920	6,060	6,880	8,870	10,120	11,470	12,200
	40	1,470	2,680	2,850	5,670	6,530	8,100	9,410	10,270	11,250
	50	1,340	2,530	2,730	5,030	5,940	6,900	8,290	8,550	9,780
	60	1,220	2,300	2,530	4,180	5,120	5,450	6,840	6,520	7,830
	70	1,130	2,010	2,270	3,290	4,180	4,060	5,280	4,660	5,880
	80	1,050	1,680	2,000	2,500	3,270	2,920	3,920	3,250	4,250
	90	980	1,370	1,680	1,860	2,480	2,080	2,850	2,250	3,020
	100	920	1,080	1,370	1,380	1,860	1,490	2,070	1,580	2,160
Check valve size – inlet		1″	1″	1″	1.5″	1.5″	2″	2″	3″	3″
Check valve size – outlet		1″	1″	1″	1.5″	1.5″	2″	2″	3″	2″
Gallons pumped per cycle		3.4	7.5	12.0	7.5	12.0	7.5	12.0	7.5	12.0

Note: Above based on steam as the motive pressure.
For multiple pumps, multiply above capacity by number of pumps to be used.
For Gallons per Minute, divide above capacities by 500.
Fill head is the distance between top of the pump tank to the bottom of the receiver/reservoir.
Above based on motive pressure being 20 psig higher than total static back pressure.
Total static back pressure equals vertical lift plus return line pressure.

Capacity Conversion Factors for Other Fill Heads

Fill Head	LMHT-510	LMV-1610	LMHT-1610	LMV-1615	LMHT-1615	LMV-1620	LMHT-1620	LMV-1630	LMHT-1632
6″	0.82	0.91	0.91	0.93	0.92	0.95	0.94	0.93	0.93
12″	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
18″	1.08	1.07	1.07	1.06	1.06	1.04	1.04	1.03	1.04
24″	1.10	1.14	1.14	1.11	1.10	1.07	1.07	1.05	1.07
36″	1.12	1.14	1.14	1.13	1.10	1.09	1.10	1.07	1.10

Material of Construction

Part Description	LMHT-500 Material	LMV-1600 Material	LMHT-1600 Material
Receiver Tank	ASME code stamped 150 psig Shell and heads – carbon steel SA-414 G	ASME code stamped 150 psig Shell and heads – carbon steel SA-414 G	ASME code stamped 150 psig Shell and heads – carbon steel SA-414 G
Pump Tank	ASME rated 200 psig Tank top and bottom – ductile iron SA-395 CL 60 SHCS – carbon steel SA-574	ASME code stamped 150 psig Shell and bottom head – carbon steel SA-414G Flat head top – carbon steel SA-516-70	ASME code stamped 150 psig Shell and heads – carbon steel SA-414 G Flange ring – carbon steel SA-106 C
Float Mechanism	Support frame – 4140 chrome moly Float, valves, springs, and linkage – stainless steel	Mounting flange – cast iron SA-278 Support frame – 4140 chrome moly Float, valves, springs, and linkage – stainless steel	Mounting flange – cast iron SA-278 Support frame – 4140 chrome moly Float, valves, springs, and linkage – stainless steel
Piping	Carbon steel A53 – schedule 40	Carbon steel A53 – schedule 40	Carbon steel A53 – schedule 40
Fittings	Malleable iron 150# threaded	Malleable iron 150# threaded	Malleable iron 150# threaded
Isolation Valves	Bronze B62	Bronze B62	Bronze B62
Skid	Carbon steel AISI 1015	Carbon steel AISI 1015	Carbon steel AISI 1015
Check Valves	Stainless steel, spring assisted non-slam	Stainless steel, spring assisted non-slam	Stainless steel, spring assisted non-slam
Gauge Glass	Bronze valves with redline glass and brass guard rods	Bronze valves with redline glass and brass guard rods	Bronze valves with redline glass and brass guard rods

PumpTrap™ System

Insufficient differential pressure across a steam trap will not allow condensate to drain properly (see Figure 1). This is commonly known as a "stall" condition. With temperature or modulated steam control valves on steam coils or heat exchangers, you may experience one or more of the following:

- Flooded heat exchangers or steam coils
- Frozen steam coils or air handlers
- Water hammer in heat exchangers or steam coils
- Damaged tube bundles
- Poor temperature control in heat exchangers, steam coils, or air handlers

A solution to a "stall" condition is to install a PumpTrap system (see Figures 2 and 3) on a single steam coil or heat exchanger (never multiple coils or heat exchangers). A PumpTrap system operates as a steam trap when the steam supply pressure (P2) is higher than the static back pressure (P3) and a condensate pump when the steam supply pressure is equal to or less than P3. The trapping function is by means of a properly sized steam trap with a Float series Liqui-Mover pump or a 2-way actuated valve with a Float Free series Liqui-Mover pump. When the Liqui-Mover pump is pumping, condensate is able to drain from the heat exchanger and collect in the reservoir, keeping the heat exchanger empty of condensate for maximum heat transfer. Steam should always be used as the motive pressure.

Example (see Figure 1):

P1	Steam supply pressure to control valve	50 psig
P2	Design pressure to heat exchanger	30 psig
P4	Return line pressure	5 psig
Vertical lift		15 feet = 6.5 psig
P3	Static back pressure (P4 + Lift)	11.5 psig
Minimum condensate stall pressure		11.5 psig

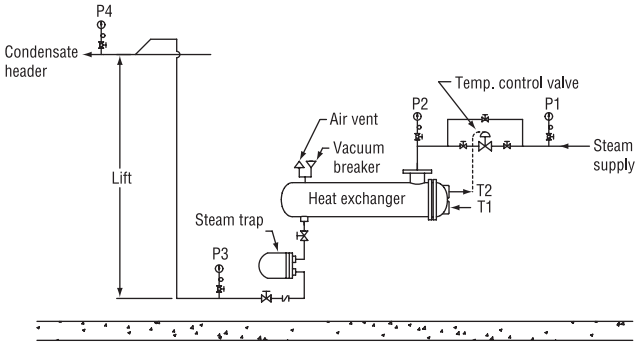


Figure 1

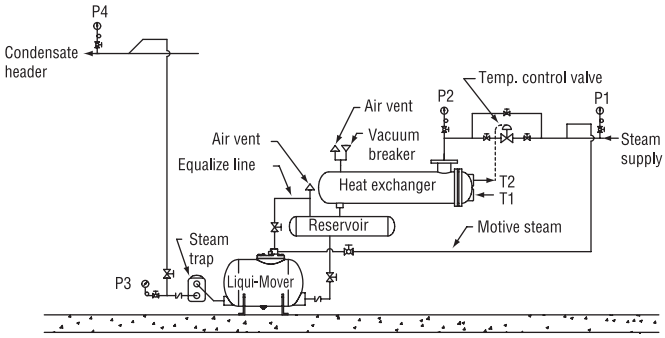


Figure 2

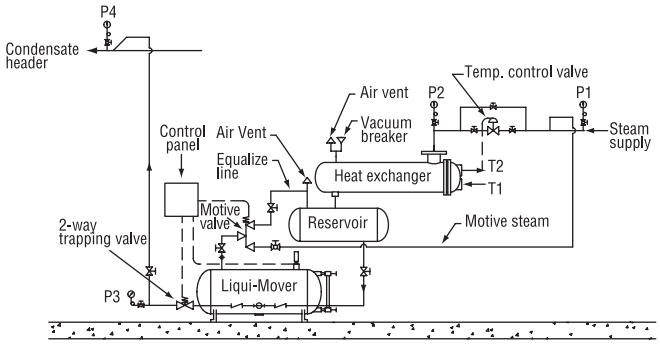
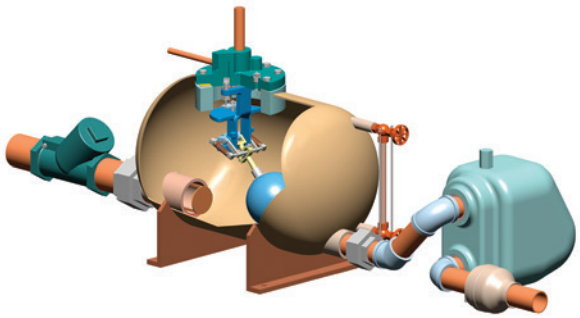
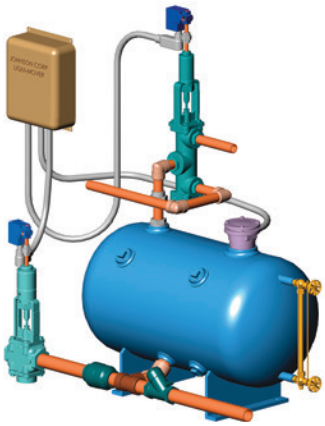


Figure 3



Float series



Float Free series

Energy Loss

Vented or flash steam contains valuable heat energy. If the flash steam can be captured, used, and returned to the boiler, your total steam generation costs may be reduced. This includes a reduction in make-up water, treatment chemicals, and possibly sewer costs.

Operating Conditions:

A. Condensate pressure: 50 psig flashing to 0 psig

B. Condensate load: 10,000 lb/hr.

C. Cost of steam: $5.00 per 1,000 lb

D. Specific volume of water:
0.120 gal./lb (40°F to 60°F)

E. Make-up water and chemical cost:
$5.50 per 1,000 gallons

F. Hours of operation (annually):
6,000 hours

Calculations

Estimated steam loss:

1. Flash loss = 9%
   See chart below.

2. Lb/hr. loss = B x flash loss
   10,000 x 9% = 900 lb/hr.

3. Lb/yr. loss = F x 900 lb/hr.
   6,000 x 900 = 5,400,000 lb/year

4. $ loss/year = lb/year x C
   $\frac{5{,}450{,}000 \times \$5.00}{1{,}000} = \$27{,}000$ *loss/year*

Estimated Water Loss:

5. Gal./year of make-up water = lb/year loss x D
   5,400,000 x 0.120 = 648,000 gal./year

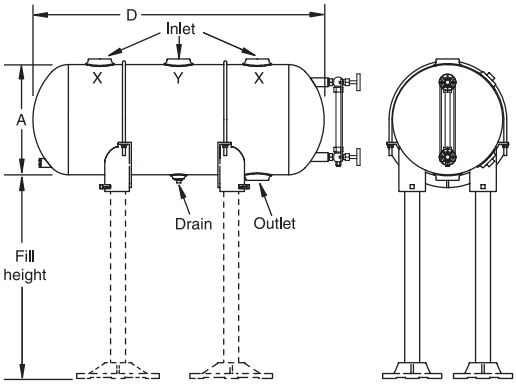
6. $ water loss/year = gal./year x E
   $\frac{648{,}000 \times \$5.50}{1{,}000} = \$3{,}564$ *loss/year*

Total Estimated Dollar Loss (Step 4 + Step 6):
$27,000 + $3,564 = $30,564/year

Percentage Flash Generated

Inlet Condensate Pressure (psig)	Flash Tank Pressure (psig)											
	0	5	10	15	20	25	30	35	40	45	50	55
5	1.6											
10	2.8	1.3										
15	3.9	2.4	1.1									
20	4.9	3.3	2.1	1.0								
25	5.7	4.2	2.9	1.8	0.9							
30	6.5	5.0	3.7	2.6	1.7	0.8						
35	7.2	5.7	4.4	3.3	2.4	1.5	0.7					
40	7.8	6.3	5.1	4.0	3.0	2.2	1.4	0.7				
45	8.4	6.9	5.7	4.6	6.7	2.8	2.0	1.3	0.6			
50	9.0	7.5	6.2	5.2	4.2	3.4	2.6	1.9	1.2	0.6		
60	10.0	8.5	7.3	6.2	5.3	4.5	3.7	3.0	2.3	1.7	1.1	0.5
70	10.9	9.4	8.2	7.2	6.2	5.4	4.6	3.9	3.3	2.7	2.1	1.5
80	11.8	10.3	9.1	8.0	7.1	6.3	5.5	4.8	4.2	3.6	3.0	2.4
90	12.5	11.1	9.9	8.8	7.9	7.1	6.3	5.6	5.0	4.4	3.8	3.3
100	13.3	11.8	10.6	9.6	8.7	7.8	7.1	6.4	5.8	5.1	4.6	4.0
110	13.9	12.5	11.3	10.3	9.4	8.5	7.8	7.1	6.5	5.9	5.3	4.7
120	14.6	13.1	12.0	10.9	10.1	9.2	8.5	7.8	7.1	6.5	6.0	5.4
130	15.2	13.7	12.6	11.5	10.6	9.8	9.1	8.4	7.8	7.2	6.6	6.1
140	15.8	14.3	13.1	12.1	11.2	10.4	9.7	9.0	8.4	7.8	7.2	6.7
150	16.3	14.9	13.7	12.7	11.8	11.0	10.3	9.6	8.9	8.3	7.8	7.3

Receivers/Reservoirs



Receiver/Reservoir Assemblies

(150 psig ASME labeled)

Size	A	D	Connections			Drain	Capacity
			Inlet (X)	Inlet (Y)	Outlet		
LMH-5	10″	26″	2″	1-1/4″	2″	3/4″	7.5 Gal.
LMH-10	14″	37″	2″	2″	2″	3/4″	22.5 Gal.
LMH-20	18″	35″	2″	2″	2″	3/4″	34 Gal.
LMH-40	18″	47″	3″	2″	3″	3/4″	47 Gal.
LMH-50	24″	40″	3″	2″	3″	3/4″	69 Gal.
LMH-65	24″	44″	3″	2″	3″	3/4″	76 Gal.
LMH-110	24″	56″	4″ 150# Flg	2″	4″ 150# Flg	3/4″	98 Gal.
LMH-150	30″	66″	6″ 150# Flg	2″	6″ 150# Flg	3/4″	182 Gal.
LMH-200	30″	123″	6″ 150# Flg	2″	6″ 150# Flg	3/4″	340 Gal.

Flash Tank and Vent Line Sizing

The tables below will assist you in choosing the correct size receiver tank and vent line size for your application. Simply calculate the amount of flash steam that will be generated and use this number to find the correct receiver and vent line.

Vent Line Capacity at 0 psig

(Based on 70 FPS or 4200 FPM velocity)

Pipe Size	1″	1½″	2″	3″	4″	6″	8″	10″	12″
Capacity (lb/hr)	55	130	220	480	830	1,900	3,250	5,150	7,300

Flash Tank Capacity at 0 psig

Flash Tank Size	LMH-5 10 x 26 7.5 Gal.	LMH-10 14 x 37 22.5 Gal.	LMH-20 18 x 35 34 Gal.	LMH-40 18 x 47 47 Gal.	LMH-50 24 x 40 69 Gal.	LMH-65 24 x 44 76 Gal.	LMH-110 24 x 56 98 Gal.	LMH-150 30 x 66 182 Gal.	LMH-200 30 x 123 340 Gal.
Lb/hr Flash Steam	67	139	161	227	238	267	356	519	1,041

Pipe Accumulators as Receivers/Reservoirs

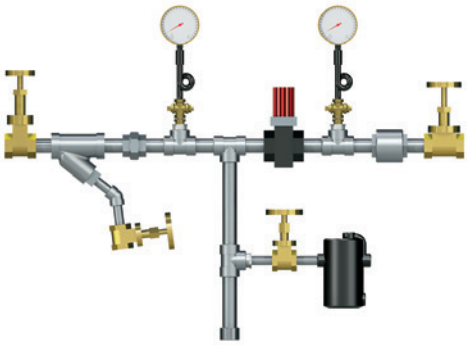
Approximate pipe lengths (in feet) needed for equivalent receiver capacity

Pipe Size (Sch 40)	Gallons per Foot	LMH-5 10 x 26 7.5 Gal.	LMH-10 14 x 37 22.5 Gal.	LMH-20 18 x 35 34 Gal.	LMH-40 18 x 47 47 Gal.	LMH-50 24 x 40 69 Gal.	LMH-65 24 x 44 76 Gal.	LMH-110 24 x 56 98 Gal.	LMH-150 30 x 66 182 Gal.	LMH-200 30 x 123 340 Gal.
3″	0.384	19.5	58.6	88.5						
4″	0.661	11.3	34.0	51.4	71.1					
5″	1.040	7.2	21.6	32.7	45.2	66.3				
6″	1.500	5.0	15.0	22.7	31.3	46.0	50.7			
8″	2.600	2.9	8.7	13.1	18.1	26.5	29.2	37.7		
10″	4.100	1.8	5.5	8.3	11.5	16.8	18.5	23.9	44.4	
12″	5.810	1.3	3.9	5.9	8.1	11.9	13.1	16.9	31.3	58.5
14″	7.030	1.1	3.2	4.8	6.7	9.8	10.8	13.9	25.9	48.4
16″	9.180		2.5	3.7	5.1	7.5	8.3	10.7	19.8	37.0
18″	11.620			2.9	4.0	5.9	6.5	8.4	15.7	29.3
20″	14.440				3.3	4.8	5.3	6.8	12.6	23.5

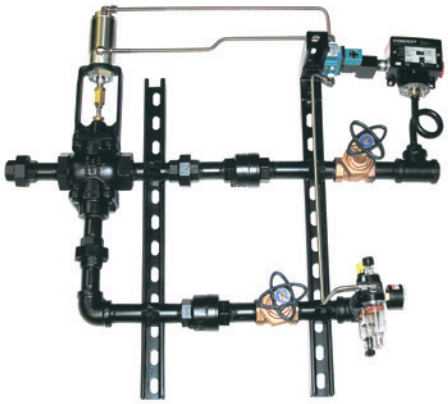
Products Options

Solenoid-Operated 3-way Valve
A solenoid-operated 3-way valve, used with Type ERS level controls. A direct-acting valve, without pilots or pistons, its side-mounted solenoid uses a lever to transmit and amplify power. The side mounting also keeps the coil away from the line heat and allows easier access to the valve mechanism.

Pneumatic-Operated 3-way Valve
A pneumatic-operated 3-way valve, used with Type ERC level controls. The air cylinder on this pneumatic valve is fitted directly to the valve stem for fast, smooth response. Cylinders can withstand hundreds of thousands of cycles and can be easily removed for maintenance.



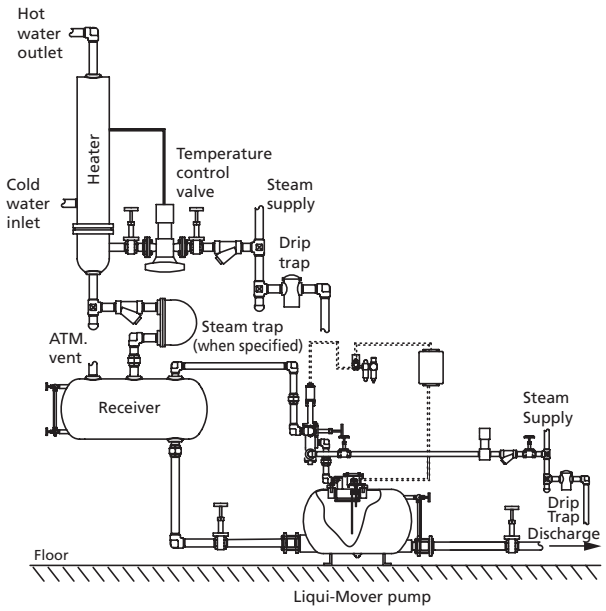
PRV Station Assembly
A pressure reducing valve (PRV) station reduces the motive steam or compressed air pressure to approximately 20 psig higher than the back pressure for smoother operation of the pressure powered pump. A pre-assembled PRV station from Kadant Johnson includes a pressure reducing valve, drip trap, pressure gauges, isolation valves, and a stainless steel reverse flow preventer.



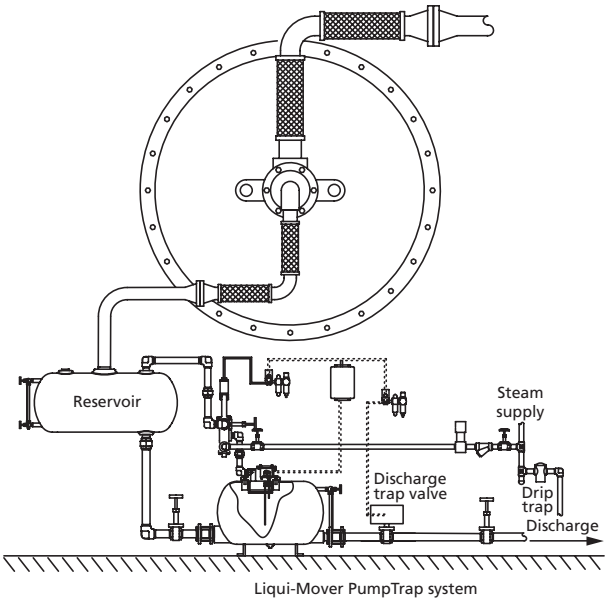
Dual Motive Station
A dual motive station allows two different motive sources to be piped to the Liqui-Mover pump. Steam is normally the primary motive source, while compressed air is the alternate or back-up motive source. The compressed air system provides reliable back-up power to keep the Liqui-Mover pumps in operation even during a loss of motive steam pressure.

Applications

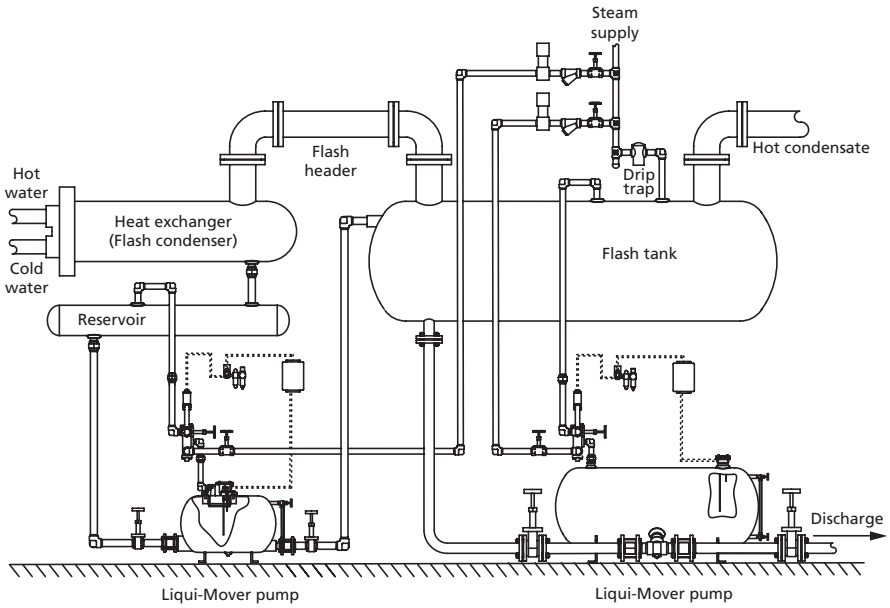
Float Free Level Control



Water Heater (open system)

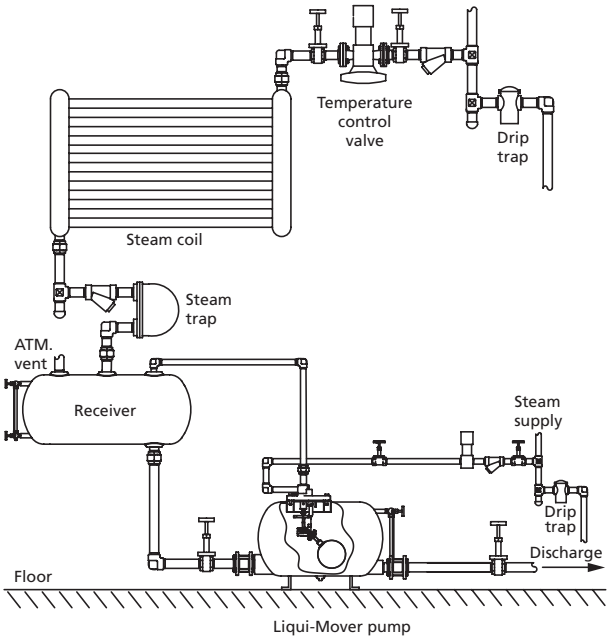


PumpTrap System (closed system)

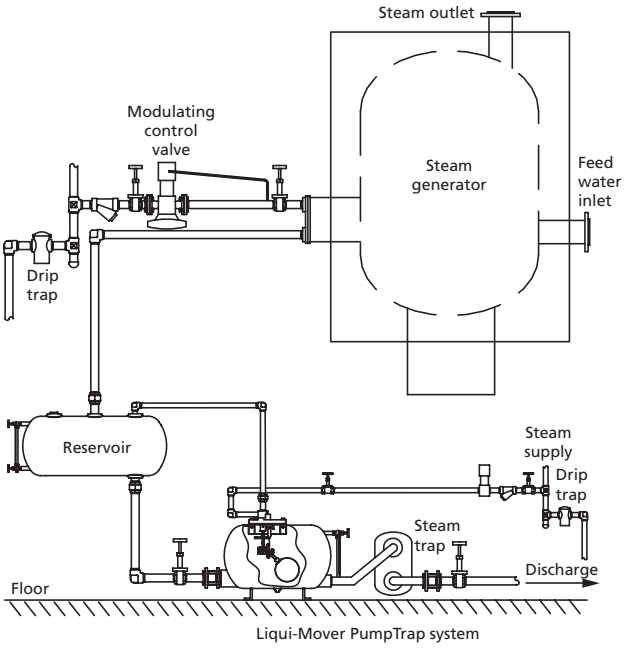


Flash Recovery

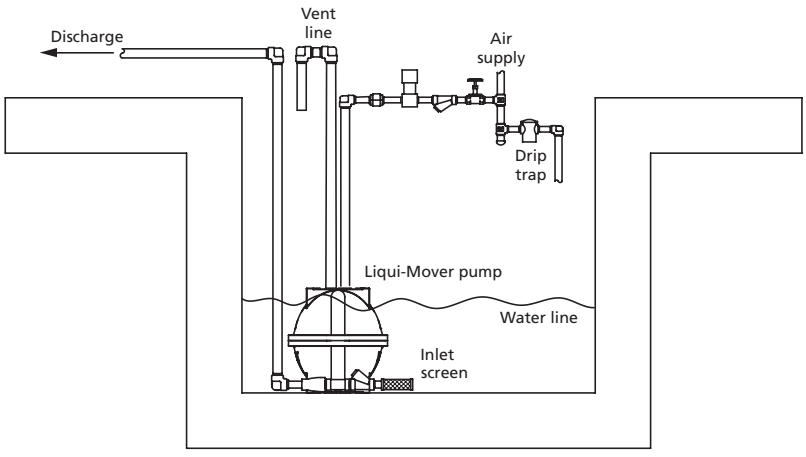
Float Level Control



Steam Coil
(open system)



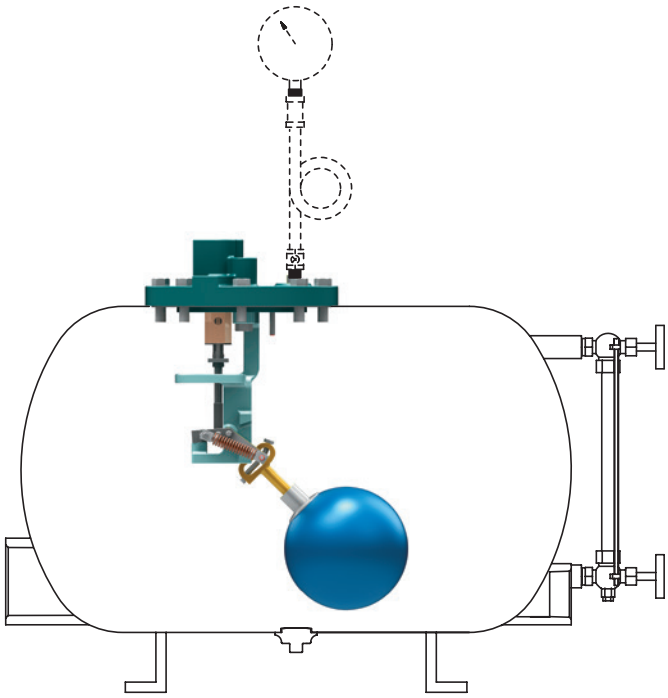
PumpTrap System
(closed system)



Sump Pump

Level Control Upgrade

Float Operated Replacement Level Control



Operating Conditions

PMA (Maximum Allowable Pressure):	150 psig
PMO (Maximum Operating Pressure):	90 psid
Temperature:	365°F

Note: Other pressure and temperature ratings available.

Features

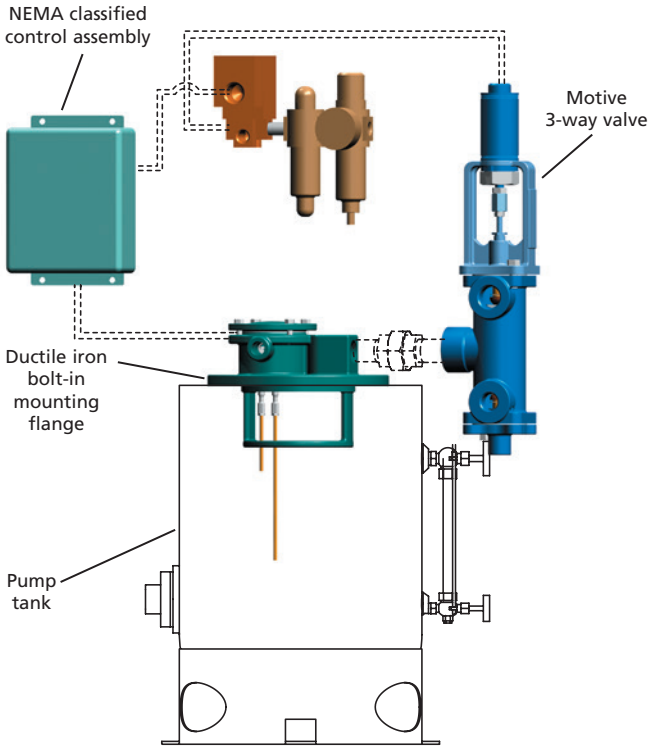
- Stainless steel float mechanism
- Designed to retrofit other manufacturers' pumps
- Exhaustive product testing
- Reduced maintenance requirements

Benefits

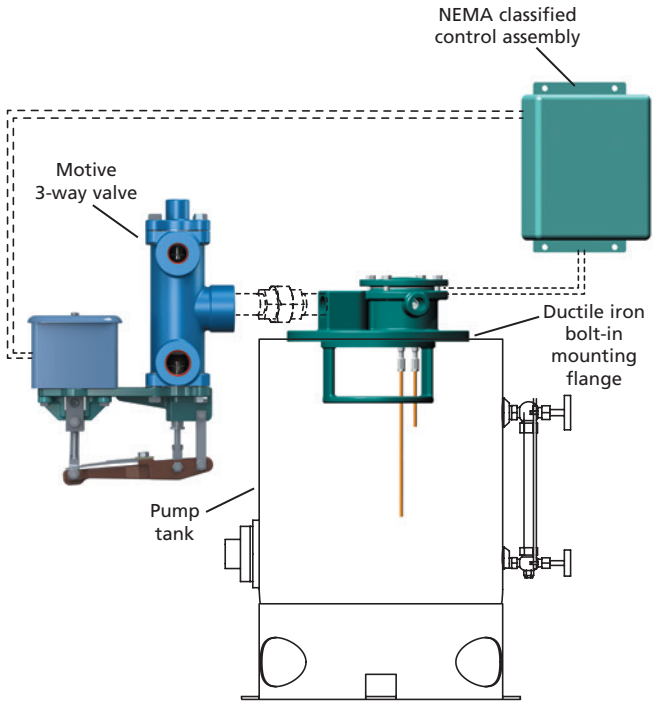
- Fast and easy upgrade
- Wear and corrosion resistant
- Trouble-free, proven technology
- Lower total operating costs

Pump Model	Spirax Sarco PPC, PPF, PTC, PTF	ITT Hoffman PCC 1, PCC 1.5, PCC 2, PCC 3	ITT Hoffman PCC 4 and 6, PCS 8	Armstrong PT-300, PT-400, PT-3500 Series	Mepco, Dunham Bush, Yarway	Spence, Nicholson	Watson McDaniel PMPC
Kadant Johnson Part No.	19L71100	19L71100	19L71500	19L66070	19L71100	19L71100	19L71110

Float Free Replacement Level Control



Pneumatic-Operated 3-way Valve



Solenoid-Operated 3-way Valve

Operating Conditions

PMA (Maximum Allowable Pressure):	150 psig
PMO (Maximum Operating Pressure):	150 psid
Temperature:	365°F

Note: Other pressure and temperature ratings available.

Features

- Designed to retrofit other manufacturers' pumps
- Reduced maintenance requirements
- No springs or floats
- More than 70 years of proven performance
- Remote monitoring capabilities

Benefits

- Virtually no moving parts to wear
- No moving parts in the condensate
- Fast and easy upgrade
- Trouble-free, proven technology
- Lower total operating costs

Pump Model	Spirax Sarco PTC, PTF, PPC Series	Spirax Sarco PPF P	Spence Commander Classic	MEPCO, Dunham, Bush, Yarway	ITT Hoffman PCC-1, PCC-1.5, PCC-2, PCC-3, PPC-4, PPC-6	Watson McDaniel PMPC	Armstrong PT-300, PT-400, PT-3500 Series	Armstrong PT-516
Kadant Johnson Pneumatic NEMA 4 Part ID No.	19L71048	19L71903	CF	CF	19L71048	19L71056	19L71068	CF
Kadant Johnson Solenoid NEMA 1 Part ID No.	19L71042	CF	CF	CF	19L71042	19L71069	19L71089	CF

CF = Consult factory

Desuperheaters

Desuperheaters are designed to reduce the temperature of superheated steam for optimal heat transfer and efficiency as well as reduced degradation of system components. Kadant Johnson desuperheaters are custom designed for each application and are available in various materials. The efficient geometry allows for direct installation into the steam pipeline with flanged connections.

Direct Steam Injection Heaters

A direct steam injection heater heats water and other fluids by injecting steam directly into the fluid. The direct injection heater is most appropriate where various volumes of hot liquids at precise temperatures are required. Direct steam injection heaters can be used in operations such as starch cooking, liquor heating, filling pulpers, calender roll heating, wastewater treatment, and industrial laundry, among others.

Air and Steam Separators

Air and steam separators use expansion, change in direction, and filtration to effectively remove up to 99% of the precipitate in compressed air and steam systems. They range in size from ⅜" to 4". The housing is made from ductile iron and is available in threaded or flanged connections with pressure ratings up to 300 psig.

Thermocompressors

Steam jet thermocompressors are designed to boost low-pressure steam by properly mixing high-pressure steam. With just three basic components: nozzle, mixing section, and diffuser, the Kadant Johnson high-efficiency thermocompressor is simple yet energy efficient.

Vacuum Breakers

Vacuum breakers provide a simple, dependable way to relieve unwanted vacuum that may develop in a closed vessel or pipeline. They can be used to prevent contamination from back flowing in fluid handling systems and to protect equipment against collapse or implosion. Vacuum breakers range in size from ⅜" to 1½". They are available in stainless steel and brass materials and rated up to 300 psig and 365°F.

Dimensions are for reference only and subject to change.

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Replaces all previous versions