INDUSTRIAL
REFRIGERATION PARTNER

FRIGO® MEKANİK

PRESSURE VESSELS

www.frigomekanik.com.tr

TÜV SAAR CERT ISO 9001:2008

TÜV SAAR CERT ISO 14001

TÜV SAAR CERT OHSAS 18001

PRESSURE VESSELS

Frigo Mekanik high pressure vessels are solely intended for use in refrigeration system, e.g. as surge drums to separate liquid and vapour or as a receivers of refrigerant.

Pressure vessels designed according to AD 2000 Merkblatter and 2014/68/EU standards with TUV certification. Each vessels have %100 radiography, liquid penetrant, ultrasonic tests.

1) HORIZONTAL RECEIVERS

Horizontal high pressure receivers provide the main source of liquid refrigerant for a refrigeration system. It also provides a place to store refrigerant as needed to minimize the effect of system transients. The receiver must accommodate all the liquid of the system in the storage volume between the high and low liquid levels.

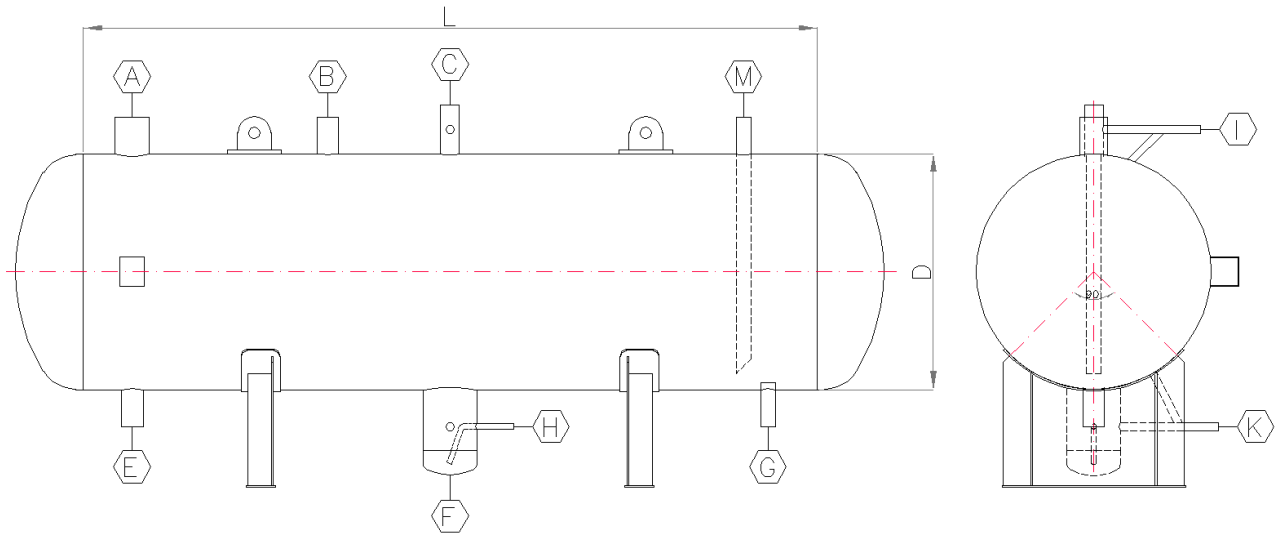

Figure 1 Dimension and nozzle details

A – TSOC Return	**E –** Liquid Inlet	**I –** Level Column
B – Vent to Condenser	**F -** Dome	**K –** Level Column
C - Header	**G –** TSOC Supply	**D –** Vessel Diameter
M – Liquid Out	**H –** Oil Drain	**L –** Vessel Length

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Dimensions and Data Table

No	Type	Diameter (mm)	Shell Length (mm)	Volume (lt)	Max.Design Pressure (bar)	Weight (kg)
1	FM.TR.60.150	600	1500	480	20	
2	FM.TR.60.200	600	2000	600	20	
3	FM.TR.60.300	600	3000	900	20	
4	FM.TR.80.150	800	1500	900	20	
5	FM.TR.80.200	800	2000	1150	20	
6	FM.TR.80.300	800	3000	1650	20	
7	FM.TR.96.300	960	3000	2400	20	
8	FM.TR.96.450	960	4500	3500	20	
9	FM.TR.120.300	1200	3000	3880	20	
10	FM.TR.120.450	1200	4500	5570	20	
11	FM.TR.140.300	1400	3000	5380	20	
12	FM.TR.140.450	1400	4500	7690	20	
13	FM.TR.160.300	1600	3000	7160	20	
14	FM.TR.160.450	1600	4500	10170	20	
15	FM.TR.180.300	1800	3000	9250	20	
16	FM.TR.180.450	1800	4500	13068	20	
17	FM.TR.200.300	2000	3000	11630	20	
18	FM.TR.200.450	2000	4500	16340	20	

- All dimensions are subject to change; please consult factory for drawings.

2) HORIZONTAL SINGLE FLOW SURGE DRUM

Flooded evaporators are equipped with a surge drum at a level slightly above the evaporator coils. Either a horizontal or vertical surge drum is possible with the choice usually dependent upon the space restrictions. The surge drum serves the purpose of liquid storage and liquid/vapor separation. A need for surge volume arises when the evaporator is subjected to a sudden heavy heat load, in which case the rate of boiling abruptly increases and the vapor thus developed pushes liquid out of the evaporator.

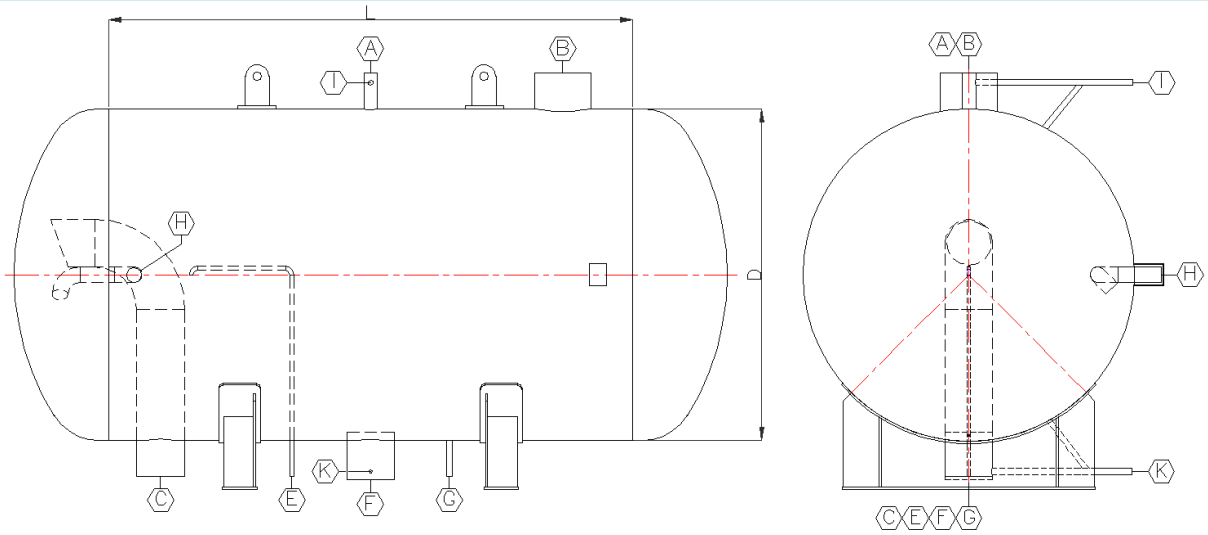


Figure 2 Dimension and nozzle details

A – Header	**E –** Oil Pot Vent	**I –** Level Column
B – Dry Suction	**F –** Liquid Outlet	**K –** Level Column
C - Wet Suction	**G –** Oil Drain	**L –** Vessel Length
D – Vessel Diameter	**H –** Liquid Inlet	

Dimensions and Data Table

No	Type	Diameter (mm)	Shell Length (mm)	Volume (lt)	Max.Design Pressure (bar)	Weight (kg)
1	FM.HSDS.60.150	600	1500	480	18	
2	FM.HSDS.60.200	600	2000	600	18	
3	FM.HSDS.60.300	600	3000	900	18	
4	FM.HSDS.80.150	800	1500	900	18	
5	FM.HSDS.80.200	800	2000	1150	18	
6	FM.HSDS.80.300	800	3000	1650	18	
7	FM.HSDS.96.300	960	3000	2400	18	
8	FM.HSDS.96.450	960	4500	3500	18	
9	FM.HSDS.120.300	1200	3000	3880	18	
10	FM.HSDS.120.450	1200	4500	5570	18	
11	FM.HSDS.140.300	1400	3000	5380	18	
12	FM.HSDS.140.450	1400	4500	7690	18	
13	FM.HSDS.160.300	1600	3000	7160	18	
14	FM.HSDS.160.450	1600	4500	10170	18	

15	FM.HSDS.180.300	1800	3000	9250	18	
16	FM.HSDS.180.450	1800	4500	13068	18	
17	FM.HSDS.200.300	2000	3000	11630	18	
18	FM.HSDS.200.450	2000	4500	16340	18	

- All dimensions are subject to change; please consult factory for drawings.

3) HORIZONTAL DUAL FLOW SURGE DRUM

Flooded evaporators are equipped with a surge drum at a level slightly above the evaporator coils. Either a horizontal or vertical surge drum is possible with the choice usually dependent upon the space restrictions. The surge drum serves the purpose of liquid storage and liquid/vapor separation. A need for surge volume arises when the evaporator is subjected to a sudden heavy heat load, in which case the rate of boiling abruptly increases and the vapor thus developed pushes liquid out of the evaporator.

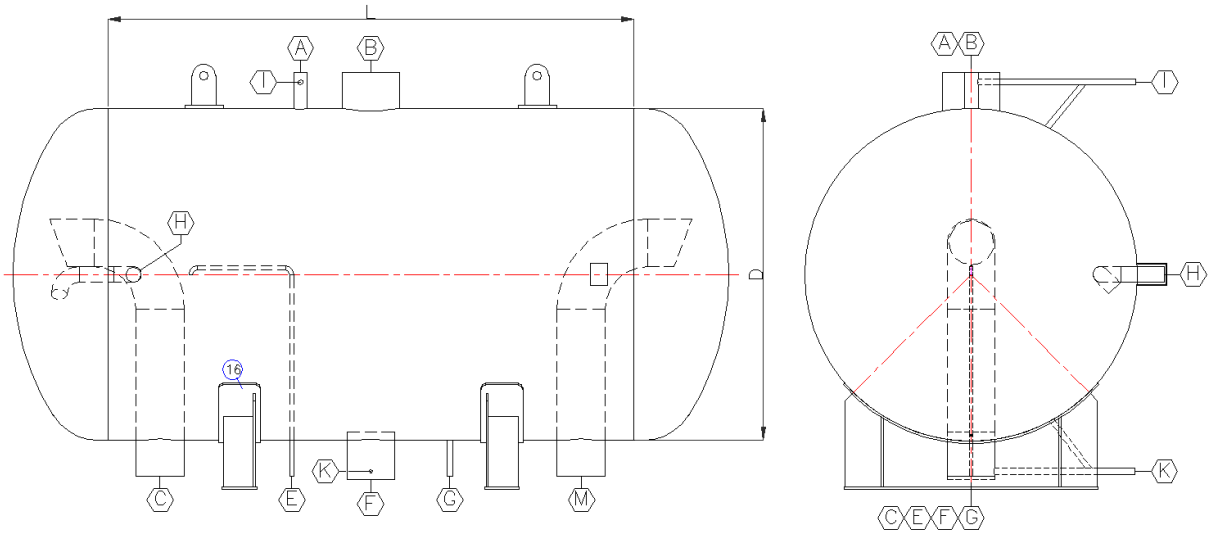


Figure 3 Dimension and nozzle details

A – Header	**E –** Oil Pot Vent	**I –** Level Column
B – Dry Suction	**F –** Liquid Outlet	**K –** Level Column
C - Wet Suction	**G –** Oil Drain	**L –** Vessel Length
D – Vessel Diameter	**H –** Liquid Inlet	**M –** Wet Suction

Dimensions and Data Table

No	Type	Diameter (mm)	Shell Length (mm)	Volume (lt)	Max.Design Pressure (bar)	Weight (kg)
1	FM.HSDD.60.200	600	2000	600	18	
2	FM.HSDD.60.300	600	3000	900	18	
3	FM.HSDD.80.200	800	2000	1150	18	
4	FM.HSDD.80.300	800	3000	1650	18	
5	FM.HSDD.96.300	960	3000	2400	18	
6	FM.HSDD.96.450	960	4500	3500	18	
7	FM.HSDD.120.300	1200	3000	3880	18	
8	FM.HSDD.120.450	1200	4500	5570	18	
9	FM.HSDD.140.300	1400	3000	5380	18	
10	FM.HSDD.140.450	1400	4500	7690	18	
11	FM.HSDD.160.300	1600	3000	7160	18	
12	FM.HSDD.160.450	1600	4500	10170	18	
13	FM.HSDD.180.300	1800	3000	9250	18	
14	FM.HSDD.180.450	1800	4500	13068	18	
15	FM.HSDD.200.300	2000	3000	11630	18	
16	FM.HSDD.200.450	2000	4500	16340	18	

- All dimensions are subject to change; please consult factory for drawings.

4) HORIZONTAL RECIRCULATORS

Recirculator vessel is one that performs both the role of liquid/vapor separation and liquid storage. The level controller or a capacitance level sensor on the vessel regulate the selenoid valve in the liquid line. If the level in the vessel drops below the control point, the selenoid valve in the liquid supply line opens. When the level in the vessel reaches the control point, the solenoid valve closes.

The controlled level is not the lowest operating level, because some liquid supply should be available between the controlled level and level that actuates the low-level alarm. The reason for needing this ballast volume is hat during startup or resumption of operation of one or more evaporators, the pump may withdraw refrigerant from the vessel at a greater rate than is supplied at that moment by the combination of the controlled liquid supply and from the return from the liquid/vapor line. If the vessel empties to the low-level alarm status, operation continues but an operator or the security system is informed of the fact. On a further drop in level the low-level cutout is reached, which is usually set to stop pump operation.

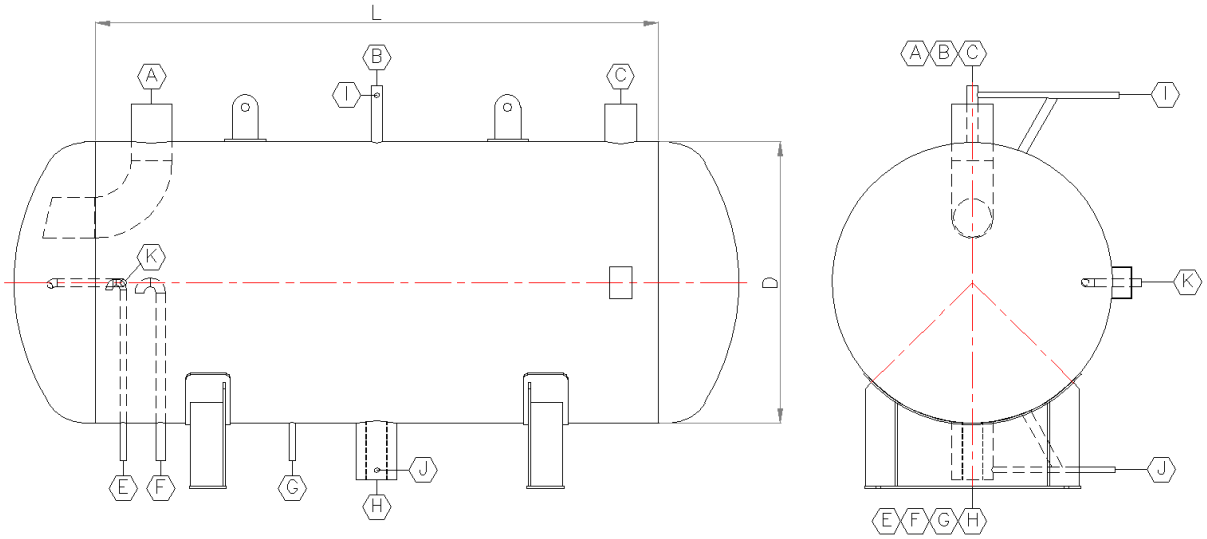


Figure 4 Dimension and nozzle details

A – Wet Suction	**E –** Oil Pot Vent	**I –** Level Column
B – Header	**F –** Liquid Bypass	**J –** Level Column
C - Dry Suction	**G –** Oil Drain	**K –** Liquid Inlet
D – Vessel Diameter	**H –** Liquid Outlet	**L –** Vessel Length

Dimensions and Data Table

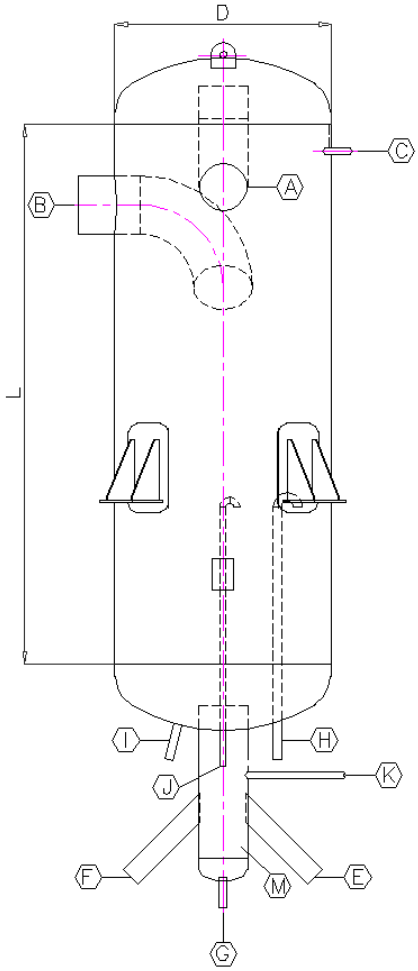
No	Type	Diameter (mm)	Shell Length (mm)	Volume (lt)	Max.Design Pressure (bar)	Weight (kg)
1	FM.HPR.80.200	800	2000	1150	18	
2	FM.HPR.80.300	800	3000	1650	18	
3	FM.HPR.96.300	960	3000	2400	18	
4	FM.HPR.96.450	960	4500	3500	18	
5	FM.HPR.120.300	1200	3000	3880	18	
6	FM.HPR.120.450	1200	4500	5570	18	
7	FM.HPR.140.300	1400	3000	5380	18	
8	FM.HPR.140.450	1400	4500	7690	18	
9	FM.HPR.160.300	1600	3000	7160	18	
10	FM.HPR.160.450	1600	4500	10170	18	
11	FM.HPR.180.300	1800	3000	9250	18	
12	FM.HPR.180.450	1800	4500	13068	18	
13	FM.HPR.200.300	2000	3000	11630	18	
14	FM.HPR.200.450	2000	4500	16340	18	

- All dimensions are subject to change; please consult factory for drawings.

5) VERTICAL RECIRCULATORS

Recirculator vessel is one that performs both the role of liquid/vapor separation and liquid storage. The level controller or a capacitance level sensor on the vessel regulate the selenoid valve in the liquid line. If the level in the vessel drops below the control point, the selenoid valve in the liquid supply line opens. When the level in the vessel reaches the control point, the solenoid valve closes.

The controlled level is not the lowest operating level, because some liquid supply should be available between the controlled level and level that actuates the low-level alarm. The reason for needing this ballast volume is hat during startup or resumption of operation of one or more evaporators, the pump may withdraw refrigerant from the vessel at a greater rate than is supplied at that moment by the combination of the controlled liquid supply and from the return from the liquid/vapor line. If the vessel empties to the low-level alarm status, operation continues but an operator or the security system is informed of the fact. On a further drop in level the low-level cutout is reached, which is usually set to stop pump operation.



A – Dry Suction
B – Wet Suction
C - Level Column
D – Vessel Diameter
E – Pump Suction
F – Pump Suction
G – Oil Drain
H – Liquid Bypass
I – Oil Drain
J – Oil Pot Vent
K – Liquid Columm
L – Vessel Length
M - Dome

Figure 5 Dimension and nozzle details

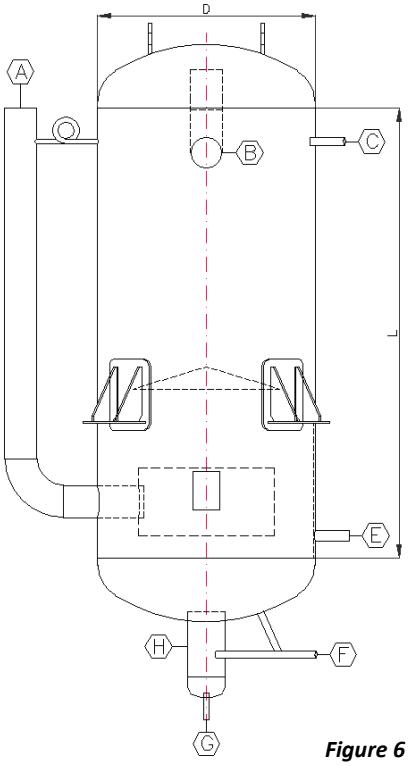
Dimensions and Data Table

No	Type	Diameter (mm)	Shell Length (mm)	Volume (lt)	Max.Design Pressure (bar)	Weight (kg)
1	FM.VPR.80.200	800	2000	1150	18	
2	FM.VPR.80.300	800	3000	1650	18	
3	FM.VPR.96.300	960	3000	2400	18	
4	FM.VPR.120.300	1200	3000	3880	18	
5	FM.VPR.140.300	1400	3000	5380	18	
6	FM.VPR.160.300	1600	3000	7160	18	
7	FM.VPR.180.300	1800	3000	9250	18	
8	FM.VPR.200.300	2000	3000	11630	18	

- All dimensions are subject to change; please consult factory for drawings.

6) VERTICAL INTERCOOLERS

The intercooler is the vessel in a two-stage system operating at the intermediate pressure that provides removal of flash gas in direct cooling of liquid. The other purpose of the vessel is to desuperheat discharge vapor from the low-stage compressor by bubbling it through the liquid in the vessel. That vessels in industrial refrigeration system have either or both the function of liquid storage and/or separation of liquid from vapor.



A – Hot Gas Inlet
B – Dry Suction
C - Level Column
D – Vessel Diameter
E – Liquid Outlet
F – Level Column
G – Oil Drain
H – Dome
L – Vessel Length

Figure 6 Dimension and nozzle details

Dimensions and Data Table

No	Type	Diameter (mm)	Shell Length (mm)	Volume (lt)	Max.Design Pressure (bar)	Weight (kg)
1	FM.VIC.80.200	800	2000	1150	18	
2	FM.VIC.80.300	800	3000	1650	18	
3	FM.VIC.96.300	960	3000	2400	18	
4	FM.VIC.120.300	1200	3000	3880	18	
5	FM.VIC.140.300	1400	3000	5380	18	
6	FM.VIC.160.300	1600	3000	7160	18	
7	FM.VIC.180.300	1800	3000	9250	18	
8	FM.VIC.200.300	2000	3000	11630	18	

- All dimensions are subject to change; please consult factory for drawings.

7) HORIZONTAL INTERCOOLERS

The intercooler is the vessel in a two-stage system operating at the intermediate pressure that provides removal of flash gas in direct cooling of liquid. The other purpose of the vessel is to desuperheat discharge vapor from the low-stage compressor by bubbling it through the liquid in the vessel. That vessels in industrial refrigeration system have either or both the function of liquid storage and/or separation of liquid from vapor.

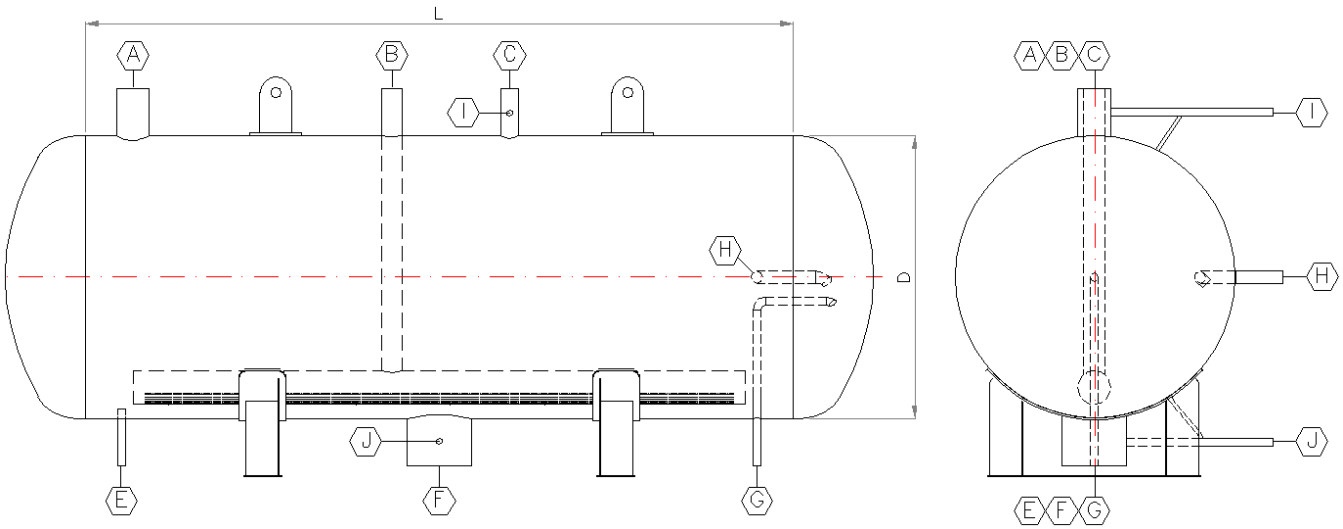


Figure 7 Dimension and nozzle details

A – Dry Suction	**E –** Liquid Outlet	**I –** Level Column
B – Hot Gas Inlet	**F –** Dome	**J –** Level Column
C - Header	**G –** Oil Pot Vent	**L –** Vessel Length
D – Vessel Diameter	**H –** Liquid Inlet	

Dimensions and Data Table

No	Type	Diameter (mm)	Shell Length (mm)	Volume (lt)	Max.Design Pressure (bar)	Weight (kg)
1	FM.HIC.80.200	800	2000	1150	18	
2	FM.HIC.80.300	800	3000	1650	18	
3	FM.HIC.96.300	960	3000	2400	18	
4	FM.HIC.96.450	960	4500	3500	18	
5	FM.HIC.120.300	1200	3000	3880	18	
6	FM.HIC.120.450	1200	4500	5570	18	
7	FM.HIC.140.300	1400	3000	5380	18	
8	FM.HIC.140.450	1400	4500	7690	18	
9	FM.HIC.160.300	1600	3000	7160	18	
10	FM.HIC.160.450	1600	4500	10170	18	
11	FM.HIC.180.300	1800	3000	9250	18	
12	FM.HIC.180.450	1800	4500	13068	18	
13	FM.HIC.200.300	2000	3000	11630	18	
14	FM.HIC.200.450	2000	4500	16340	18	

- All dimensions are subject to change; please consult factory for drawings.

8) VERTICAL ACCUMULATORS

Accumulator vessel should normally not be necessary, and in newly designed and constructed systems it usually is not found. In a two-stage liquid recirculation system the low-pressure receiver should be designed to prevent liquid from reaching the low-stage compressors, and the flash-tank/intercooler should prevent liquid from reaching the high-stage compressors.

The operators of many plants that employ a suction-line accumulator, however, are comforted by having one. In plants that through the years have been expanded, modified, and restructured there is sometimes liquid carryover and the suction-line accumulator is the final protector of the compressor from slugging with liquid. Some of the reasons that liquid carryover occurs are because of improper design of some other separating vessel, or occasional liquid carryover from a leaking expansion valve on a direct expansion valve on a direct-expansion coil or the imposition of a sudden heat load on a flooded coil.

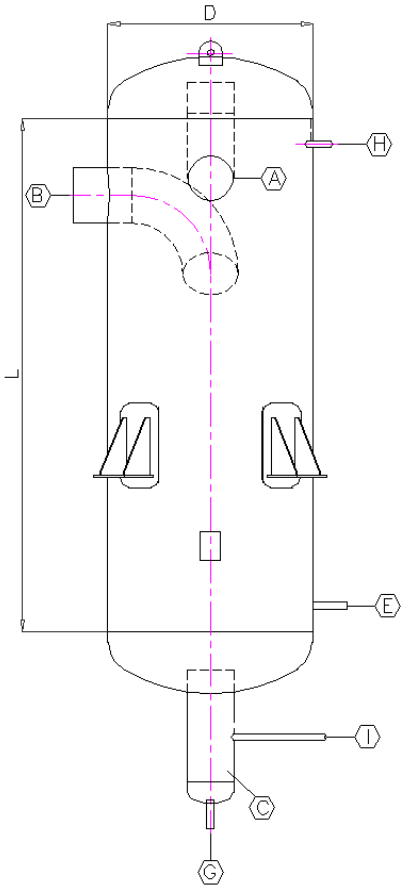


Figure 8 Dimension and nozzle details

A – Dry Suction
B – Wet Suction
C - Dome
D – Vessel Diameter
E – Liquid Outlet
F – Level Column
G – Oil Drain
H – Level Column
L – Vessel Length

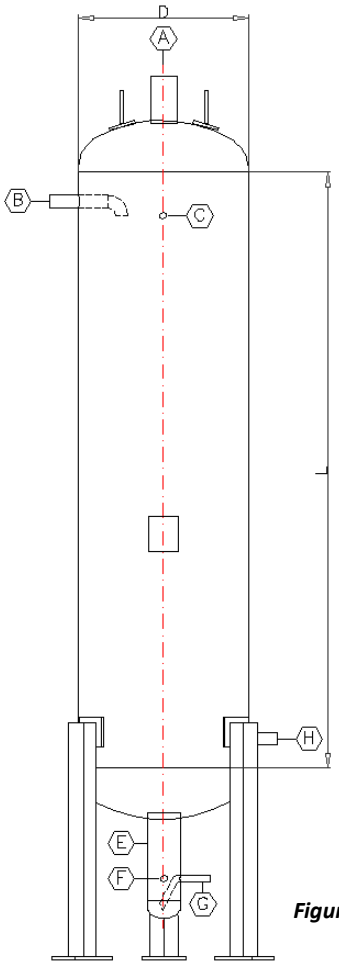
Dimensions and Data Table

No	Type	Diameter (mm)	Shell Length (mm)	Volume (lt)	Max.Design Pressure (bar)	Weight (kg)
1	FM.VAC.60.150	600	1500	480	18	
2	FM.VAC.60.200	600	2000	600	18	
3	FM.VAC.60.300	600	3000	900	18	
4	FM.VAC.80.150	800	1500	900	18	
5	FM.VAC.80.200	800	2000	1150	18	
6	FM.VAC.80.300	800	3000	1650	18	
7	FM.VAC.96.300	960	3000	2400	18	
8	FM.VAC.120.300	1200	3000	3880	18	
9	FM.VAC.140.300	1400	3000	5380	18	
10	FM.VAC.160.300	1600	3000	7160	18	
11	FM.VAC.180.300	1800	3000	9250	18	
12	FM.VAC.200.300	2000	3000	11630	18	

- All dimensions are subject to change; please consult factory for drawings.

9) VERTICAL FLASH ECONOMIZERS

Flash Economizers provide an intermediate pressure level in a refrigeration system for liquid and flash gas separation. The saturated liquid from this vessel produces less flash gas at the evaporator improving system efficiency and reduced operating cost.



A – Gas Outlet
B – Liquid Inlet
C - Level Column
D – Vessel Diameter
E – Dome
F – Level Column
G – Oil Drain
H – Liquid Outlet
L – Vessel Length

Figure 9 Dimension and nozzle details

Dimensions and Data Table

No	Type	Diameter (mm)	Shell Length (mm)	Volume (lt)	Max.Design Pressure (bar)	Weight (kg)
1	FM.VAC.60.150	600	1500	480	18	
2	FM.VAC.60.200	600	2000	600	18	
3	FM.VAC.60.300	600	3000	900	18	
4	FM.VAC.80.150	800	1500	900	18	
5	FM.VAC.80.200	800	2000	1150	18	
6	FM.VAC.80.300	800	3000	1650	18	
7	FM.VAC.96.300	960	3000	2400	18	

- All dimensions are subject to change; please consult factory for drawings.

10) HORIZONTAL OIL POT

Oil Pots are small diameter certified pressure vessels that collect a mixture of refrigerant and oil that can accumulate at various points in a refrigeration system. This single collection point facilitates the separation of the refrigerant from the oil and the removal of the oil from the oil pot.

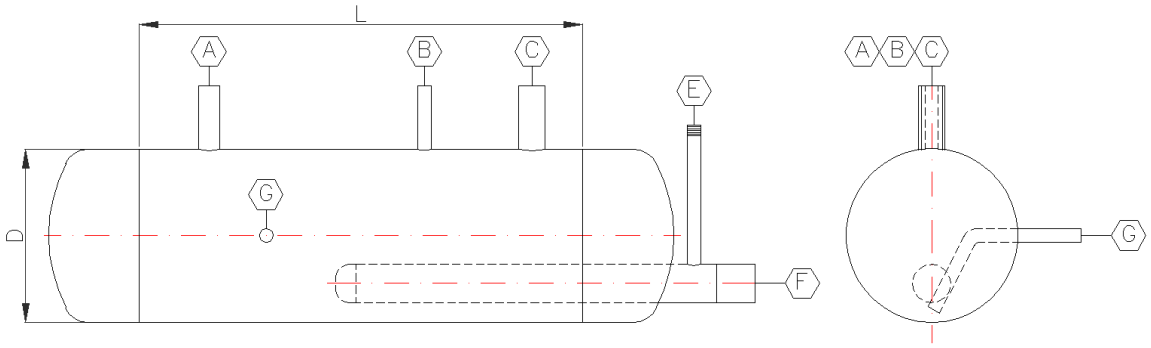


Figure 10 Dimension and nozzle details

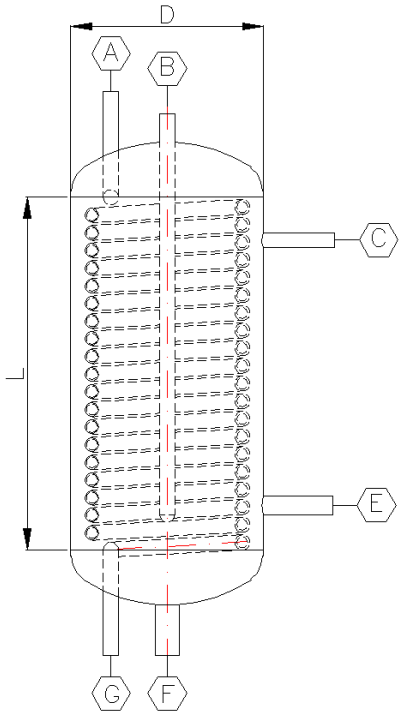
A – Vent	**D –** Pipe Diameter	**G –** Oil Outlet
B – Relief	**E –** Oil Inlet for heater	**L –** Pipe Length
C – Inlet	**F –** Heater Connection	

Dimensions and Data Table

No	Type	Diameter (mm)	Shell Length (mm)	Volume (lt)	Max.Design Pressure (bar)	Weight (kg)
1	FM.HOP.27.70	273	700	45	24	

11) VERTICAL AIR PURGER

Air Purger, that has proven to be highly efficient while being very simple to operate. The Air Purger utilize the lowest temperature and the highest pressure available in the system to achieve the highest possible degree of separation between the air and the refrigerant.



A – Gas Outlet
B – Thermostat connection
C - Air Outlet
D – Pipe Diameter
E – Vent
F – Liquid Outlet
G – Liquid Inlet

Figure 11 Dimension and nozzle details

Dimensions and Data Table

No	Type	Diameter (mm)	Shell Length (mm)	Volume (lt)	Max.Design Pressure (bar)	Weight (kg)
1	FM.AIP.27.50	273	500	35	24	