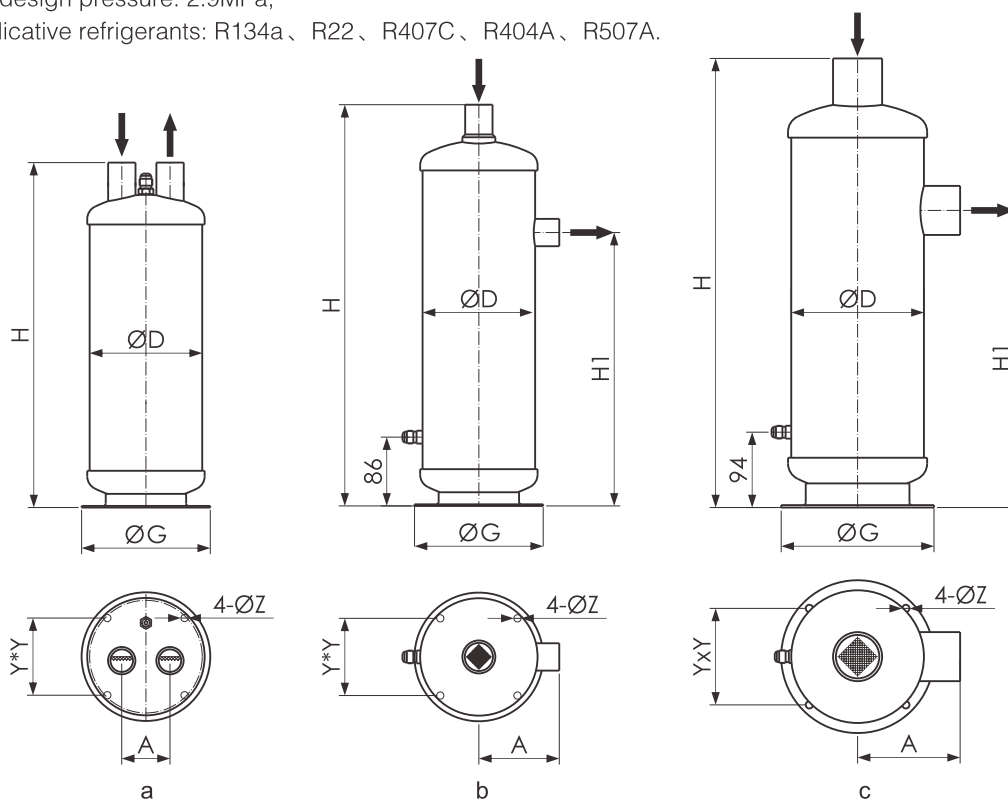


从压缩机输出的带有悬浮油颗粒的气态制冷剂进入到油分离器中，气态制冷剂携带的油经过进口金属丝网和带有隔板的出口金属网网的拦截，油颗粒之间相互撞击并形成较重的油颗粒，这些较重的油颗粒最终撞击在油分离器的内壁上，此处具有最终分离作用。被分离出来的油滴落到油分离器的底部，并通过此处安装的浮球式针阀将油返回到曲轴箱或储油器中。

- 设计压力：2.9 MPa；
- 适用制冷剂：R134a、R22、R407C、R404A、R507A。

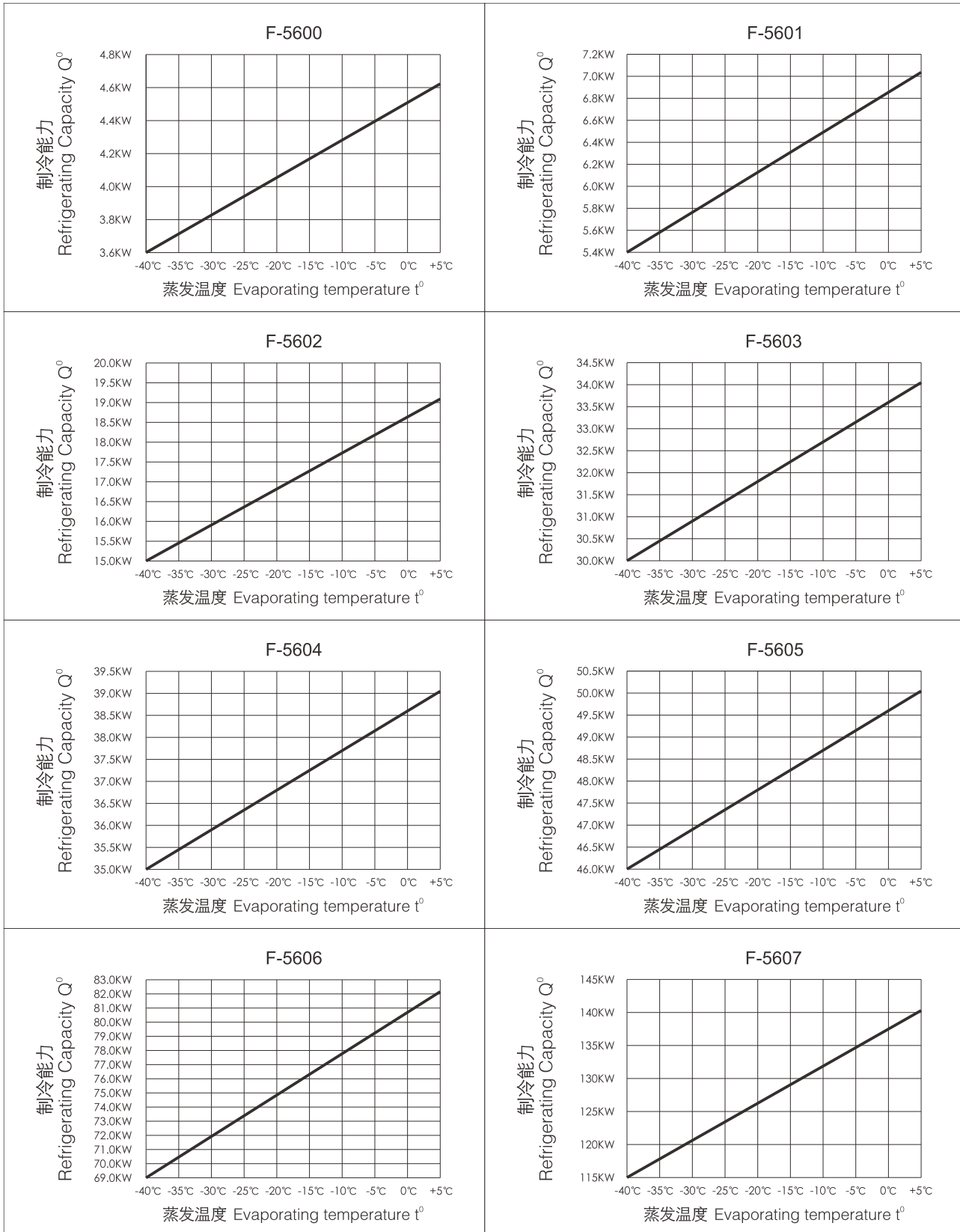
The refrigerant gas containing oil in aerosol form exported from the compressor enters into the oil separator. The oil contained in the refrigerant gas is intercepted when it passes through the inlet metal web and the outlet metal web and then the shell wall of the oil separator. The oil particle collide with one another and form heavier oil particles. The heavier oil particles drops finally hit on the wall of the oil separator, and here have the final separation effect. Be isolated droplets to the bottom of the oil separator where a float operated needle valve returns the oil back to the crankcase or oil reservoir.

- The design pressure: 2.9MPa;
- Applicative refrigerants: R134a、R22、R407C、R404A、R507A.



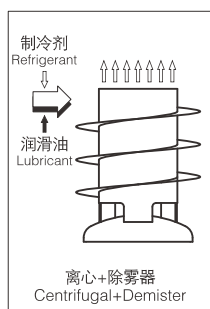
型号 Model	接口尺寸 Joint Size (Inch)	ØD (mm)	H (mm)	H1 (mm)	A (mm)	Y (mm)	ØG (mm)	ØZ (mm)	油出口 Oil Outlet (SAE)	初始注油量 First Oil Charge (l)	容积 Volume (l)	图例 Fig.
F-5600	3/8"	102	273	-	48	86	140	8.5	1/4"	0.5	1.6	a
F-5601	1/2"	102	273	-	48	86	140	8.5	1/4"	0.5	1.6	a
F-5602	5/8"	102	343	-	48	86	140	8.5	1/4"	0.5	2.1	a
F-5603	7/8"	140	424	293	100	96	160	9.0	3/8"	0.9	5.0	b
F-5604	1-1/8"	140	499	336	100	96	160	9.0	3/8"	0.9	6.0	b
F-5605	1-3/8"	140	499	336	103	96	160	9.0	3/8"	0.9	6.0	b
F-5606	1-5/8"	165	558	376	130	120	190	9.0	3/8"	1.2	8.0	c
F-5607	2-1/8"	165	558	370	128	120	190	9.0	3/8"	1.2	9.0	c

- ★ 油分离器第一次安装时，需要向油分离器内充注与压缩机相同牌号的润滑油，充注量参照上面表格中给出的“初始注油量”。
- ★ When you use the oil separator for the first time, please fill the lubricating oil with the same trademark as it is in the compressor into the oil separator, and the oil charging volume please take the numbers marked in the above form as your reference.



上述数据基于R22/R407C/R404A, 冷凝温度+40°C, 使用R134a (R22数值 × 0.65)

Based on the above date: R22/R407C/R404A,condensing temperature+40° c,used R134a(R22 datex0.65)



F-66SG系列螺旋式油分离器以其离心式分离的特点，可在引起最小压降的情形下达到非常好的分油效果。

油分离器内部安装了一个用不锈钢丝编织成的除雾器。从而形成了一道捕获雾状油的屏障。这道屏障使雾状油变得紊乱，从而使得它们彼此相互碰撞、聚集，并且吸附在除雾器上变成油滴，最后靠重力作用到达油分离器底部的油收集区。

油分离器底部有一个法兰，可以非常方便的清洗进入油分离器的脏物。法兰上装有一块永磁铁，它可以吸附进入油分离器中的铁屑。

离心+除雾器
Centrifugal+Demister

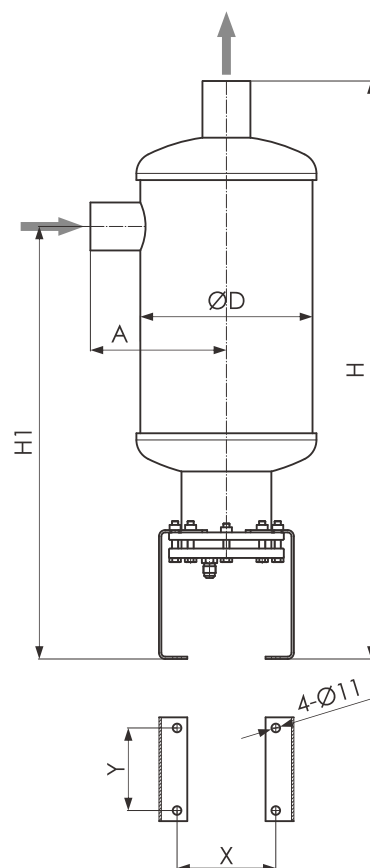
- 设计压力：2.9 MPa；
- 适用制冷剂：R134a、R22、R407C、R404A、R507A。

F-66SG series helical oil separator features a centrifugal flow path achieving very good oil separation effect with lowest pressure drop.

Inside of the oil separator there is a demister which is knitted by stainless steel wire. So it engender a barrier to capture the oil in fog form. This barrier make the oil in fog form chaotic and they collide and get together with each other, and then they will be adsorbed by the demister and final become oil drop. The oil drop will fall into the oil collection area at the bottom of the oil separator by gravity action.

It has a flange on the bottom, so it is quite convenient to clean the drughill inside of it, And there is a piece of permanent magnet with which can adsorb the scrap iron entered into the oil separator.

- The design pressure: 2.9MPa;
- Applicative refrigerants: R134a、R22、R407C、R404A、R507A.

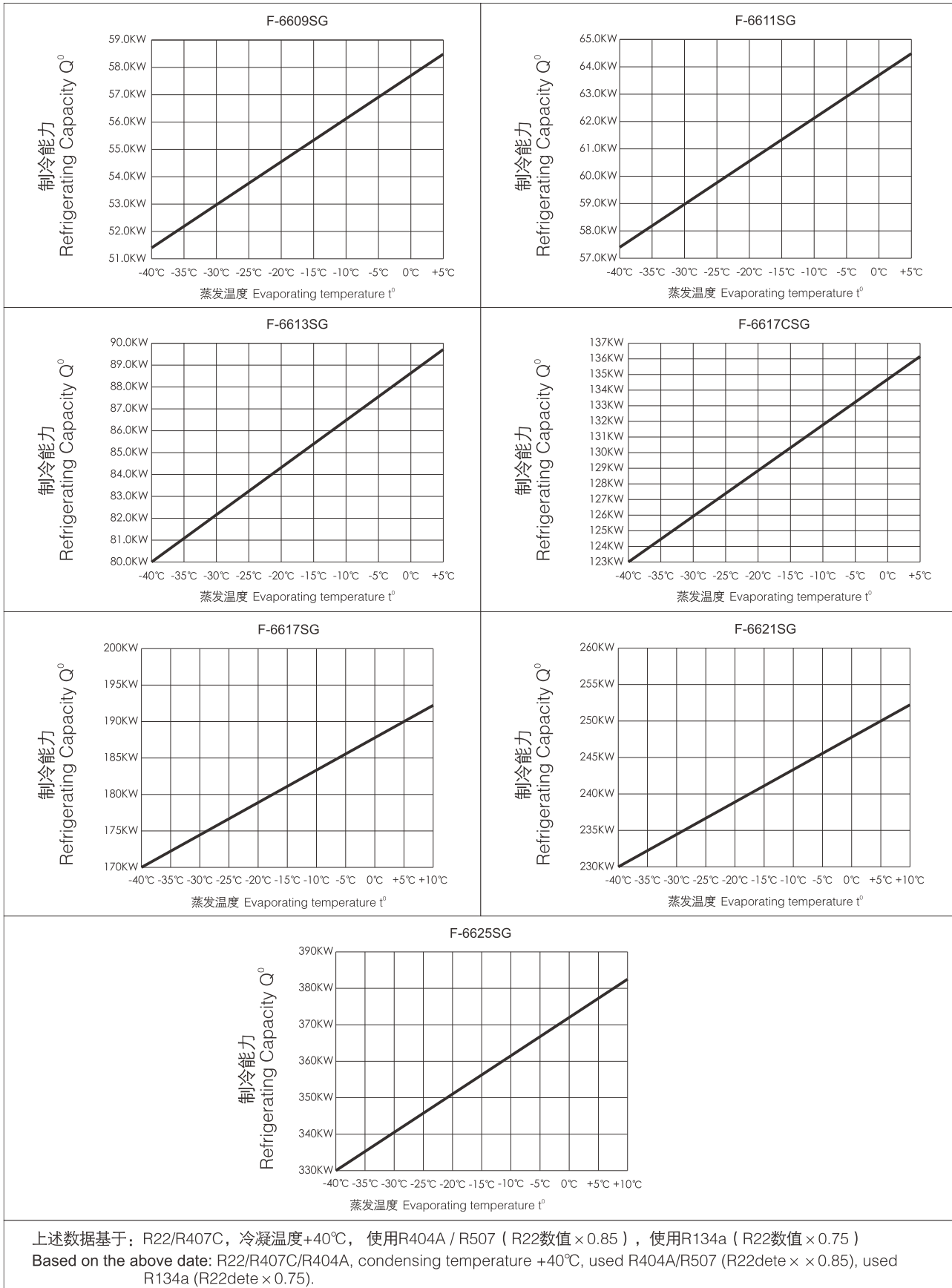


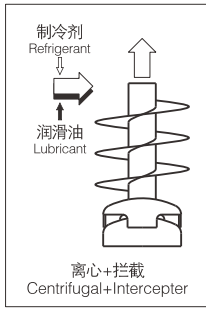
型号 Model	接口尺寸 Joint Size (Inch)	ØD (mm)	H (mm)	H1 (mm)	A (mm)	X (mm)	Y (mm)	油出口 Oil Outlet (SAE)	初始注油量 First Oil Charge (l)	容积 Volume (l)
F-6609SG	1-1/8"	165	611	471	123	126	105	3/8"	0.5	6.0
F-6611SG	1-3/8"	165	641	492	128	126	105	3/8"	0.5	6.5
F-6613SG	1-5/8"	165	673	515	138	126	105	3/8"	0.5	7.0
F-6617CSG	2-1/8"	165	723	549	145	126	105	3/8"	0.5	7.9
F-6617SG	2-1/8"	219	735	550	173	126	105	3/8"	0.5	14.0
F-6621SG	2-5/8"	219	779	584	190	126	105	3/8"	0.5	15.5
F-6625SG	3"	273	795	563	227	194	105	3/8"	0.5	23.0

- ★ 油分离器第一次安装时，需要向油分离器内充注与压缩机相同牌号的润滑油，充注量参照上面表格中给出的“初始注油量”。
- ★ When you use the oil separator for the first time, please fill the lubricating oil with the same trademark as it is in the compressor into the oil separator, and the oil charging volume please take the numbers marked in the above form as your reference.

F-66SG 系列油分离器制冷能力表

F-66SG Series Oil Separator Refrigerating Capacity Table





F-66系列螺旋式油分离器以其离心式分离的特点，可在引起最小压降的情形下达到非常好的分油效果。

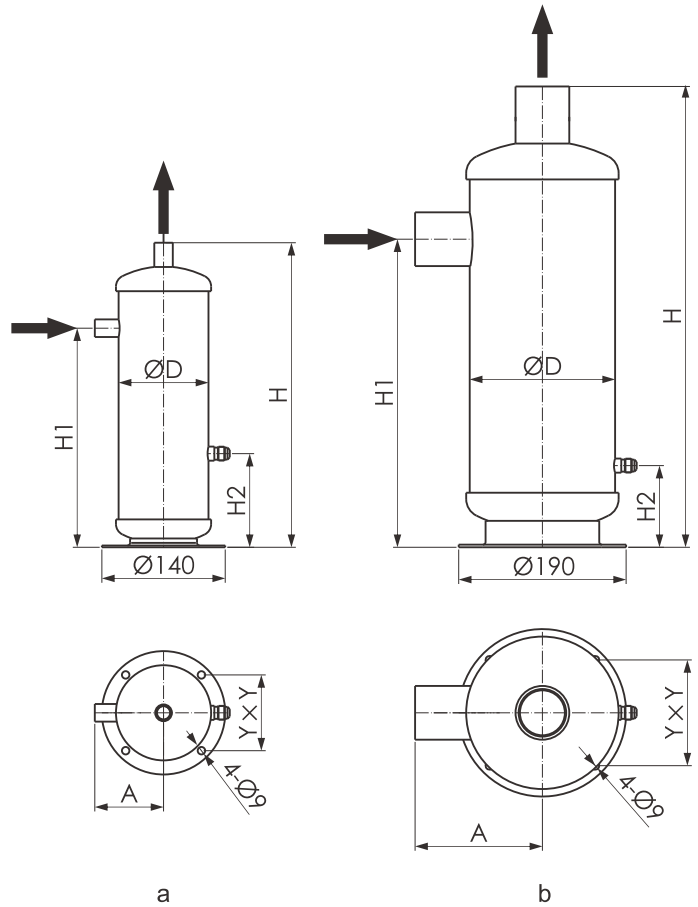
从压缩机输出的带有悬浮油颗粒的气态制冷剂进入到油分离器中，带有悬浮油颗粒的气态制冷剂与螺旋式导流板相接触，并且沿导流板旋转流动。油颗粒在离心力的作用下，被分离到螺旋式导流板的边缘处和油分离器的桶壁上，在这里被分离出来的油颗粒聚集成较大的油滴流入油分离器底部的油收集区。我们在螺旋式导流板的下部设计了一个碟状导流罩，它可有效的防止被分离出来的油滴再次飞散。导流罩下面又设计了一个碟状反射屏，反射屏的独特设计使得油收集区域被独立分隔出来，它可以防止油分离器内流速过高时油收集区域内的油被带走。

- 最大许可运行压力：2.9MPa；
- 适用制冷剂：R134a、R22、R407C、R404A、R507A。

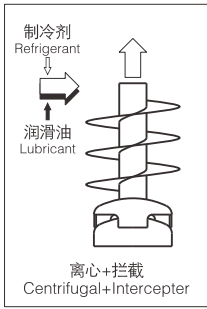
F-66 Series Helical Oil Separator features a centrifugal flow path achieving very perfect separation effect with lowest pressure drop.

The refrigerant in gaseous exported from compressor which contains floating oil particles contacts with the helix guide plate, and then it flows along the guide plate reelingly. The oil particles will be separated onto the helix guide plate and the shell body of oil separator by the centrifugal force. The separated oil particles get together and become the heavier ones and then drop to the oil collection area at the bottom of oil separator. There is an acetabuliform guide cover to the helix guide plate with which can effectively prevent the separated oil flyoff again. At the bottom of the guide cover there is an acetabuliform reflecting screen. With this special design of the reflecting screen it isolates the oil collection area independently, so it prevents the oil in the oil collection area being taken away when the flow rate inside is high.

- The max. acceptable running pressure : 2.9MPa;
- Applicative refrigerants : R134a、R22、R407C、R404A、R507A.



型号 Model	接口尺寸 Joint Size (Inch)	ØD (mm)	H (mm)	H1 (mm)	H2 (mm)	A (mm)	Y (mm)	油出口 Oil Outlet (SAE)	初始注油量 First Oil Charge (l)	容积 Volume (l)	图例 Fig.
F-6604	1/2"	102	344	249	106	75	86	3/8"	0.5	2.2	a
F-6605	5/8"	102	346	249	106	78	86	3/8"	0.5	2.2	a
F-6607	7/8"	102	399	290	106	81	86	3/8"	0.5	2.5	a
F-6609	1-1/8"	102	409	290	106	91	86	3/8"	0.5	2.5	a
F-6611	1-3/8"	165	446	299	93	128	120	3/8"	1.2	7.0	b
F-6613	1-5/8"	165	456	299	93	138	120	3/8"	1.2	7.0	b
F-6617	2-1/8"	165	523	350	93	145	120	3/8"	1.2	8.2	b



F-66Q系列储油式油分离器以其离心式分离的特点，可在引起最小压降的情形下达到非常好的分油效果。

F-66Q系列储油式油分离器是针对安装电子油位控制器的并联式压缩机机组设计的。它可以将分离出来的润滑油储存在下部的储油段内。

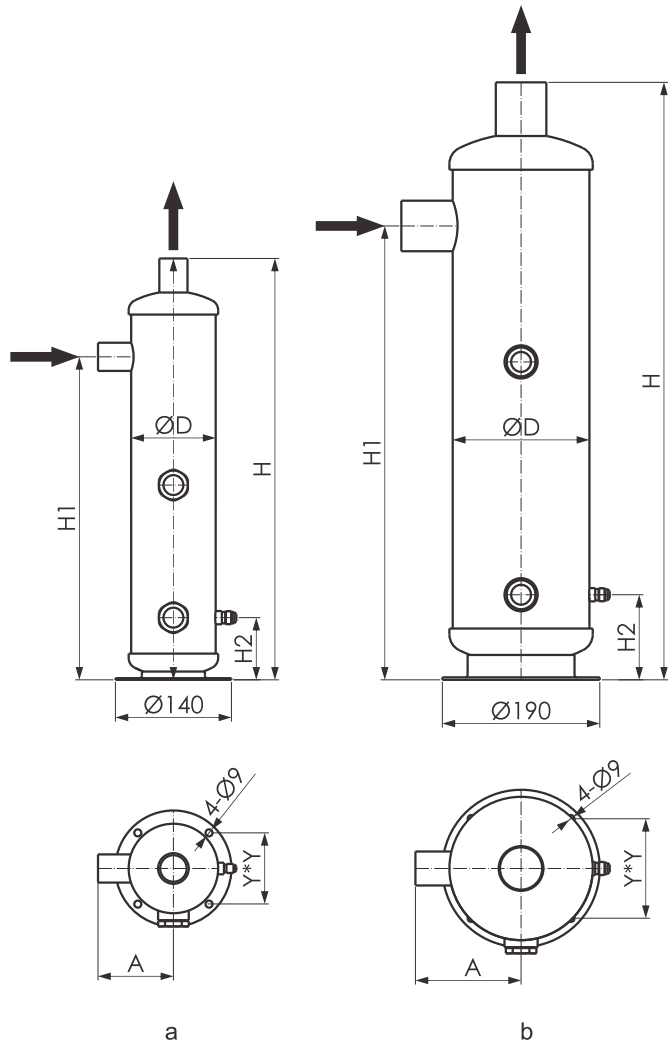
依靠油分离器和压缩机曲轴箱之间的压力差，通过电子油位控制器将润滑油直接输送到每一台压缩机曲轴箱。

- 最大许可运行压力：2.9MPa；
- 适用制冷剂：R134a、R22、R407C、R404A、R507A。

F-66Q Series Oil-stored Oil Separator features a centrifugal flow path achieving very perfect separation effect with lowest pressure drop.

F-66Q Series Oil-stored Oil Separator is special designed for the parallel compressor unit which assembled with electronic oil level regulator. It can store the separated lubricant in the oil-stored area at the bottom. Dependent on the pressure difference between the oil separator and crankcase of the compressor, and through by the electronic oil level regulator it can directly transport the lubricant to each compressor.

- The max. acceptable running pressure: 2.9MPa;
- Applicative refrigerants: R134a、R22、R407C、R404A、R507A.



型号 Model	接口尺寸 Joint Size (Inch)	ØD (mm)	H (mm)	H1 (mm)	H2 (mm)	A (mm)	Y (mm)	油出口 Oil Outlet (SAE)	油容积 Oil Volume (l)	总容积 Total Volume (l)	图例 Fig.
F-6604Q	1/2"	102	496	403	74	75	86	3/8"	2.0	3.3	a
F-6605Q	5/8"	102	496	403	74	78	86	3/8"	2.0	3.3	a
F-6607Q	7/8"	102	550	441	74	81	86	3/8"	2.0	3.6	a
F-6609Q	1-1/8"	102	560	441	74	91	86	3/8"	2.0	3.6	a
F-6611Q	1-3/8"	165	689	542	103	128	120	3/8"	7.0	19.8	b
F-6613Q	1-5/8"	165	699	542	103	138	120	3/8"	7.0	19.8	b
F-6617Q	2-1/8"	165	765	592	103	145	120	3/8"	7.0	21.0	b

F-66 & F-66Q 制冷能力表

F-66 & F-66Q Series Oil Separator Refrigerating Capacity Table



<p style="text-align: center;">F-6604 & F-6604Q</p> <p style="text-align: center;">蒸发温度 Evaporating temperature t°</p>	<p style="text-align: center;">F-6605 & F-6605Q</p> <p style="text-align: center;">蒸发温度 Evaporating temperature t°</p>
<p style="text-align: center;">F-6607 & F-6607Q</p> <p style="text-align: center;">蒸发温度 Evaporating temperature t°</p>	<p style="text-align: center;">F-6609 & F-6609Q</p> <p style="text-align: center;">蒸发温度 Evaporating temperature t°</p>
<p style="text-align: center;">F-6611 & F-6611Q</p> <p style="text-align: center;">蒸发温度 Evaporating temperature t°</p>	<p style="text-align: center;">F-6613 & F-6613Q</p> <p style="text-align: center;">蒸发温度 Evaporating temperature t°</p>
<p style="text-align: center;">F-6617 & F-6617Q</p> <p style="text-align: center;">蒸发温度 Evaporating temperature t°</p>	
<p>上述数据基于: R22/R407C, 冷凝温度+40°C, 使用R404A / R507 (R22数值×0.85), 使用R134a (R22数值×0.75) Based on the above date: R22/R407C/R404A, condensing temperature +40°C, used R404A/R507 (R22dete × ×0.85), used R134a (R22dete × 0.75).</p>	

F-86Q系列储油式油分离器以其离心式分离的特点，可在引起最小压降的情形下达到非常好的分油效果。

F-86Q系列储油式油分离器用于高压回油的并联式压缩机组。它可以将分离出来的润滑油储存在下部的储油段内。依靠油分离器和压缩机曲轴箱之间的压力差，通过油位控制系统将润滑油输送到每一台压缩机。

油分离器下部有一个储油段，储油段上有一个高位视油镜和一个低位视油镜，标准油位应该在高位视油镜的1/2以下和低位视油镜1/2以上的区间内。

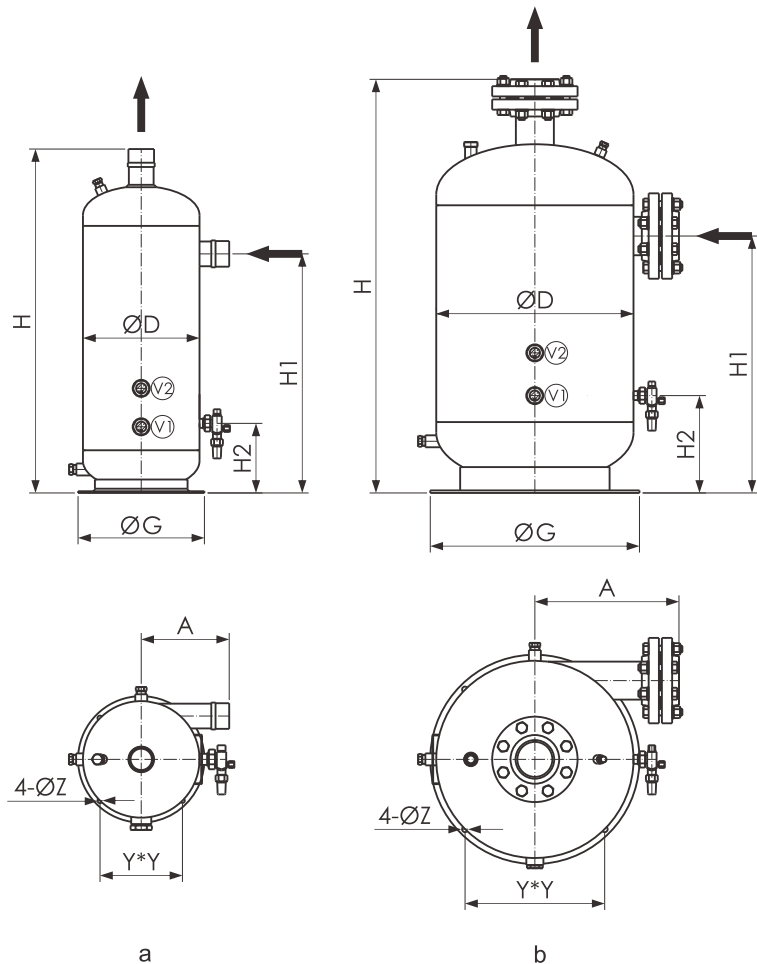
- 设计压力：2.9 MPa；
- 适用制冷剂：R134a、R22、R407C、R404A、R507A。

F-86Q Series Oil-stored type Oil Separator features a centrifugal flow path achieving very good oil separation effect with lowest pressure drop.

F-86Q Series Oil-stored type Oil Separator is specially designed for the parallel compressor unit who with the high pressure oil return. It can store the separated lubricant in the oil-stored area at the bottom. Dependent on the pressure difference between the oil separator and the crankcase of the compressor, and with the work of the electronic oil level regulator it can directly transport the lubricant to each crankcase of the compressor.

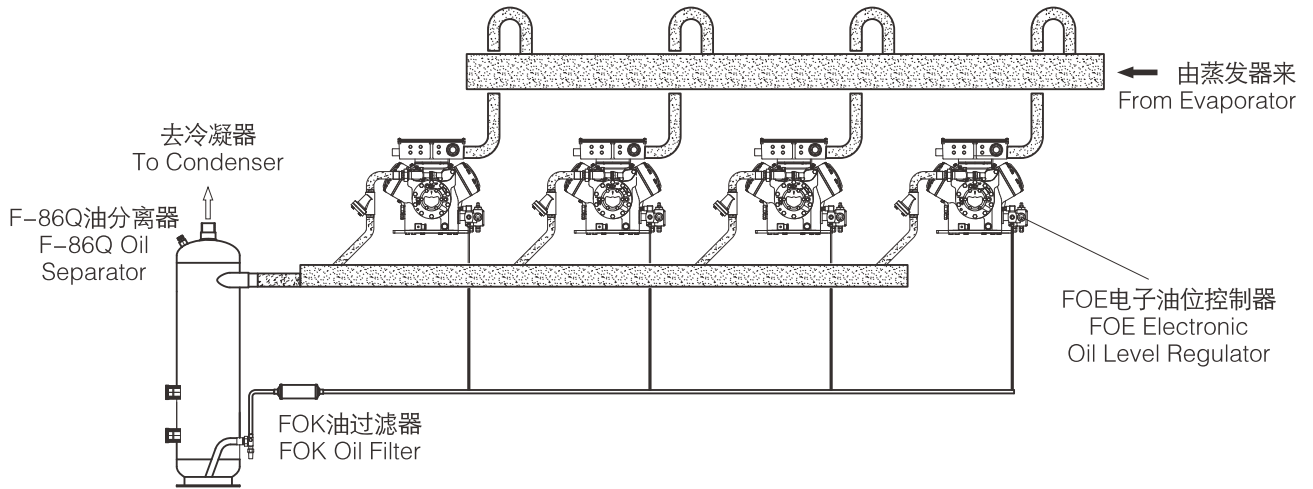
There is an oil-stored area at the bottom of the oil separator. And at this oil-stored area, there are a high-level oil sight glass and a low-level oil sight glass. The standard oil level shall be lower than 1/2 position of the high-level oil sight glass and higher than 1/2 position of the low-level oil sight glass.

- The design pressure: 2.9MPa;
- Applicative refrigerants: R134a、R22、R407C、R404A、R507A.



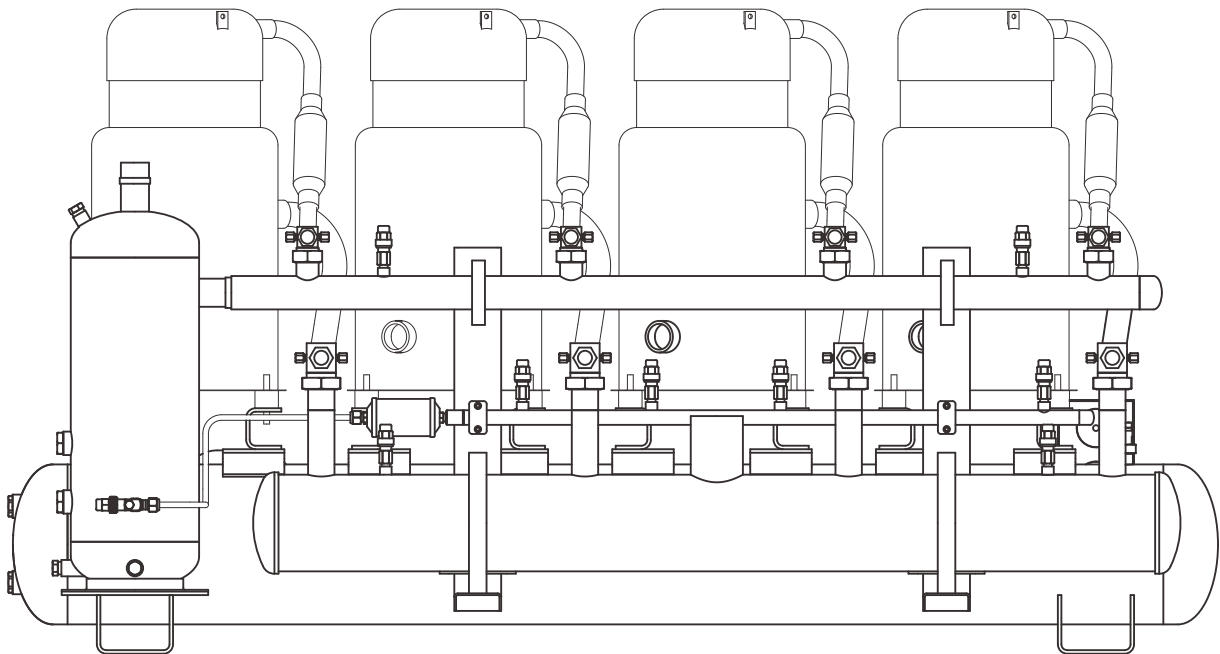
型号 Model	接口尺寸 Joint Size (Inch)	ØD (mm)	H (mm)	H1 (mm)	H2 (mm)	A (mm)	Y (mm)	G (mm)	ØZ (mm)	出油口 Oil Outlet (Inch)	V1 油容积 Oil Volume (l)	总容积 Total Volume (l)	图例 Fig.
F-8613Q	1-5/8"	219	732	510	148	191	155	250	12	3/8"	4.3	20	a
F-8617Q	2-1/8"	273	805	560	163	206	193	296	12	3/8"	6.4	36	a
F-8621Q	2-5/8"	325	947	652	183	258	230	350	13	1/2"	10.4	59	a
F-8625Q	3-1/8"	377	991	672	213	280	267	410	13	1/2"	14.9	79	a
F-86065Q	DN65	412	946	620	207	326	290	440	14	5/8"	19.0	91	b
F-86080Q	DN80	462	969	602	228	338	327	490	14	5/8"	25.7	112	b
F-86100Q	DN100	512	1044	646	234	368	360	540	18	7/8"	33.0	152	b
F-86125Q	DN125	616	1167	704	261	425	436	652	18	7/8"	52.7	240	b

活塞并联机组
Piston parallel unit



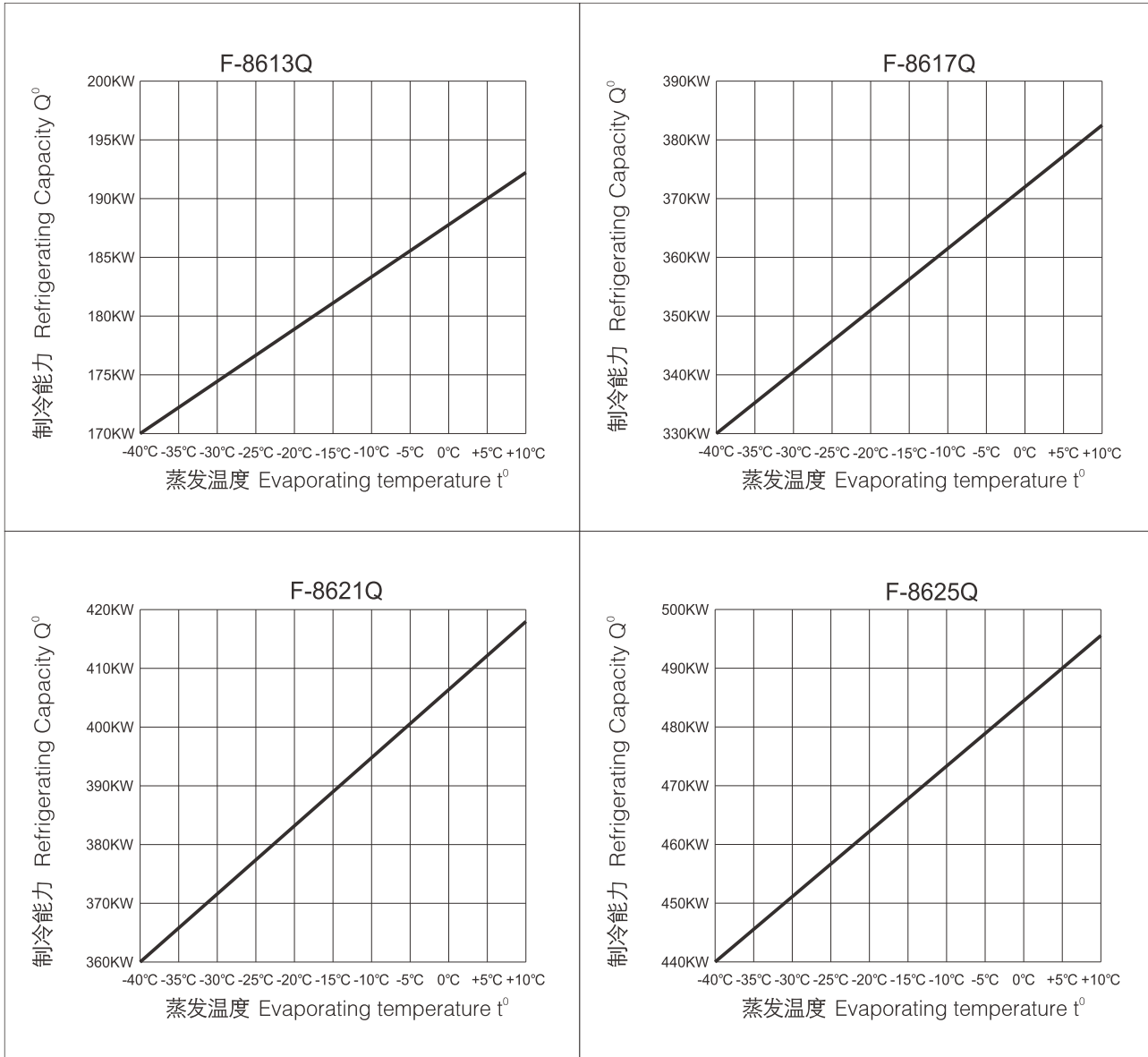
新设计的系统多以排气压力回油
Oil control feeds at discharge pressure in new system

涡旋并联机组
Scroll parallel unit



当F-86Q用于活塞/涡旋并联压缩机组时，请参考以下数据

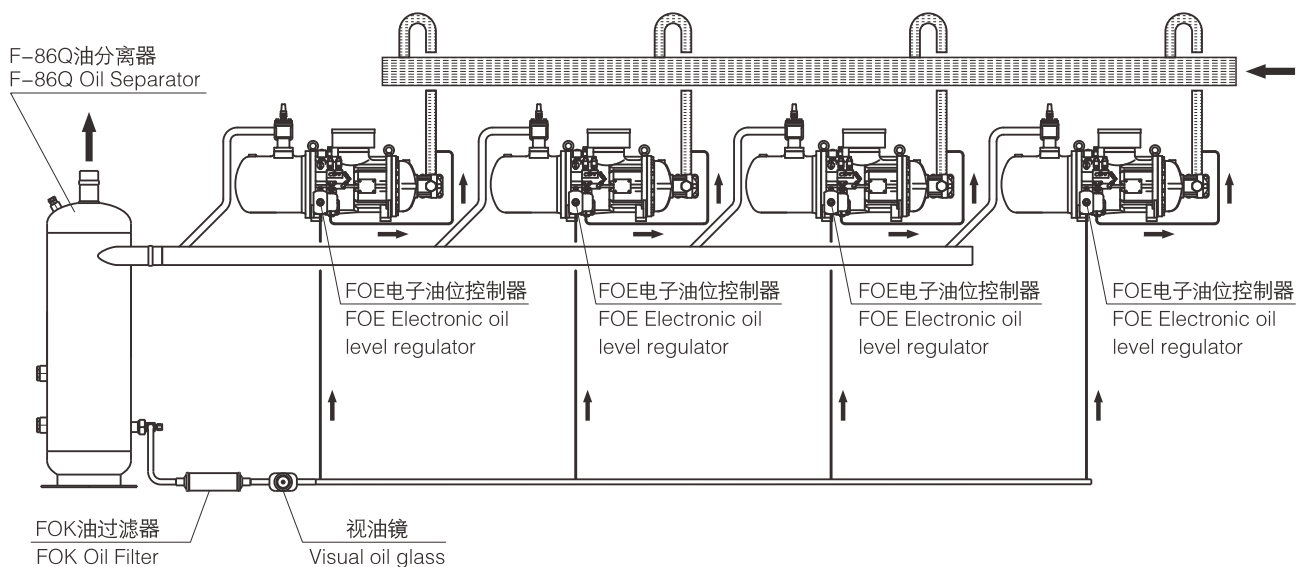
When you use F-86Q in piston/scroll parallel unit, please take the below data as your reference.



上述数据基于：R22/R407C，冷凝温度+40°C，使用R404A / R507 (R22数值×0.85)，使用R134a (R22数值×0.75)
 Based on the above date: R22/R407C/R404A, condensing temperature +40°C, used R404A/R507 (R22dete × ×0.85), used R134a (R22dete × 0.75).

带内置油分螺杆并联压缩机组

Screw compressor with inside oil separator parallel unit



当F-86Q用于带内置油分螺杆并联压缩机组时，请参考以下数据

When you use F-86Q in screw compressor with inside oil separator parallel unit, please take the below data as your reference.

型号 Model	中/高温范围 Medium and High Temp. Range	低温范围 Low Temp. Range
F-8613Q	130	180
F-8617Q	220	300
F-8621Q	390	520
F-8625Q	490	660
F-86065Q	720	1000
F-86080Q	940	1320
F-86100Q	1320	1550
F-86125Q	2050	2500

备注：以上标注基于在40°C冷凝温度允许压缩机最大理论排量VH (m³/h)，制冷剂：R22,如使用其他制冷剂请与O&F技术部联系。

Remark: The allowed max.theoretical displacement VH (m³/h) listed above are on the basis of 40°C condensing temperature and with refrigerant is R22. If other refrigerant you used, please contact with O&F technology department.

F-96系列二次油分离器是针对满液式制冷装置和高压压缩比工况运行的系统设计的。它可以使最少量的油进入系统内部，从而提高换热效率，降低失油危险。

油气混合气沿油分离器内桶与外桶之间形成的环形通道进入油分离器中，油颗粒在离心力的作用下被分离到桶壁上，在这里被分离出来的油颗粒聚集成较大的油滴流入油分离器底部的油收集区。内桶安装了一个用不锈钢丝编织成的除雾器。从而形成了一道捕获雾状油的屏障。这道屏障使雾状油变得紊乱，从而使得它们彼此相互碰撞、聚

F-96 Series Oil Separator is specially designed for the flooded refrigeration system and also for the system whose compression ratio is high. It will allow the least oil to enter into the system, so the heat exchange ratio will be increased and the danger of oil lose will be decreased.

The refrigerant gas containing oil in aerosol form will enter into the oil separator following the circular passage who is formed between the internal and external cylinders. The oil particles will be separated onto the shell wall by the centrifugal force. The separated oil particles get together and become heavier ones and then drip to the oil collection area at the bottom of the oil separator. Inside of this internal cylinder there is a demister which is knited by stainless steel wire. So it engender a barrier to capture the oil in fog form. This barrier make the oil in fog form

集，并且吸附在除雾器上变成油滴，最后靠重力作用到达油分离器底部的油收集区。这个系列产品通过捕获微小颗粒油滴及大部分油蒸气来达到高效油气分离的目的。

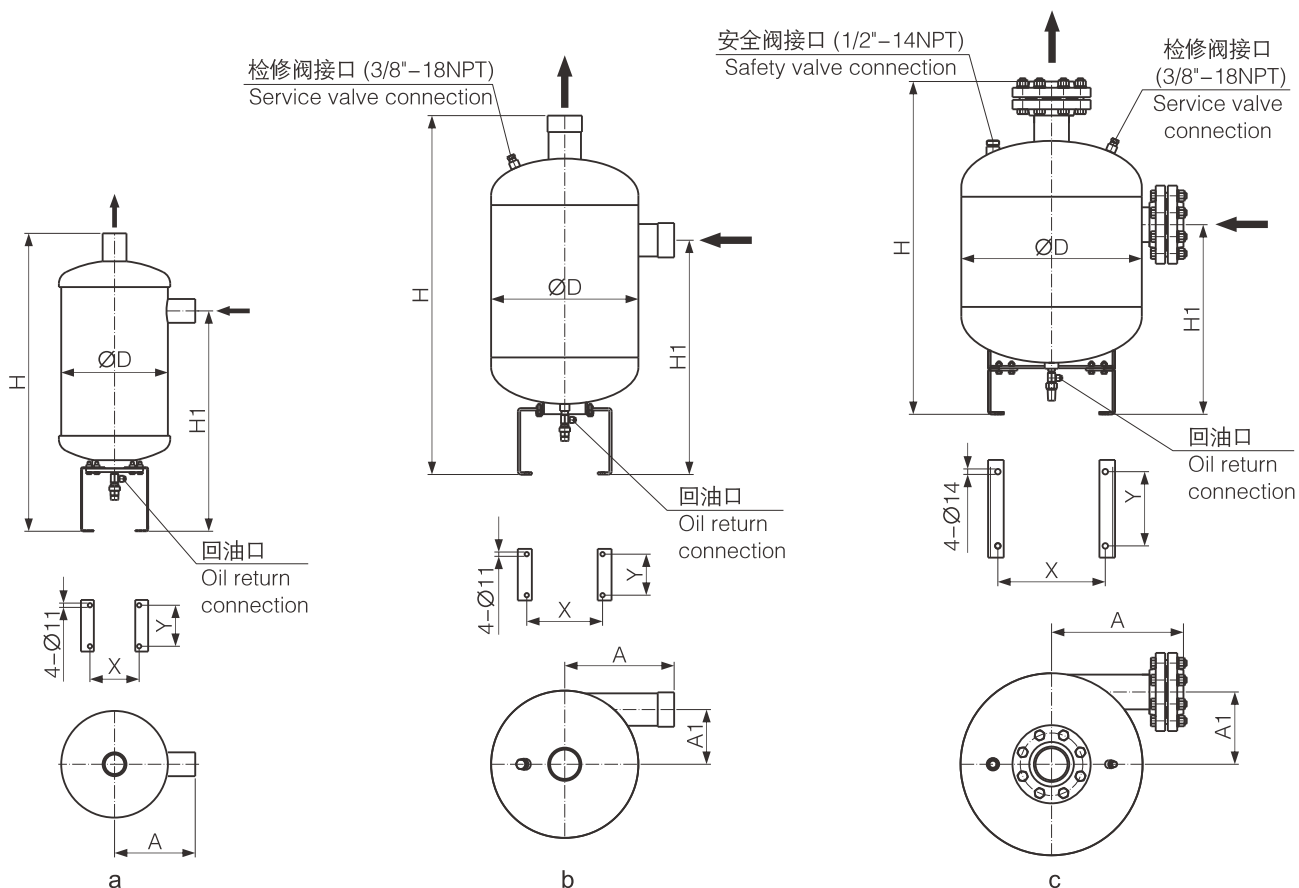
内桶下面设计了一个碟状反射屏，反射屏的独特设计使得油收集区域被独立分隔出来，它可以防止油分离器内流速过高时油收集区域内的油被带走。

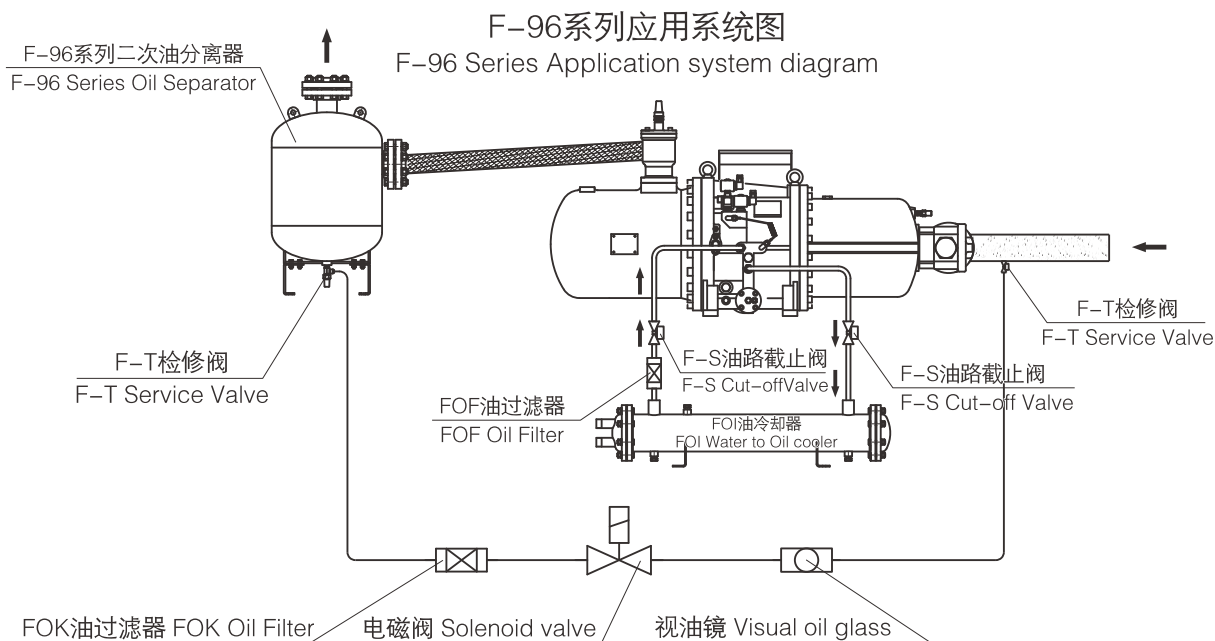
- 设计压力：2.9 MPa；
- 适用制冷剂：R134a、R22、R407C、R404A、R507A。

chaotic and they collide and get together with each other, and then they will be adsorbed by the demister and final become the oil drop. The oil drop will fall into the oil collection area at the bottom of the oil separator by the gravity action. This series of oil separator achieves the high-performance of oil separation by capturing the tiny oil particles and most of the oil vapour.

And at the bottom of the internal cylinder there is an acetabuliform reflecting screen. With this special design of the reflecting screen it isolates the oil collection area independently, so it prevents the oil in the oil collection area being taken away when the flow rate inside is high.

- The design pressure: 2.9MPa;
- Applicative refrigerants: R134a、R22、R407C、R404A、R507A.





根据压缩机带油量设定回油电磁阀开启频率和时间，直接将分离出来的润滑油送回压缩机吸气侧。

Setting up the opens frequency and time of the magnetic valve according to the quantity of the oil taken by compressor, and sending the separated oil back to the suction side of compressor directly.

型号 Model	接口尺寸 Joint Size	ØD (mm)	H (mm)	H1 (mm)	A (mm)	A1 (mm)	X (mm)	Y (mm)	油出口 Oil Outlet (SAE)	容积 Volume (l)	图例 Fig.
F-961A	1-5/8"	219	714	543	166	-	126	105	3/8"	16	a
F-961B	2-1/8"	273	765	563	199	-	194	105	3/8"	24	a
F-961C	2-5/8"	325	876	600	258	120	195	105	3/8"	41	b
F-961D	3-1/8"	377	919	609	280	140	195	105	3/8"	60	b
F-962A	DN65	412	817	491	297	166	275	190	3/8"	60	c
F-962B	DN80	462	852	485	338	185	275	190	3/8"	76	c
F-962C	DN100	516	986	588	368	202	275	190	3/8"	117	c
F-962D	DN125	616	1091	628	430	234	275	190	3/8"	184	c

在40°C冷凝温度允许压缩机最大理论排量VH (m³/h)

Be allowed compressor Max theoretical displacement at condensing temperature 40°C VH (m³/h)

型号 Model	中/高温范围 Medium and High Temp. Range	低温范围 Low Temp. Range
F-961A	130	180
F-961B	220	300
F-961C	390	520
F-961D	490	660
F-962A	720	1000
F-962B	940	1320
F-962C	1320	1550
F-962D	2050	2500

备注：以上标注的最大理论排量基于制冷剂：R22，如使用其他制冷剂请与O&F技术部联系。

Remark: The max. theoretical displacement mentioned above is on the basis of refrigerant R22, please contact with the technology department of O&F if you used other kinds of refrigerants.

OVS系列螺杆机外置油分离器的优秀设计可以确保螺杆压缩机得到良好的润滑。同时，可以使最少量的润滑油进入系统内部，从而提高系统的换热效率。

油分离器的油加热器应在压缩机停止时通电工作，压缩机运转时油加热器应停止工作。油温控制器设定温度最低+50℃，如果在低环境温度中使用需将油分离器作保温处理。

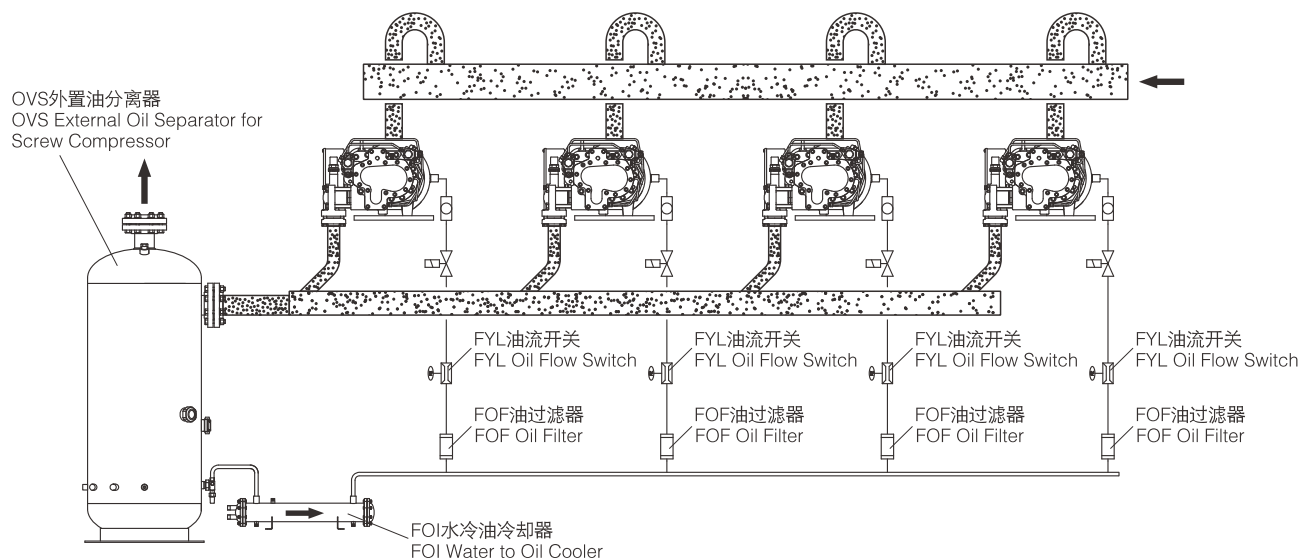
- 设计压力：2.9 MPa；
- 适用制冷剂：R134a、R22、R404A、R507A。

With the excellent design of OVS Series external oil separator for screw compressor, it can ensure that the screw compressor get perfect lubrication. And at the same time, it will allow the least lubricant enter into the system, so the heat exchange ratio of the system will be increased.

The oil heater of the oil separator shall be power up to work when the compressor stops running, and it shall stop working when compressor starts to run. The lowest temperature of the oil temperature controller shall be set with +50℃, if you used the oil separator in the low-temperature environment, do please performe the insulation treatment to it.

The operation instruction to the photoelectric type oil level monitoring please check in the next page.

- Design Pressure: 2.9 MPa;
- Applicative refrigerants: R134a、R22、R404A、R507A.



技术参数 Technical Data

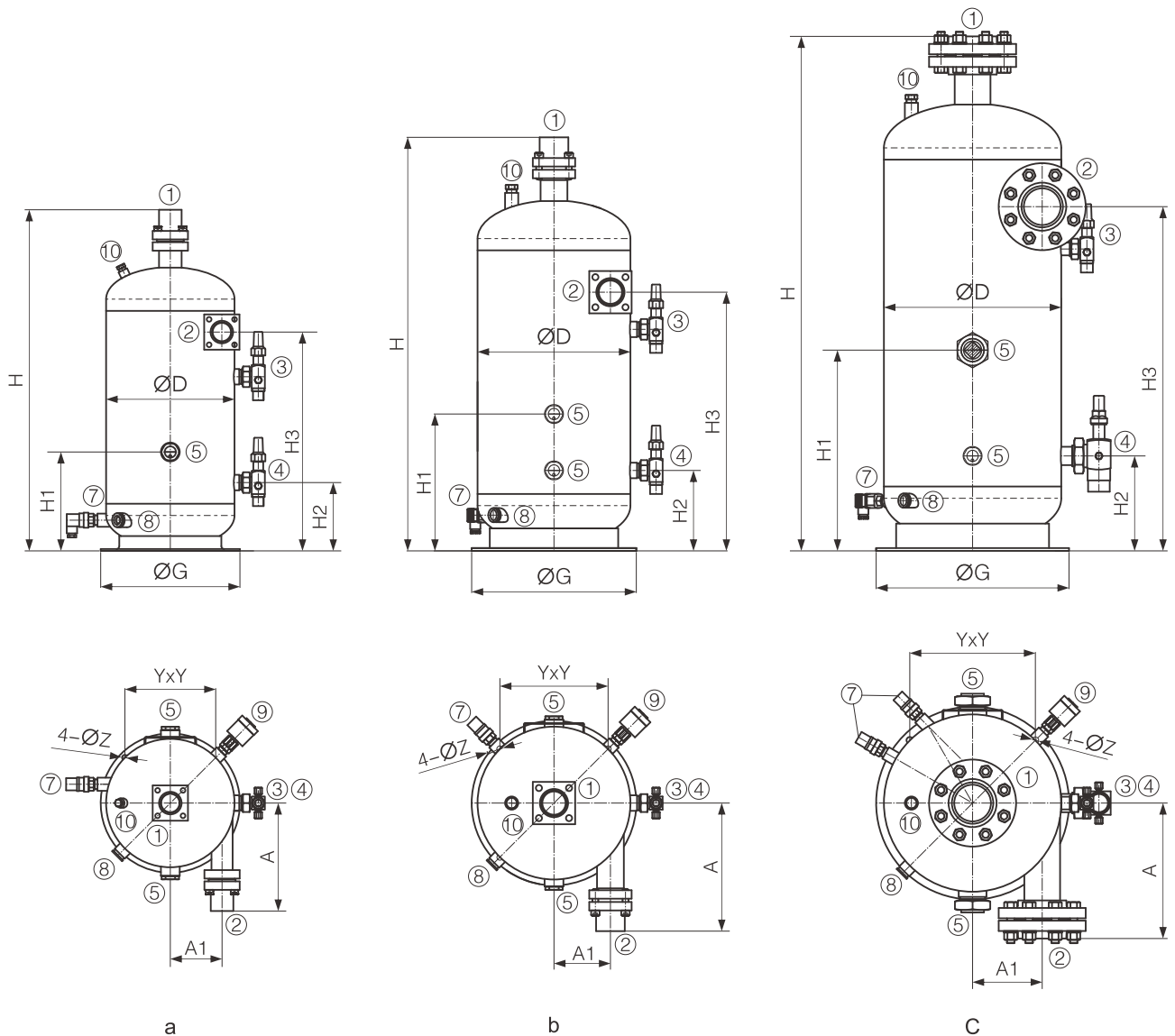
型号 Model	高/中温范围 High/Medium temperature range		低温范围 Low temperature range
	R134a, R22	R404A, R507A	R134a, R22, R404A, R507A
OVS.20/5	130	110	180
OVS.40/5	250	220	300
OVS.90/5	450	340	520
OVS.120/5	580	440	660
OVS.220/5	1160	840	1320
OVS.400/5	1320	1180	1550
OVS.670/5	2050	1900	2500
OVS.1100/5	2800	2550	3400

以上标注基于在40℃冷凝温度允许压缩机最大理论排量VH (m³/h)

The allowed max. theoretical displacement VH (m³/h) listed as above are on the basis of 40℃ condensing temperature

连接位置 Connection Positions

1	制冷剂出口 Refrigerant outlet
2	制冷剂进口 Conn. for refrigerant inlet
3	注油阀连接口 Conn. for oil charging valve
4	油出口 Oil outlet
5	油位视镜 Oil level sight glass
6	油加热器接口 Conn. for oil heater
7	油温传感器接口 Conn. for oil temperature sensor
8	油位开关接口 Conn. for oil level monitoring
9	安全阀接口 Conn. for safety valve



外形尺寸 Dimensional Drawings

	OVS.20/5	OVS.40/5	OVS.90/5	OVS.120/5	OVS.220/5	OVS.400/5	OVS.670/5	OVS.1100/5
最大注油量 (L) Max.Oil charge (l)	10	19	40	50	90	140	250	330
总容积 (L) Total volume (l)	29	50	90	126	239	404	672	1113
ØD (mm)	273	325	377	412	512	666	770	920
H (mm)	725	880	1094	1239	1486	1553	1905	2223
H1 (mm)	210	291	427	475	550	501	662	639
H2 (mm)	145	171	202	210	240	276	367	419
H3 (mm)	465	559	732	870	1075	1018	1292	1494
A (mm)	230	272	288	307	357	447	506	597
A1 (mm)	110	120	148	162	200	265	300	365
Y × Y (mm)	193	230	267	290	360	465	530	655
ØG (mm)	296	350	410	440	540	700	800	970
ØZ (mm)	12	13	13	14	18	18	18	20
制冷进进口 (mm) Refrigerant inlet (mm)	42(ODS)	54(ODS)	DN65	DN65	DN80	DN100	DN125	DN150
制冷剂出口 (mm) Refrigerant outlet (mm)	42(ODS)	54(ODS)	DN65	DN65	DN80	DN100	DN125	DN150
油出口 (mm) Oil outlet(mm)	Ø16	Ø22	Ø28	Ø28	Ø42	Ø54	Ø76	Ø76
油加热 Oil heater	140W × 1	300W × 1	300W × 2	300W × 2	300W × 3	300W × 3	300W × 3	300W × 5
油加热输入 Input oil heater	1P/230V/AC							
图例 Fig.	a	b	c	c	c	c	c	c