

Alco Controls

Oil Separator Series OS

Technical Bulletin

The OS Oil Separators are used for multiple compressor racks in supermarkets and air conditioning systems for use with HCFCs, HFCs and their lubricants.

Features

- Three different construction styles:
 - OSH hermetic style
 - OST with top flange
 - OSB with bottom flange and supporter
- Solid Copper ODF connections
- Stainless steel needle valve and floater
- Temperature range TS: -10°C to +150°C
- Max. allowable pressure: 31 bar
- Permanent magnet to filter metal particles out of the oil circulation
- Corrosion resistant epoxy powder painting
- CE marking according PED 97/23 EC
- Comply with UL standard

Introduction

Refrigeration compressors are lubricated by refrigeration oil that circulates from the compressor crankcase or housing. As refrigerant gas is discharged by the compressor, it will leave with a fine oil mist, that will be circulated throughout the entire system.

Small amounts of oil circulating through the system will not affect the system performance. Too much refrigeration oil circulating in the system will have adverse effects on the components in the system. Circulating oil reduces the ability of the system to effectively remove the heat. Condensers, evaporators and other heat exchangers lose efficiency when coated internally with an oil film.

Refrigeration oil not returning to the compressor causes improper lubrication and eventual compressor failure. At low temperature application, refrigeration oil thickness becomes difficult to move, causing oil to be trapped in the system.

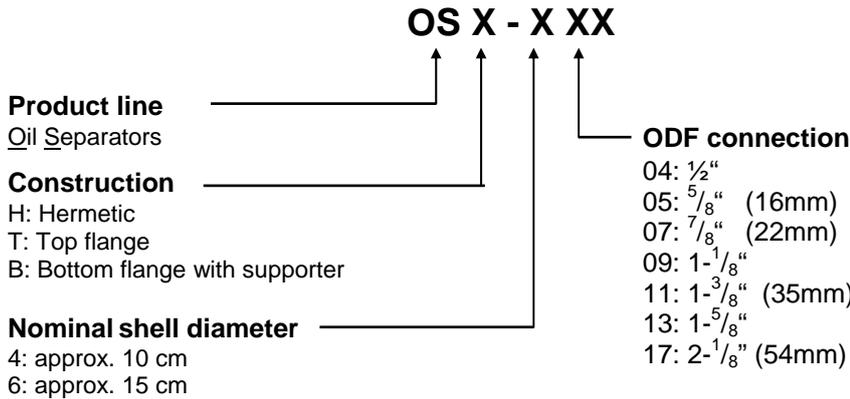


Function

Refrigerant gas leaving the compressor through the discharge line contains refrigeration oil in a vaporous mist. As this mixture enters the oil separator, the velocity is reduced to allow oil separation to begin. The refrigerant gas and oil mixture enters the oil separator and passes through an inlet screen, causing the fine particles to combine. Larger oil particles are formed and drop to the bottom of the oil separator.

The refrigerant gas then passes through an outlet screen to remove residual oil particles. The oil gathers in the bottom of the oil separator until a float operated needle valve opens to allow the return of oil to the compressor. Oil returns quickly to the compressor, because of the higher pressure in the oil separator than in the compressor crankcase. When the oil level has lowered, the needle valve closes to prevent refrigerant gas from returning back to the compressor. The refrigerant gas leaves through the outlet of the oil separator and goes to the condenser.

Nomenclature



Selection table

Type	Part No.	Connection ODF		Conformity Assessment Category	Conformity Assessment Procedure	Nominal capacity (kW)			Volume Lit.
		Inch	mm			R 22 / R 407C	R 134a	R 404A / R 507	
OSH-404	881 598	1/2"		Cat. I	Module A*	7.0	4.9	7.3	2.0
OSH-405	881 599	5/8"	16mm			18.7	13.1	19.4	2.4
OSH-407	881 600	7/8"	22mm			28.1	19.7	29.0	2.8
OSH-409	881 792	1-1/8"				37.4	26.2	38.7	3.0
OSH-411	881 794	1-3/8"	35mm			46.8	32.8	48.4	3.6
OSH-413	881 856	1-5/8"				65.5	45.9	67.8	3.6
OSH-611	881 940	1-3/8"	35mm	Cat. II	Module D1	51.5	36.1	53.3	6.5
OSH-613	881 953	1-5/8"				65.5	45.9	67.8	7.9
OSH-642	889 022		42mm			65.5	45.9	67.8	7.9
OSH-617	881 970	2-1/8"	54mm			105.3	73.8	108.9	7.9
OST-404	881 860	1/2"		Cat. I	Module A*	7.0	4.9	7.3	1.8
OST-405	881 861	5/8"	16mm			18.7	13.1	19.4	2.6
OST-407	881 862	7/8"	22mm			28.1	19.7	29.0	3.2
OST-409	881 863	1-1/8"				37.4	26.2	38.7	3.8
OST-411	881 938	1-3/8"	35mm			46.8	32.8	48.4	3.8
OST-413	881 939	1-5/8"				65.5	45.9	67.8	3.8
OSB-613	881 971	1-5/8"		Cat. II	Module D1	65.5	45.9	67.8	7.8
OSB-617	881 972	2-1/8"	54mm			105.3	73.8	108.9	7.8

* applied higher module as required

The nominal capacities at +38°C condensing temperature (+38°C bubble point or +43°C dew point for R407C), +4°C evaporating temperature and 1 K liquid subcooling at the inlet of the expansion valve.

Nominal capacities for other operating conditions

For other operating conditions than nominal correction factors have to be used:

$$Q_n = Q_o \times K_t$$

Q_n : Nominal oil separator capacity

Q_o : System cooling capacity at specific operating conditions

K_t : Correction factor

Refrigerant	Condensing Temperature °C	Correction factor K_t						
		Evaporating temperature °C						
		10	0	-10	-20	-30	-40	-50
R 22 R 407	25	1,29	1,31	1,33	1,36	1,40	1,44	1,49
	30	1,16	1,17	1,20	1,23	1,27	1,31	1,36
	35	1,05	1,07	1,09	1,11	1,13	1,17	1,23
	40	0,95	0,96	0,98	1,00	1,03	1,07	1,12
	45	0,87	0,88	0,90	0,92	0,95	0,99	1,04
	50	0,81	0,83	0,85	0,87	0,89	0,93	0,99

Refrigerant	Condensing Temperature °C	Correction factor K_t						
		Evaporating temperature °C						
		10	0	-10	-20	-30	-40	-50
R 134a	25	1,31	1,36	1,39	1,43	1,50		
	30	1,18	1,21	1,24	1,28	1,35		
	35	1,06	1,08	1,11	1,15	1,21		
	40	0,95	0,98	1,01	1,05	1,10		
	45	0,86	0,88	0,92	0,95	1,02		
	50	0,80	0,81	0,85	0,89	0,97		

Refrigerant	Condensing Temperature °C	Correction factor K_t						
		Evaporating temperature °C						
		10	0	-10	-20	-30	-40	-50
R 404A R 507	25	1,22	1,25	1,30	1,33	1,43	1,53	1,63
	30	1,12	1,15	1,20	1,26	1,32	1,42	1,54
	35	1,03	1,06	1,11	1,16	1,24	1,34	1,46
	40	0,95	0,99	1,04	1,09	1,17	1,28	1,41
	45	0,90	0,92	0,97	1,03	1,14	1,26	1,39
	50	0,86	0,89	0,93	1,00	1,13	1,26	1,39

Technical data

Maximum working pressure	PS: 31 bar
Factory test pressure PT	
Hazard category I	34.1 bar
Hazard category II	44.3 bar
Temperature Range TS	-10°C to +150°C
Fluid group	II
Marking	CE
Compatibility	CFC, HCFC, HFC, mineral and ester lubricants *

Approvals	UL
Paint	Epoxy powder paint
Protection	minimum 500 hours salt spray test
Solder connections	copper, ODF
Shell material	steel
Package	Individual packaged Master box quantity: 6 pcs

*) The oil separators are not released for use with caustic, poisonous or flammable substances.

Note: All pressure are given in gauge pressure.

Oil Separators OS Series

Dimensions (mm)

Type	Part No.	Connec- tion ODF	A	B	C	D	E	F
OSH-404	881598	1/2"	274	249	102	48	-	-
OSH-405	881599	5/8"	335	297	102	48	-	-
OSH-407	881600	7/8"	381	345	102	48	-	-
OSH-409	881792	1-1/8"	413	369	102	48	-	-
OSH-411	881794	1-3/8"	497	449	102	48	-	-
OSH-413	881856	1-5/8"	505	449	102	48	-	-
OSH-611	881940	1-3/8"	400	356	153	76	-	-
OSH-613	881953	1-5/8"	483	432	153	76	-	-
OSH-617	881970	2-1/8"	495	432	153	76	-	-
OST-404	881860	1/2"	266	237	102	48	140	-
OST-405	881861	5/8"	381	339	102	48	140	-
OST-407	881862	7/8"	456	415	102	48	140	-
OST-409	881863	1-1/8"	540	492	102	48	140	-
OST-411	881938	1-3/8"	543	492	102	48	140	-
OST-413	881939	1-5/8"	552	492	102	48	140	-
OSB-613	881971	1-5/8"	740	511	153	111	273	137
OSB-617	881972	2-1/8"	745	516	153	118	273	141

