# Oil Management Systems

This guide is intended for oil management systems installed with scroll or reciprocating compressors using HCFC or HFC refrigerants. For other systems, please contact Henry Technologies for guidance.

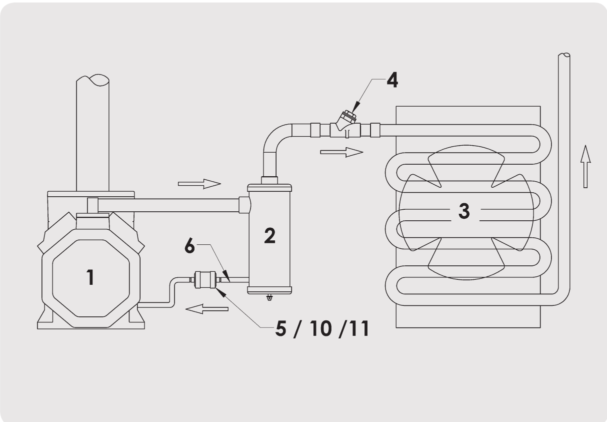
A proper oil management system is essential to ensure compressor lubrication and energy efficient cooling.

An oil management system is a cost effective alternative to replacing expensive compressors due to incorrect lubrication. If selected and installed correctly, an oil management system will give years of trouble free operation, protecting the compressors from both low and excess oil levels, with little or no maintenance. Excessive oil within the system can lead to a slug of oil returning to the compressor. A slug of oil can be as damaging to a compressor as a slug of liquid refrigerant.

By removing oil from the discharge gas, the system efficiency is increased. Oil in a refrigeration or air conditioning system reduces the efficiency of the system by:-

1. A reduction in heat transfer due to oil coating of the condenser and evaporator walls.
2. Displacing refrigerant volume resulting in an increase in system mass flow.

Oil does not change phase from liquid to gas and is therefore a very poor refrigerant. A minimal amount of oil flowing through the system is necessary to provide lubrication to valves, but a very small amount is needed.




**SINGLE COMPRESSOR SYSTEM**

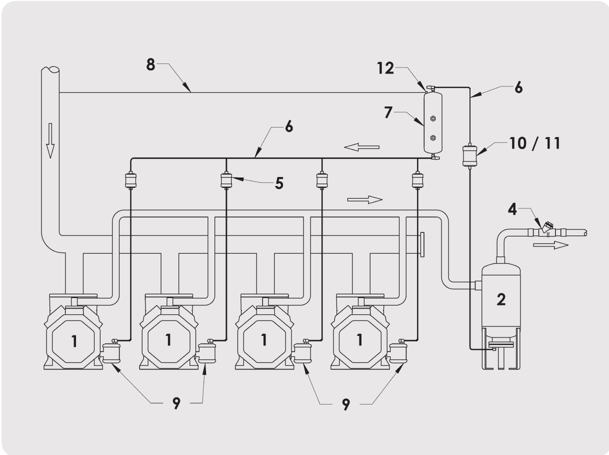
Single Compressor System

A single compressor has the most basic oil system. The compressor discharge is piped to the inlet of an oil separator (2) and the outlet of the oil separator is piped to the condenser (3). A discharge check valve should be fitted (4). An oil return line (6) is connected from the oil separator through an oil strainer (5), oil filter (10) or oil filter drier (11), to the compressor crankcase.

A float valve in the oil separator opens and feeds a small amount of oil by-passing the rest of the cooling system. The oil is returned under discharge pressure to the crankcase. The float valve prevents hot gas from bypassing to the crankcase by closing when the oil level falls.

It is recognised best practice to fit a solenoid valve, sight glass, and shut-off valve in the oil return line. These components are not shown in the diagram.

Refer to equipment list for further details on each component in the oil system




**LOW PRESSURE OIL MANAGEMENT SYSTEM**

Low Pressure Oil Management System

This system is normally used for parallel compressors and uses three main components; Oil Separator (2), Oil Reservoir (7) and Oil Level Regulators (9). The common discharge is piped to the inlet of the oil separator and the outlet of the oil separator is piped to the condenser via a discharge check valve (4). An oil return line is connected from the oil separator to the top valve of the oil reservoir (7). A vent line (8) is installed to the suction line, using a pressure valve (12), to reduce the pressure in the reservoir. This makes a low pressure system. The pressure valve will maintain the reservoir at a set pressure above suction. Although mechanical oil level regulators (9) are shown in the diagram, Electro-mechanical and Optronic oil level regulators can also be used.

The bottom valve of the oil reservoir is piped to the oil level regulators mounted on the compressor crankcases. These regulators open to feed oil as the oil level drops and close as the oil level rises to the set level.
In this way, the oil level in each compressor is controlled. An oil strainer (5) per regulator should be used to remove debris from the oil. One oil strainer is installed between the oil reservoir and each regulator. Alternatively, the oil strainers may be replaced by one oil filter (10) or an oil filter drier (11). The oil filter or oil filter drier must however be installed between the separator and oil reservoir. Due to the scavenging nature of POE oil, it is recommended to install either an oil filter or oil filter drier on a HFC/POE system instead of individual oil strainers.

On dual temperature and satellite systems, ensure that all regulators see positive oil differential pressures within their allowable operating range.

It is recognised best practice to fit a solenoid valve, sight glass, and shut-off valve in the oil return line. These components are not shown in the diagram.

Refer to equipment list for further details on each component in the oil system

**High Pressure Oil Management System**

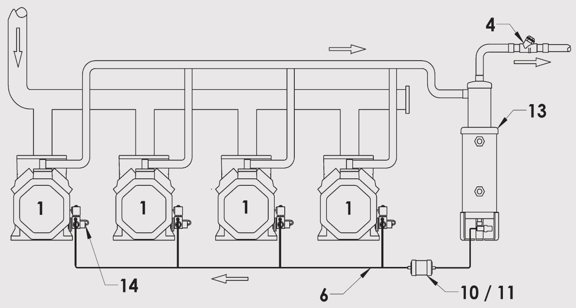
High pressure oil systems remove the need for a separate oil reservoir. This type of system also reduces the amount of pipework and fittings.

A high pressure oil system relies on the oil level regulators being able to operate with a high pressure differential. Mechanical oil level regulators should not be used on this type of system. The Optronic oil level regulator is recommended for this application. Electro-mechanical regulators can also be used, depending on the model. A high pressure system is not recommended for HCFC/mineral oil systems due to potential foaming problems.

A discharge check valve should be fitted (4). An oil separator-reservoir (13) is fitted in the discharge line similar to an oil separator. The oil return connection, positioned at the bottom of the vessel, is piped to the oil level regulators. An oil filter (10) or oil filter drier (11) should be installed between the oil separator-reservoir and the regulators (14).

It is recognised best practice to fit a solenoid valve, sight glass, and shut-off valve in the oil return line. These components are not shown in the diagram.

Refer to equipment list for further details on each component in the oil system




HIGH PRESSURE OIL MANAGEMENT SYSTEM

## EQUIPMENT LIST FOR OIL LEVEL CONTROL

1. Compressor.
2. Oil Separator – The function of an Oil Separator is to remove oil from the discharge gas and return it to the compressor, either directly or indirectly. This helps maintain the compressor crankcase oil level and raises the efficiency of the system by preventing excessive oil circulation. Oil separators are not 100% efficient, so installing an oil separator should not be viewed as a replacement for oil traps, accumulators, or good oil return piping practices. Henry Technologies manufacture 3 different types of oil separator, Helical, Impingement & Coalescent type.
3. Condenser.
4. Discharge Check Valve – The function of a Check Valve is to allow fluid flow in one direction only. This prevents condensed liquid refrigerant returning down the discharge line into the separator. If this check valve is not installed the separator can feed excessive liquid refrigerant to the compressor on start up. This can cause oil dilution, excessive foaming, erratic oil pressures and possible compressor damage. The check valve must be installed after the oil separator.
5. Oil Strainer – The function of an Oil Strainer is to remove system debris from the refrigerant oil. Their purpose is to protect compressors and oil level regulators from damage. For recommendations on HFC/POE systems, refer to section on oil filters and oil filter driers.
6. Oil Return Line.
7. Oil Reservoir – The function of an Oil Reservoir is to provide a holding charge of oil as part of a Low Pressure Oil Management System. The amount of oil circulating in a system varies depending on the operating conditions. The oil reservoir caters for these fluctuations by providing additional storage capacity.
8. Vent Line.
9. Mechanical Oil Level Regulators – The function of a Mechanical Oil Level Regulator is to control the oil level in the compressor crankcase. This protects the compressors from damage. There are two main types of oil level regulators, fixed level and adjustable level. The fixed level regulators have an allowable oil pressure differential range of 0.35 to 2.1 barg.
   The adjustable level regulators have an allowable oil pressure differential range of 0.35 to 6.2 barg. Oil pressure differential is the difference between the crankcase pressure and the pressure in the oil reservoir. Gravity pressure head should be included also, if applicable. Some regulator models are fitted with an equalisation connection that enables the oil levels between several compressors to be balanced.
10. Oil Filter – The function of an Oil Filter is to remove system debris from the refrigerant oil. An oil filter is recommended for HFC/POE systems instead of individual oil strainers, where filtration only is required.
11. Oil Filter Drier –The function of an Oil Filter Drier is to remove both system debris and moisture from the refrigerant oil. An oil filter drier is recommended for HFC/POE systems instead of individual oil strainers, where both filtration and moisture removal is required.
12. Pressure Vent Valve – The function of a Pressure Vent Valve is to maintain a positive pressure in the Oil Reservoir above the compressor crankcase pressure. Three different pressure settings are available; 0.35 barg, 1.4 barg and 2.4 barg. A higher pressure differential will increase the oil flow rate from the oil reservoir back to the compressors. The pressure setting should be selected taking into account the allowable oil pressure differential of the oil level regulator type.
13. Oil Separator-Reservoir – The function of an Oil Separator-Reservoir is to provide a Separator and Oil Reservoir in one unit. It is designed for high pressure systems and eliminates the need for a separate Oil Reservoir and its associated piping.
14. Optronic Oil Regulator – The function of the Optronic Oil Regulator is to control the oil level in the compressor crankcase. This protects the compressors from damage. This regulator can be used on high pressure systems.

# Helical Oil Separators

The function of a Helical Oil Separator is to efficiently remove oil from the discharge gas and return it to the compressor, either directly or indirectly. This helps maintain the compressor crankcase oil level and raises the efficiency of the system by preventing excessive oil circulation.

The Helical oil separator features a centrifugal flow path that achieves approximately 99% efficiency of oil separation with a low pressure drop. Independent testing has found that only 0.006% oil by volume was being discharged into the system after leaving a Helical oil separator. Virtually oil-free refrigerant vapour exits the oil separator.

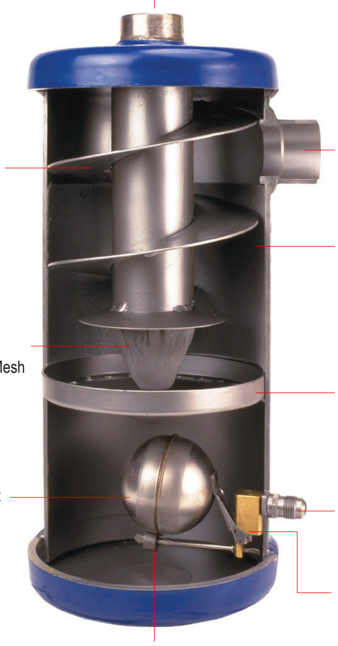
A higher level of efficiency is to be expected compared to an Impingement type separator.

### Applications

Helical oil separators can be used in a wide variety of applications. These can include multi-compressor racks and remote condensing units.

Helical oil separators are intended for Low Pressure Oil Management Systems. These products are designed for use with scroll and reciprocating type compressors. They are not recommended for screw or rotary vane compressors.

The product range is designed for use with HCFC and HFC refrigerants, along with their associated oils.




### Features

- Patented Henry Technologies Design*
- High oil separation efficiency – up to 99%.
- Low pressure drop.
- No blocked elements because of too much oil in the system.
- No oil blow-out at start up from oil left in a coalescing element.

*US Patents 5113671, 5404730 & 5271245; Mexico 173552; Denmark, France, UK & Italy 0487959;
Germany P69106849.6-08; Taiwan UM-7863; & other worldwide patents pending.

### Benefits

- A proven design that works.
- Guaranteed performance.
- Negligible loss in system efficiency.
- Dependable operation.
- Oil is metered back to the compressor as required.

### Technical Specification

S-5 Series:
Safe Working Pressure = 3,100 kPa
Allowable Operating Temperature = -10°C to 130°C

SH-5 Series:
Safe Working Pressure = 4,000 kPa
Allowable Operating Temperature = -10°C to 110°C

### Materials of Construction

- Shell, end caps and connections: Carbon steel
- Oil float: Stainless steel
- Needle valve seat: Brass

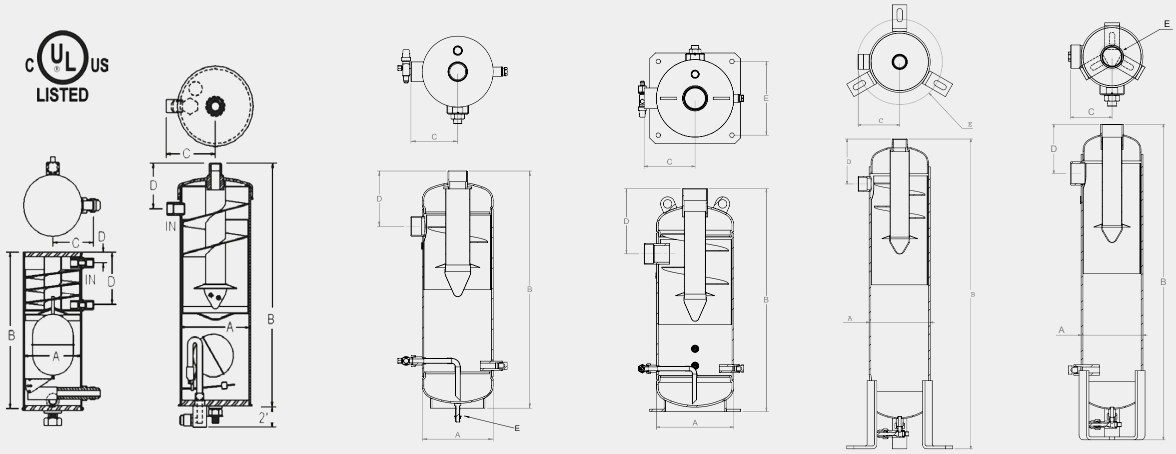



FIG. 1 FIG. 2 FIG. 3 FIG. 4 FIG. 5 FIG. 6

### Helical Range

| Part No | Conn Size (inch) | Dimensions (mm) | | | | Mounting details | Drawing reference | Weight (kg) | Pre-charge qty (l) |
|---|---|---|---|---|---|---|---|---|---|
| | | Ø A | B | C | D | | | | |
| S-5181 | 3/8 ODS | 64 | 195 | 45 | 71 | M10 | fig.1 | 1.5 | 0.1 |
| S-5182 | 1/2 ODS | 102 | 333 | 69 | 64 | M10 | fig.2 | 4 | 0.4 |
| S-5188 | 1 1/8 ODS | 102 | 483 | 75 | 78 | M10 | fig.2 | 4 | 0.4 |

Notes: 1. For use with ammonia, the CE Category increases to II

### Oil Separator/Reservoir Range

| Part No | Conn Size (inch) | Dimensions (mm) | | | | | Drawing reference | Weight (kg) | Maximum oil capacity (Ltr) |
|---|---|---|---|---|---|---|---|---|---|
| | | A | B | C | D | E (Mounting details) | | | |
| S-5302 | 2 1/8 ODS | 219 | 732 | 145 | 171 | M12 | fig.3 | 23 | 7.5 |
| S-5303 | 2 5/8 ODS | 273 | 770 | 180 | 214 | 320 | fig.4 | 43 | 9.5 |
| S-5390 | 1 3/8 ODS | 168 | 854 | 114 | 124 | 235 | fig.5 | 20 | 6 |
| S-5392 | 1 5/8 ODS | 168 | 857 | 117 | 127 | 240 | fig.5 | 20 | 6 |
| S-5394 | 2 1/8 ODS | 168 | 859 | 113 | 134 | 113 | fig.6 | 20 | 6 |

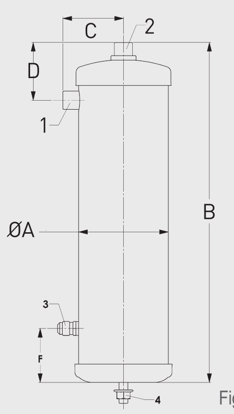



Fig. 1

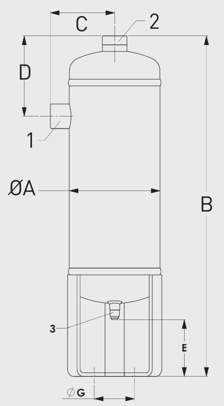



Fig. 2

1. Inlet
2. Outlet
3. Oil return,
   3/8 MSAE
4. M10 stud and nut

### High Pressure Range

| Part No | Conn Size (inch) | Dimensions (mm) | | | | | | | Mounting details | Drawing reference | Weight (kg) | Pre-charge qty (l) | CE Cat |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Ø A | B | C | D | E | F | Ø G | | | | | |
| SH-5188-CE | 1 1/8 ODS | 102 | 500 | 75 | 93 | N/A | 61 | N/A | M10 | fig.2 | 4.5 | 0.4 | Cat I |
| SH-5188X-CE | 1 1/8 ODS | 102 | 500 | 75 | 93 | N/A | 61 | N/A | M10 | fig.1 | 4.5 | 0.4 | Cat I |
| SH-5190-CE | 1 3/8 ODS | 152 | 570 | 108 | 135 | 95 | N/A | 100 | 3 x Ø14mm slots | fig.5 | 9.5 | 1.1 | Cat II |

| HELICAL OIL SEPARATOR-RESERVOIRS | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Part No | Conn Size (inch) | Dimensions (mm) | | | | | | | | Mounting details | Drawing reference | Oil Capacity (l) | Weight (kg) | CE Cat |
| | | ØA | B | C | D | E | F | G | ØH | | | | | |
| S-5387-6L-CE | 7/8 ODS | 102 & 152 | 699 | 74 | 76 | 48 | 222 | 201 | 113 | 3 x Ø14mm slots | fig.1 | 5.7 | 11 | Cat II |
| S-5388-6L-CE | 1 1/8 ODS | 102 & 152 | 682 | 75 | 78 | 48 | 207 | 201 | 113 | 3 x Ø14mm slots | fig.2 | 5.4 | 11 | Cat II |
| S-5388-CE | 1 1/8 ODS | 102 & 152 | 813 | 75 | 78 | 48 | 222 | 311 | 113 | 3 x Ø14mm slots | fig.3 | 7.6 | 13 | Cat II |
| S-5390-CE | 1 3/8 ODS | 152 | 850 | 108 | 91 | 48 | 222 | 311 | 113 | 3 x Ø14mm slots | fig.4 | 7.6 | 16 | Cat II |
| S-5392-CE | 1 5/8 ODS | 152 | 900 | 108 | 98 | 48 | 222 | 311 | 113 | 3 x Ø14mm slots | fig.4 | 7.6 | 16 | Cat II |
| S-5394-CE | 2 1/8 ODS | 152 | 902 | 114 | 105 | 48 | 222 | 311 | 113 | 3 x Ø14mm slots | fig.4 | 7.6 | 16 | Cat II |
| S-5422-CE | 2 1/8 ODS | 219 | 699 | 148 | 164 | N/A | 127 | 149 | 282 | 3 x Ø14mm slots | fig.5 | 8.4 | 40 | Cat II |
| S-5423-CE | 2 5/8 ODS | 273 | 790 | 183 | 201 | N/A | 161 | 173 | 339 | 3 x Ø14mm slots | fig.5 | 14.8 | 52 | Cat III |
| S-5424-CE | 3 1/8 ODS | 324 | 784 | 215 | 229 | N/A | 99 | 166 | 388 | 3 x Ø14mm slots | fig.5 | 17 | 63 | Cat III |

| HIGH PRESSURE RANGE • HELICAL OIL SEPARATOR-RESERVOIRS | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Part No | Conn Size (inch) | Dimensions (mm) | | | | | | | | Mounting details | Drawing reference | Oil Capacity (l) | Weight (kg) | CE Cat |
| | | ØA | B | C | D | E | F | G | ØH | | | | | |
| SH-5382-1.5L-CE | 1/2 ODS | 102 | 501 | 70 | 81 | 41 | 175 | 71 | N/A | M10 | fig.6 | 1.5 | 4.6 | Cat I |
| SH-5388-1.5L-CE | 1 1/8 ODS | 102 | 472 | 70 | 85 | 51 | 142 | 71 | N/A | M10 | fig.6 | 1.5 | 4.6 | Cat I |
| SH-5388-2.5L-CE | 1 1/8 ODS | 102 | 625 | 75 | 85 | 51 | 282 | 71 | N/A | M10 | fig.6 | 2.5 | 5.6 | Cat I |
| SH-5390-CE | 1 3/8 ODS | 152 | 947 | 108 | 140 | 51 | 222 | 362 | 100 | 3 x Ø14mm slots | fig.4 | 7.7 | 15.5 | Cat II |
| SH-5392-CE | 1 5/8 ODS | 152 | 998 | 108 | 143 | 51 | 222 | 362 | 100 | 3 x Ø14mm slots | fig.4 | 7.7 | 16.2 | Cat II |

### Performance data

This table provides a summary of the kW capacity of each separator for fixed evaporating and condensing temperatures. This table can be used as a quick reference guide. However, the Selection Guidelines are recommended for helical separator sizing.

| Part No | Capacity in kW of refrigeration at nominal evaporator temperature | | | | | | Maximum discharge volume ($m^3$/hr) |
|---|---|---|---|---|---|---|---|
| | R404A/507 | | R134a | | R407F | | |
| | -40°C | 5°C | -40°C | 5°C | -40°C | 5°C | |
| SH-5382-1.5L-CE | 5.3 | 7 | 3.5 | 5.3 | 6.8 | 8 | 2.6 |
| S-5387-6L-CE | 23 | 30 | 15.8 | 19.4 | 26.7 | 31.3 | 10.2 |
| S-5388-6L-CE, S-5388-CE, CE SH-5388-1.5L-CE & SH-5388-2.5L-CE | 29.8 | 38.7 | 21.1 | 26.4 | 35.6 | 41.7 | 13.6 |
| S-5390-CE & SH-5390-CE | 42.2 | 52.8 | 28.2 | 35.2 | 49 | 57.3 | 18.7 |
| S-5392-CE & SH-5392-CE | 52.8 | 66.9 | 38.7 | 45.8 | 62.4 | 72.9 | 23.8 |
| S-5394-CE | 84.4 | 109 | 63.4 | 73.8 | 98 | 115 | 37.4 |
| S-5422-CE | 109 | 144 | 77.4 | 95 | 129 | 151 | 49.3 |
| S-5423-CE | 225 | 292 | 162 | 197 | 267 | 312 | 102 |
| S-5424-CE | 352 | 461 | 253 | 310 | 419 | 490 | 159.8 |

**Notes:** All data is for a 38°C condensing temperature, 18°C suction temperature and on connection size being the same as the compressor discharge valve

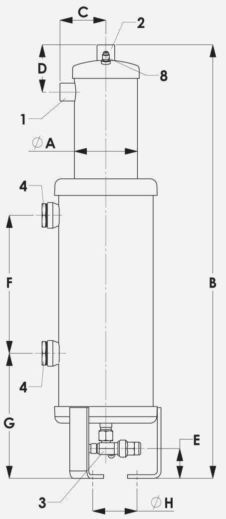



Fig.1

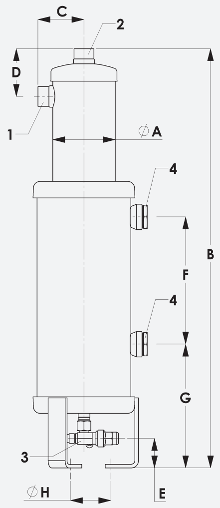



Fig.2

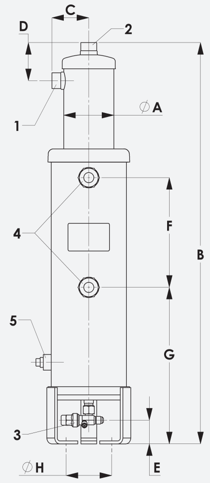



Fig.3

1. Inlet
2. Outlet
3. Oil return, Rotalock valve, 3/8 SAE Flare
4. Sight glass
5. 1/2 FPT connection
6. Oil return, 3/8 ODS
7. M10 stud and nut
8. 1/4 SAE Flare connection

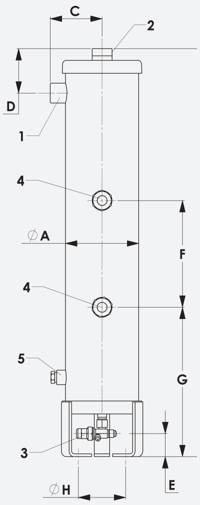



Fig.4

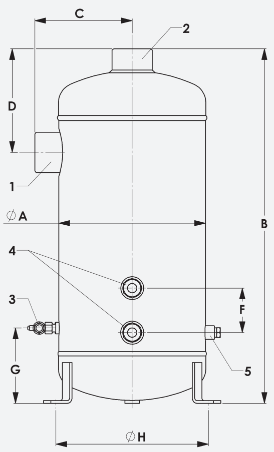



Fig.5

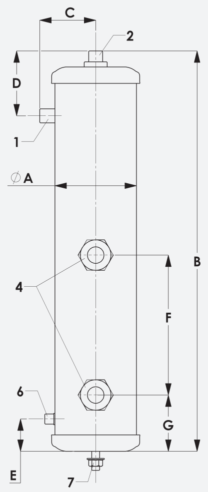



Fig.6

**Selection Guidelines**
Refer to Helical Oil Separator Section for guidance. The same rules apply.

**Installation – Main Issues**
1. Oil separator reservoirs are not 100% efficient, so installing this product should not be viewed as a replacement for oil traps, suction line accumulators or good oil return piping practices.

2. Install the unit vertically and reasonably close to the compressor. Proper piping practice should be adopted to prevent excessive loads or vibration at the inlet and outlet connections. The separator must be properly supported at the mounting feet interface.

3. A check valve should be located downstream of the outlet connection. This check valve is to prevent liquid refrigerant migrating from the condenser.

# Impingement Type Oil Separators

Oil separators are used in refrigeration systems that require the compressor lubricating oil to be returned directly to the compressor crankcase under all operating conditions. Using an oil separator will prevent lubricating oil from circulating throughout the system with the refrigerant making the condenser and evaporator more efficient.

Henry Impingement type oil separators are designed for maximum flow with minimal pressure drop while efficiently removing oil suspended in the refrigerant. Oil removal is achieved using stainless steel screens that have been optimised for both flow and oil removal. A baffle plate allows separated oil to de-aerate while remaining warm and viscous. A stainless steel ball float and precision needle and seat are used to achieve automatic oil return to the compressor crankcase.

Henry conventional oil separators are constructed from steel with solid copper connections.


### Manufacturing Standards

Manufactured in accordance with AS 2971
Safe Working Pressure: 3,200 kPa for models: 3210 - 6410 and above.
Safe Working Pressure: 4,200 kPa for models: 3210 - 6406S
3210 - 6406
3210 - 6408

### Features

- Designed for maximum flow and minimal pressure drop.
- Solid copper connectors.
- Optimised separation membrane.
- Precision needle and seat ball valve allows accurate metering of oil to return to the compressor crankcase.
- Internal baffle plate.
- Hermetically sealed stainless steel float.
- Powder coated finish.

### Benefits

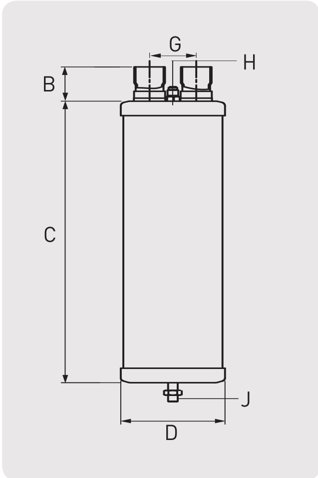
- Negligible loss in system efficiency.
- Easier installation.
- Efficient removal of oil from the refrigerant flow.
- Allows only the correct amount of oil to return to the crankcase.
- Improves quality of returning oil.
- Extended service life.
- Exceeds 500 hours salt spray tests.

| Part No. | Nominal Capacity kW at Evaporating Temperature °C | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | R22 | | | | | R404A | | | | | R134a | | | | |
| | -30 | -20 | -10 | 0 | 5 | -30 | -20 | 10 | 0 | 5 | -30 | -20 | -10 | 0 | 5 |
| 3210-6406S | 3.0 | 3.2 | 3.6 | 3.8 | 4.2 | 3.0 | 3.2 | 3.6 | 3.8 | 4.2 | 2.7 | 2.9 | 3.2 | 3.4 | 3.8 |
| 3210-6406 | 4.1 | 4.3 | 5.0 | 5.1 | 5.4 | 4.1 | 4.3 | 5.0 | 5.1 | 5.4 | 3.7 | 3.9 | 4.5 | 4.6 | 4.9 |
| 3210-6408 | 5.8 | 6.2 | 6.5 | 6.8 | 7.0 | 5.8 | 6.2 | 6.5 | 6.8 | 7.0 | 5.2 | 5.6 | 5.9 | 6.1 | 6.3 |
| 3210-6410 | 16.9 | 17.5 | 18.2 | 18.8 | 19.3 | 15.4 | 16.4 | 17.5 | 18.5 | 19.3 | 15.2 | 15.8 | 16.4 | 16.9 | 17.4 |
| 3210-6414 | 25.4 | 26.2 | 26.9 | 27.6 | 28.1 | 24.0 | 25.2 | 26.6 | 28.0 | 28.8 | 22.9 | 23.8 | 24.2 | 24.8 | 25.3 |
| 3210-6418 | 33.1 | 34.3 | 35.3 | 36.4 | 37.0 | 31.7 | 33.4 | 35.0 | 36.6 | 37.4 | 29.8 | 30.9 | 31.8 | 32.8 | 33.3 |
| 3210-6422 | 42.1 | 43.6 | 44.8 | 46.3 | 47.5 | 40.1 | 43.3 | 47.5 | 47.7 | 49.0 | 37.9 | 39.2 | 40.3 | 41.7 | 42.8 |
| 3210-9622 | 46.7 | 47.4 | 48.0 | 48.6 | 49.3 | 43.1 | 45.2 | 48.3 | 49.5 | 50.8 | 42.0 | 42.7 | 43.2 | 43.8 | 44.4 |
| 3210-9626 | 57.7 | 58.9 | 60.5 | 62.0 | 63.2 | 54.2 | 57.3 | 60.5 | 63.6 | 65.1 | 51.9 | 53.0 | 54.4 | 55.8 | 56.9 |
| 3210-9634 | 100.1 | 102.3 | 103.5 | 104.6 | 105.5 | 93.4 | 98.4 | 102.2 | 106.0 | 108.6 | 90.0 | 92.0 | 93.1 | 94.1 | 95.0 |

Capacity figures based on;

| | |
|---|---|
| Evaporator temperature | te = 5˚C |
| Condensing temperature | tc = 30˚C |
| Pressure drop | P = 7 kpa (1 psi) |

**3210 - Series**




Note: Oil separator must be installed vertically

| Part No. | Connection Size I.D. (Inch) | Dimensions | | | | | | Oil Pre-charge (ml) * | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|
| | | B | C | D | G | H MSAE | J THREAD | | |
| 3210-6406S | 3/8 | 32 | 148 | 107 | 48 | 1/4 | M10 x 1.5 | 480 | 1.8 |
| 3210-6406 | 3/8 | 32 | 245 | 107 | 48 | 1/4 | M10 x 1.5 | 480 | 2.2 |
| 3210-6408 | 1/2 | 33.5 | 245 | 107 | 48 | 1/4 | M10 x 1.5 | 480 | 2.5 |
| 3210-6410 | 5/8 | 38.5 | 300 | 107 | 48 | 1/4 | M10 x 1.5 | 480 | 2.9 |
| 3210-6414 | 7/8 | 40 | 344 | 107 | 48 | 1/4 | M10 x 1.5 | 480 | 3.2 |
| 3210-6418 | 1 1/8 | 45 | 370 | 107 | 48 | 1/4 | M10 x 1.5 | 480 | 3.6 |
| 3210-6422 | 1 3/8 | 49 | 475 | 107 | 48 | 1/4 | M10 x 1.5 | 480 | 4.5 |
| 3210-9622 | 1 3/8 | 43 | 352 | 153 | 75 | 3/8 | M10 x 1.5 | 1230 | 3.2 |
| 3210-9626 | 1 5/8 | 50 | 429 | 153 | 75 | 3/8 | M10 x 1.5 | 1230 | 3.5 |
| 3210-9634 | 2 1/8 | 55 | 432 | 153 | 75 | 3/8 | M10 x 1.5 | 1230 | 3.6 |

* Oil pre-charge to be added to oil separator before installation

### Selection Guidelines

The most important parameter for selection is the discharge volumetric flow rate, expressed in $m^3$/hr. This is the calculated volume flow rate at entry to the oil separator. It is not to be confused with the compressor displacement or swept volume.

A quick method is to use the selection graphs. For HCFC and HFC refrigerants, the same graphs apply for both conventional and helical oil separators. Conventional separators are not suitable for use with ammonia hence the R717 graph should not be used.

As with the helical separators, where a higher degree of accuracy is required to calculate the $m^3$/hr, the flow rate calculation method is recommended. The flow rate calculation method is also recommended for special applications.

### Conventional Separator Selection using the Graphs

To use the selection graphs, the refrigerant type, maximum refrigeration capacity, minimum refrigeration capacity, evaporating temperature and the condensing temperature is required.

Example:
Refrigerant R404A

Maximum refrigeration capacity = 100 kW

Minimum refrigeration capacity = 50 kW

Evaporating temperature = -10°C

Condensing temperature = +40°C

From the R404A graph, follow the -10°C evaporator temperature line to the intersection of the 40°C condensing temperature line.

Extend a line horizontally from this point to the $m^3$/hr/kW factor.

Multiply this factor by the maximum and minimum refrigeration capacities to compute the maximum and minimum discharge volume flow rates.

From the R404A graph, the [$m^3$/hr/kW factor] = 0.355

**Therefore:-**

Maximum discharge volume flow rates = (0.355 x 100) = 35.5 $m^3$/hr

Minimum discharge volume flow rates = (0.355 x 50) = 17.75 $m^3$/hr

The maximum and minimum $m^3$/hr figures should be compared with the rated capacity of the conventional separator. Refer to the Performance Data Table for the rated capacities.

The general recommendation is that the calculated maximum flow should not exceed the rated capacity of the separator. Also, the minimum flow should not be below 33% of the rated capacity.

Using these $m^3$/hr figures, the recommended conventional separator selection is model 3210-9634 (sealed unit only) with a rated capacity of 38.3 $m^3$/hr. The final selection depends on whether or not the user requires a separator model with a removable/cleanable oil float assembly.

### Additional notes on selection:-

1. The 33% minimum recommendation rule is to optimise efficiency. Below this load factor, the efficiency of the separator will decrease. On systems with extreme unloading conditions, one separator per compressor should be used rather then one separator for a common discharge line.
2. Understanding the system refrigeration capacity and the percentage of full and low load run times can also be helpful in selecting the separator.
3. In cases where the maximum discharge has been exceeded by only a minimal amount and the system has unloading characteristics, select the smaller separator. It is not recommended to oversize.

### Installation – Main issues

Same as for helical oil separators.

# Coalescent Oil Separators

Specially designed for Australian Conditions - High pressure as standard, the word coalesce means to bring many pieces together to form a mass.
In regard to Oil Separators, coalesce means to bring the tiny droplets that are present in the discharge gas of the compressor, together to form a mass of oil, heavy enough to separate from the gas stream and drop into the retaining sump under the filter.

Fine micron filtration strips oil of any contaminant and sludge. Built in Differential pressure sensor can determine when filter is required to be changed.

**Features**

- Designed for maximum flow and minimal pressure drop
- Large filtration surface area
- Replaceable filter

**Benefits**

- Legible loss in system efficiency
- Filtration to 0.3 micron
- Easy to change filter when required

**Materials of construction**

- Shell and end caps are carbon steel
- Connections are carbon steel
- Filter is proprietary composition

**Manufacturing standards**

Manufactured in accordance with AS2971.2

Safe working pressure: 4500 kPa

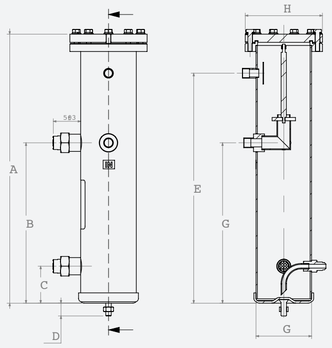


FIG. 1

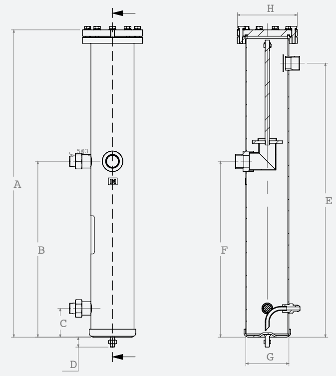


FIG. 2

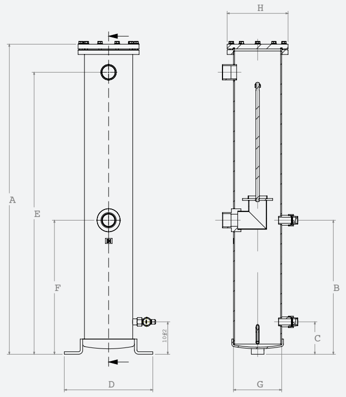


FIG. 3

| Part No. | Connection Size I.D. (Inch) | A | B | C | D | E | F | G | H | Drawing Reference |
|---|---|---|---|---|---|---|---|---|---|---|
| HCOS-022R | 5/8 | 495 | 295 | 68 | 24 | 423 | 295 | 102 | 142 | fig 1 |
| HCOS-023R | 7/8 | 495 | 295 | 68 | 24 | 419 | 295 | 102 | 142 | fig 1 |
| HCOS-024R | 1 1/8 | 727 | 416 | 68 | 24 | 648 | 416 | 102 | 142 | fig 2 |
| HCOS-025R | 1 3/8 | 727 | 416 | 68 | 24 | 644 | 416 | 102 | 142 | fig 2 |
| HCOS-026R | 1 5/8 | 977 | 422 | 102 | 279 | 888 | 422 | 152 | 192 | fig 3 |
| HCOS-027R | 2 1/8 | 977 | 422 | 102 | 279 | 883 | 422 | 152 | 192 | fig 3 |

| Ordering Info. | | | R134a Evaporating (kW) | | | | R404A Evaporating (kW) | | | | | | †R744 Evaporating (kW) | | | Pressure rating |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Model | Filter Number | Line Size | -10 | -5 | 0 | 5 | -40 | -30 | -20 | -15 | -10 | -5 | -40 | -30 | -20 | (Bar. Guage) |
| HCOS-022R | 3500-34000 | 5/8" ODS | 14.0 | 14.3 | 14.6 | 15.0 | 15.5 | 17.0 | 18.4 | 19.0 | 19.7 | 20.3 | 35.0 | 35.1 | 35.2 | 45 |
| HCOS-023R | 3500-34000 | 7/8" ODS | 31.6 | 32.3 | 33.0 | 33.7 | 35.0 | 38.3 | 41.4 | 42.9 | 44.4 | 45.8 | 78.5 | 79.0 | 79.2 | 45 |
| HCOS-024R | 3500-37000 | 1-1/8" ODS | 49.4 | 50.5 | 51.6 | 52.7 | 54.8 | 59.8 | 64.7 | 67.1 | 69.4 | 71.6 | 123.0 | 123.5 | 123.8 | 45 |
| HCOS-025R | 3500-37000 | 1-3/8" ODS | 87.8 | 89.8 | 91.8 | 93.8 | 97.4 | 106.5 | 115.0 | 119.3 | 123.4 | 127.4 | 218.7 | 219.5 | 220.1 | 45 |
| HCOS-026R | 3500-28000 | 1-5/8" ODS | 126.4 | 129.4 | 132.2 | 135.1 | 140.3 | 153.2 | 165.5 | 171.6 | 177.6 | 183.5 | 315.0 | 316.8 | 317.0 | 45 |
| HCOS-027R | 3500-28000 | 2-1/8" ODS | 224.8 | 230.0 | 235.1 | 240.2 | 249.0 | 272.5 | 294.4 | 305.4 | 316.0 | 326.0 | 560.0 | 563.2 | 563.6 | 45 |
| HCOS-028R | 3500-28000 | 2-5/8" ODS | 351.3 | 359.5 | 367.4 | 375.3 | 389.0 | 425.0 | 460.0 | 477.0 | 493.0 | 509.5 | - | - | - | 32 |

Filter efficiency = 0.3 Micron at a 45 Bar stagnation pressure within the limts of the table

Table is based on 45°C Condensing Temperature/ -10 for R744 Cascade condenser

kW = Maximum kW for line size and pressure drop

†Cascade only



HENRY TECHNOLOGIES