



OM3 **TRAXOIL** Electronic Oil Level Management System Technical Data

Document no.: A3.5.054/E 00
replacement for:
Date: 01.10.2004

Electronic oil level management system with alarm function and compressor shut down

Features

- IP 65 rating due to molded housing and new electrical connection with molded cable Assemblies
- 3 Zone 100% Level Control by using precise Hall-sensor measurement, not prone to errors by foaming or light like optical sensors
- CE marking under Low Voltage and EMC Directive
- SPDT output contact for compressor shut down or alarming, rating 230VAC/3A
- Easy installation by sight-glass replacement and front side mounting without nuts
- Self contained unit with oil level sensor and integral solenoid to manage oil level supply
- Alarm, status and 3 zone indication by LED's
- Supply 24 V AC, 50/60 Hz
- Adapters suitable for various types of compressors
- Sacrificial magnet for reliable operation
- Recommended by leading compressor manufacturers

Introduction

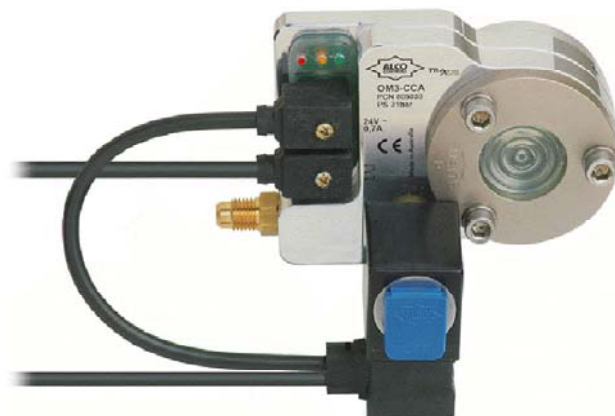
Maintaining proper oil level is of primary importance for a long compressor lifetime. Especially when paralleling compressors in compressor pack applications, maintaining sufficient oil in the compressor's crankcase becomes difficult. A simple way of balancing the oil level in parallel compressor arrangements is the use of oil equilibrium lines. These systems are also referred to as *passive systems*. However, passive systems require individual tailoring for each application and they only perform satisfactorily under more or less constant operating conditions. Particularly in refrigeration applications with varying operating conditions and defrost cycles an active means of oil level management is a must in order to ensure reliable compressor operation.

An additional benefit of active systems is that, apart from oil balancing, they normally also monitor the oil level and provide alarming capabilities. This is a particular benefit for scroll compressors which, due to the lack of an integral oil pump, do not have a differential oil pressure switch as conventional compressors have.

The OM3 TraxOil system is a self-contained system which provides both functions, oil level monitoring and oil level balancing, for active oil level management systems.

Description

OM3 TraxOil uses a Hall-Sensor to measure the oil level and its electronics controls an integrated solenoid valve which feeds missing oil directly into the compressor sump. If the oil level drops into the **red zone** (see page 2 for more details) OM3-TraxOil shows an alarm signal and the alarm contact changes into alarm state. The latter may be used to shut down the compressor. In the Alarm status the OM3 Traxoil is still feeding oil into the compressor. If the oil level comes back to normal, the Alarm will be reset.



OM3 **TRAXOIL**

Electronic Oil Level Management System

An indicator float inside the OM3 TraxOil system is equipped with a magnet and changes its position according to the oil level. Through the variation in the magnetic field the position of the float is monitored by the Hall Sensor. The integrated electronics takes care of the levels for alarming and solenoid control as described below.

Operation

The Level control is divided into 3 Zones. The green LED indicates that Oil level is within the normal limit (**green Zone, 40-60% sight glass height**) and only the green LED is on. On reaching the "Fill level" OM3 Traxoil is starting after 10 sec. delay to fill oil into the crankcase of the compressor and the yellow LED is switched on. The time delay of 10 sec. is for some applications/compressor types necessary to avoid overfilling of the compressor. During the start of a compressor the oil level can vary much and quickly and although there is enough oil in the compressor the fill level is reached and would lead to immediate oil injection. If this happens frequently the result could be overfilling.

Should the oil level reaching the yellow zone although oil is injected the green LED will go off and the yellow is now indicating Oil level in the **yellow Zone (25-40% sight glass height)**. The yellow Zone could be understood as a warning zone. Reason that oil level reaches the yellow Zone could be that the Oil separator is not working properly or the compressor is throwing more oil into the circuit than the OM3 can feed into the crankcase of the compressor for compensation. Alco recommends to have the OM3 TraxOil permanently under power supply also during stand-by and shut-off mode.

Should the system fail to reach oil level within **green or yellow zone**, OM3 TraxOil will interpret this as a fault in the oil supply system and the float reaches now the **red zone (<25% sight**

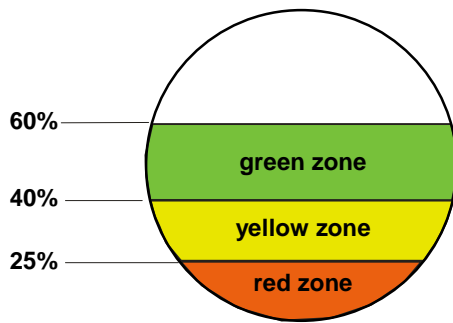


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glass height). Consequently, the alarm relay will open and the red LED will illuminate after a time delay of 20 sec. In this condition OM3-Traxoil is still feeding oil into the crankcase of the compressor and subsequently the yellow LED is on.

Sight-Glass Level Control Zones

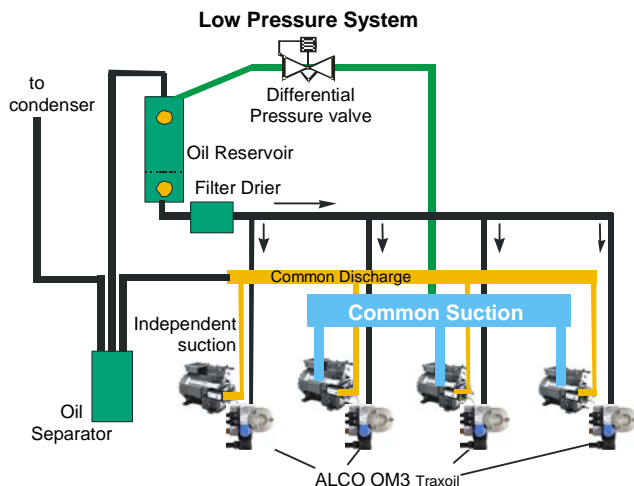


Applications

The OM3 TraxOil system is applicable to low and **high pressure oil management systems**. Traditional oil level management systems work with a low pressure oil reservoir. The oil is kept at a pressure slightly above suction pressure by a differential pressure valve. A possible configuration is shown below:

Traditional low pressure oil level management system

The oil separator is connected downstream of the discharge line. After separation, the refrigerant flows to the condenser while the oil flows to the oil receiver. The pressure inside the oil receiver is controlled by the differential pressure valve. When the integrated solenoid of OM3 TraxOil opens then oil will flow to the compressors crankcase. Note that OM3 TraxOil contains an own inbuilt strainer. However, an additional oil filter/filter-dryer (i.e. ADK Series) in the common oil supply line is recommended for reliable system operation. The differential pressure required for sufficient oil flow from the oil receiver to the compressor is system specific. For most applications, a value of 3.5 bar will give satisfactory results, whereas 1.4 bar can be regarded as a minimum required value. A suitable valve with a differential pressure of 3.5 bar is available from ALCO, refer to the Accessories Section for further details.



Depending on the external wiring of the cable OM3-N__ the compressor may be shut down automatically. See Table 1 for complete functional explanation and LED configuration.

Table 1

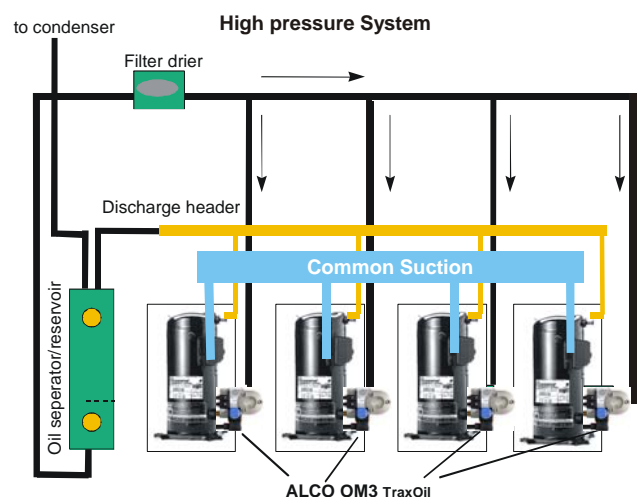
LED	Status / Function
● Green	Oil Level in green zone (60 - 40%)
● Green ● Yellow	Oil Level in green zone (60 - 40%) & Injection
● Yellow	Oil Level in yellow zone (40 - 25%) & Injection
● Red ● Yellow	Oil Level in red zone (25 - 0%) & Injection

High pressure systems store the oil at compressor discharge pressure. The advantage of this is that these systems do not need a separate oil receiver but make use of a combined oil separator/reservoir arrangement. This normally results in a cost saving over traditional systems.

High pressure oil level management system

From an application point of view, high pressure systems are more critical than traditional low pressure systems. There must be a separator/reservoir installed with a sufficient size and Oil content that there is always Oil stored and thus avoiding discharge gas entering the crankcase of the compressor which could lead to some negative effects like higher discharge and oil temperatures, less of lubrication capability and the loss of efficiency due to hot-gas bypass.

OM3 TraxOil is designed for applications with low and high pressure systems.





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Selection Chart

Complete systems

Complete systems come as a packages consisting of OM3 TraxOil base unit, adapter flange, O-rings and with an ALCO ASC coil. Depending on the compressor type for which the OM3 is to be used different adapters are supplied with the system.

Cable Assemblies for Power Supply/Solenoid and Relay have to be ordered separately.

Type	PCN	Compressors	Weight
OM3-CUA flange adapter 3-/4-hole	805 030	Arctic Circle G2, G4, G6 Bitzer 4VC, 4TC, 4PC, 4NC, 4J, 4H, 4G, 6J, 6H, 6G, 6F, 8GC, 8FC Bock HA, HG (except HG/HA-12/22/34, see OM3-CBB), O-series Copeland D2, D3, D4, D6, D9, 4CC, 6CC Dorin all KP, K sizes (except those mentioned under OM3-CBB) Frascold Series A, B, D, F, S, V, Z	0,91 kg
OM3-CBB screw adapter 1-1/8"-18 UNF	805 032	Bitzer 2KC, 2JC, 2HC, 2GC, 2FC, 2EC, 2DC, 2CC, 4FC, 4EC, 4DC, 4CC, Bock HA12/22/34, HG12/22/34 Dorin all H, K100CC/CS, K150CC/CS, K180CC/CS, K200CC, K230CS, K235CC, K240SB, K40CC, K50CS, K75CC/CS- L'Unite Hermetique TAH, TAG Maneurop LT, MT, SM, SZ	0,86 kg
OM3-CCA screw adapter 3/4"-14 NPTF	805 033	Bitzer ZL, ZM Copeland ZB, ZF, ZS	0,85 kg
OM3-CCB screw adapter 1-1/8"-12 UNF	805 034	Copeland DK, DL	0,87 kg
OM3-CCD Rotalock adapter 1-3/4"-12 UNF	805 031	Copeland ZR 90 to ZR19M ZR 250 to ZR 380 ZRT 180K to 760K, ZRU 280K-560K, ZRY480K-1140K	0,93 kg
OM3-CCC flange adapter 3-hole	805 035	Copeland D8D, D8S_ (except D8SJ and D8SK, installation only on one sight glass possible due to higher cylinder head)	0,92 kg

Other adapter types on request!

Cable Assemblies for OM3

Type	PCN	Connection to ..	Temperature Range °C	Cable length mtr.	Gewicht
OM3-P30	805 151	Power Supply and Solenoid	-25/+80	3,0	0,24 kg
OM3-P60	805 152			6,0	0,25 kg
OM3-N30	805 141	Relay		3,0	0,13 kg
OM3-N60	805 142			6,0	0,14 kg

Accessories and Spare Parts

Typ	Art.-Nr.		Gewicht
ECT-523	804 332	Transformer 230 VAC / 24VAC, 20 VA (supply of 1 pcs. OM3)	0,82 kg
ECT-623	804 421	Transformer 230 VAC / 24VAC, 50 VA (supply of 3 pcs. OM3)	1,20 kg
ODP-33A	800 366	Differential Oil check valve 3.5 bar (Inlet 5/8"-UNF female, outlet 5/8"-UNF male)	0,14 kg
ASC 24VAC	801 052	Solenoid coil 24 VAC, 50/60 Hz, 15VA	
OM0-CUA	805 037	Flange adapter 3-/4-hole	
OM0-CBB	805 038	Screw adapter 1-1/8"-18 UNF	
OM0-CCA	805 039	Screw adapter 3/4"-14 NPTF	
OM0-CCB	805 040	Screw adapter 1-1/8"-12 UNF	
OM0-CCC	805 041	Flange adapter 3-hole	
OM0-CCD	805 042	Rotalock adapter 1-3/4"-12UNF	
OM3-K01	805 036	Repair Kit for all types (consists of all necessary gaskets, coil clip, oil adapter with screen, sightglas)	0,26 kg

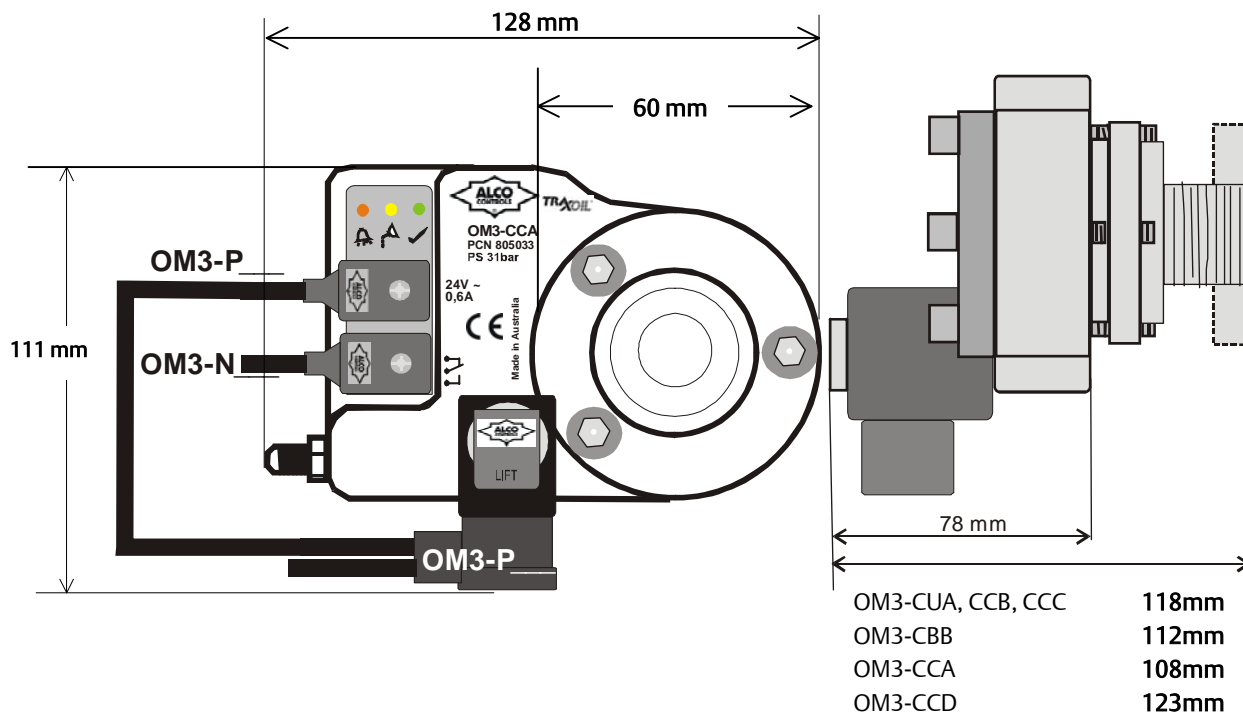


OM3 TRAXOIL® **Electronic Oil Level** **Management System**

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Dimensions in mm: (not to scale)

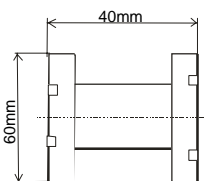
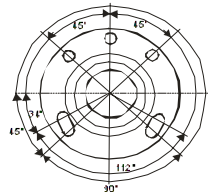
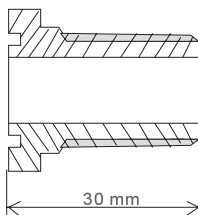
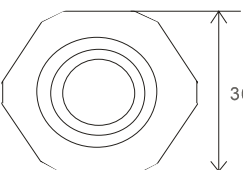
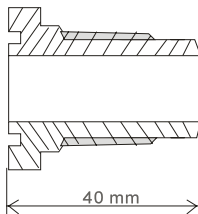
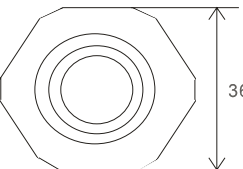
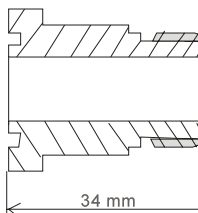
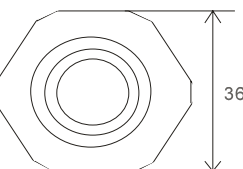
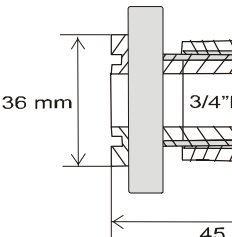
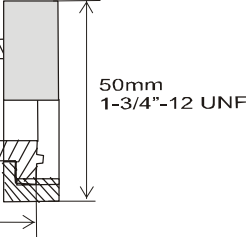
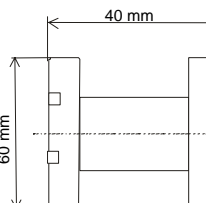
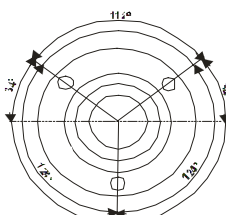
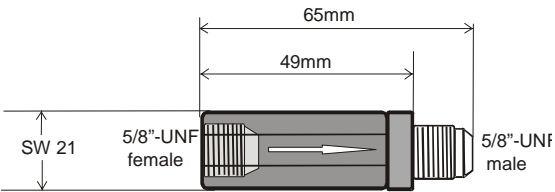
➡ Base unit must be mounted horizontally for correct operation!
 Max. Deviation +/- 1°





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Adapters	Side view	Front view (facing compressor):
OM0-CUA (805 037) Flange adapter 3-/4-hole as used in OM3-CUA (805 006) <ul style="list-style-type: none">Three holes $\varnothing 6.9$ mm, PCD 47.62Four holes $\varnothing 6.9$ mm, PCD 50 mm		
OM0-CCA (805 039) Screw adapter 3/4"-14 NPTF as used in OM3-CCA (805 008) <ul style="list-style-type: none">Additional flange ring for adapter / base unit connection (included)		
OM0-CCB (805 040) Screw adapter 1 1/8"-12 UNF as used in OM3-CCB (805 016) <ul style="list-style-type: none">Additional flange ring for adapter / base unit connection (included)		
OM0-CBB (805 038) screw adapter 1-1/8"-18 UNF as used in OM3-CBB (805 032) <ul style="list-style-type: none">Additional flange ring for adapter / base unit connection (included)		
OM0-CCD (805 042) 1-3/4"-UNF <ul style="list-style-type: none">two piece Adapter consists of OM0-CCA and rotalock adapter 1-3/4"-12 UNF		
OM0-CCC (805 041) 3 hole Flange Adapter		
ODP-33A (800 366) Differential Pressure Valve <ul style="list-style-type: none">$\Delta p = 3,5$ bar		

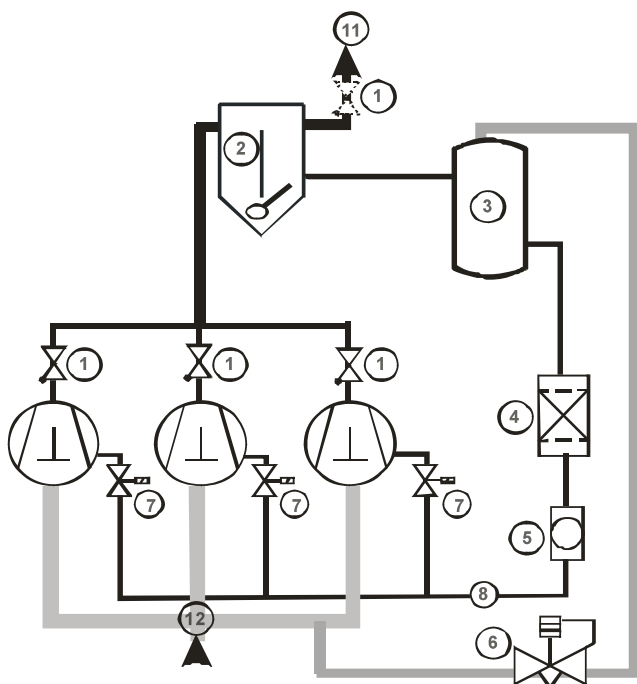


OM3 TRA^{XL}OIL[®]
Electronic Oil Level
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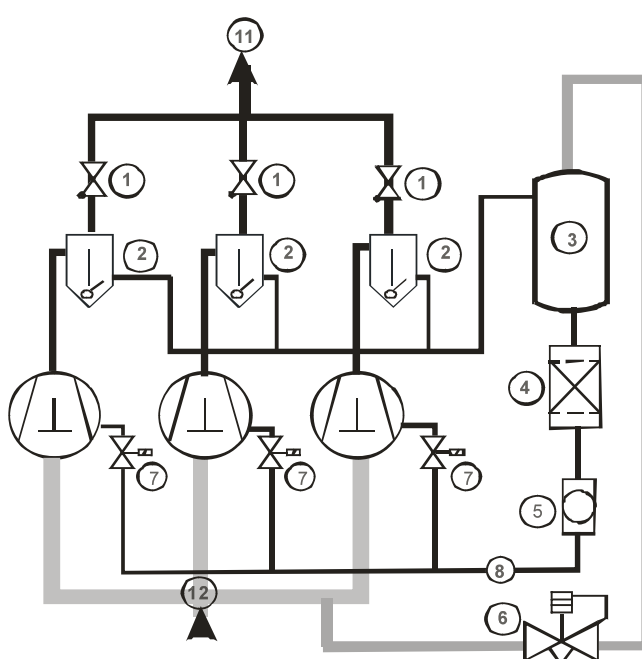
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Typical Application Diagrams: (systems can have more devices installed which are not shown for simplicity reasons)

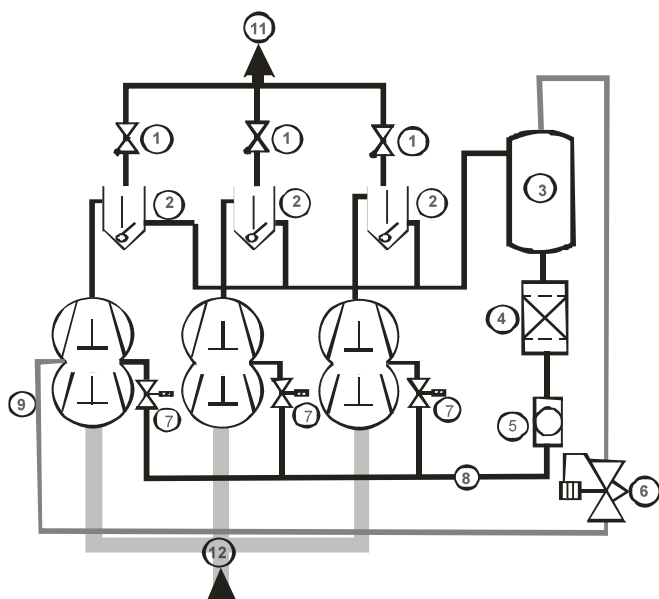
Single Stage Compressors with one Oil Separator/Reservoir



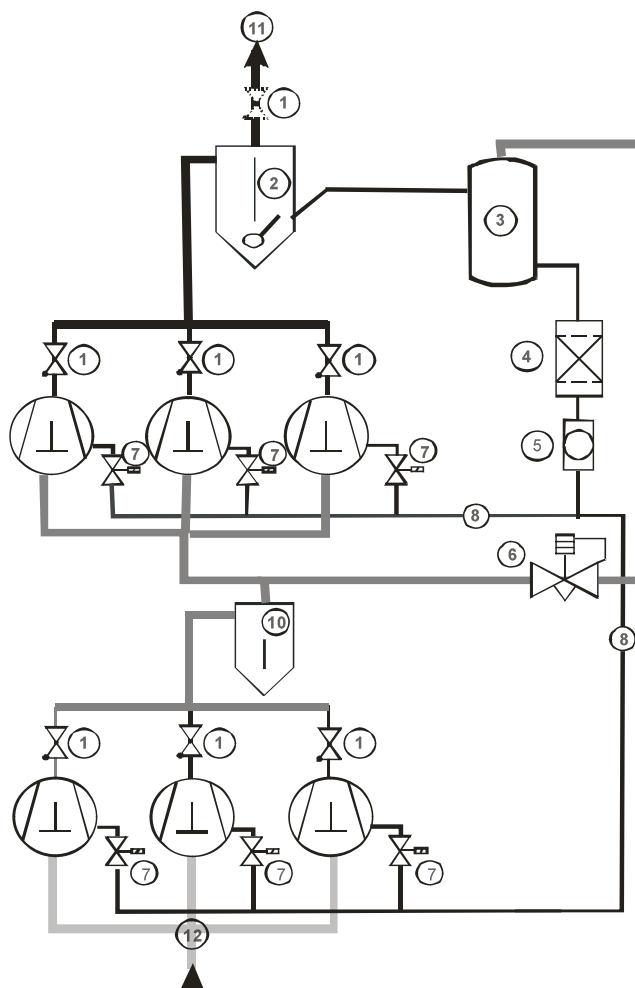
Single stage Compressors with multiple Oil Separators



Two Stage Compressor Arrangement (see also page 8)



Booster Systems (see also Page 8)



- 1 Check Valve
- 2 Oil Separator (OS Series)
- 3 Oil Reservoir
- 4 Filter Drier
- 5 Sight Glass (AMI or MIA Series)
- 6 Pressure Diff. Valve (ODP-33A)
- 7 Electronic Oil Regulator Series OM3
- 8 Oil Line
- 9 Intermediate Pressure Connection
- 10 Suction Accumulator (A Series)
- 11 Discharge Line
- 12 Suction Line



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Two Stage Compressors

On these type of Compressors the Oil in the Crankcase is exposed to the intermediate Pressure. For that reason the Differential pressure valve must be connected to this and not to the suction line.

Booster systems

These systems also require the installation of the Differential valve to the suction of the high pressure compressors (intermediate pressure). Oil separators will be installed on the high pressure stage only and then distributed to both the high and low pressure compressors.

Installation

For a very quick installation from front side all adapters have thread holes. Arrangement of adapter and OM3 body becomes very easily due to markings on body and adapter.

Oil Reservoirs

Oil reservoirs needs to have a minimum oil charge all the time to compensate any fluctuation in oil level. For high pressure systems it is imperative, otherwise OM3 Traxoil would feed discharge gas into the crankcase of the compressor with the according negative impacts to the system as described in the section for "High pressure oil management system".

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