



# COLTRI SUB

Special equipment and compressors for underwater activities

## High Pressure Compressors

# MCH 13-16-26-32/ET COMPACT

*VERSION: English*

## /INSTRUCTION

## MANUAL



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To make the manual easier to read, the following terms have been adopted:



**DANGER**

The term **DANGER** is used when failure to comply with the regulations or tampering with the parts could lead to serious injury or even death.



**WARNING**

The term **WARNING** is used when failure to comply with the instructions could cause damage to the machine and other parts associated with the same or to the surrounding area.

**LABEL APPLIED TO THE COMPRESSORS**

<b>AEROTECNICA COLTRI S.r.l.</b>		
Via Colli Storici, 177		
25010 S. Martino d/Battaglia (BS) Italy		
Tel. 030/9910297-9910301		
Fax 030/9910283		
<b>MODEL</b>	<input type="text"/>	
<b>TYPE</b>	<input type="text"/>	
<b>S/N</b>	<input type="text"/>	
<b>YEAR</b>	<input type="text"/>	
<b>MOTOR</b>	<input type="text"/>	
<b>POWER</b>	<input type="text"/>	

To protect exposed persons or objects, a special booklet entitled "**SAFETY REGULATIONS**" is supplied with the machine and must be considered an integral part of the Compressor Instruction Manual.

This manual is the property of **AEROTECNICA COLTRI S.r.l.** and any copying of the same, even partial, is prohibited.



## USE IN BRIEF

The following information must be referred to and applied only when this manual and the “Safety regulations” manual have been read and their contents have been understood and assimilated.



- Check whether or not the area where the machine is installed has suitable ventilation (see chapter 6.1).
- If the machine is installed in a place without the required characteristics above, connect the air intake extension (see chapter 6.2.1).
- Connect the refill hoses to the machine (see chapter 6.2.2).
- Connect the switchboard to the mains power supply (see chapter 6.2.3).
- Check the level of the lubricating oil in the pump unit (see chapter 8.2). If the level is too low, turn off the machine and add or change the oil (see chapter 8.1).
- Turn on the machine using the main switch (see chapter 7.1).
- Check the direction of rotation of the motor. If the direction of rotation does not coincide with the one shown on the belt guard, turn off the machine and invert the two phases on the main power supply (see chapter 7.2).
- Check the operation of the safety valve (see chapter 9.1).
- Check for wear on the cylinders to be filled (see chapter 9.1).
- Set the pressure switch on the control panel to the refill pressure value given on the cylinder (see chapter 8.1).
- Fit the hose attachment on the cylinder and check that the taps on the hose are open (see chapter 9.2).
- Turn on the cylinder tap and start up the compressor (see chapter 9.2).
- When the filling operation has been completed, the compressor is stopped automatically by the pressure switch, turn off the cylinder and the hose taps.
- Press the pressure bleed button and disconnect the cylinder attachment (see chapter 9.2).



# 1

## GUARANTEE AND ASSISTANCE

### 1.1

#### Guarantee

**AEROTECNICA COLTRI S.r.l.** guarantees its compressors against any design or manufacturing defect or fault and against any fault in the materials for a period of twelve months from the delivery of the machine. The customer must inform **AEROTECNICA COLTRI S.r.l.** in writing of any fault and/or defect that may be found within eight days from its discovery by means of a registered letter with advice of receipt or telegramme, otherwise the guarantee will become null and void.

The guarantee is only valid against faults or defects that may arise with the compressor used under proper operating conditions according to the instructions given in this manual and with the maintenance carried out at the intervals as provided for.

The guarantee expressly excludes any faults arising as a result of improper use of the machine, of atmospheric agents and of damage due to transport; the guarantee does not cover the expendable materials and materials required for the periodic maintenance which are at the customer's entire expense. The guarantee will, in any case, become automatically null and void if the compressor is tampered with or if it has been serviced by technicians who are not authorized to do so by **AEROTECNICA COLTRI S.r.l.**

Any compressor that is acknowledged to be faulty due to defects in the design, manufacturing or materials used, will be repaired or replaced free of charge by **AEROTECNICA COLTRI S.r.l.** at its factory in San Martino della Battaglia (BRESCIA). The customer will be responsible for the costs of transport and carriage as well as for any spare parts and expendable materials.

If it should be necessary for service to be carried out under the guarantee at the customer's premises, the latter will be responsible for the travel and transfer costs for the staff sent out by **AEROTECNICA COLTRI S.r.l.**

Taking delivery of the machine and/or of any faulty components or the transfers for the inspection of faults and/or defects as notified by the customer, will not, however, denote any implicit acknowledgement regarding the effectiveness of the guarantee.

Repairs and/or replacements made by **AEROTECNICA COLTRI S.r.l.** during the guarantee period will not extend the duration of the same.

Acknowledgment of the guarantee does not itself imply any liability for compensation on the part of **AEROTECNICA COLTRI S.r.l.**

**AEROTECNICA COLTRI S.r.l.** does not assume any responsibility for injury to persons or damage to property or for any other direct or indirect damage (loss of production or missed profit, etc.) that may be attributable to faults or defects of the compressor, except for those cases in which a serious fault can be attributed to the company.

### 1.2

#### Assistance

The **AEROTECNICA COLTRI S.r.l.** technicians are available for any kind of routine or additional maintenance work.

The request for technical assistance must be sent to **AEROTECNICA COLTRI S.r.l.** at the following address:

**AEROTECNICA COLTRI S.r.l.**

Via Colli Storici, 177  
25010 San Martino della Battaglia (BRESCIA) ITALIA

Fax: +39 030 9910283

e-mail: coltrisub@coltrisub.it





## TECHNICAL DESCRIPTION

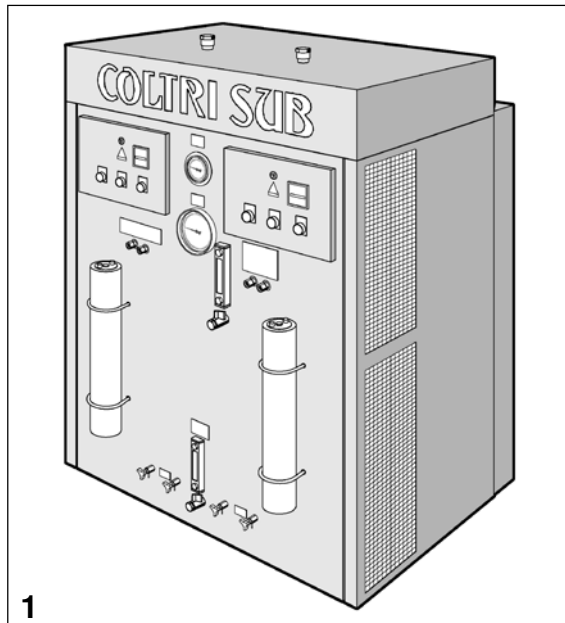
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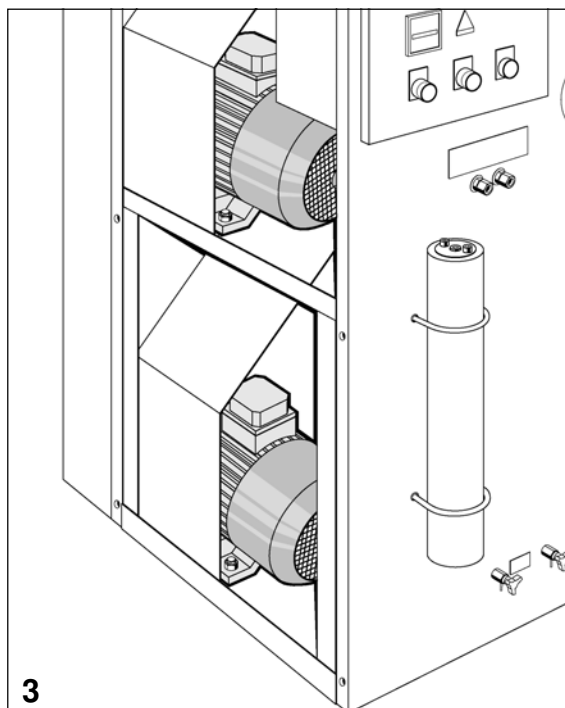
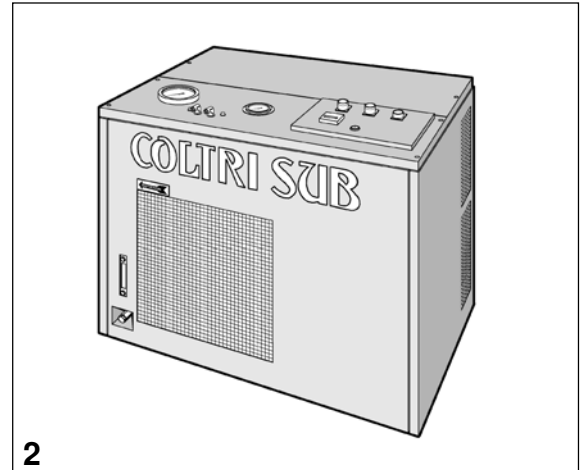
*This chapter provides a technological description of the machine and its main components.*

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## 2.1 Operating principle

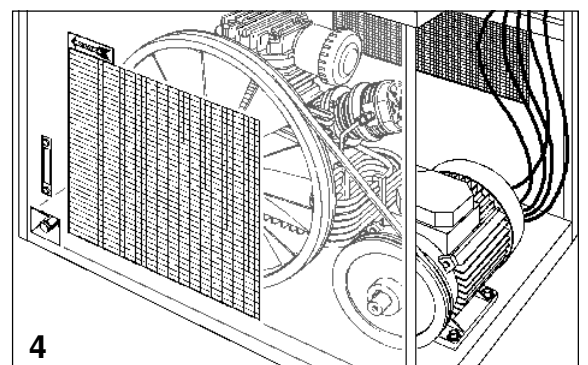


The refill stations in the “**Compact**” series are of the semi-soundproofed type (model MCH 13-16/ET) (Fig. 2) (model MCH 26-32/ET) (Fig. 1).



Model **MCH 13-16/ET** is fitted with a compressor (Fig. 4), while model **MCH 26-32/ET** is provided with two compressors (Fig. 3), which enable the latter to refill up to four cylinders at the same time (in the standard version).

All the compressors fitted inside the refill stations are of the high pressure type with forced air cooling and 3 stages of compression.



The air circulating around the compressor, which does not contain any harmful fumes, is taken into the intake filter and introduced through the intake valve into the cylinder of the first stage where the first compression takes place.

A part of the heat produced in the compression is dissipated by the flow of air created by the fan through the head and relative valves, piston, cylinder, monobloc and lubricating oil; the heat remaining in the compressed air is dissipated in the long piping connecting one stage of the compression to another and which acts as a radiator; the temperature at the hose outlet is just a few degrees higher than that of the environment.

The operating temperatures of each stage are: at the pipe connection that goes to the intake cylinder: about 15-20 °C above the environmental temperature (it feels warm to the touch), to the pipe connection that starts from the head (from the discharge valve), about 80-100 °C.

The intake air contains a certain degree of humidity according to atmospheric conditions. During the compression and subsequent cooling, the humidity condenses and together with the particles of lubricating oil forms a milky white emulsion that precipitates into the separators.

The compression diagram is included in chapter 13.

**Description of the pump unit**

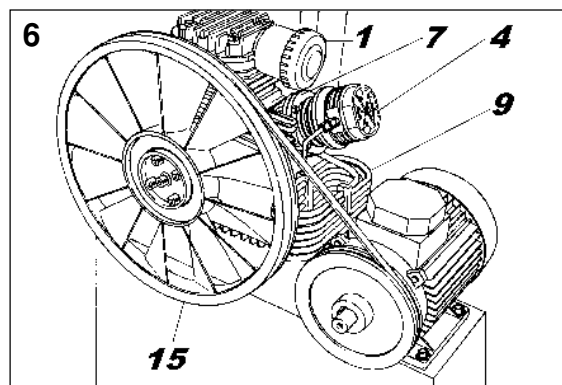
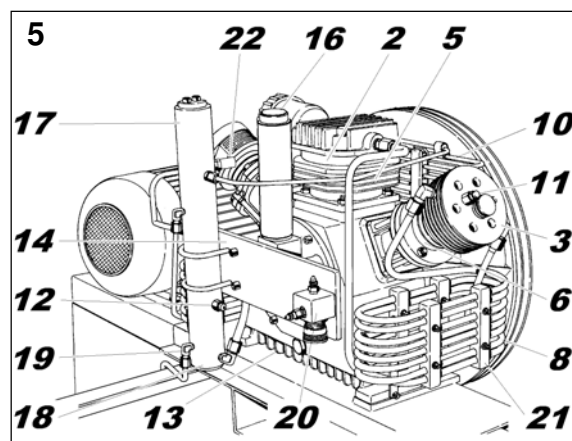
**2.2**

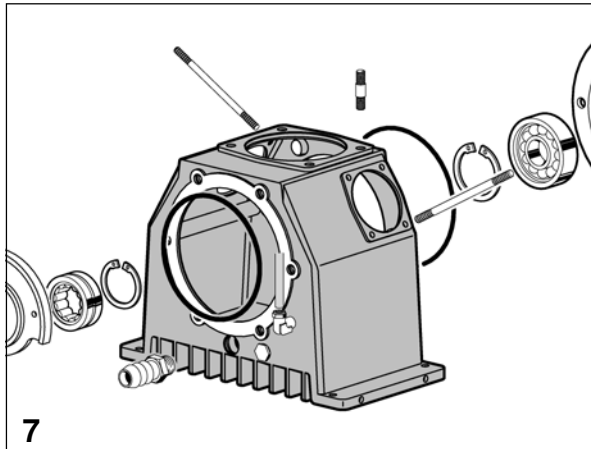
The pumping unit has the task of producing compressed air at high pressure (200-300 bar) and purifying it by means of the decantation and filtering systems until it reaches a level of purity equal to or higher than the limits set by the standards DIN 3188 - UNI EN 132 - CGA/E, or to increase the pressure of the gas inhaled (only inert - non-explosive gases).

This unit consists of the following components (Fig. 5-6):

**Table 1**

N°	Description	N°	Description
1	Intake filter	12	2 <sup>nd</sup> stage safety valve
2	1 <sup>st</sup> stage head	13	Monobloc
3	2 <sup>nd</sup> stage head	14	Filter-holding bracket
4	3 <sup>rd</sup> stage head	15	Fan
5	1 <sup>st</sup> stage cylinder	16	Oil cap
6	2 <sup>nd</sup> stage cylinder	17	Final condensate separator
7	3 <sup>rd</sup> stage guiding cylinder	18	Condensate separator between stages
8	1 <sup>st</sup> -2 <sup>nd</sup> stage cooling pipe	19	Condensate discharge connection
9	2 <sup>nd</sup> -3 <sup>rd</sup> stage cooling pipe	20	Maintenance valve
10	Final cooling pipe	21	Pipe-fastening bracket
11	1 <sup>st</sup> stage safety valve	22	3 <sup>rd</sup> stage or final safety valve



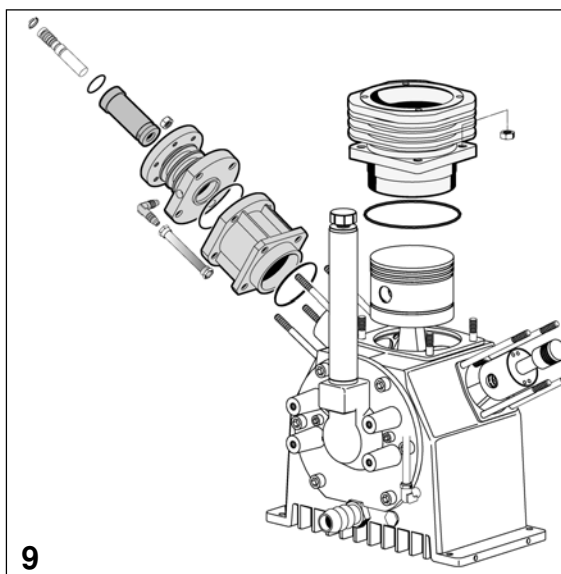
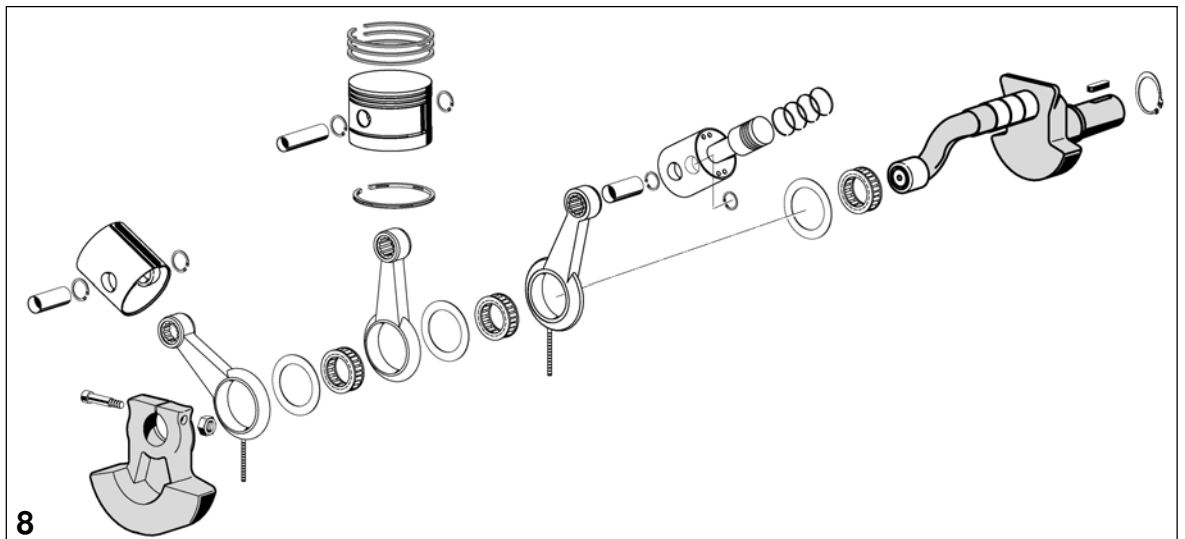
**2.2.1****Monobloc unit**

The gooseneck, the pistons and the cylinders also form a part of this unit.

The monobloc (Fig. 7) is made of aluminium alloy, the two flanges with the ball and roller bearings that support the gooseneck are oil-tight with the monobloc due to the O-Rings fitted.

The gooseneck and the connecting rods only turn on roller or ball bearings (Fig. 8).

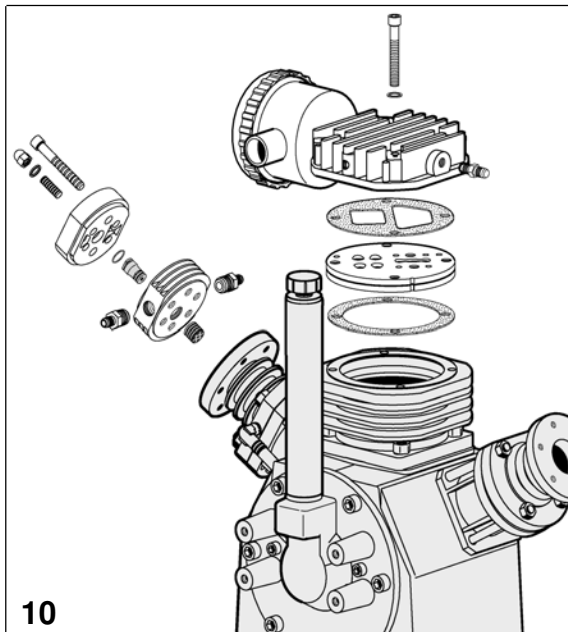
The three connecting rods are fitted on the gooseneck with a single crank angle.



The cylinders are made of cast iron (Fig. 9), while the pistons are made of aluminium and have traditional multiple compression rings. The high pressure stage piston has an anti-wear coating. The relative cylinder is given a self-lubricating treatment.

## Head unit (Fig. 10)

### 2.2.2



The head unit includes the discharge and intake valves.

The head of the 1<sup>st</sup> stage is of a lamellar type and includes both the intake and the discharge.

The intake and discharge valves are located directly in their threaded seats of the heads of the 2<sup>nd</sup> and 3<sup>rd</sup> stages. The intake valves can be removed using the special pin wrench (cod. SC000480), having first removed the heads.

The discharge valves can be removed from the outside.

See Chapter 11, "Maintenance".

## Safety valves

### 2.2.3

The purpose of the safety valves (see figure 5) is to protect the machine (and the cylinders) from overpressure.

These valves are pre-calibrated in the factory at the following pressures:

- safety valve for 1<sup>st</sup> stage: 8 bar;
- safety valve for 2<sup>nd</sup> stage: 50 bar;
- safety or final valve for 3<sup>rd</sup> stage: 225 bar - or 330 bar.

### WARNING

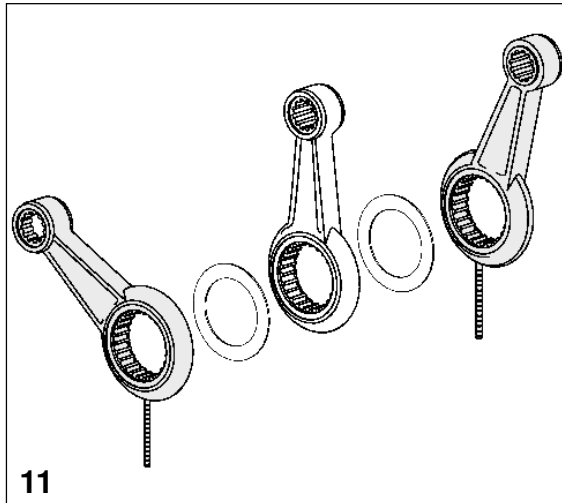
Under no circumstances may these valves be altered to increase the calibrated pressure.

If these valves should come into operation, check the cause that has led to the maximum pressure and take steps according to the instructions given in paragraph 12.1.

Any tampering with the safety valves causes serious damage and an immediate cancellation of the guarantee.



## 2.2.4 Lubricating unit



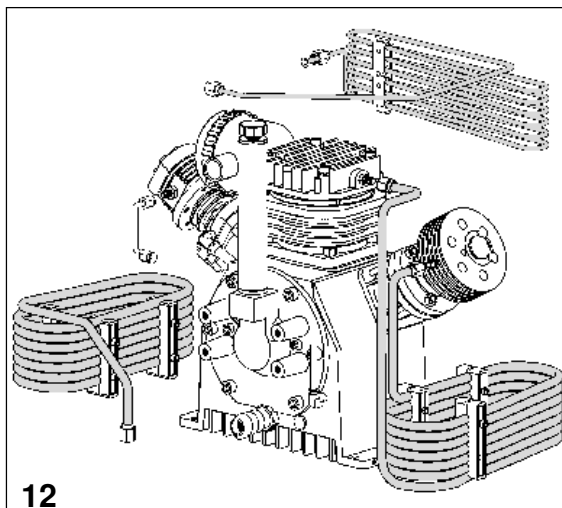
Lubrication is carried out by means of a tang screwed into the end part of the connecting rods of the 2<sup>nd</sup> and 3<sup>rd</sup> stages (Fig. 11).

The 3<sup>rd</sup> high pressure stage is lubricated by oil vapours.

## 2.2.5 Pressure maintenance valve

This valve is fitted after the final filter. Just a few seconds after the compressor has been started up, it keeps the pressure of the entire system at  $100 \pm 20$  bar (see exploded view Chapter 14), for the purpose of eliminating as much water as possible from the air. It also acts as a non-return valve.

## 2.2.6 Cooling pipes (Fig. 12)

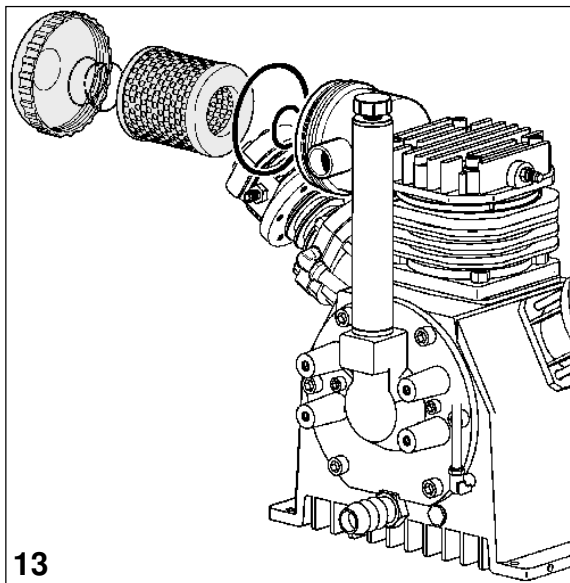


The cooling pipes between the 1<sup>st</sup> and 2<sup>nd</sup> stage, between the 2<sup>nd</sup> and 3<sup>rd</sup> stage and after the 3<sup>rd</sup> stage are made of stainless steel, like those for the passage of air between the separator and the filter.

## Filters

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### INTAKE FILTER (Fig. 13)



The suction filter is coupled directly to the lid of the 1<sup>st</sup> stage head.

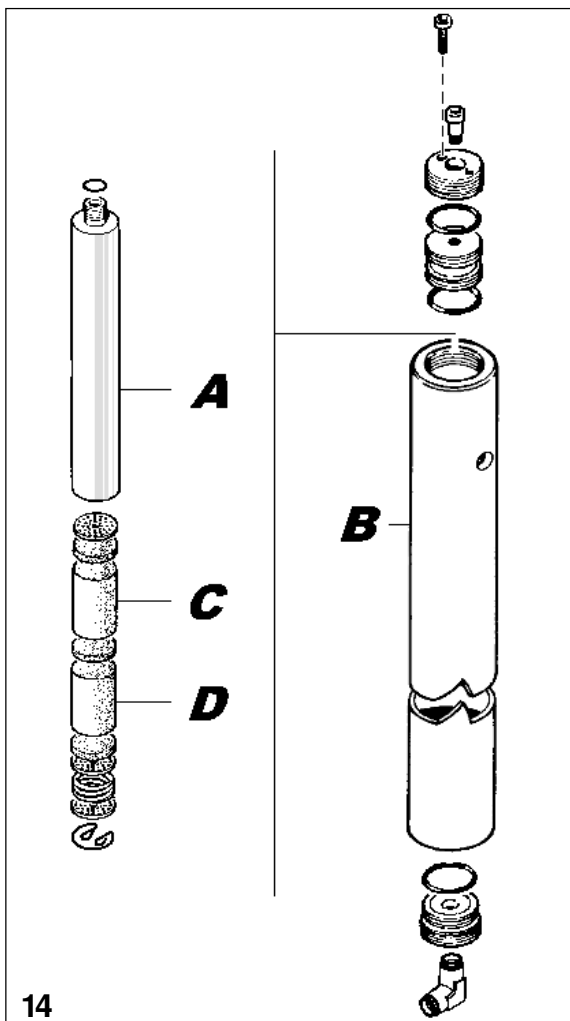
The intake filter consists of a cylindrical aluminium casing provided with a screw cap that holds the filtering cartridge.

A special attachment is provided on the filter for the connection of an extension (optional) which enables air to be taken from the outside when the compressor is installed in a place without ideal ventilation.

For the compressor to operate properly, the filter maintenance must be carried out as provided for and at the intervals recommended (instructions in paragraph 11.6).

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### ACTIVE CARBON AND MOLECULAR SIEVE FILTER (Fig. 14)



For model MCH 13-16/ET, the filter is housed inside the compressor covering panel, while for model MCH 26-32/ET there are two active carbon filters both of which are located on the outside of the compressor on the front panel.

The filter consists of an aluminium tube (B) that holds the filter cartridge (A).

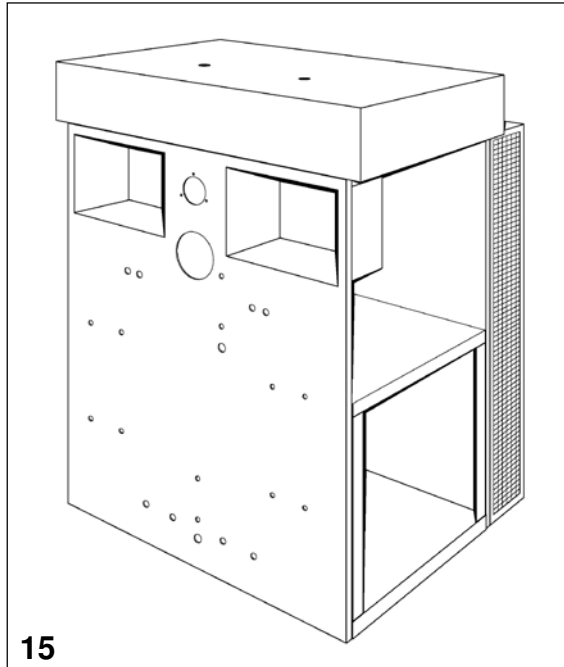
The shell of the cartridge contains the active carbon (C) and the molecular sieve (D) placed between felt disks.

The condition of the cartridge is of fundamental importance for the quality of the air (see paragraph 11.7 for replacement instructions).

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## 2.2.8 Frame and sound-proofed casing (Fig. 15-16)

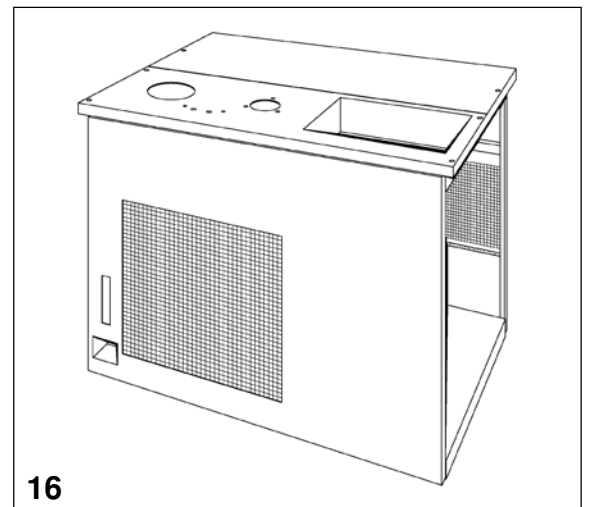
MCH 26-32/ET FRAME



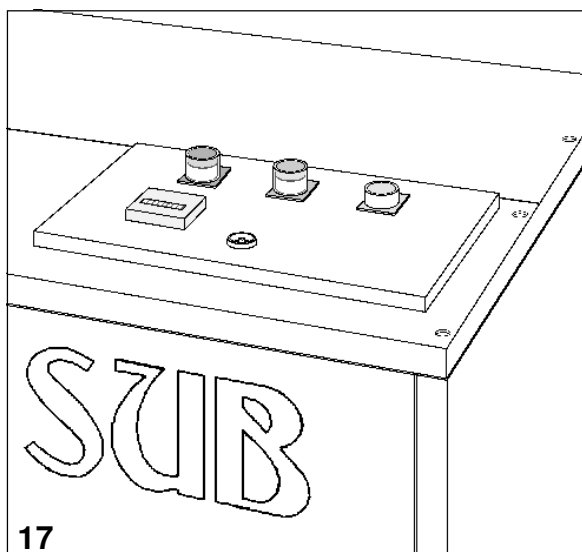
The compressor and the electric motor are fitted on a welded steel frame coated in epoxy resins and are enclosed within a sound-proofed casing covered in sound-deadening, water-repellent and fireproof panels.

The excellent way in which the flow of the cooling air has been designed enables the temperature inside to be just slightly higher than the outside temperature.

MCH 13-16/ET FRAME



## 2.3 Machine control

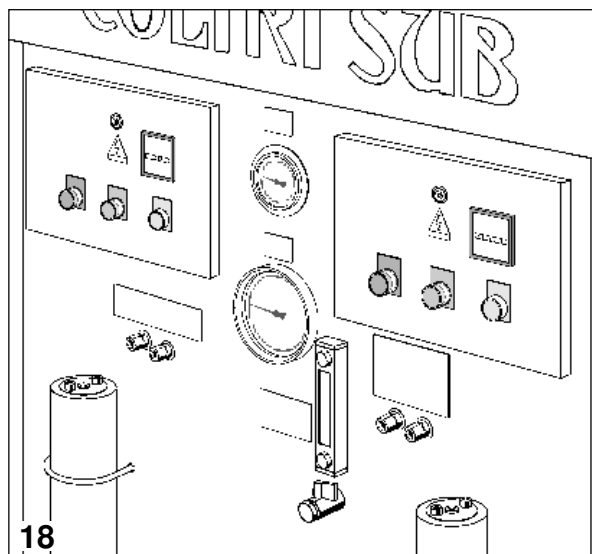


MCH 13-16/ET

The machine function controls are located on an electric control panel (Fig. 17).

Apart from the various control buttons, this panel also includes an hour counter that enables the number of machine operating hours to be memorized.



**MCH 26-32/ET**

This model also has the same control buttons as for model MCH 13-16/ET.

For model MCH 26-32/ET, the same controls are doubled up on two independent control panels (Fig. 18) which each control one of the two pump units present inside the refill station.



# 3

## TECHNICAL CHARACTERISTIC



This chapter provides some technical information concerning the machine.

<b>3.1</b>	<b>Technical characteristics of the pump unit</b> .....	<b>18</b>
	<b>3.1.1 Machine series MCH 13-16-26-32/ET</b> .....	<b>18</b>
	<b>3.1.2 Sizes and weights</b> .....	<b>19</b>
<b>3.2</b>	<b>Noise</b> .....	<b>19</b>

### 3.1 Technical characteristics of the pump unit

The pump unit consists of: three compression stages, three cylinders, forced air cooling by means of a large diameter fan, splash lubrication with immersed tangs, stainless steel cooling pipes.

#### 3.1.1 Machine series MCH 13-16-26-32/ET

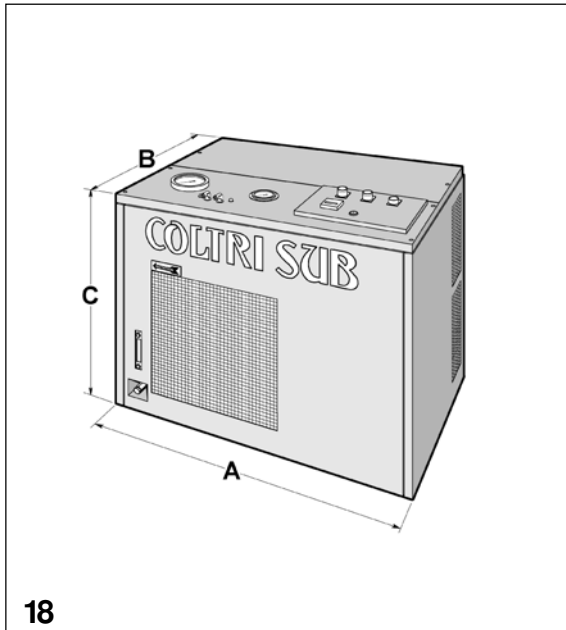
Table 1

	MCH 13/ET	MCH 16ET	MCH 26/ET	MCH 32/ET
Max. non-continuous peak pressure	225 o 330 bar - 3200 o 4700 psi			
Max. non-continuous working pressure				
Capacity	approx. 210 lt/min 13 m <sup>3</sup> /h	approx. 260 lt/min 16 m <sup>3</sup> /h	approx. 420 lt/min 26 m <sup>3</sup> /h	approx. 520 lt/min 32 m <sup>3</sup> /h
Cylinder diameter	88/36/14 mm	95/38/14 mm	88/36/14 mm	95/38/14 mm
Speed of rotation	1350 r.p.m.	1550 r.p.m.	1350 r.p.m.	1550 r.p.m.
Piston stroke	40 mm			
Intermediate pressures	1 <sup>st</sup> stage 2 <sup>nd</sup> stage 3 <sup>rd</sup> stage	5 bar/70 psig 40 bar/570 psig 225-330 bar/3200-4700 psig	1 <sup>st</sup> stage 2 <sup>nd</sup> stage 3 <sup>rd</sup> stage	5 bar/70 psig 40 bar/570 psig 225-330 bar/3200-4800 psig
Power motor	4Kw-5,5HP	5,5Kw-7,5HP	2x 4Kw-5,5HP	2x 5,5Kw-7,5HP
Tension and frequency (three-phase)	400V - 50Hz 440V - 60Hz 230V - 50Hz 230V - 60Hz			

**Sizes and weights (Fig. 18-19)**

**3.1.2**

MCH 13-16/ET COMPACT



MCH 26-32/ET COMPACT

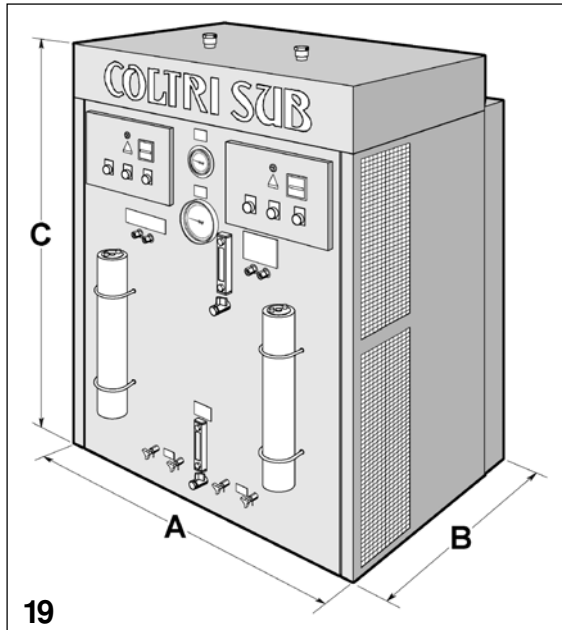


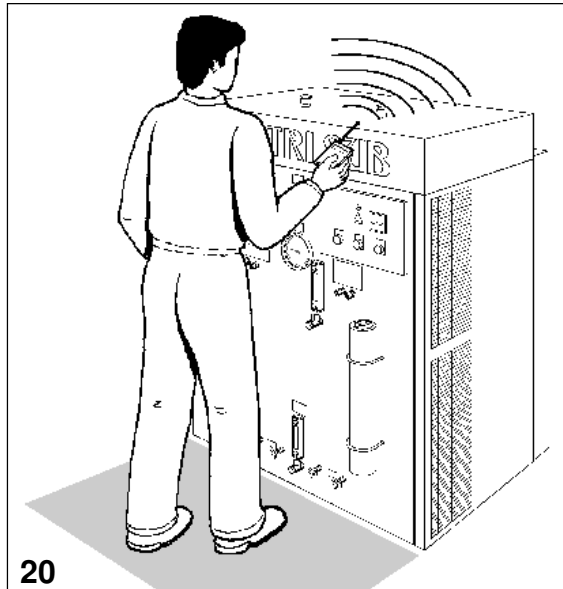
Table 2

MODEL	A (mm)	B (mm)	C (mm)	Weight (Kg.)
MCH 13/ET Compact	890	600	840	141
MCH 16/ET Compact	890	600	840	151
MCH 26/ET Compact	890	850	1330	286
MCH 32/ET Compact	890	850	1330	306

**Noise**

**3.2**

The **Compact** series of compressors have been designed and built with the objective of reducing acoustic pressure to a minimum.



The reading of the machine noise level was taken from the "operator's work place" (Fig. 20), with the following methods and results:

**Table 3**

METHODS OF MEASUREMENT ISO 3746	MCH 13/ET Compact	MCH 16/ET Compact	MCH 26/ET Compact	MCH 32/ET Compact
Level of acoustic pressure at the operator's work place	dB(A) 79,4	dB(A) 81	dB(A) 72,4	dB(A) 75
Level of acoustic power	dB(A) 91,5	dB(A) 94,5	dB(A) 92,7	dB(A) 97,1
Peak level	-	-	-	-
INSTRUMENTS				
Bruel & Kjacr sound level integrating meter	Mod. 2231 cl. 1			
Microphone for sound level meter	Mod. 4155 cl. 1			
Gauge	Mod. 4230 cl. 2			

Whenever the machines are used for work in environments where the daily noise level to which the operators are exposed is higher than 80 dBA, the employer must take steps to apply all the measurements necessary to safeguard the operator's health. In particular, the operators must, if necessary, use all the individual protection devices to protect themselves from the noise level.

## PRECAUTIONS FOR USE AND MAINTENANCE

# 4

Refer to the specific "Safety Regulation Manual" which is supplied enclosed with this manual (and which forms an integral part of the same).



4.1	<b>Machine area diagrams</b> .....	21
4.1.1	<b>Safety devices</b> .....	22
4.1.2	<b>Residual risk areas</b> .....	24

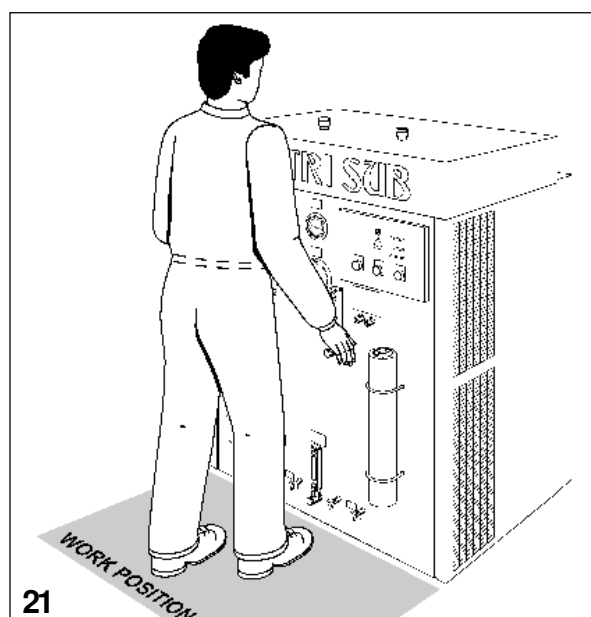
### Machine area diagrams

## 4.1

The **MCH 13-16-26-32/ET Compact** series of compressors are electrically driven, automatically operated machines.

Therefore the term "operator" as repeatedly defined in this manual refers to the following professional figures:

- **PERSON IN CHARGE OF MAINTENANCE**, this is the person entrusted with the handling, installation, start-up, regulation, cleaning, repair, changing of the tooling and maintenance of the machine.  
This person must be a qualified member of staff who has followed courses of specialization and who has had experience with the handling, installation, start-up and maintenance of machines and plants of a mechanical, electrical and pneumatic type.  
It is always advisable for the person in charge of maintenance to follow a training and specialization course on the machine given by the **AEROTECNICA COLTRI S.r.l.** technicians.
- **PERSON IN CHARGE OF OPERATION**, this is the person responsible for operating the machine whose work must be limited only to filling the cylinders and the control operations.  
This person must be perfectly acquainted with all the machine instructions and operating methods as described in this manual and the regulation manual.



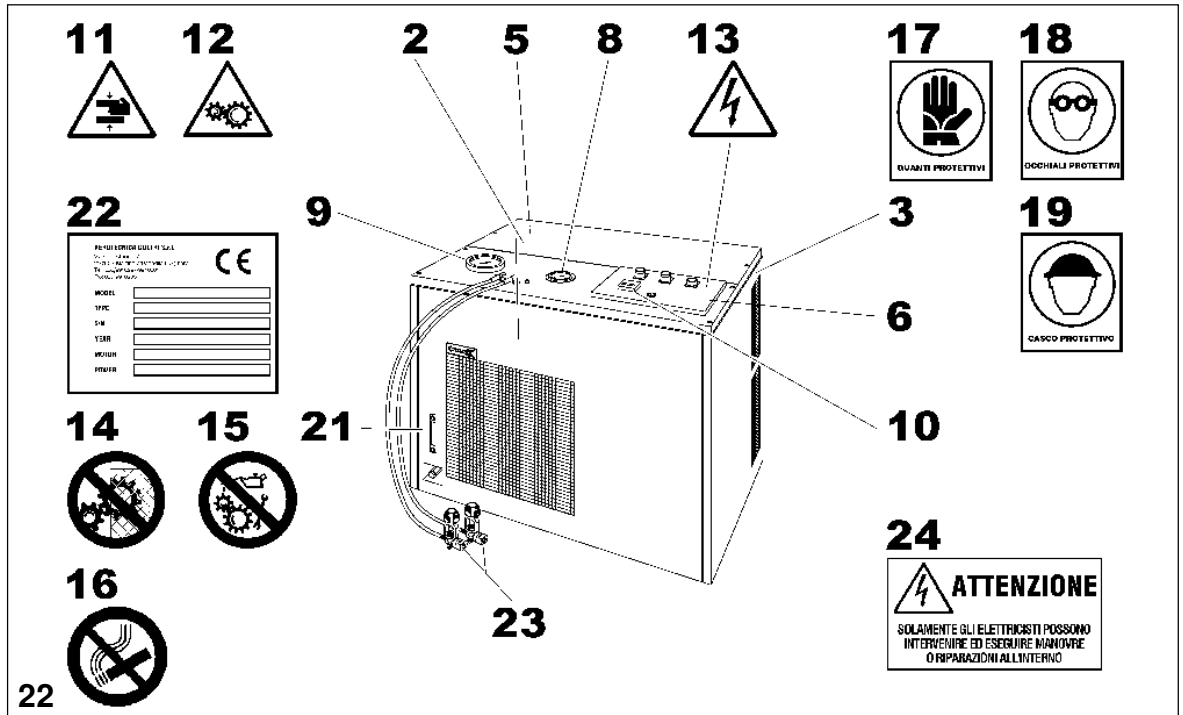
It is absolutely prohibited for the person in charge of operation to carry out any tasks other than those described above or to work in areas other than those marked in figure 21.

### 4.1.1 Safety devices

The **MCH 13-16/ET Compact** (Fig. 22) and **MCH 26-32/ET Compact** (Fig. 23) series of compressors are equipped with a series of protection guards fitted with screws and safety devices to guarantee the operator's safety, by limiting the work area and ensuring good operating conditions.

The figure shows the safety devices provided on the compressors and the information labels applied.

The model "MCH 13-16/ET Compact" compressor



The model "MCH 26-32/ET Compact" compressor

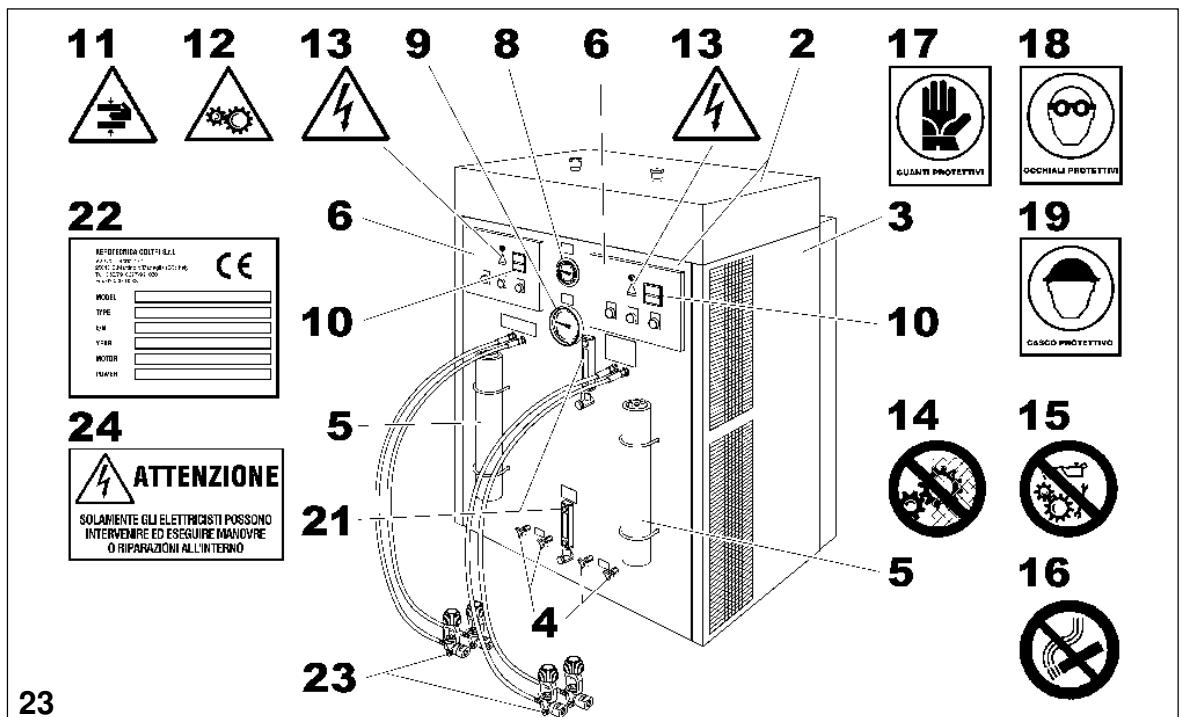




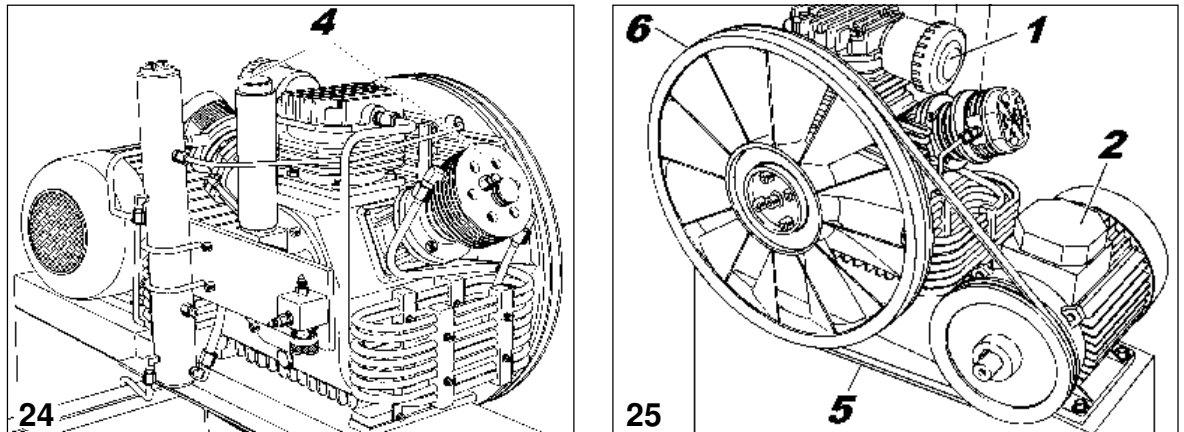
Table 1

POSITION	SAFETY DEVICE	DESCRIPTION	INSPECTION
1	Safety valves.	Protect the third stage and the cylinders from being overfilled; it is calibrated during the inspection of the compressors.	The safety valve must be checked at each refill; start up the compressor with the cylinder valves closed and the end valve open. Check that the safety valve starts operating correctly with the pressure gauge, open the valves and proceed with the refill.
2	Sound-proofed frame.	Built of steel.	Periodically check its integrity.
3	Side panels.	Fixed with locks.	Periodically check their integrity.
4	Manual condensate discharge taps.	The condensate is a milky-white emulsion formed of oil and water. The absorption of water by the filter causes wear on the filter itself and consequent contamination.	Open the discharge taps every 10-15 minutes and make sure the condensate comes out visibly and consistently. If the condensate is discharged automatically, check that it operates correctly by opening the manual discharge taps. The condensate should be present in minimum quantities.
5	Active carbon filter and molecular sieve.	The quality of the air depends to a great extent on the conditions of the filter and sieve.	The cartridge must be replaced before the air becomes foul smelling. For the frequency of replacement, see the instructions in Chapter 11, "Maintenance".
6	Electrical switchboard built to EN 60204-1 regulations with IP 54 level of protection and fitted with a lock and key.		
7			
8	Pressure gauge showing the operating pressure.		
9	Pressure switch that can be manually calibrated showing the maximum cylinder filling pressure; when the set pressure is reached, the compressor turns off.		
10	Sealed hour counter to memorize the actual hours of operation in order to be able to carry out the maintenance procedures at the proper intervals.		
11	Danger of crushing hands symbol (if the side panels are removed).		
12	Danger of moving parts symbol.		
13	Danger of voltage present symbol.		
14	Removal of safety devices prohibited symbol.		
15	Work on moving parts prohibited symbol.		
16	Smoking prohibited symbol.		
17	Gloves compulsory picture diagram.		
18	Goggles compulsory picture diagram.		
19	Helmet compulsory picture diagram.		
20	Rating plate on the electric motor giving data concerning voltage, phases, frequency, breaking capacity.		
21	Pump unit oil level indicator.		
22	Machine plate showing the CE mark.		
23	Hose area : danger of direct contact by the operator if breakage should occur during cylinder filling.		
24	Voltage warning plate. Only qualified staff may intervene.		
(see "Safety Regulations" enclosed)	Warning to use the machine and carry out maintenance in accordance with the instruction manual.		
(see chapter 11)	Warning to cut off the power supply before carrying out any maintenance work.		

### 4.1.2 Residual risk areas

In some areas of the machine there are some residual risks that could not be eliminated during the design phase or protected by guards due to the particular operation of the compressors model **MCH 13-16-26-32/ET Compact** (Fig. 24-25). Each operator must be aware of the residual risks present on the machine in order to avoid possible accidents.

**MCH 13-16-26-32/ET Compact**



**Table 2**

POSITION	DESCRIPTION
1	Danger of polluting the air produced owing to the possibility of mixing fumes or vapours from the lubricating oil with the compressed air produced.
2	Electrical danger. Use the machine with suitable protection from the electrical power supply especially in the presence of water and humidity.
3	Danger deriving from the noise emitted by the compressor if maintenance work is carried out without the safety guards.
4	Pump unit area : danger from heat. For any maintenance operation (requiring the removal of the safety guard) wait about 30 minutes after turning off the engine.
5	Transmission belt area: danger of crushing or dragging by the belts when maintenance work is carried out without the safety guards.
6	Cooling fan area: danger of impact and abrasion if the cylinders are refilled without the safety guards.





## UNPACKING AND HANDLING THE MACHINE

# 5

This chapter provides the instructions necessary for unpacking and handling the machine.



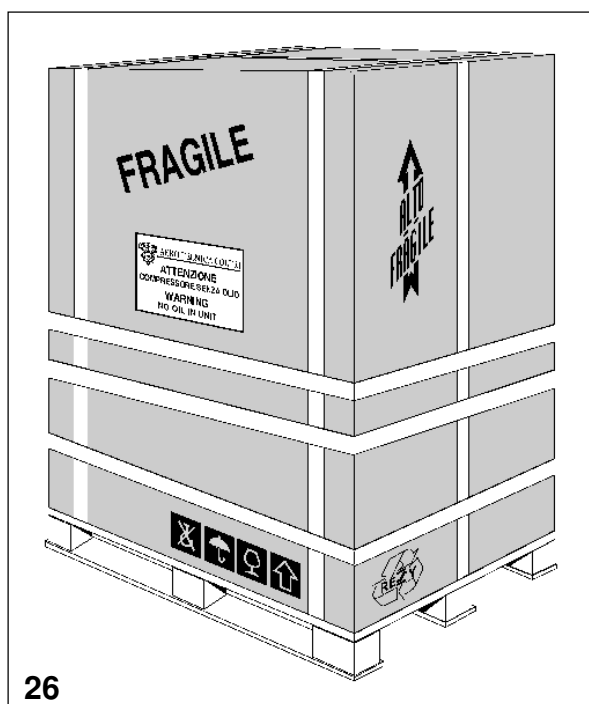
5.1	Unpacking the machine.....	25
5.2	Pack contents .....	26
5.3	Handling the machine.....	26

### Unpacking the machine

## 5.1

The machines in the **Compact** series are delivered fully assembled, but with the hoses supplied separately.

The compressors are packed in cardboard boxes fitted on europallets to make handling and transportation easier.



To unpack the boxes containing the machine, follow the instructions given on the outside of the boxes with great care (Fig. 26).

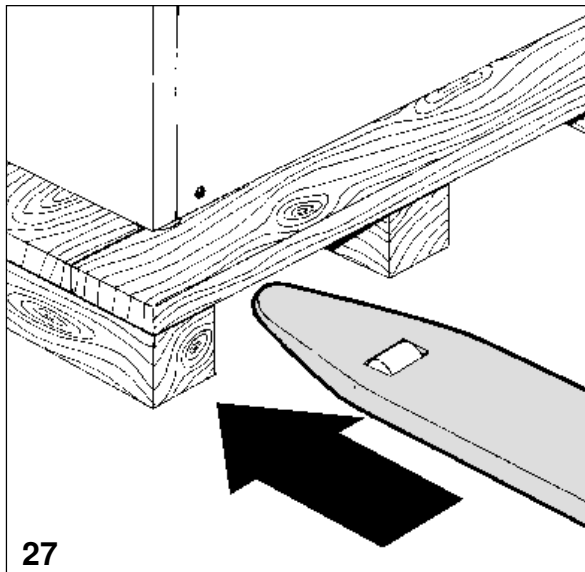
## 5.2 Pack contents

The standard equipment with which the machine is supplied is:

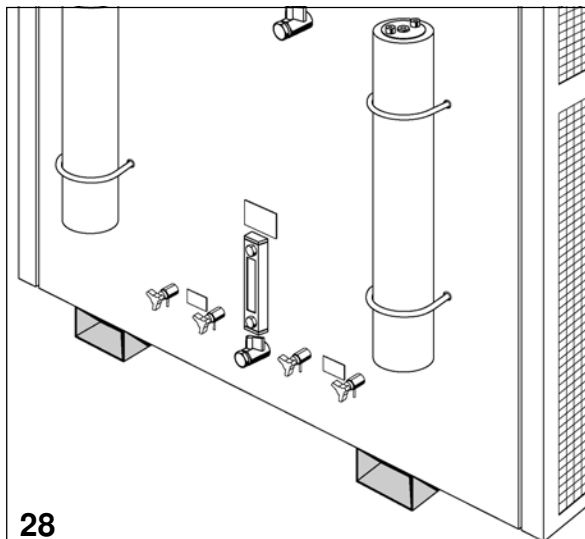
- 2 refill hoses measuring 1200 mm with valve for model MCH 13-16/ET Compact and 4 hoses for model MCH 26-32/ET Compact;
- operating and maintenance booklet;
- enclosure with the Instruction Manual (Safety regulations);
- lubricating oil in cans (2 lt for model MCH 13-16/ET Compact and 4 lt for model MCH 26-32/ET Compact).

## 5.3 Handling the machine

Having removed the compressor from its pack as described in the previous paragraph, the machine can be moved to its place of installation.



To carry out this operation, it is necessary to use a fork-lift truck or transpallet (of a suitable capacity), the forks of which must be positioned between the feet of the europallet on which the machine is placed (Fig. 27).



Model MCH 26-32/ET is fitted with special side members fixed under the structure (Fig. 28) that enable the machine to be lifted with a fork-lift truck even when it is not on a europallet.



# INSTALLATION

# 6

This chapter provides a description of the operations for installing the machine.

The following instructions presume that the operator has already become familiar with the regulations given in Chapter 4, "Precautions for use and maintenance".



<b>6.1 Positioning</b> .....	<b>27</b>
<b>6.2 Connections</b> .....	<b>28</b>
<b>6.2.1 Connecting the air intake extension</b> .....	<b>28</b>
<b>6.2.2 Connecting the refill hoses</b> .....	<b>32</b>
<b>6.2.3 Electrical connections</b> .....	<b>33</b>

## WARNING

Before proceeding with the installation operations described below, read Chapter 4, "Precautions for use and maintenance" carefully and proceed as directed.



## Positioning

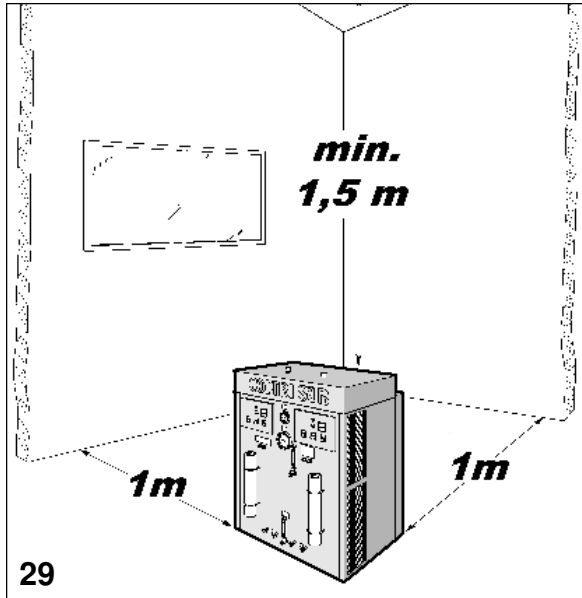
## 6.1

- 1 Position the machine in the chosen area and check that it is on a level (the plane should not be at an angle of more than 5° to assure perfect lubrication). For the machine sizes, see paragraph 3.1.2 "Sizes and weights".

### WARNING

The compressors used on board boats can be certified with inspections by R.I.Na (Italian Register of Shipping), to be requested as a special supply.

- 2 Check that in the place chosen for installation there are suitable ventilation conditions:
  - a good change of air (several windows), no dust and no risks of explosion, corrosion or fire.
- 3 Use in environments with a temperature of over 40 °C makes it necessary to use synthetic lubricating oil and air-conditioning must be provided for the environment.



- 4 Position the machine at a minimum distance of 1 m. from the surrounding walls and at a distance of not less than 1.5 m. from the ceiling in order not to compromise the proper operation and cooling of the pump unit (Fig. 29).

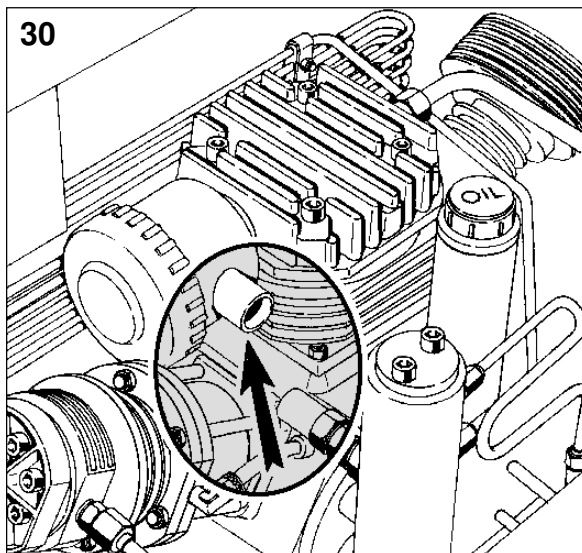
- 5 Make sure that the machine is in a well-lit area, so that each detail can be clearly made out (especially the writing on the plates).

Add artificial lighting to the area if the natural lighting is not sufficient for the requirements mentioned.

## 6.2 Connections

### 6.2.1 Connecting the extension for the air intake

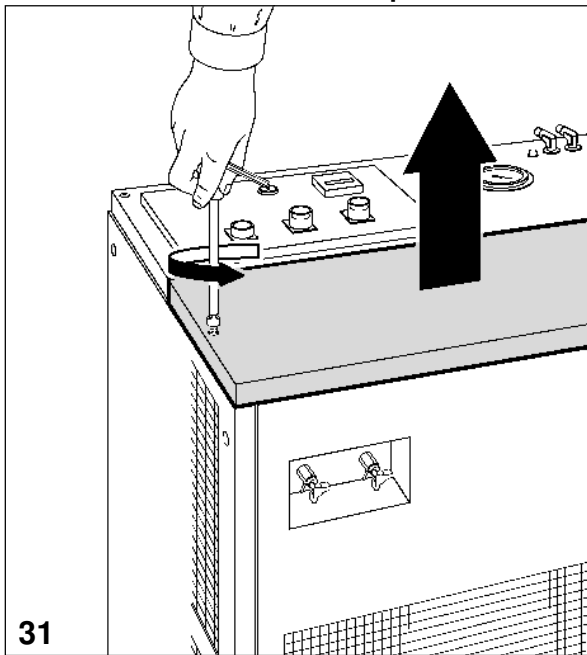
If the machine is installed in a place without the ventilation features as referred to in the previous paragraph, it is necessary to fit the system with an extension to take in air from the outside or from a place with the above-mentioned ventilation characteristics.



This extension which is supplied as an optional, must be connected to the appropriate intake attachment (Fig. 30).



**MCH 13-16/ET Compact**

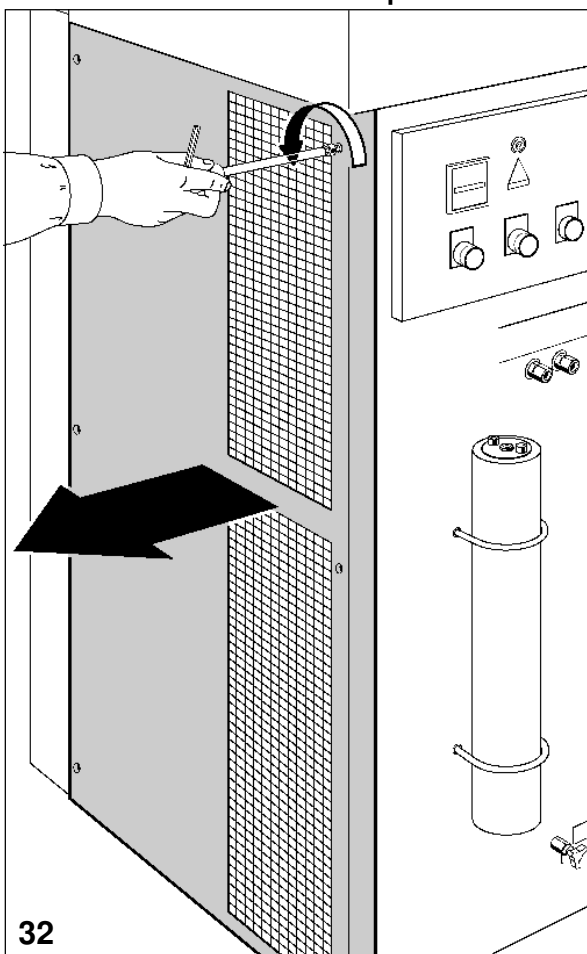


To connect the extension, proceed as follows:

**MCH 13-16/ET Compact**

- 1 Remove the upper protective cover by unscrewing the fixing screws (Fig. 31).

**MCH 26-32/ET Compact**



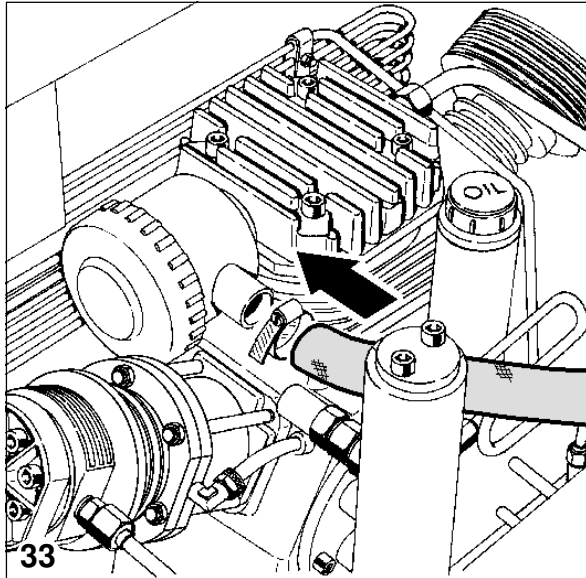
**MCH 26-32/ET Compact**

- 1 Remove the left-hand side protective cover (looking at the compressor from the **front**), by unscrewing the fixing screws (Fig. 32).

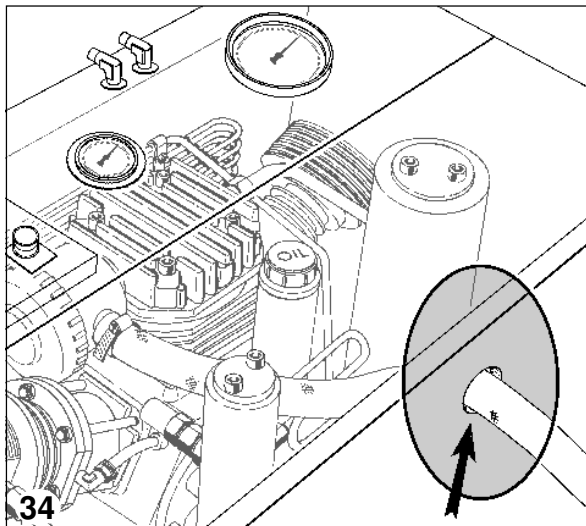
**WARNING**

Only use a flexible pipe provided with a steel spiral internal reinforcement to prevent bending and a consequent reduction in the cross section.



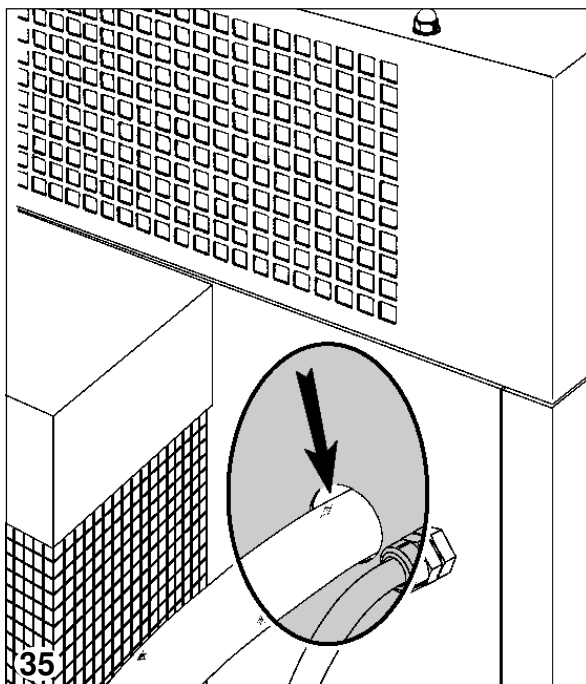


**2** Connect the extension pipe to the connector (Fig. 33) (2 in model MCH 26-32/ET Compact).

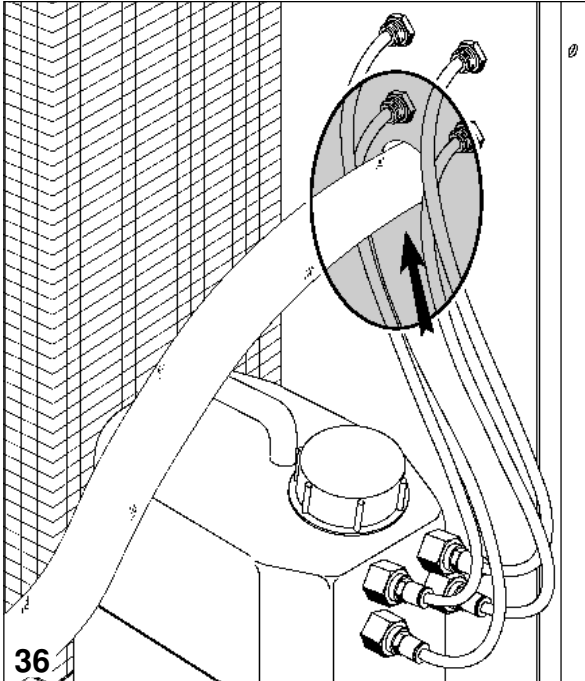


**3** Pass the pipe through the hole located in the rear guard (Fig. 34-35-36) (2 in model MCH 26-32/ET Compact).

**MCH 13-16/ET Compact**

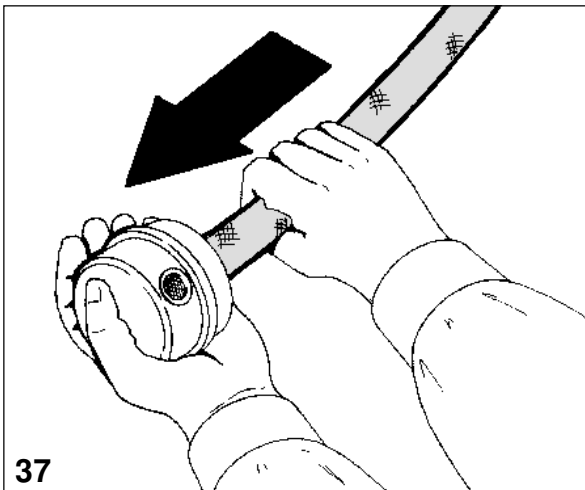


**MCH 26-32/ET Compact**

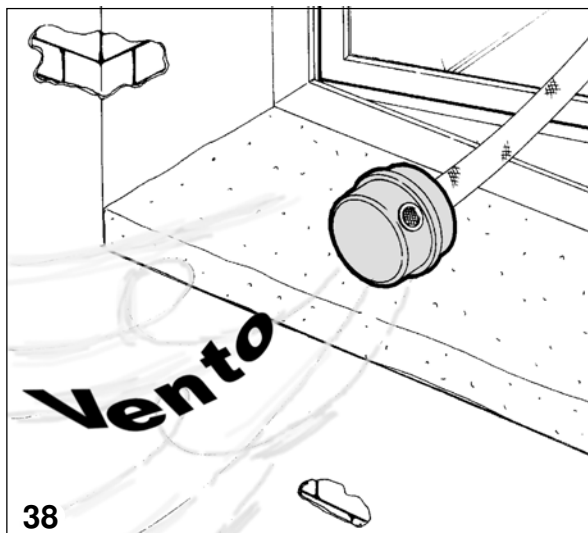


**MCH 26-32/ET Compact**

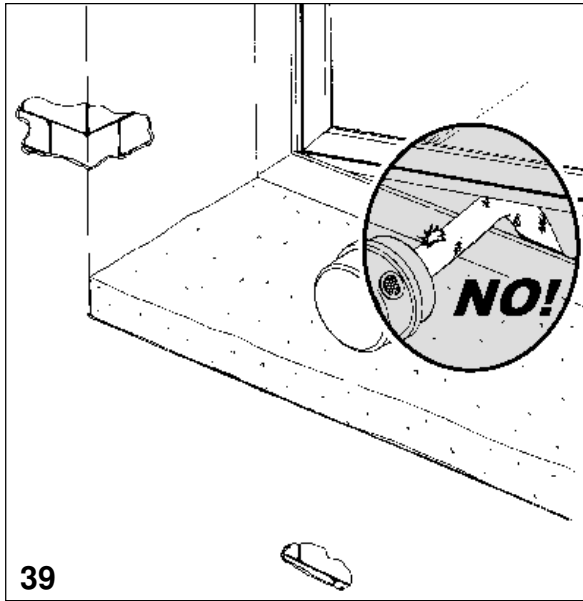
- 4 Fit the additional intake filter on the end of the extension pipe (Fig. 37) (2 in model MCH 26-32/ET Compact).



- 5 Position the end of the extension on which the intake filter is fitted (air intake) in a ventilated place protected from atmospheric agents.



- 6 Direct the air intake in a position "against the wind" (Fig. 38).



7 Make sure that there are no bends or breakages along the length of the pipe (Fig. 39).

If the extension should have broken during the connection to the head, it must be replaced.

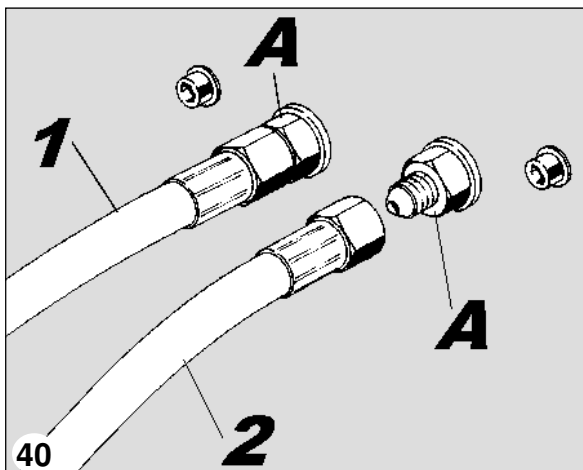


**WARNING**

Make sure that the air intake is away from exhaust fumes given off by internal-combustion engines or harmful fumes.

For the compressor model MCH 26-32/ET Compact, the following operations must be carried out twice (bearing in mind that this model is double).

**6.2.2 Connecting the refill hoses**

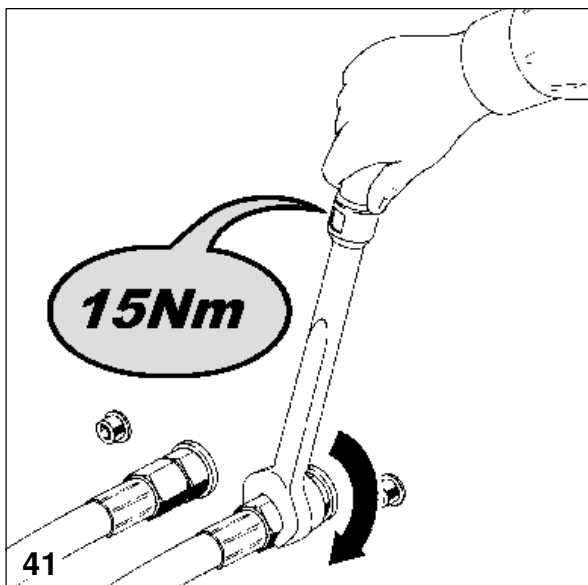


1 Screw hose N° 1 into the special attachment "A" (Fig. 40) without securing it too tightly (see point 4).

2 Connect hose N°2 in the same way as described in the previous point (4 for the model MCH 26-32/ET Compact).

3 A torque wrench should be available to fasten the hoses.





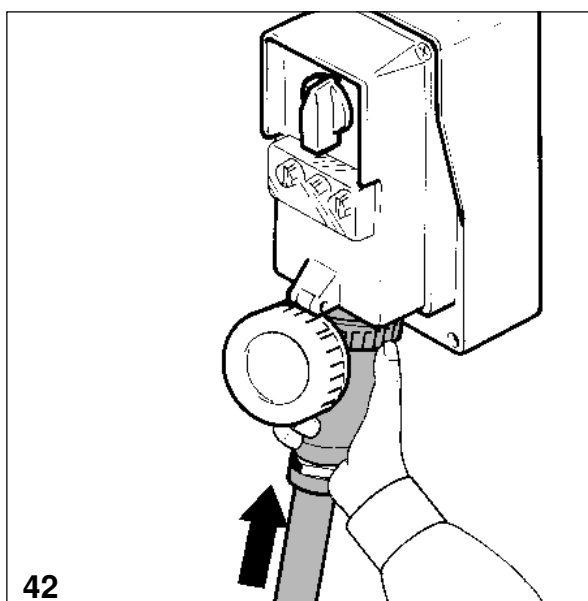
- 4 Tighten the hoses to the machine with a torque wrench setting of 15Nm (Fig. 41).

**NOTE:**

- the hoses should be replaced every so often (every year or every 1000 hours) or when they show signs of being scratched. For this purpose, check the number of operating hours of the hoses that are to be disconnected (on the hour counter).
- The minimum radius of curvature of each hose must not be less than 250 mm.

## Electrical connections

## 6.23



The compressor is supplied with an electric cable and plug (4-pole 16A MCH 13-16/ET, 4-pole 32A MCH 26-32/ET) (Fig. 42).

- 1 For the electrical connection, the plug simply has to be connected to a mains power supply socket.

**WARNING**

Before fitting the plug, make sure that the installation has been set up in accordance with the regulations in force in the country where the compressor has been installed.

- 2 Also check that the details on the machine rating plate are compatible with the mains power supply, especially the nominal current and input voltage.

- 3 The mains power supply should be provided with an effective grounding system. It is particularly important to check that the earth resistance value complies with the protection and operating requirements of the electrical installation of the compressor.

**WARNING**

An effective machine earthing system is of fundamental importance for safety purposes.





# 7

## CONTROL PANEL



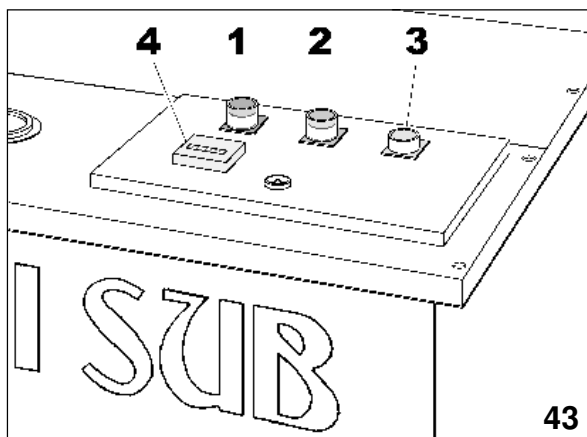
This chapter provides a description of the functions carried out by the various devices fitted on the control panel.

7.1 Control panel..... 34

7.2 Indication and control devices ..... 35

### 7.1 Control panel

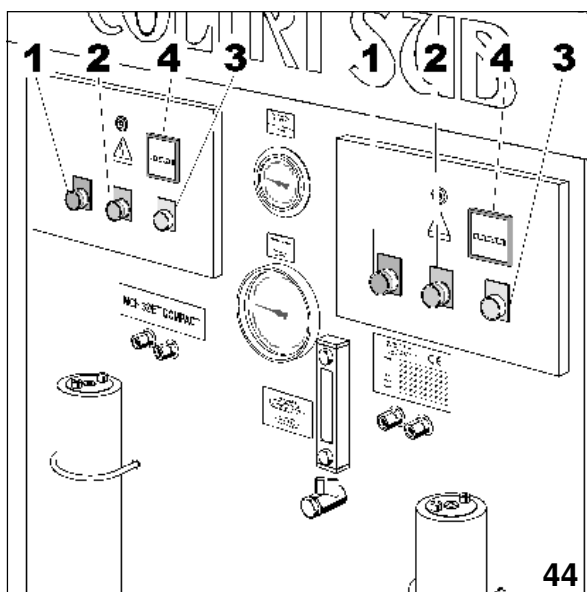
The control panel has three operating buttons and the hour counter to memorize the number of machine operating hours (Fig. 43-44).



**1 ON - green button.**  
It enables the compressor to be started up. The button has a light inside that comes on when it is pressed.  
(The general switch must be in the "ON" position).

**2 OFF - red button.**  
It enables the compressor to be stopped. The button has a light inside that comes on when the power supply is connected.

**3 MANUAL PURGE - yellow button.**  
It enables the condensate to be purged manually. This function permits the pressure present inside the condensate separators and the filter to be discharged, evacuating the condensate through the electromagnetically-controlled valves. This operation is normally carried out by the timer at regular intervals.



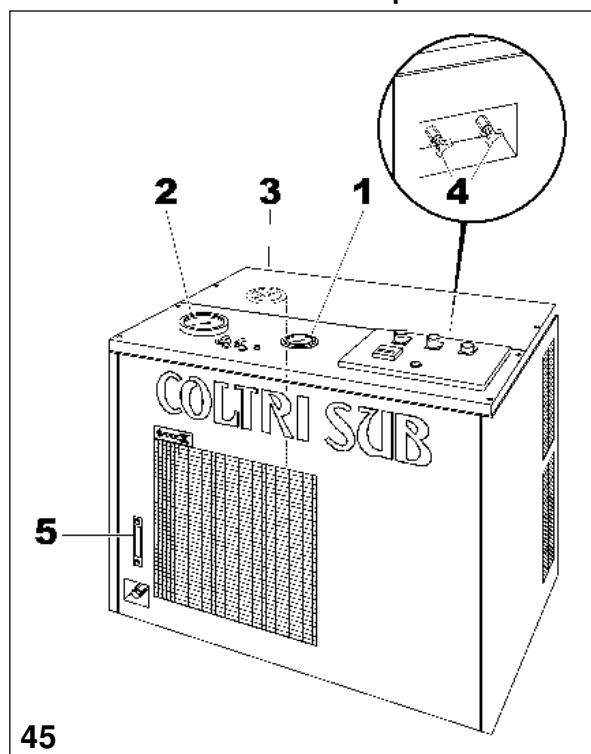
**4 HOUR COUNTER**  
It enables the actual operating hours to be memorized in order to be able to carry out the maintenance work as provided for.

**Indication and control devices**

**7.2**

Apart from the control panel, the front panel of the machine is also fitted with some devices to control the pressure, the discharge of the condensate, the strainer filter and the level of the lubricating oil (Fig. 45-46). Bear in mind that for model MCH 26-32/ET Compact, all the devices are double.

**MCH 13-16/ET Compact**



**1 Pressure gauge**

It indicates the working pressure.

**2 Pressure switch**

It enables the maximum cylinder filling pressure to be set and displayed.

During the cylinder filling phase, the pressure switch stops the compressor when it reaches the maximum pressure as shown by the red cursor.

**3 Strainer filter**

The purpose of this device is to withhold the impurities present in the air before they enter the cylinders.

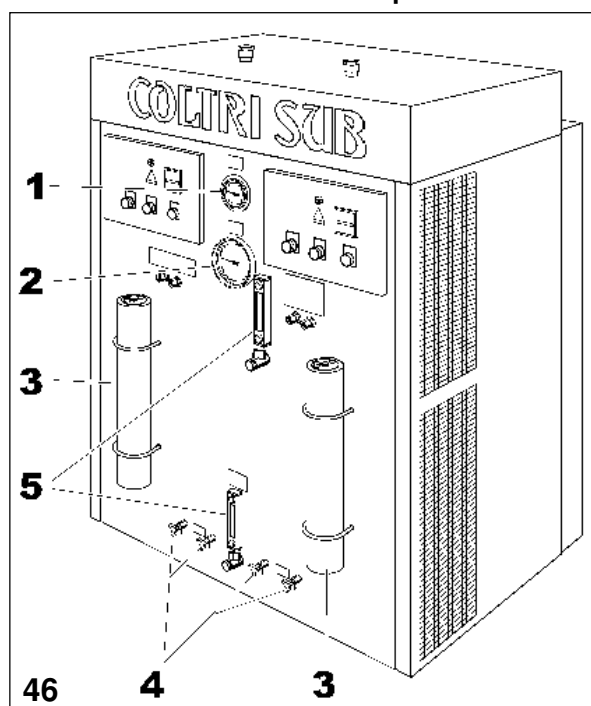
**4 Condensate discharge taps**

They enable the condensate that has accumulated during machine operation to be discharged by hand.

The condensate is discharged automatically by the machine by means of electromagnetically-controlled valves.

**5 Lubricating oil level indicator**

**MCH 26-32/ET Compact**





# 8

## START UP



This chapter describes the operations regarding the machine start up phase.

The following instructions presume that the operator has already become familiar with the precautions given in Chapter 4 "Precautions for use and maintenance" and that the machine has been installed according to the instructions given in the previous chapter.

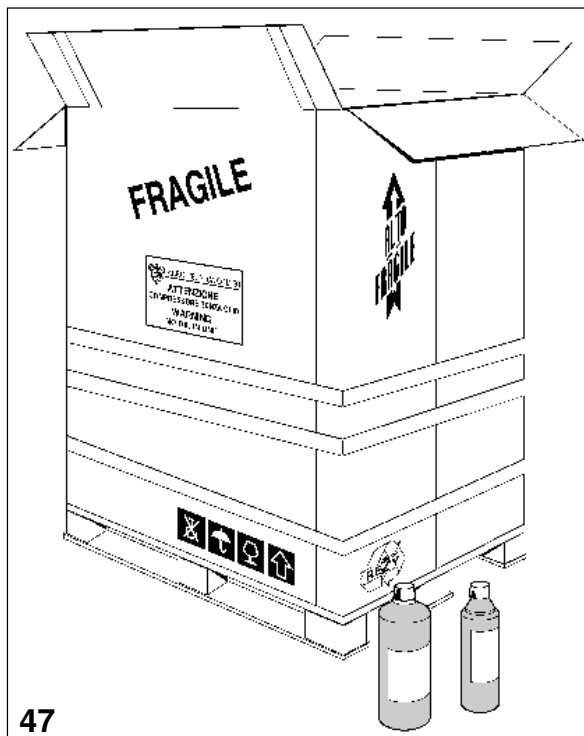
8.1 Filling the machine ..... 36

8.2 Checks ..... 37

### 8.1 Filling the machine

#### WARNING

Before proceeding with the start up operations described below, read chapter 4, "Precautions for use and maintenance" very carefully and follow the advice given.

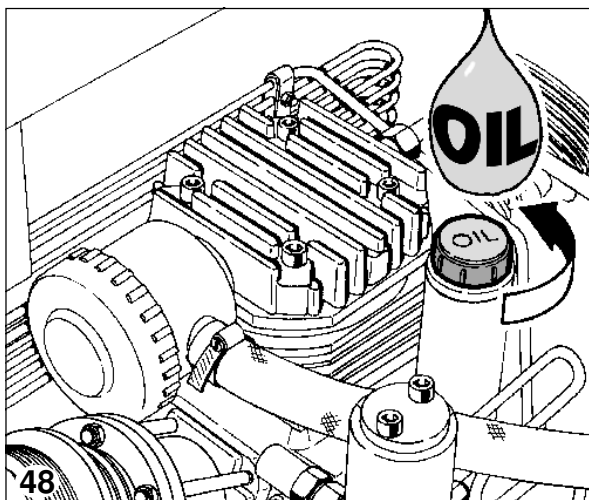


47

Fill the lubricating oil sump of the pump unit when the machine is switched off.

The machine is delivered without lubricating oil which is collected in the cans that can be found inside the machine packaging (Fig. 47).

MCH 13-16/ET Compact

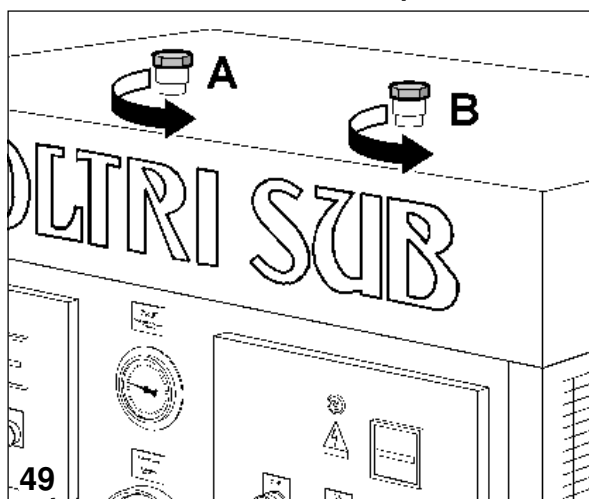


The oil is added by removing the cap marked with the word "OIL" (Fig. 48) for model MCH 13-16/ET, while for model MCH 26-32/ET the two oil caps located on the upper cover of the machine (Fig. 49) and marked with the letters "A" and "B" must be unscrewed.

The quantity of oil to be poured in is 1.5 lt. and the level should be checked with the machine turned off, bearing in mind that an excess amount of oil may cause infiltrations in the cylinders and a deposit on the valves. On the contrary, if the oil level is too low, the tang of the connecting rod is prevented from providing the correct lubrication with the possibility of causing a seizure of the cylinders.

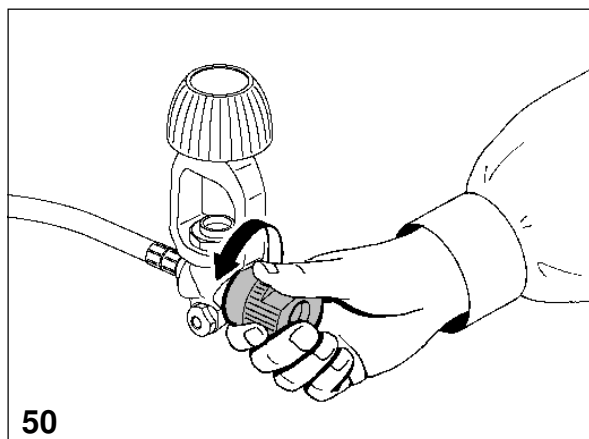
To check the quantity of oil poured in, see the following paragraph.

MCH 26-32/ET Compact

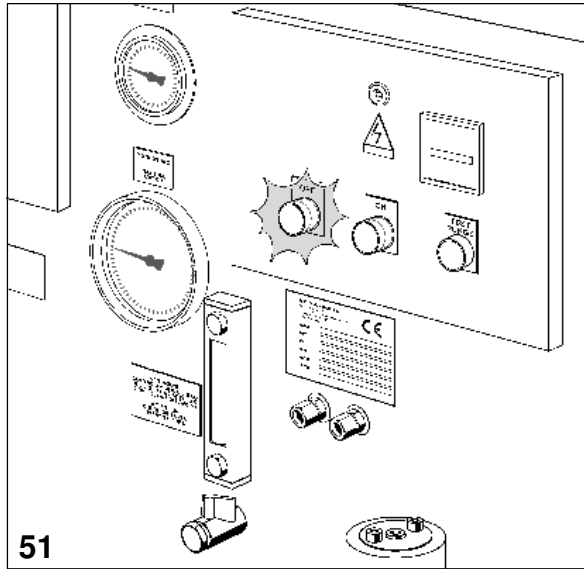


## Checks

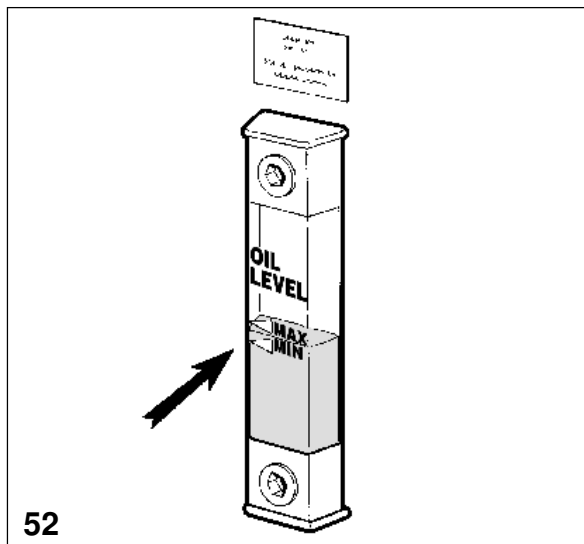
## 8.2



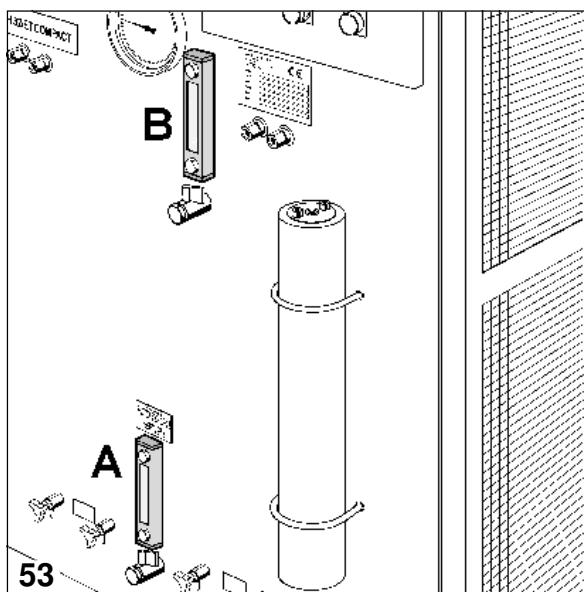
- 1 Turn on the manual condensate discharge taps (Fig. 50).



- 2 Turn the machine on by moving the general switch to the "ON" position. Check that the machine has been switched on by looking to see the red light of the "OFF" button (Fig. 51).
- 3 Run the compressor for about 10 minutes then leave it at a standstill for 20 minutes.



- 4 Check the level of the lubricating oil of the pump unit by looking at the indicator located on the control board (Fig. 52).



For model MCH 26-32/ET, as previously stated, there are two indicators provided, one for each pump unit.

The indicators are marked by the letters "A" and "B" (Fig. 53) and correspond to the same marks also shown on the relative oil caps.

When oil has to be added, this indication will be used to establish, according to the indicator, which cap has to be unscrewed for the filling operation.

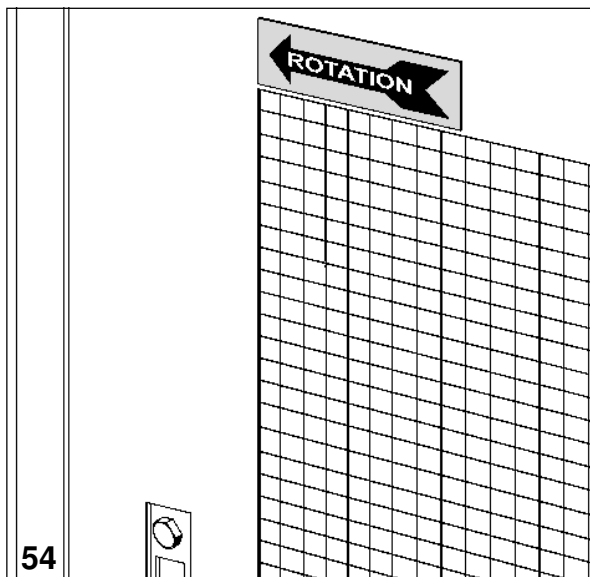
If the level is too low, top the oil up following the instructions given in the previous paragraph.

If the level is too high, discharge some of the oil as described in chapter 11.4 "Changing the lubricating oil".

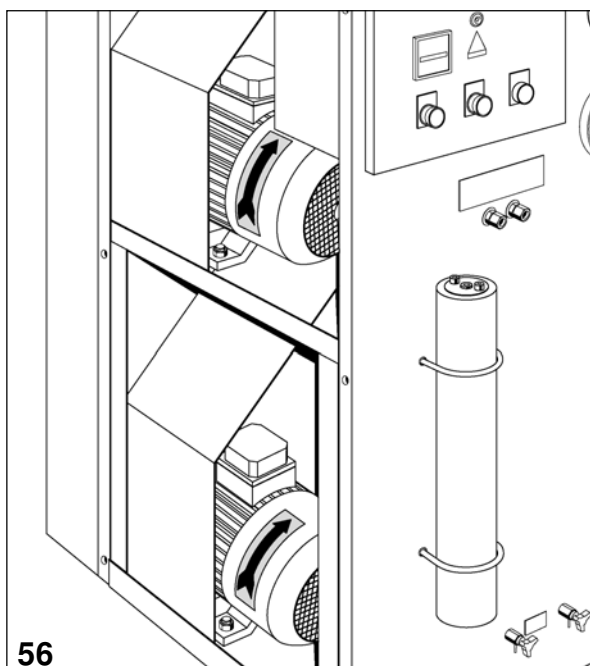
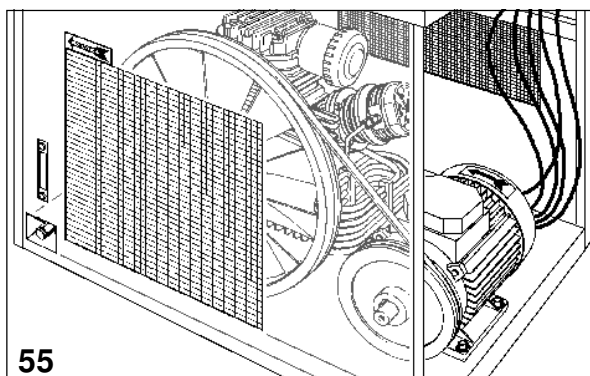
To dispose of the oil, refer to chapter 10.2, "Disposal of waste".



- 5 The operation to check the level of the lubricant must be carried out when the machine arrives and then before starting up the compressor. It must be remembered that if the level is too low or too high it may compromise the running of the compressor.
- 6 In order to check the correct connection of the electrical phases, the engine should be turned on and the direction of rotation checked.

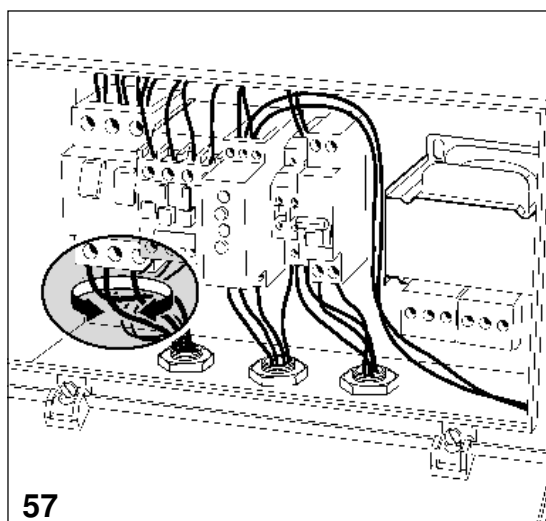


If the direction of rotation does not correspond with that shown by the arrow located on the front panel covering the fan (Fig. 54) for models MCH 13-16/ET Compact and rear panel for models MCH 26-32/ET Compact, or directly on the motors (Fig. 55-56) that can be seen by removing the side panel on the side of the motor, the power supply must be switched off and two of the three phases must be inverted on the main power line (Fig. 57).



**WARNING**

The yellow/green wire corresponds to the earthing. **DO NOT** disconnect or invert this wire.





# 9

## USE



*This chapter describes the operations required for refilling the cylinders.*

*The following instructions presume that the operator has already become familiar with the precautions given in Chapter 4 "Precautions for use and maintenance" and that the machine has been started up according to the instructions given in the previous chapter.*

**9.1 Preliminary operations ..... 40**

**9.2 Refilling the cylinders ..... 43**

### WARNING

Before proceeding to use the machine as described below, read chapter 4, "Precautions for use and maintenance" very carefully and follow the advice given.

## 9.1

### Preliminary operations

- 1 Check that the safety valve is operating properly by starting up the compressor with the end taps turned off so that the pressure in the circuit rises quickly and the valve comes into operation at the set pressure.

The valve is pre-calibrated in the factory at a pressure of 225 bar or 330 bar.

### WARNING

Under no circumstances may the calibration pressure of these valves be increased. Any tampering with the safety valves may cause serious damage to the machine or to persons and a cancellation of the guarantee.

- 2 Check the condition of the cylinders to be filled.

### DANGER



If the cylinders should show evident signs of internal and/or external corrosion, it is not advisable to proceed with the filling operation, even if they comply with inspection requirements.

### WARNING

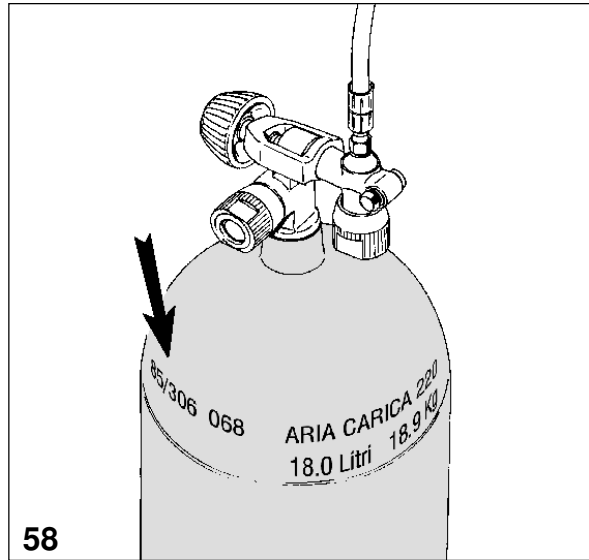


Only use inspected cylinders provided with the relative approval.

The cylinder operating and filling pressure values are given on the cylinders themselves.

It is prohibited to exceed this refill pressure value.





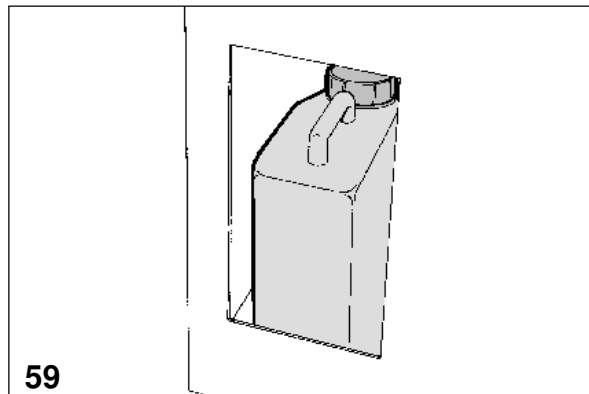
After refilling, the cylinders must not be emptied completely, even during winter storage, to prevent damp air from getting in (Fig. 58).

- 3 Check the condition of the hoses and the relative connectors.

See paragraph 6.2.2 "Connecting the refill hoses".

#### AUTOMATIC CONDENSATE DISCHARGE

##### MCH 13-16/ET Compact

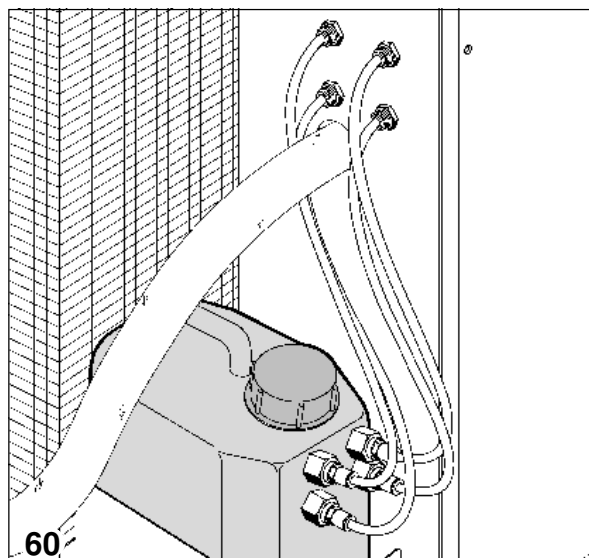


- 4 For the models provided with an automatic condensate discharge, a special condensate collection tank has been fitted in the side compartment of the compressor (Fig. 59-60).

The outlet of water vapourized with lubricating oil should be considered normal during refilling: the quantity is in direct relation to the percentage of humidity present in the air.

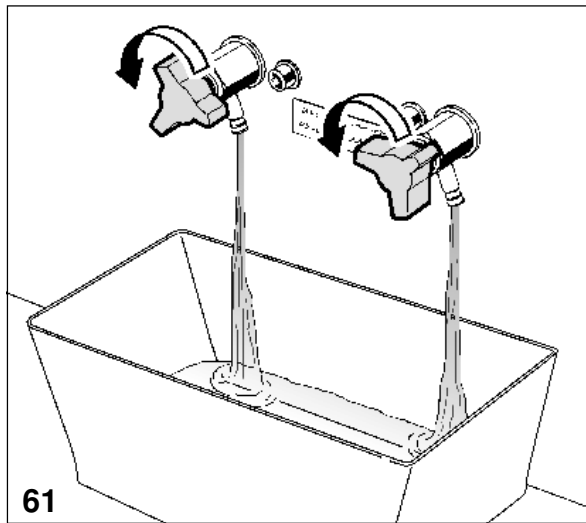
The condensate must be disposed of according to the instructions given in chapter 10.2 "Disposal of waste".

##### MCH 26-32/ET Compact

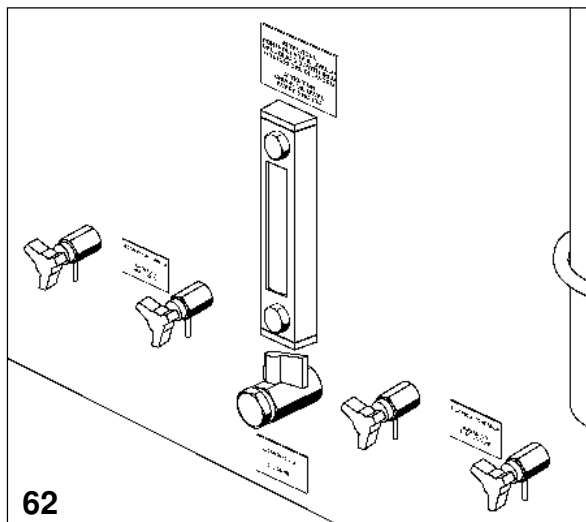




### MANUAL CONDENSATE DISCHARGE

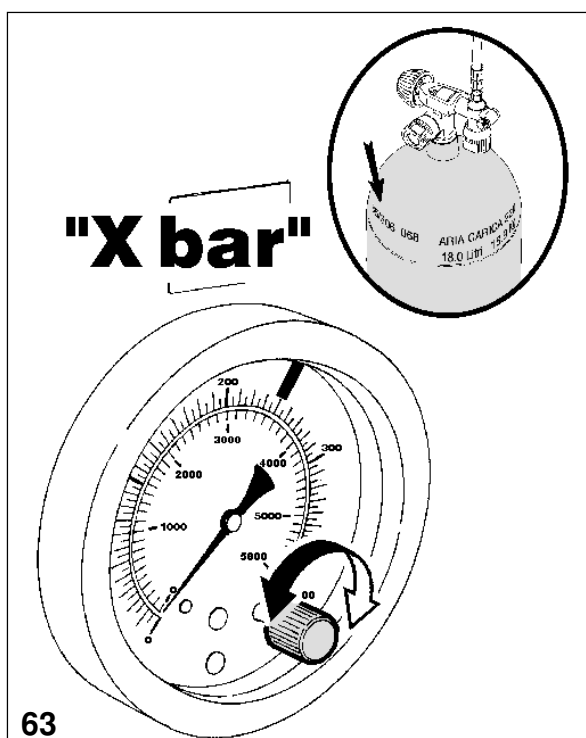


- 4 Place a container under the two condensate sniffle valves and then proceed with the manual discharge by turning on the respective taps (Fig. 61).



For models MCH 26-32/ET Compact the operation must be carried out twice (4 valves) (Fig. 62).

This operation should also be carried out during the cylinder refill operations, every 15/20 minutes only on the models without an automatic condensate discharge feature.



- 5 Set the pressure switch on the control board to the pressure value given on the cylinder using the external knob and positioning the red cursor on the required machine switch-off pressure (Fig. 63).

## Refilling the cylinders

## 9.2

During this operation, the operator's position is that shown in chapter 3.2 "Noise".

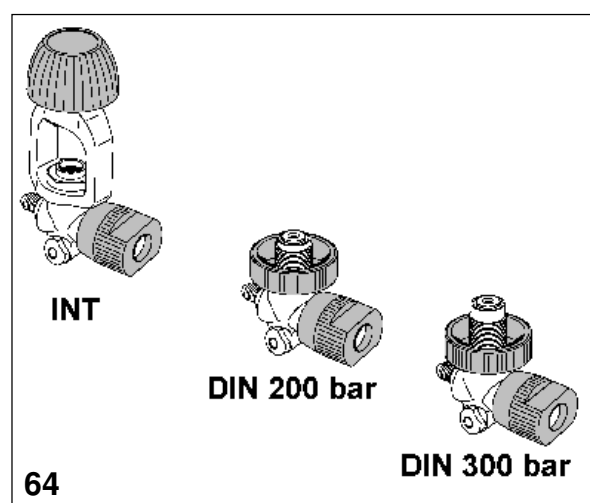
### WARNING

During the refilling of the cylinders it is compulsory for staff who are not involved with the task to keep a distance of at least three metres. Furthermore, it is not permitted to disconnect the hoses from the connectors or from the refill tap while the machine is under pressure.

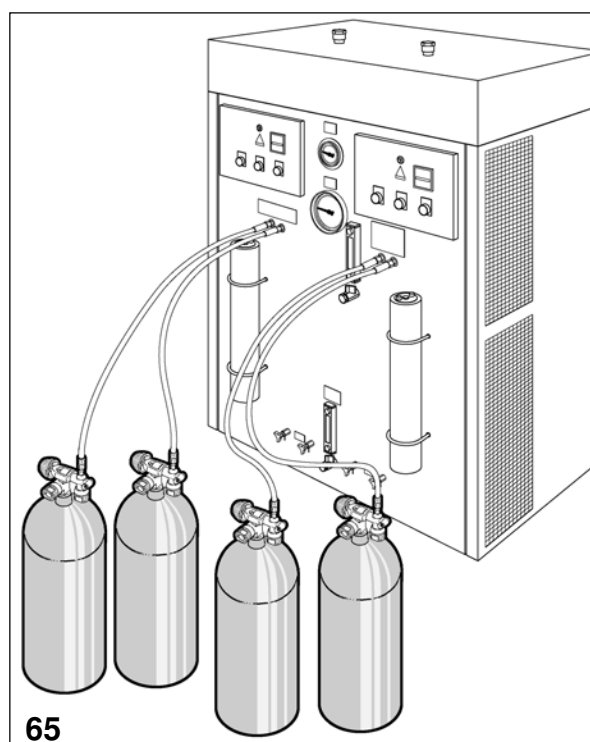


### INDICATION

During the cylinder refill phase, it is advisable to immerse the cylinders in cold water in order to reduce the drop in pressure when the cylinders cool down.



The attachments are disponible: INT - DIN 200 and DIN 300 (Fig. 64).

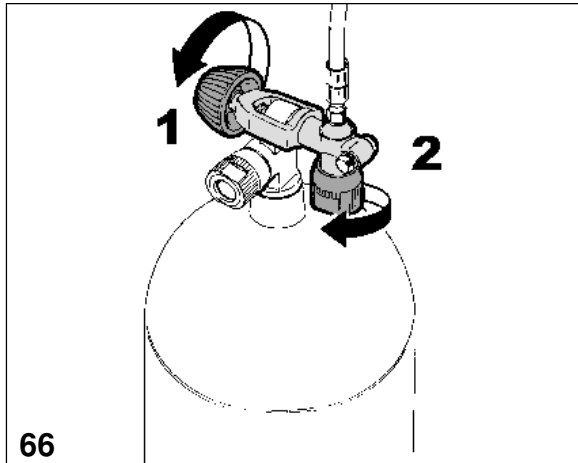


Each refill hose can be connected to a cylinder so that more than one cylinder can be refilled at the same time.

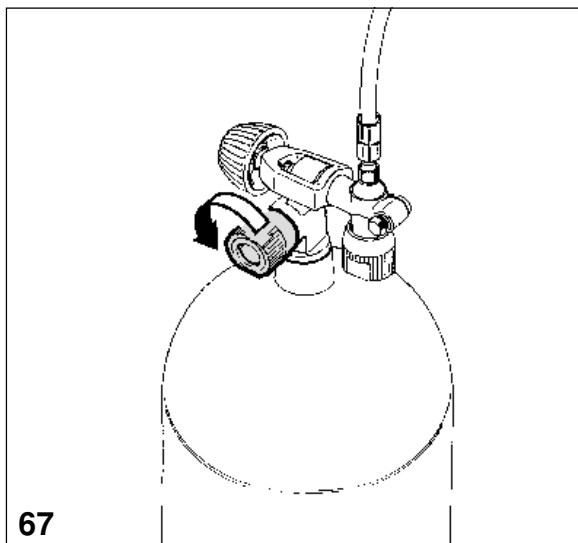
Model MCH 26-32/ET can fill up to four cylinders at the same time with the hoses supplied as a standard fitting (Fig. 65).

The following operations must be repeated for each hose that is to be connected to the cylinder to be refilled. Furthermore, it should be borne in mind that for model MCH 26-32/ET Compact, each control panel on the machine is provided with controls that carry out the same functions (see chapter 7).

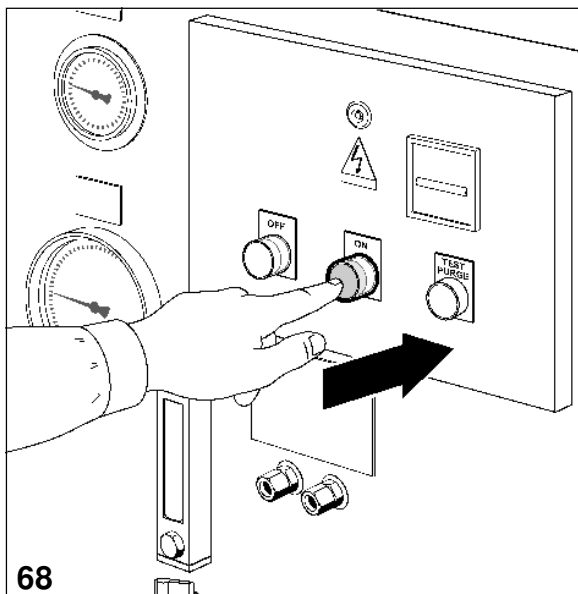
Each panel controls a pump unit while the 4 hoses are connected together and can refill up to 4 cylinders using the compressors, either separately or together. The period between refills obviously depends on the use made of the cylinders.



1 Fit hose attachment "1" to the cylinder valves and turn on tap "2" (Fig. 66).

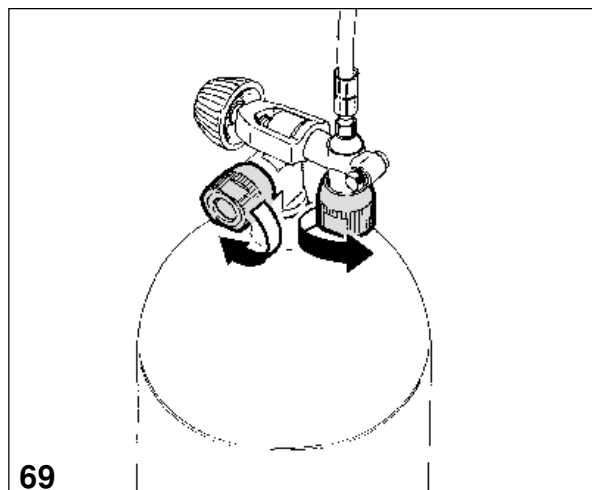


2 Turn on the cylinder tap (Fig. 67).

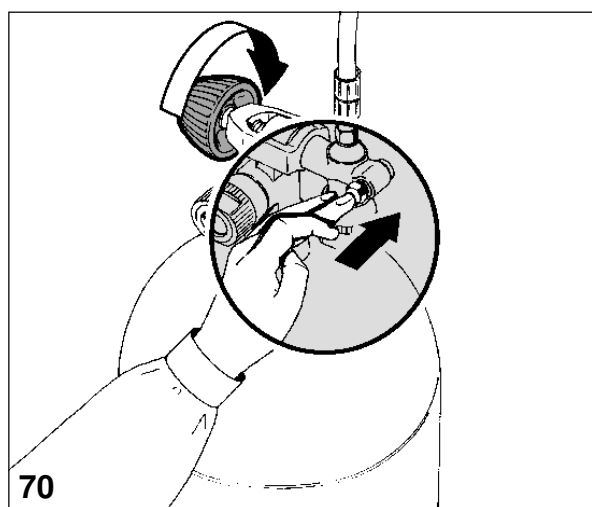


3 Start up the compressor by pressing the corresponding button. (General switch on "ON" and then press the green button) (Fig. 68).

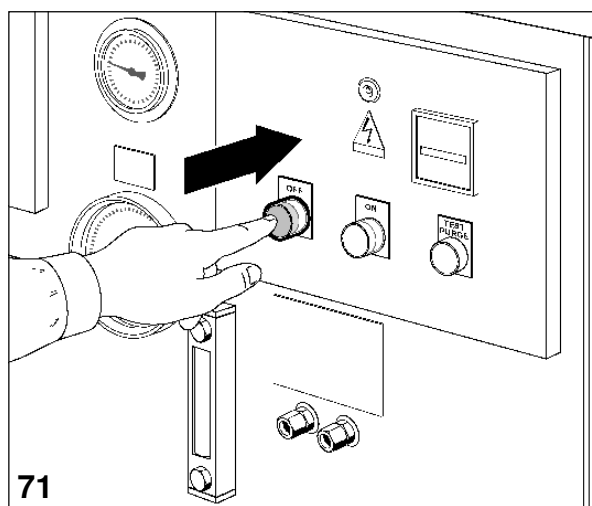
4 When the cylinder has been filled, the compressor is stopped automatically by the pressure switch.



5 Turn off the cylinder tap and that of the hoses (Fig. 69).



6 Press the pressure bleed button on the refill tap and then disconnect the cylinder attachment (Fig. 70).



If an emergency situation should arise during the refilling of the cylinders, press the "OFF" button located on the control board (Fig. 71).

The machine is, in any case, provided with an emergency system that automatically blocks it when:

- 1) the pressure set on the pressure switch is reached;
- 2) there is a temporary cut in the power supply;
- 3) the heat release of the electric motor trips due to an overload.

After an emergency stop and before proceeding with a subsequent operation, it is necessary to check that the cause of the emergency has been eliminated.



# 10

## PUTTING THE MACHINE OUT OF OPERATION AND DISMANTLING THE MACHINE



*This chapter provides instructions to be followed for long machine standstills or for the dismantling of the same.*

<b>10.1</b>	<b>Instructions for prolonged machine standstills</b>	<b>46</b>
<b>10.2</b>	<b>Disposal of waste products</b>	<b>46</b>
<b>10.3</b>	<b>Dismantling the machine</b>	<b>47</b>

### WARNING



Before carrying out any procedure on the machine, read Chapter 4, "Precautions for use and maintenance" with care.

## 10.1

### Instructions for prolonged machine standstills

If the compressor is not to be used for prolonged periods, remove the active carbon cartridge from the strainer filter.

Run the compressor idle for a few minutes to drain off any residue condensate. Stop the compressor, remove the intake filter, start up the compressor again spraying a few drops of oil into the intake hole so that a light film of lubricant is sucked in and penetrates the internal parts of the compressor.

Stop the compressor and refit the intake air filter. Clean the external parts and try to remove any saline humidity and oily deposits. Protect the compressor from dust and water by storing it in a clean, dry place.

Turn the machine off using the general switch (position "0") and remove the power plug.

Carry out a general cleaning operation on the machine and all its components.

## 10.2

### Disposal of waste products

When using the compressor, **special waste products** are produced. It must be remembered that waste from industrial processes, agricultural, artisan and commercial activities and service industries cannot be disposed of together with normal urban waste either because of their quality or quantity. Old or obsolete machinery is also to be considered as special waste.

Special care must be taken with the disposal of worn active carbon filters which, being a waste product that cannot be disposed of together with normal urban waste, must be dealt with in compliance with the laws in force in the country where the compressor is installed.



It is important to remember that the loading and discharge of waste oil, special waste products and toxic or harmful waste products deriving from industrial or artisan processes must be registered. The collection of waste oils and special toxic or harmful waste products must be carried out by specially authorized companies.

The disposal of waste oils in particular must be carried out in accordance with the regulations in force in the user's country.

## **Dismantling the machine**

## **10.3**

**The operations required for stripping and demolishing the machine must be carried out by qualified staff.**

To dismantle the machine, follow the regulations imposed by the laws in force in the user's country. Before demolishing the machine, an inspection must be requested by the competent authority with the issuing of a relative report.

Disconnect the machine from the power supply.

Remove any interfacing that there may be between the compressor and other machines, checking carefully that any interfacing between other machines that are still in use remain operative.

Empty the tank containing the lubricating oil and store it according to legal requirements.

Proceed with the stripping of the individual machine components, grouping them together according to their composition. The machine consists mainly of components made of steel, stainless steel, cast iron, aluminium and plastic.

Finally, send the materials for scrap in accordance with the laws in force in the country where the compressor is installed.

**During all the dismantling phases, follow the safety warnings given in this manual with great care.**



# 11

## MAINTENANCE



*This chapter includes instructions concerning the preventive, routine and additional maintenance operations.*

*In the specifications for the preventive maintenance operations for the various devices indication is also given of the frequency of such procedures.*

*Before consulting the chapter, read Chapter 4 "Precautions for use and maintenance" with care.*

<b>11.1</b>	<b>General notes</b> .....	<b>48</b>
<b>11.2</b>	<b>Preventive maintenance</b> .....	<b>49</b>
<b>11.3</b>	<b>Changing the lubricant oil</b> .....	<b>50</b>
<b>11.4</b>	<b>Checking the transmission belt</b> .....	<b>52</b>
<b>11.5</b>	<b>Air intake filter</b> .....	<b>53</b>
<b>11.6</b>	<b>Active carbon filter and molecular sieve</b> .....	<b>55</b>
<b>11.7</b>	<b>Refill hose</b> .....	<b>57</b>
<b>11.8</b>	<b>Intake and discharge valves</b> .....	<b>58</b>
<b>11.9</b>	<b>Heads</b> .....	<b>58</b>
<b>11.10</b>	<b>Cylinders</b> .....	<b>59</b>
<b>11.11</b>	<b>Maintenance programme</b> .....	<b>60</b>

### WARNING

All the routine and additional maintenance operations must be carried out with the machine at a standstill (the compressor at a standstill) and with the power supply disconnected.

The residue pressure in the machine (pump circuit) must be eliminated.

Any operation carried out on the machine must only be undertaken having read and carefully applied the regulations listed in Chapter 4 "Precautions for use and maintenance".

**All the operations described in the following paragraphs, for model MCH 26-32/ET Compact, must be repeated twice (one for every component that is the same).**

## 11.1

### General notes

To keep the machine in good working condition, it must be cleaned very thoroughly.

Having been designed and built according to the most advanced technological criteria, this type of refill station requires very limited preventive and routine maintenance operations.

However, it is essential to follow the indications given in this chapter very carefully and to follow the intervals between operations as suggested.





During the guarantee period no responsibility is taken for any damage or operating faults due to a failure to comply with the regulations in force.

The following paragraph enables all the routine and additional maintenance operations carried out on the machine to be recorded.

This paragraph should be filled in carefully and any operations carried out to solve problems should also be reported.

**Preventive maintenance (Table 1)**

**11.2**

**Table 1**

		INTERVALS										
		X	1 day	15 min	30 min	25 h	50 h	125 h	250 h	500 h	1000 h	5000 h
1	Replace the active carbon cartridge, see par. 11.7											
2	Check the compressor oil level					○						
3	First compressor oil change					●						
4	Change compressor oil								●			
5	Intake filter cartridge					○		●				
6	Operation of the end safety valve					○						
7	Operation and tightness of the refill valve					○						
8	Alignment of the compressor needle with the ○ when the compressor is depressurized					○						
9	Tightening of the cooling pipes							○				
10	Tightening of the connecting pipes							○				
11	Belt tension and wear								○		●	
12	Hose replacement										●	
13	2 <sup>nd</sup> and 3 <sup>rd</sup> stage intake and discharge valves									●		
14	Internal cleaning of end separator								○			
15	Tightening of all the screws								○			
16	General cleaning								○			
17	Replacement of the external casing of the strainer filter											●
18	Replacement of 1 <sup>st</sup> stage head										●	

● = replacement

○ = inspection, cleaning



### 11.3 Changing the lubricant oil (Table 2)

The quantity of oil for the lubrication of the pump unit must be checked every 25 hours.

To carry out this operation, see chapter 8 "Start up".

The oil must be changed every 250 operating hours or yearly.

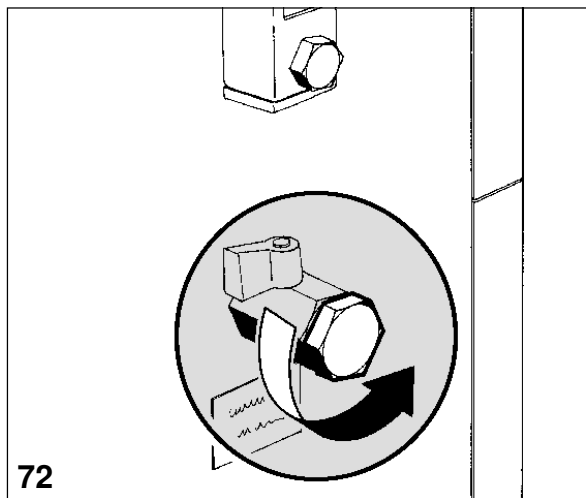
When changing the oil, it must be remembered that a mixture of different oils cannot be used.

The oil must have the following characteristics:

Table 2

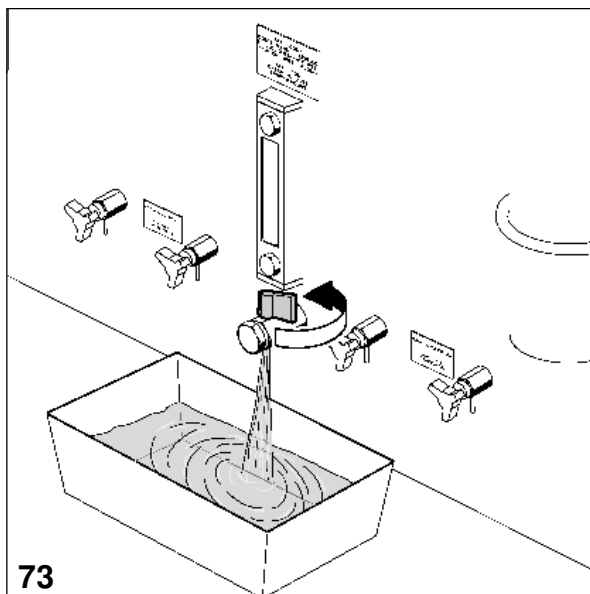
<b>Sump capacity</b>	cu.cm. litres/gallons	1500 1.5/0.476
<b>Recommended oils</b>		AEROTECNICA COLTRI SPECIAL MINERAL OIL AEROTECNICA COLTRI SPECIAL SYNTHETIC OIL MOBIL SPECIAL 20 W 50 MOBIL RARUS 827-829 ANDEROL 755 SYNTHETIC
<b>Viscosity of the oil</b>	summer winter	above +10 °C (50 °F) SAE 20 W/40 from +10 °C to -15 °C (50° to 5 °F) SAE 10 W below -15 °C (5 °F) SAE 5 W
<b>Maximum tilt of the compressor with the oil level at maximum</b>	degrees	~ 5

To change the oil, proceed as follows:



- 1 Use a basin with a minimum capacity of 2.5 lt. capacity under the oil discharge tap (Fig. 72).

- 2 Unscrew the hexagonal closing cap located in front of the oil discharge.



- 3 Open the oil discharge two taps (Fig. 73) and discharge all the oil in the sumps.

- 4 Close the discharge tap and replace the hexagonal closing cap.
- 5 Carry out the filling operations as described in chapter 8 "Start up".

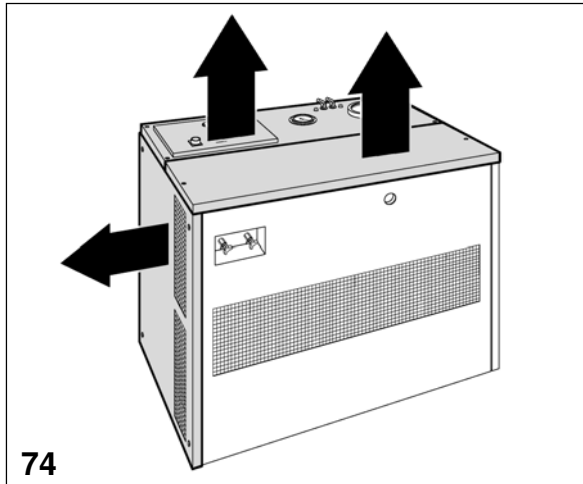
**WARNING**

To dispose of waste oils follow the instructions given in chapter 10.2 "Disposal of waste products" with great care.



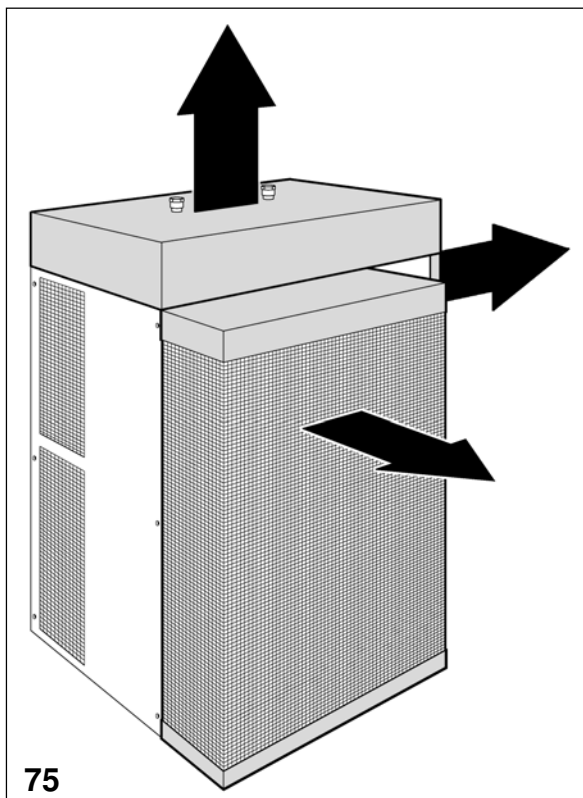
## 11.4 Checking the transmission belt

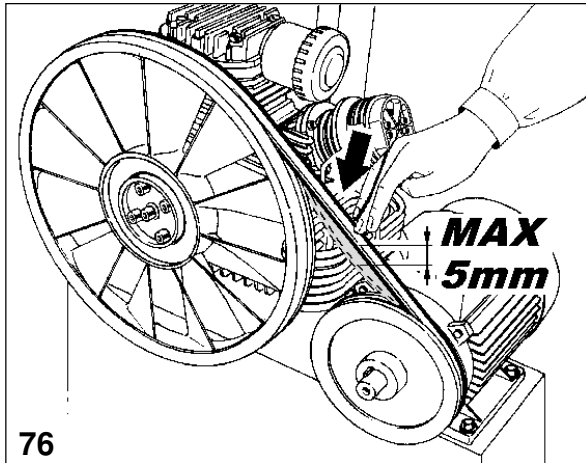
The drive belt control involves measuring the flex herself.



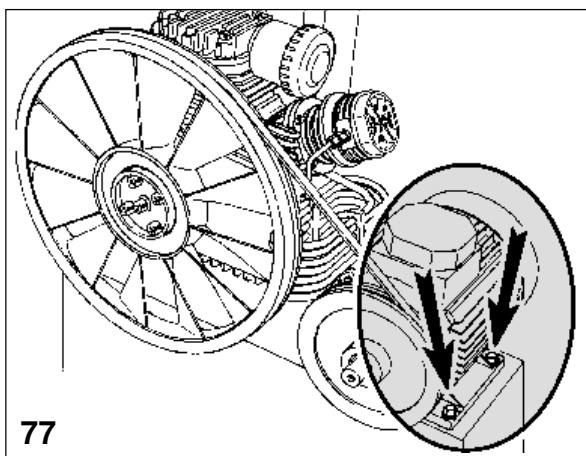
This operation must be carried out every 250 machine operating hours as described below:

- 1 Remove the protective cover as shown on figures 74 and 75, by unscrewing the fixing screws.





- 2 By exerting a pressure of at least 5 Kg., check that the belt does not flex by more than 5 mm. compared to its original position (Fig. 76).



If this distance should exceed 5 mm., intervene by loosening the motor fastening screws (Fig. 77), remove the driving belt and move the motor away from the compressor by a few millimetres by sliding it along the slots.

Tighten the motor fastening screws.

Refit the belt, placing it in the race provided in the motor pulley and in the innermost race of the fan, turning it by hand to enable the belt to go over the diameter of the fan and to fit into the race.

- 3 Carry out the measurement procedure again and if necessary, repeat the operations until a maximum distance of 5 mm. is reached.
- 4 Replace the covers securing the appropriate screws tightly (see point 1).

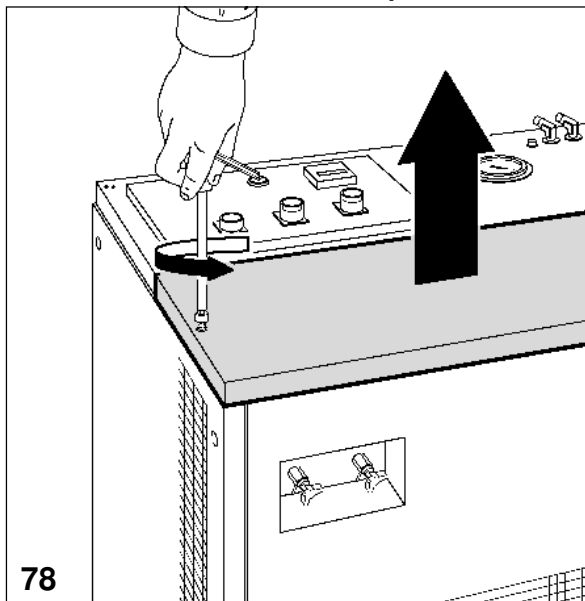
## Air intake filter

## 11.5

The intake filter must be checked to make sure it is in good order every 25 operating hours.

The filter is cleaned by blowing air inside the cartridge when it has been removed.

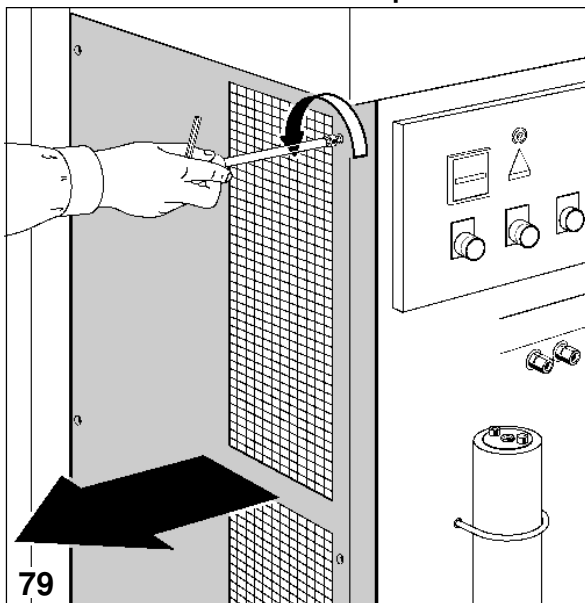
Replace the cartridge turning it by 60° compared to its initial position.

**MCH 13-16/ET Compact**

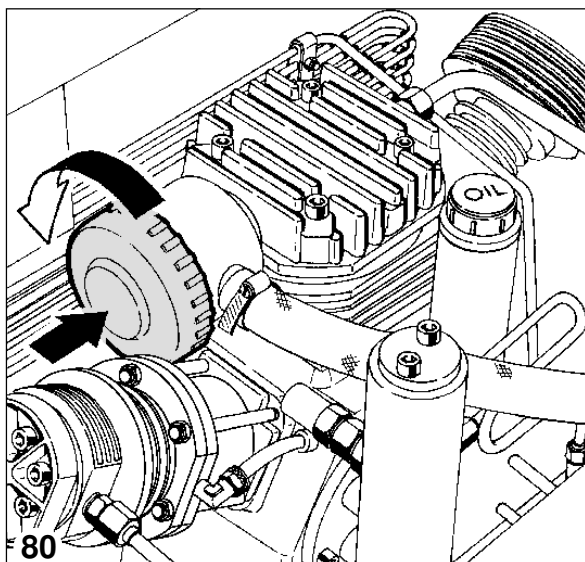
The filter must be replaced every 125 operating hours with the following procedure:

**MCH 13-16/ET Compact**

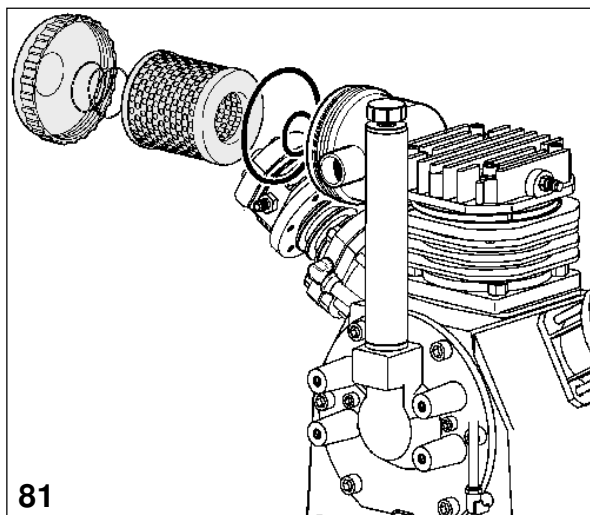
- 1 Remove the upper protective cover by unscrewing the securing screws (Fig. 78).

**MCH 26-32/ET Compact****MCH 26-32/ET Compact**

- 1 Remove the left-hand side protective cover (looking at the compressor from the **front**), by unscrewing the fixing screws (Fig. 79).



- 2 Press cap n° 1 lightly and turn it in an anti-clockwise direction (Fig. 80).



- 3 Remove the filter and replace it with a new one (Fig. 81).

To order a new spare filter, refer to chapter 14 "Spare parts".

- 4 Refit the safety guard and tighten the screws (see point 1).

## Active carbon filter and molecular sieve

## 11.6

The cartridges must be replaced before the air becomes foul-smelling.

The quality of the air depends to a large extent on the condition of the filtering cartridge. For this reason, it is important to comply with the intervals as specified.

The frequency of replacement has been calculated for use of the compressor with intake air at a temperature of 20 °C (68 °F), see table 4. If the temperatures differ, apply the coefficients given in the following table 3 to the duration of the filter:

Table 3

°C	°F	Multiplicative coefficients
50	122	0.20
40	104	0.34
30	86	0.57
20	68	1
10	50	1.85
5	41	2.60
0	32	3.80



Table 4

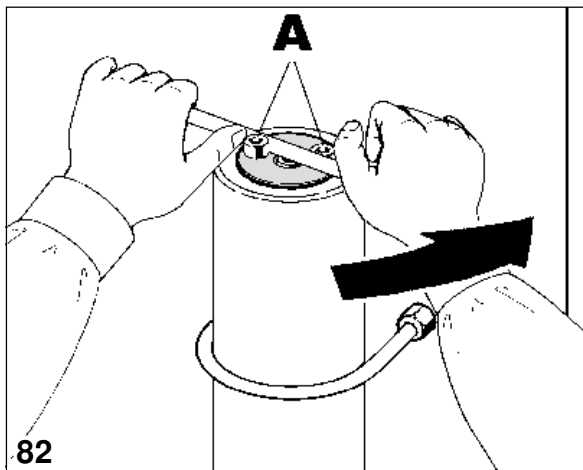
MODEL	N° OF 10 LITRE CYLINDERS TO BE REFILLED				VOLUME OF FILTERED AIR		DURATION OF THE FILTER	
	200 bar		300 bar		cu.m.		hours	
MCH 13/ET	322		214		644		50	
MCH 16/ET	322		214		644		40	
MCH 26/ET	322	322	214	214	644	644	50	50
MCH 32/ET	322	322	214	214	644	644	40	40

Check the sealing O-Rings and replace them if they are damaged.

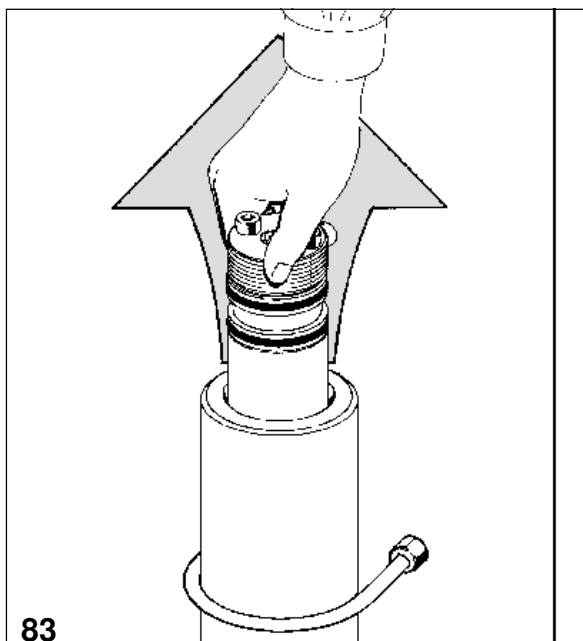
Leave the cartridge in the filter when the compressor is not in use.

Maintain a pressure of 40-70 bar inside the filter to prevent outside dampness from getting in.

To replace the active carbon filter, proceed as follows:

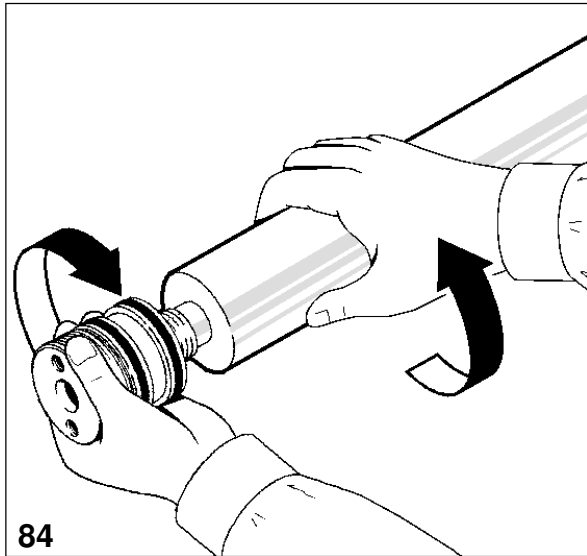


- unscrew the external cap using a lever between the screws "A" (Fig. 82);



- remove the external cap and the internal cap (Fig. 83);





- unscrew the used cartridge from the internal cap (Fig. 84) and then screw in the new one;

- screw up the internal cap having lubricated or replaced the sealing O-Rings if they are worn and having lubricated the threads of the external cap using silicone grease.

#### WARNING

The used active carbon filter cannot be disposed of together with urban waste. To dispose of the active carbon filter, follow the instructions given in chapter 10.2, "Disposal of waste products" with great care.



## Refill hose

## 11.7

The refill hose must be in good condition especially in the area of the connections.

The plastic sheath that covers the hose must not show any signs of abrasion otherwise if any humidity infiltrates, it could corrode the steel plait and reduce its resistance. The hose must be replaced periodically (annually) and/or when it shows signs of wear. Failure to comply with this regulation could cause serious danger to the operators. Make sure that the minimum radius of curvature of the hose is not less than 250 mm.

To connect the hose, follow the instructions given in chapter 6.2.2, "Connecting the refill hose".

## 11.8 Intake and discharge valves

The 2<sup>nd</sup> stage intake valve can be removed for maintenance purposes while those of the 1<sup>st</sup>, 2<sup>nd</sup> (only discharge) and 3<sup>rd</sup> stages must be entirely replaced. The seats must be cleaned carefully using petrol and soft brass or nylon brushes.

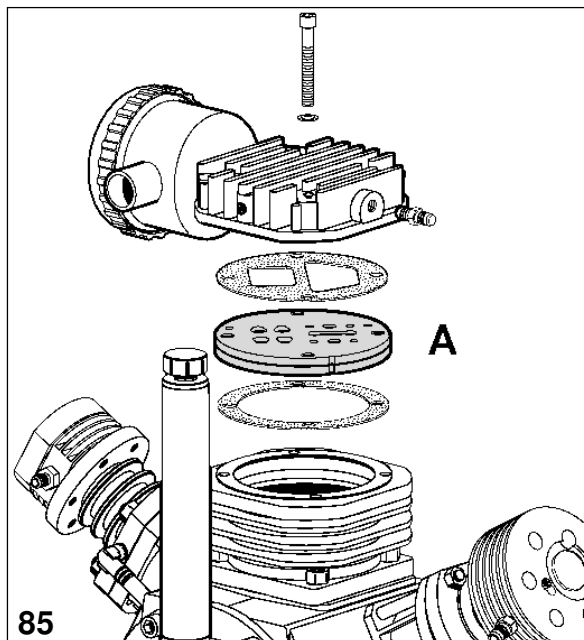
The torque wrench setting for the head bolts of the 3<sup>rd</sup> stage is initially 1 Kgm. Having moved the head closer, tighten the bolts to 2.2 Kgm, making sure that the piston is at the bottom dead centre during the operation.

Avoid using steel brushes or screwdrivers. The interval between maintenance operations is 400-600 working hours. If any parts are damaged or worn, they must be replaced. The discharge valves can be removed from the outside while the intake valves can only be removed when the head of the cylinder has been taken off.

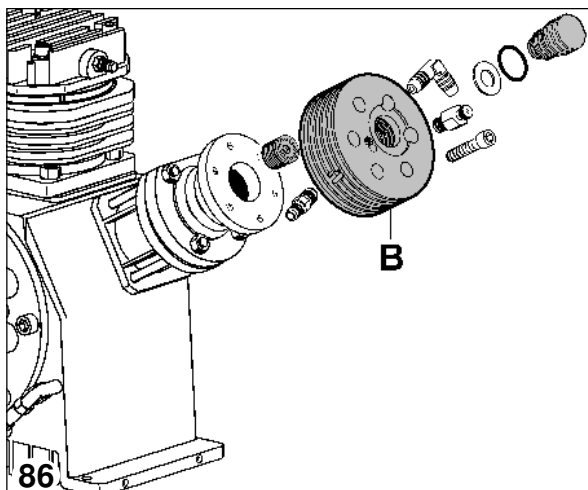
**NOTE:** the valve replacement procedure must be carried out at the work bench by specialized technicians who have specific equipment for the stripping operation.

In any case, it is preferable to contact **AEROTECNICA COLTRI S.r.l.** who will supply the necessary technical assistance.

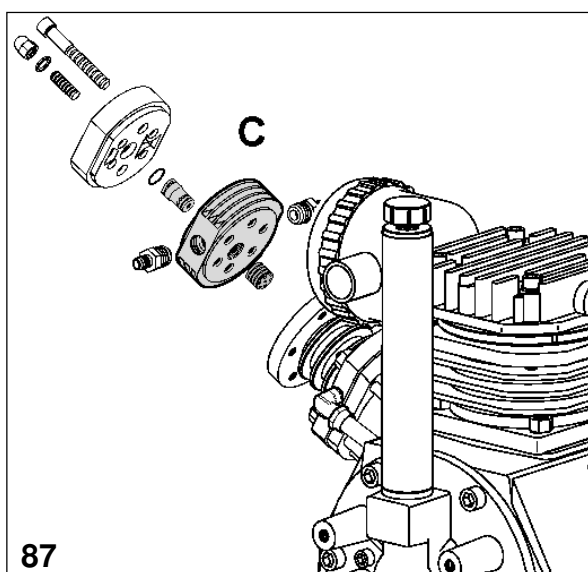
## 11.9 Heads



- The head of the 1<sup>st</sup> stage (A) is of the lamellar type (Fig. 85). It must be fitted so that the word "TOP" remains upwards and the flaps correspond with the openings in the cover of the head. Replace every 1000 hours.



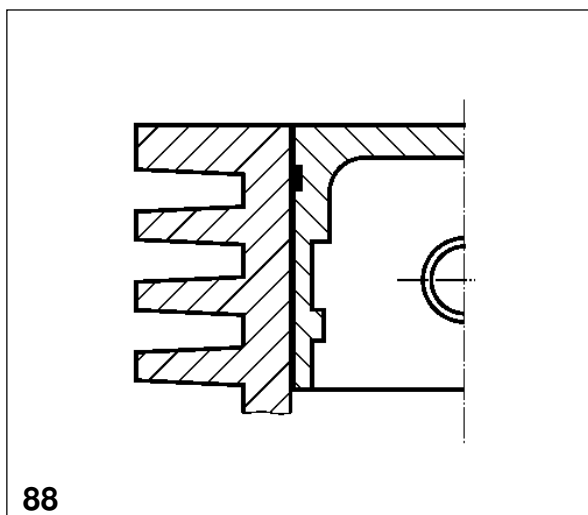
- The head of the 2<sup>nd</sup> stage (B) is made of aluminium (Fig. 86), the valves are screwed in; the intake valve inside is removed using a special pin wrench while the discharge valve is on the outside and is removed with a non-adjustable wrench or a box wrench.



- The head of the 3<sup>rd</sup> stage (C) is made of aluminium (Fig. 87), the intake valve is screwed inside and is removed using a special pin wrench while the discharge valve is on the outside and is kept in position by the threaded dowel which is screwed into the cover.

## Cylinders

## 11.10



After removing the cylinders, it is necessary to check, when they are replaced, that the piston at the maximum point and the upper edge of the cylinder are on the same level (Fig. 88).

Adjust any differences that there may be by making the base of the cylinder thicker using gaskets.



## 11.11 Maintenance programme

Use the following pages to note the routine and additional maintenance operations carried out on the machine.

If the maintenance programme is filled in accurately, it will be easier for the technician to intervene if assistance is required.

Date: .....

Operation carried out: .....

Date: .....

Operation carried out: .....

Date: .....

Operation carried out: .....

Date: .....

Operation carried out: .....

Date: .....

Operation carried out: .....

Date: .....

Operation carried out: .....

Date: .....

Operation carried out: .....

Date: .....

Operation carried out: .....

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# 12

## TROUBLESHOOTING



This chapter describes the faults that may arise during machine operation.

For each fault, the cause and the solution to be adopted are specified.

### 12.1 List of faults ..... 62

#### 12.1 List of faults

Table 1 below lists all the faults that may arise during operation and the relative solution.

Table 1

PROBLEM	CAUSE	SOLUTION
The electric motor does not start	A phase is missing	Check the fuses
The safety valve of the 1 <sup>st</sup> stage discharges	The 2 <sup>nd</sup> stage valves are not working	Perform maintenance operations or replace the valves
The safety valve of the 2 <sup>nd</sup> stage discharges	The 3 <sup>rd</sup> stage valves are not working	Replace them
The speed of rotation and capacity are reduced	The motor power is insufficient	Check the motor and the power line
	The belt slips	Tighten the belt
The capacity is reduced without a reduction in the speed of rotation	The valves are not working	Contact the technical assistance service
	The 3 <sup>rd</sup> stage piston is worn	Contact the technical assistance service
	The connections are loose or the gaskets leak	Check the leaks with water and soap and eliminate them
	The intake filter is blocked	Replace it
	The intake extension is bent	Straighten it, use a semi-rigid pipe
Smell of oil in the air	The piston or compression rings are worn	Contact the technical assistance service
	The filter cartridge is worn	Replace it
The compressor overheats	The compression rings are worn	Contact the technical assistance service
	Wrong direction of rotation	Check the direction of rotation by inverting the two phases in the plug
	The cooling pipes are dirty	Contact the technical assistance service
	The valves are not completely closed (causing an overload of another stage)	Contact the technical assistance service



# MACHINE DIAGRAMS

**13**

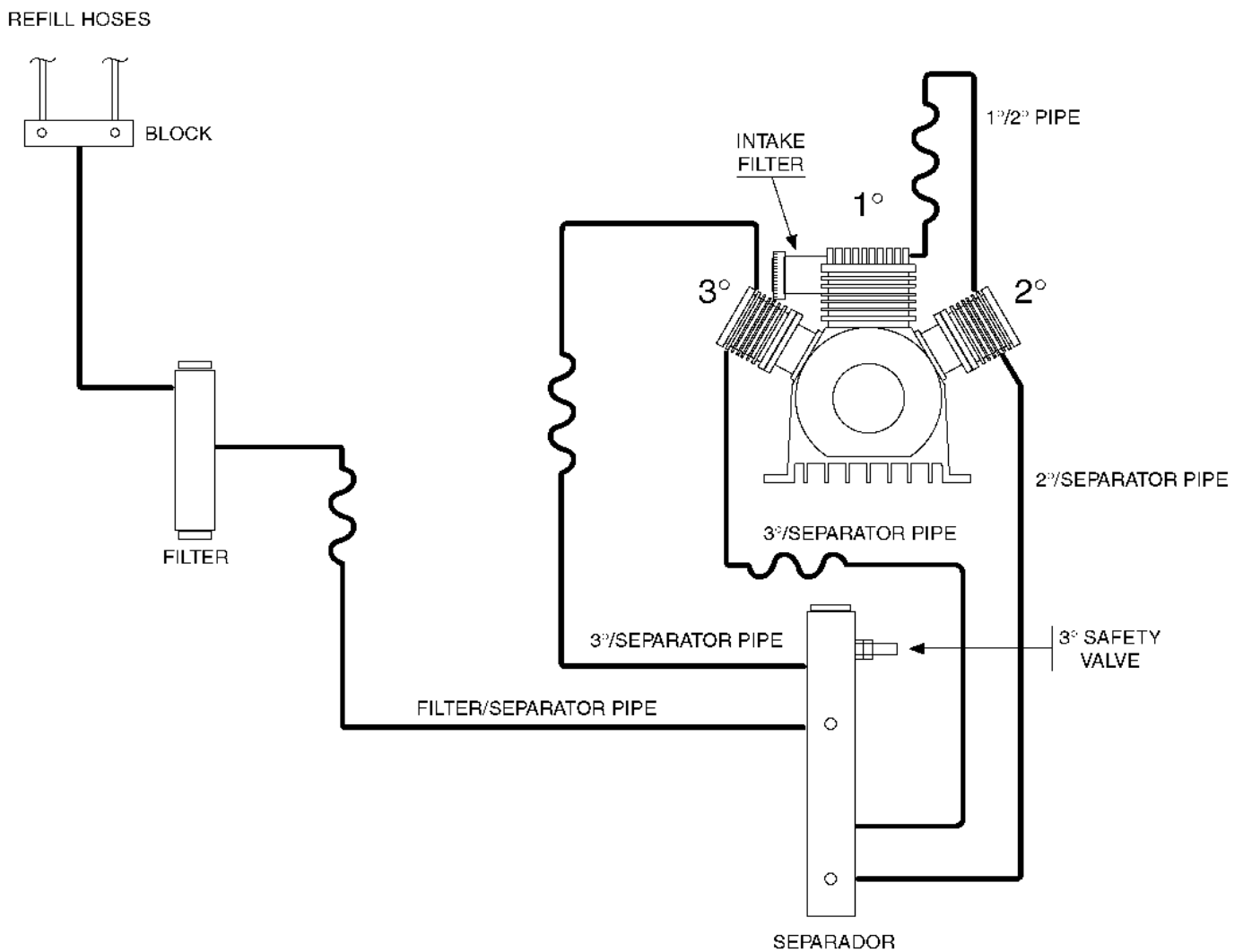
This chapter provides the plans and diagrams of the systems installed on the machine.



13.1 Compression diagram ..... 63  
 13.2 Electrical diagram ..... 64

## Compression diagram

**13.1**



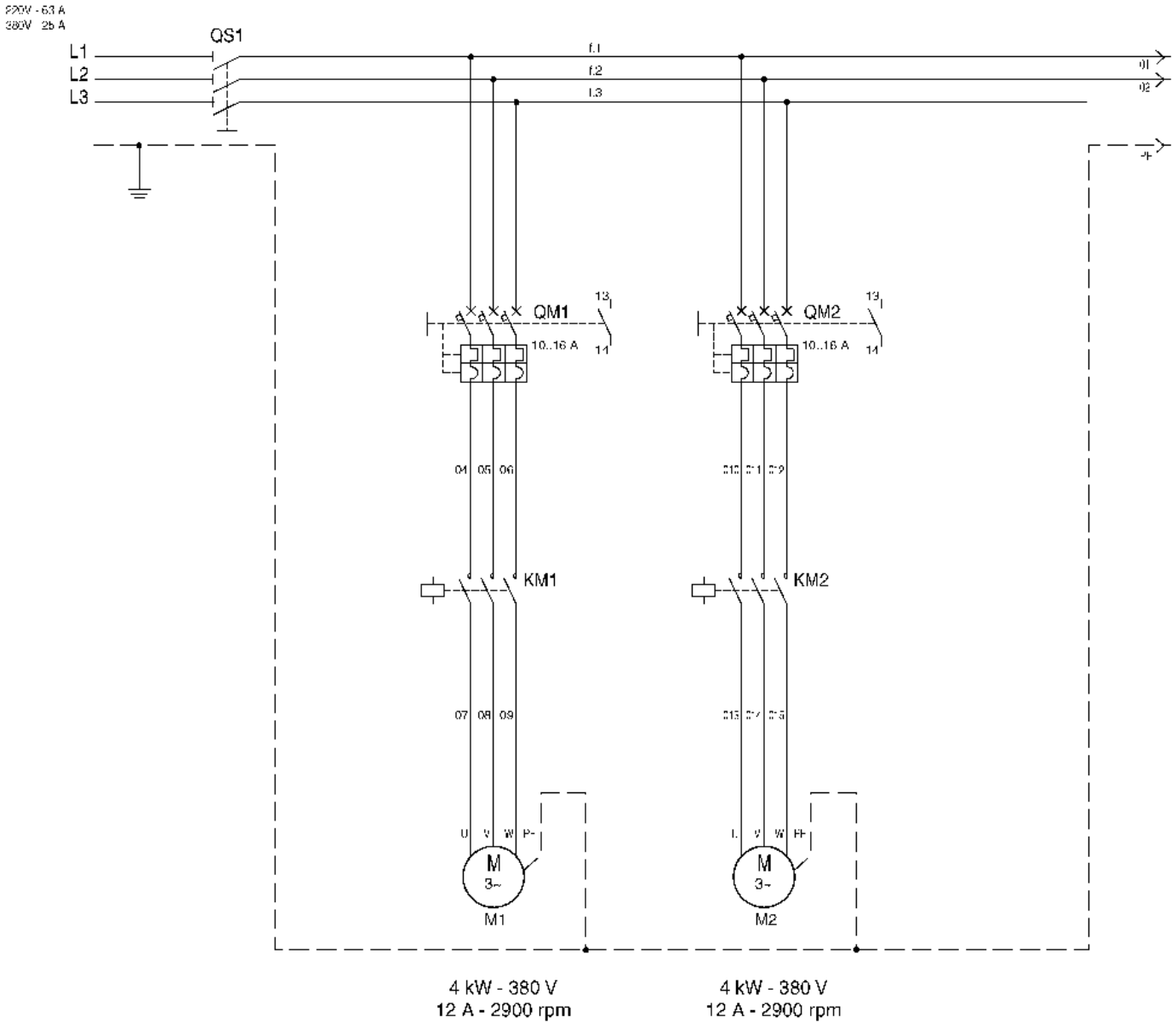






**The model "MCH 26-32/ET Compact" compressor**

THREE PHASE ELECTRICAL LINE WITHOUT NEUTRAL WIRE







POS.	TO BE READ
	GENERAL
QS1	MAIN SWITCH
QF1	PRIMARY AUSILIARIES PROTECTION SWITCH
TC1	AUSILIARIES TRASFORMER (380/220 OR 220/220)
QF2	SECONDARY AUSILIARIES PROTECTION SWITCH
BP1	PRESSURE SWITCH
SQ1	MECHANICAL PROTECTION CONTROL
SQ2	MECHANICAL PROTECTION CONTROL
	MOTOR M1
QM1	OVERLOAD RELEASE MOTOR PROTECTION SWITCH
KM1	MOTOR CONTROL CONTACTOR
M1	MOTOR
SB1	STOPPING PUSH BOTTON
SB2	STOPPING PUSH BOTTON
SB3	PURGE PUSH BOTTON
HL2	READY STATE RUNNING SIGNALING (GREEN)
HL1	RUNNING SIGNALING (RED)
PT1	HOURS COUNTER
KT1	CHARGE-PURGE TIMER
Y1	SOLENOID VALVE TO CHARGE
Y2	SOLENOID VALVE TO PURGE
	MOTOR M2
QM2	OVERLOAD RELEASE MOTOR PROTECTION SWITCH
KM2	MOTOR CONTROL CONTACTOR
M2	MOTOR
SB5	STOPPING PUSH BOTTON
SB6	STOPPING PUSH BOTTON
SB7	PURGE PUSH BOTTON
HL4	READY STATE RUNNING SIGNALING (GREEN)
HL3	RUNNING SIGNALING (RED)
PT2	HOURS COUNTER
KT2	CHARGE-PURGE TIMER
Y3	SOLENOID VALVE TO CHARGE
Y4	SOLENOID VALVE TO PURGE





## SPARE PARTS

# 14

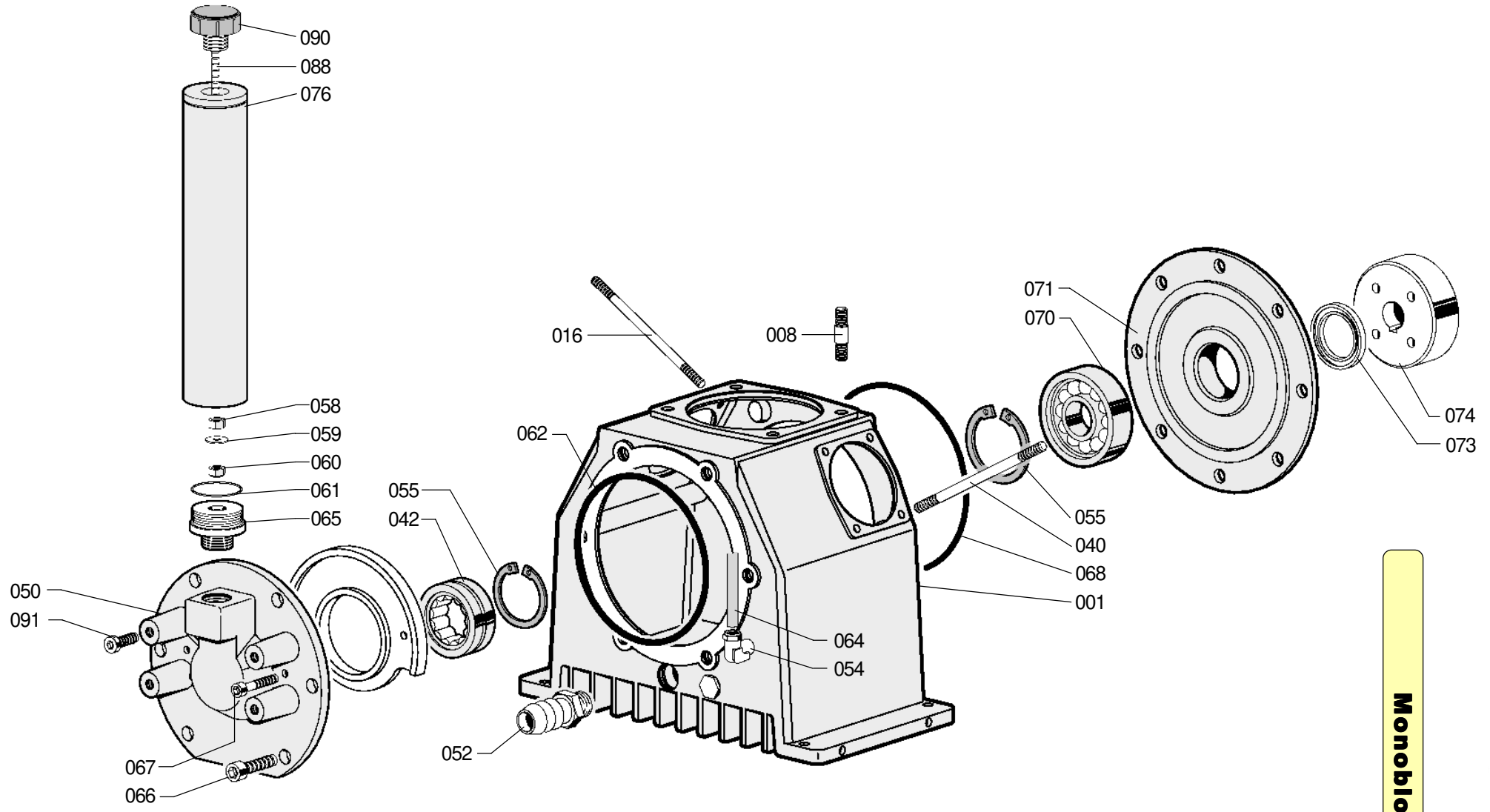
<b>14.1</b>	<b><i>Exploded view of the machine parts</i></b> .....	<b>69</b>
	<i>Monobloc</i> .....	70
	<i>Pistons rod unit</i> .....	72
	<i>Cylinders unit</i> .....	74
	<i>Head unit</i> .....	76
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	<i>MCH 13-16/ET condensate trap</i> .....	82
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## Exploded view of the machine parts

### 14.1



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**Monobloc**

**COLTRI S.p.A.**

*Spare parts*

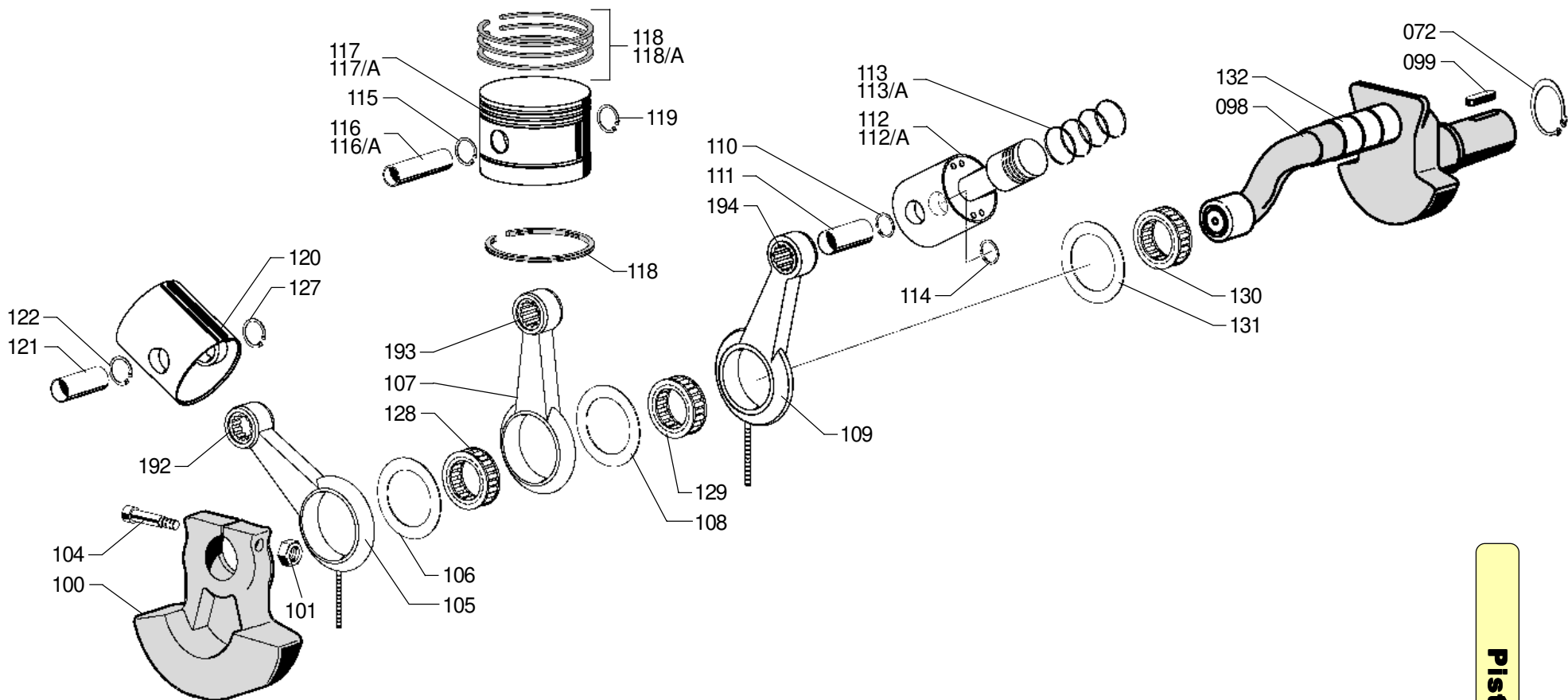


## Monobloc

POS.	CODE	DESCRIPTION
001	13-00-0001	MONOBLOC
008	13-01-0008	FIRST STAGE TIE ROD
016	13-03-0016	THIRD STAGE TIE ROD
040	13-02-0040	SECOND STAGE TIE ROD
042	13-00-0042	FLANGE ROLLER BEARING NU305
050	13-00-0050	FILTER SIDE FLANGE
052	13-00-0052	OIL DISCHARGE EXTENSION
054	13-00-0021	CORNER 1/8 PIPE FITTING 8 mm. RILSAN
055	13-00-0055	SEEGER RETAINING RING J 62
058	13-00-0018	8 mm. NUT
059	13-00-0009	8 mm. FLAT WASHER
060	13-00-0018	8 mm. NUT
061	13-00-0061	OIL FILLING PIPE O-RING
062	13-00-0062	FLANGE O-RING
064	13-00-0064	OIL LEVEL CONTROL PIPE
065	13-00-0065	OIL FILLING PIPE FITTING
066	13-00-0048	8x25 TCE SCREW
067	13-00-0067	6x35 TCE SCREW
068	13-00-0062	FLANGE O-RING
070	13-00-0070	BALL BEARING 6302
071	13-00-0071	FAN SIDE FLANGE
073	13-00-0073	OIL SPLASH GUARD 30-48-8
074	13-00-0074	FAN-HOLDING HUB
076	13-00-0076	OIL FILLING PIPE WITH UPPER FLANGE
088	13-00-0088	8 mm. THREADED ROD
090	13-00-0090	OIL FILLING CAP
091	13-00-0048	8x25 TCE SCREW



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**Pistons rod unit**

Spare parts

**COLTIRI S.p.A.**



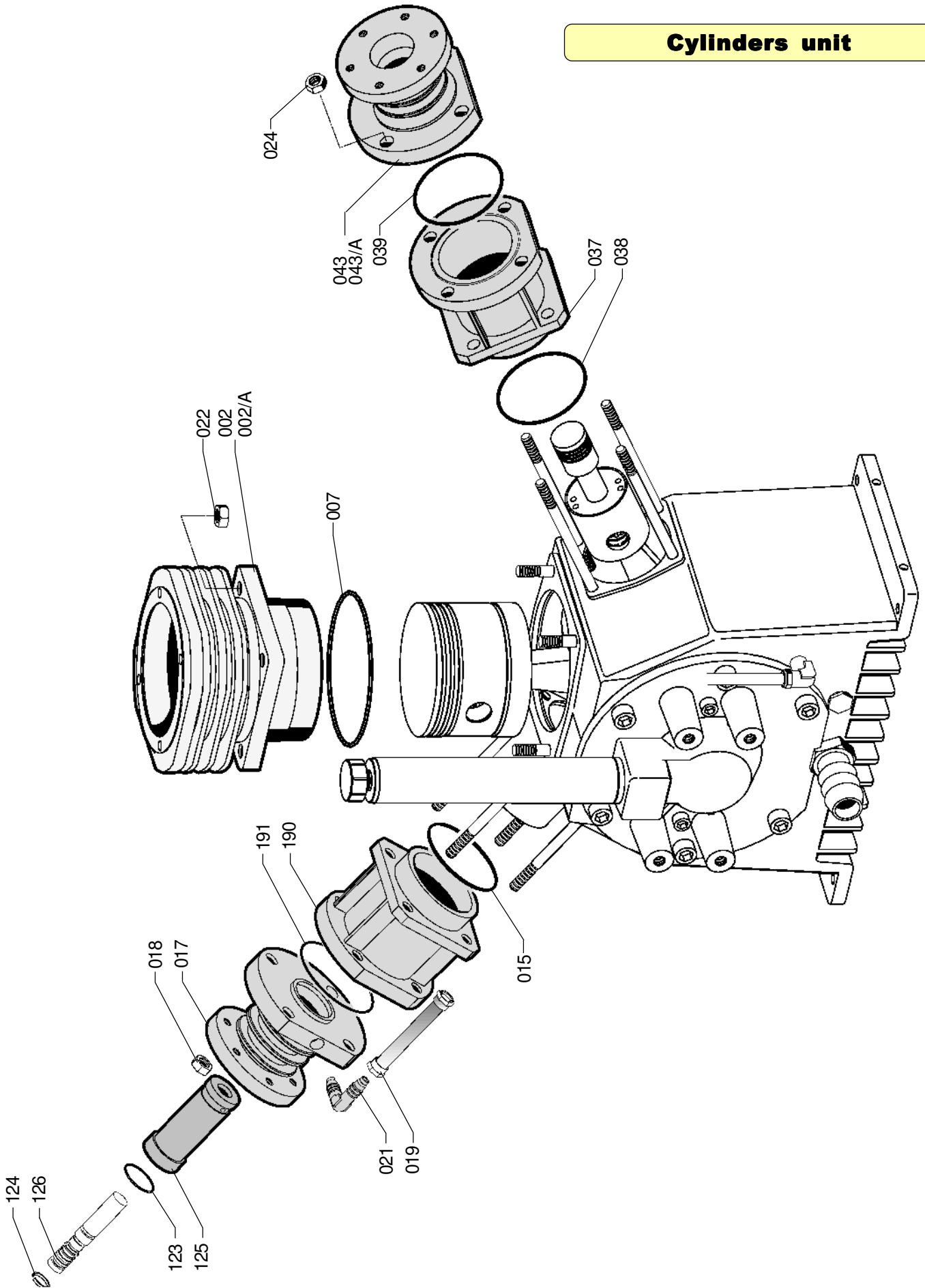


## Pistons rod unit

POS.	CODE	DESCRIPTION
072	13-00-0072	SEEGER RETAINING RING A 30
098	13-00-0098	GOOSENECK
099	13-00-0099	KEY
100	13-00-0100	COUNTERWEIGHT
101	13-00-0101	8 mm. SELF-LOCKING NUT
104	13-00-0104	8x65 TCE SCREW
105	13-00-0105	THIRD STAGE CONNECTING ROD
106	13-00-0106	SPACER
107	13-01-0107	FIRST STAGE CONNECTING ROD
108	13-00-0106	SPACER
109	13-00-0105	SECOND STAGE CONNECTING ROD
110	13-00-0110	SEEGER RETAINING RING
111	13-02-0111	2nd STAGE PIN
112	13-02-0112	SECOND STAGE 36 mm. PISTON
112/A	16-02-0112	SECOND STAGE 38 mm. PISTON
113	13-02-0113	SET OF 2nd STAGE 36 mm. PISTON RINGS
113/A	16-02-0113	SET OF 2nd STAGE 38 mm. PISTON RINGS
114	13-00-0110	SEEGER RETAINING RING
115	13-00-0110	SEEGER RETAINING RING
116	13-01-0116	FIRST STAGE 88 mm. PIN
116/A	16-01-0116	FIRST STAGE 95 mm. PIN
117	13-01-0117	FIRST STAGE 88 mm. PISTON
117/A	16-01-0117	FIRST STAGE 95 mm. PISTON
118	13-01-0118	SET OF 1st STAGE 88 mm. PISTON RINGS
118/A	16-01-0118	SET OF 1st STAGE 95 mm. PISTON RINGS
119	13-00-0110	SEEGER RETAINING RING
120	13-03-0120	GUIDING SLIDING BLOCK
121	13-02-0111	3rd STAGE PIN
122	13-00-0110	SEEGER RETAINING RING
127	13-00-0110	SEEGER RETAINING RING
128	13-00-0128	ROLLER CAGE
129	13-00-0128	ROLLER CAGE
130	13-00-0128	ROLLER CAGE
131	13-00-0106	SPACER
132	13-00-0132	HARDENED RING
192	13-00-0192	ROLLER CAGE
193	13-00-0192	ROLLER CAGE
194	13-00-0192	ROLLER CAGE



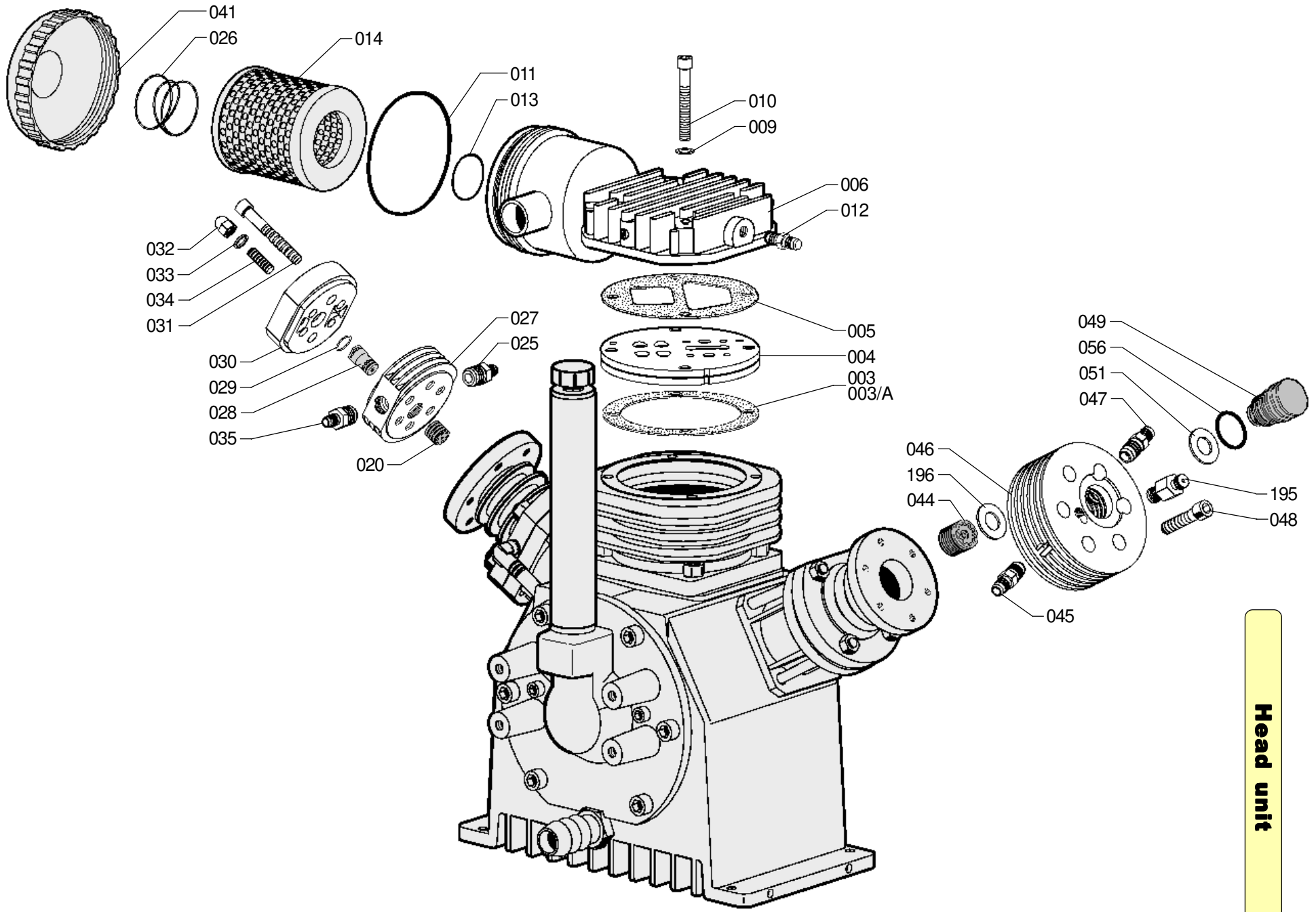
**Cylinders unit**





## Cylinders unit

POS.	CODE	DESCRIPTION
002	13-01-0002	FIRST STAGE 88 mm. CYLINDER
002/A	16-01-0002	FIRST STAGE 95 mm. CYLINDER
007	13-01-0007	FIRST STAGE CYLINDER O-RING
015	13-00-0015	THIRD STAGE CYLINDER O-RING
017	13-02-0017	THIRD STAGE GUIDING CYLINDER
018	13-00-0018	8 mm. BOLT
019	13-00-0019	LUBRICATION INDICATOR PIPE
021	13-00-0021	CORNER 1/8 PIPE FITTING 8 mm. RILSAN
022	13-00-0018	8 mm. NUT
024	13-00-0018	8 mm. NUT
037	13-02-0037	SECOND STAGE 60 mm. GUIDING CYLINDER
038	13-00-0015	GUIDING CYLINDER O-RING
039	13-00-0039	SECOND STAGE CYLINDER O-RING
043	13-02-0043	SECOND STAGE 36 mm. CYLINDER
043/A	16-02-0043	SECOND STAGE 38 mm. CYLINDER
123	13-03-0123	3rd STAGE VITON O-RING
124	13-03-0124	SET OF 3rd STAGE PISTON RINGS
125	13-03-0125	14 mm. THIRD STAGE CYLINDER
126	13-03-0126	14 mm. THIRD STAGE PISTON
190	13-03-0190	THIRD STAGE 60 mm GUIDING CYLINDER
191	13-00-0039	THIRD STAGE GUIDING CYLINDER O-RING



**Head unit**

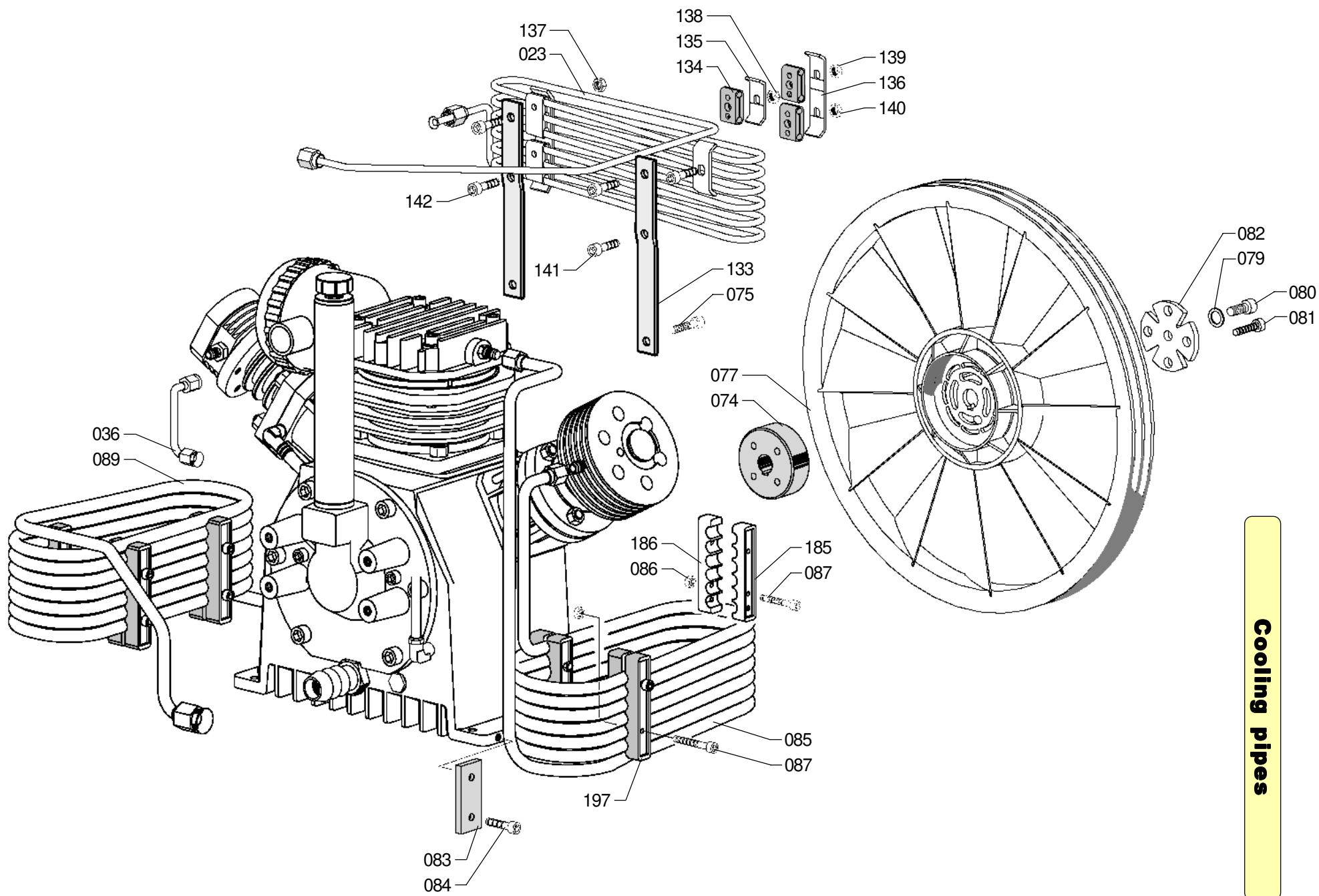


## Head unit

POS.	CODE	DESCRIPTION
003	13-01-0003	FIRST STAGE 88 mm. GASKET
003/A	16-01-0003	FIRST STAGE 95 mm. GASKET
004	13-01-0004	FIRST STAGE HEAD WITH VALVES
005	13-01-0005	FIRST STAGE GASKET
006	13-01-0006	FIRST STAGE HEAD COVER
009	13-00-0009	8 mm. FLAT WASHER
010	13-00-0010	SCREW 8x55 TCE
011	13-01-0011	INTAKE FILTER COVER O-RING
012	13-00-0012	STRAIGHT 1/4 PIPE FITTING 10 mm
013	13-01-0013	INTAKE FILTER O-RING
014	SC000370	LUBRICATION INDICATOR PIPE
020	13-03-0020	THIRD STAGE INTAKE VALVE
025	13-00-0025	STRAIGHT 1/4 - PIPE FITTING 6 mm.
026	13-01-0026	INTAKE FILTER SPRING
027	13-03-0027	THIRD STAGE HEAD
028	13-03-0028	THIRD STAGE EXHAUST VALVE
029	13-03-0029	VITON O-RING FOR THIRD STAGE EXHAUST VALVE
030	13-03-0030	3rd STAGE HEAD COVER
031	13-00-0031	8x50 TCE SCREW
032	13-00-0032	STAINLESS STEEL 8 mm. CAP NUT
033	13-03-0033	8 mm. COPPER WASHER
034	13-03-0034	8x25 STAINLESS STEEL DOWEL
035	13-00-0035	STRAIGHT 1/4 PIPE FITTING 8 mm.
041	13-01-0041	INTAKE FILTER COVER
044	13-02-0044	SECOND STAGE INTAKE VALVE
045	13-02-0045	LONG STRAIGHT 1/4 PIPE FITTING 10
046	13-02-0046	SECOND STAGE HEAD
047	13-02-0047	LONG STRAIGHT 1/4 PIPE FITTING 10
048	13-00-0048	8x25 TCE SCREW
049	13-02-0049	SECOND STAGE EXHAUST VALVE
051	13-02-0051	SECOND STAGE COPPER GASKET
056	13-02-0056	VITON O-RING FOR 2nd STAGE VALVE
195	13-00-0195	FIRST STAGE SAFETY VALVE
196	13-02-0051	SECOND STAGE COPPER GASKET



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**Cooling pipes**

Spare parts

COLTRI S.p.A.

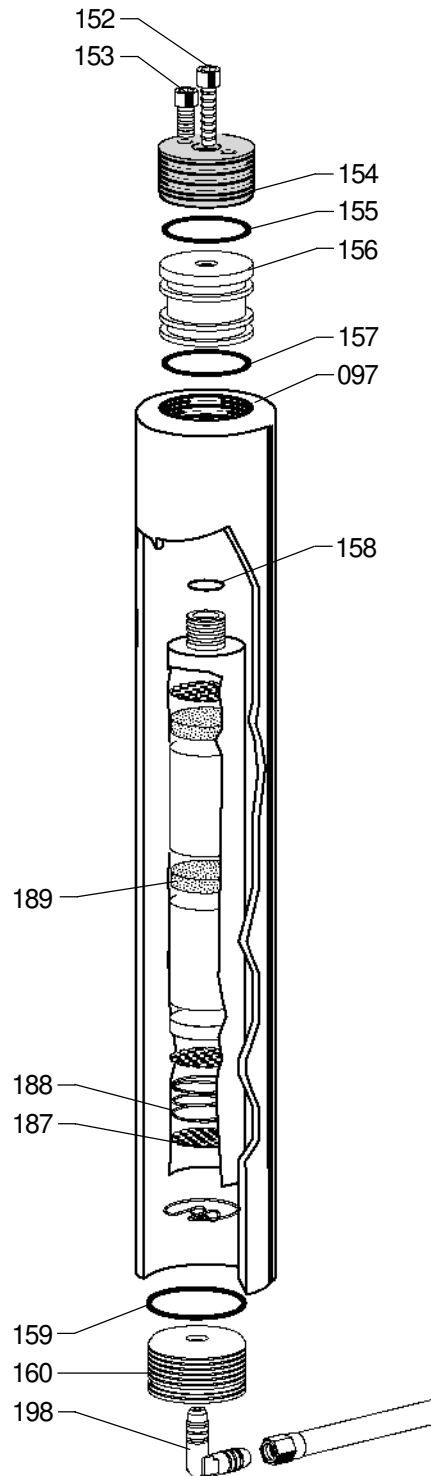


## Cooling pipes

POS.	CODE	DESCRIPTION
023	13-03-0023	6 mm. COOLING PIPE
036	13-00-0036	8 mm. PIPE
074	13-00-0074	FAN-HOLDING HUB
075	13-00-0075	8x30 TCE SCREW
077	13-00-0077	COOLING FAN
079	13-00-0079	12 mm. FLAT WASHER
080	13-00-0080	12x35 TCE SCREW
081	13-00-0081	10x40 TCE SCREW
082	13-00-0082	FAN FLANGE
083	13-00-0083	GALVANIZED PIPE-HOLDING BRACKET
084	13-00-0084	6x15 TCE SCREW
085	13-00-0085	1st-2nd STAGE 10 mm. COOLING PIPE
086	13-00-0086	6 mm. NUT
087	13-00-0087	6x30 TCE SCREW
089	13-00-0089	10 mm. 2nd-3rd STAGE COOLING PIPE
133	13-00-0133	6 mm. PIPE-HOLDING BRACKET
134	13-00-0134	VIBRATION-DAMPING PIPE-HOLDING RUBBER WASHER
135	13-00-0135	SINGLE 6 mm. PIPE-HOLDING BRACKET
136	13-00-0136	DOUBLE 6 mm. PIPE-HOLDING BRACKET
137	13-00-0137	SELF-LOCKING 6MA NUT
138	13-00-0137	SELF-LOCKING 6MA NUT
139	13-00-0137	SELF-LOCKING 6MA NUT
140	13-00-0137	SELF-LOCKING 6MA NUT
141	13-00-0141	6x25 TCE SCREW
142	13-00-0141	6x25 TCE SCREW
186	13-00-0186	3-HOLE PIPE-HOLDING BRACKET
197	13-00-0197	2-HOLE PIPE-HOLDING BRACKET



**Filtering system**



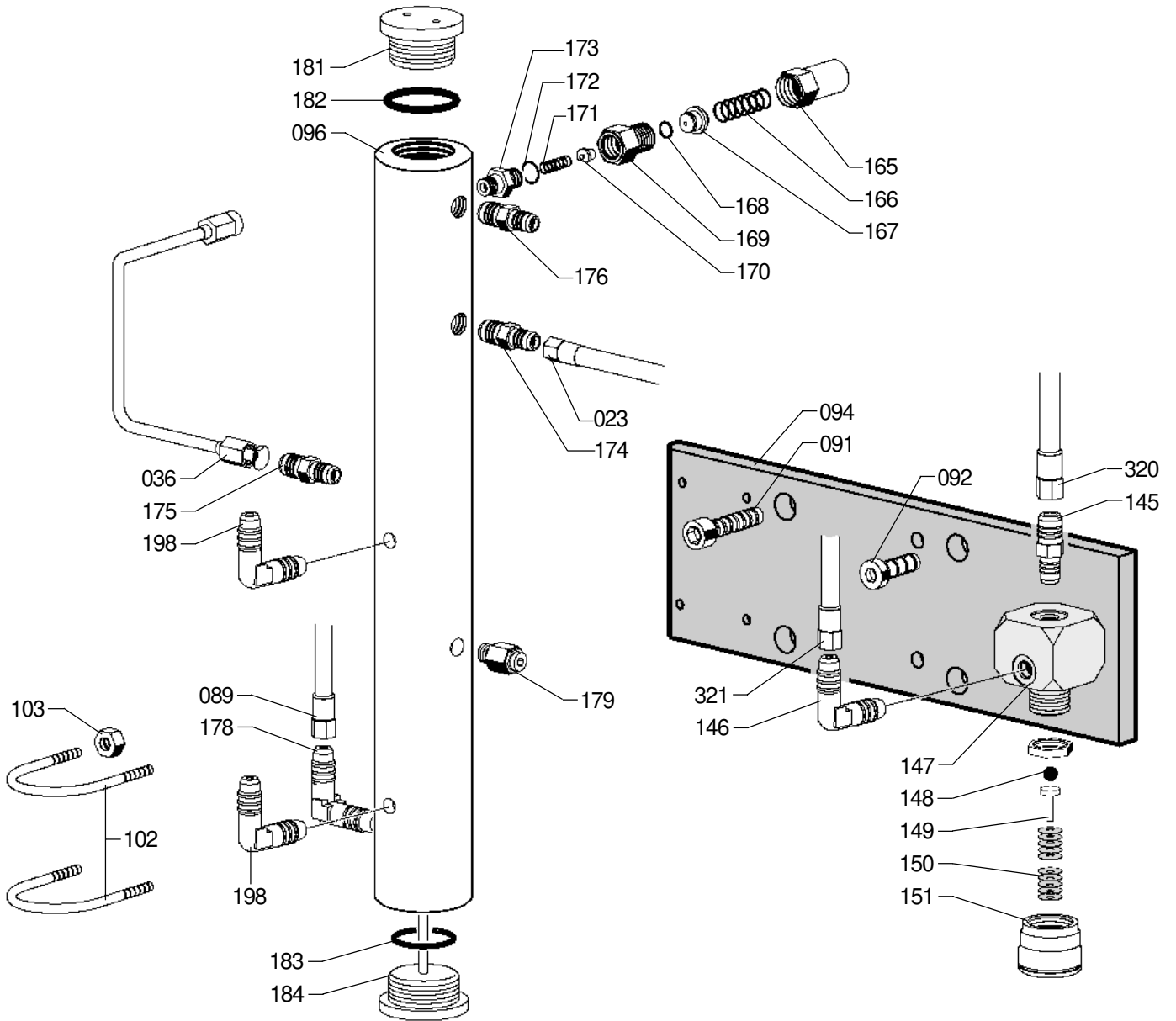


**Filtering system**

POS.	CODE	DESCRIPTION
097	13-00-0097	CLEANER FILTER
152	13-00-0152	VITE 8x30 TCE
153	13-00-0153	VITE 8x12 TCE
154	13-00-0154	UPPER FILTER CAP
155	13-00-0155	FILTER CAP O-RING
156	13-00-0156	INTERNAL FILTER CAP
157	13-00-0155	FILTER CAP O-RING
158	13-00-0158	FILTER CARTRIDGE O-RING
159	13-00-0155	FILTER CAP O-RING
160	13-00-0160	LOWER FILTER CAP
187	13-00-0187	MESH DISK DIAM. 39 mm.
188	13-00-0188	FILTER CARTRIDGE INTERNAL SPRING
189	13-00-0189	FELT DISK DIAM. 40 mm
198	13-00-0144	CORNER 1/8 PIPE FITTING 6 mm.



**MCH 13-16/ET condensate trap**



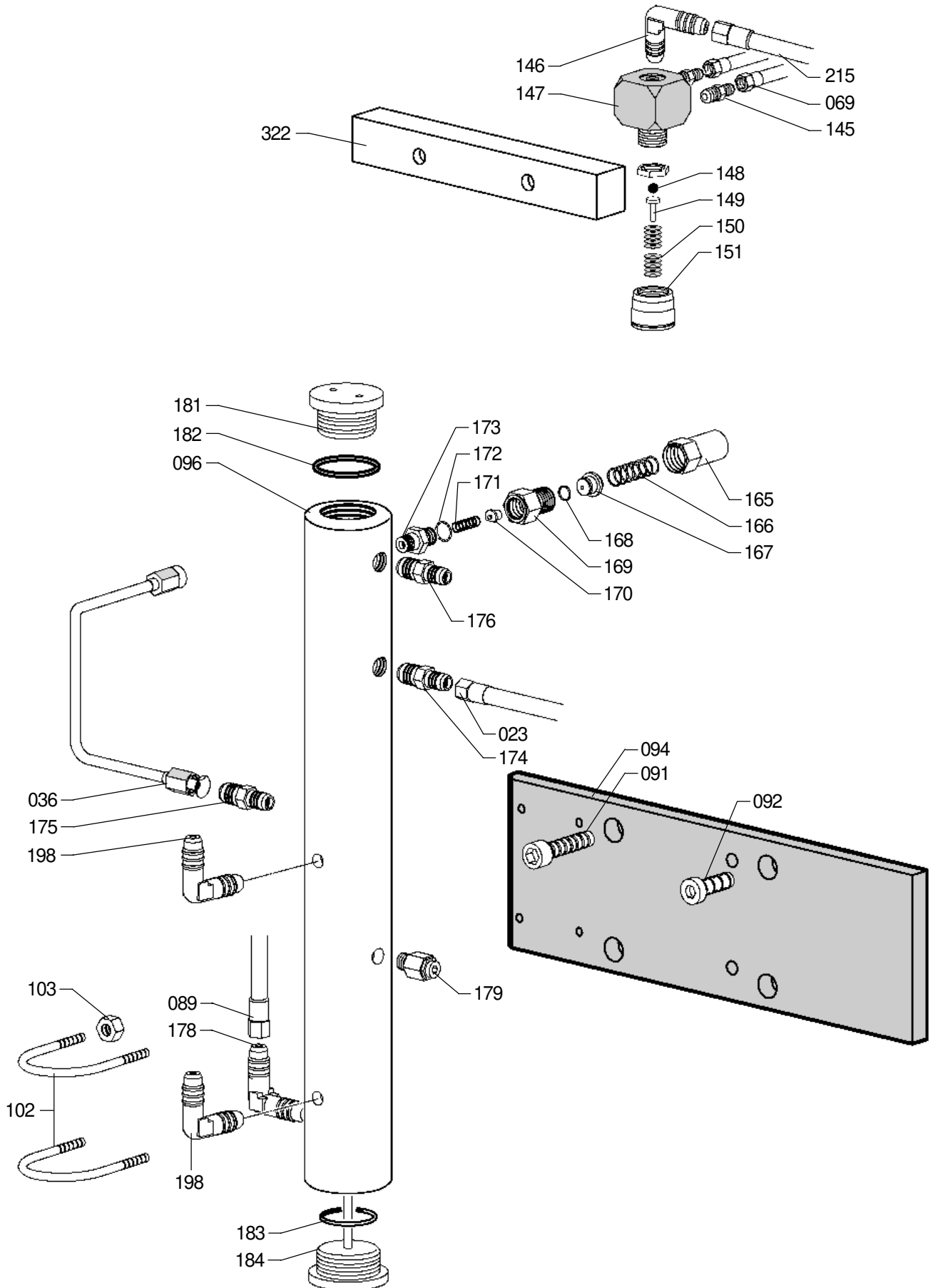


## MCH 13-16/ET condensate trap

POS.	CODE	DESCRIPTION
023	13-03-0023	6 mm. COOLING PIPE
036	13-00-0036	8 mm. PIPE
089	13-00-0089	10 mm. 2nd-3rd STAGE COOLING PIPE
091	13-00-0048	8x25 TCE SCREW
092	13-00-0092	LOWERED 8x20 TCE SCREW
094	13-00-0094	FILTER-HOLDING PLATE
096	13-00-0096	CONDENSATE TRAP
102	13-00-0102	TRAP-HOLDING BRACKET
103	13-00-0018	8 mm. NUT
145	13-00-0025	STRAIGHT 1/4 - PIPE FITTING 6 mm.
146	13-00-0146	CORNER 1/4 - PIPE FITTING 6 mm.
147	13-00-0147	V.M.P. BODY
148	13-00-0148	V.M.P. STEEL BALL
149	13-00-0149	SMALL V.M.P. PISTON
150	13-00-0150	SET OF BELLEVILLE WASHERS
151	13-00-0151	V.M.P. CAP
165	13-00-0165	SAFETY VALVE ADJUSTMENT COVER
166	13-00-0166	SAFETY VALVE SPRING
167	13-00-0167	SMALL SAFETY VALVE PISTON
168	13-00-0168	SMALL S.V. PISTON O-RING
169	13-00-0169	SAFETY VALVE BODY
170	13-00-0170	NYLON SAFETY VALVE SEAT
171	13-00-0171	SAFETY VALVE SEAT SPRING
172	13-00-0172	SAFETY VALVE O-RING
173	13-00-0173	SAFETY VALVE CONNECTOR
174	13-00-0174	STRAIGHT 1/8 PIPE FITTING 6
175	13-00-0174	STRAIGHT 1/8 PIPE FITTING 6
176	13-00-0174	STRAIGHT 1/8 PIPE FITTING 6
178	13-00-0178	CORNER 1/4 - PIPE FITTING 10 mm.
179	13-03-0179	SECOND STAGE SAFETY VALVE
181	13-00-0181	UPPER TRAP/FILTER TRAP CAP
182	13-00-0182	UPPER TRAP CAP O-RING
183	13-00-0182	TRAP CAP O-RING
184	13-00-0184	LOWER TRAP CAP
198	13-00-0144	CORNER 1/8 - PIPE FITTING 6 mm.
320	13-04-0320	HP 6 mm. PIPE
321	13-04-0321	HP 800 mm. PIPE



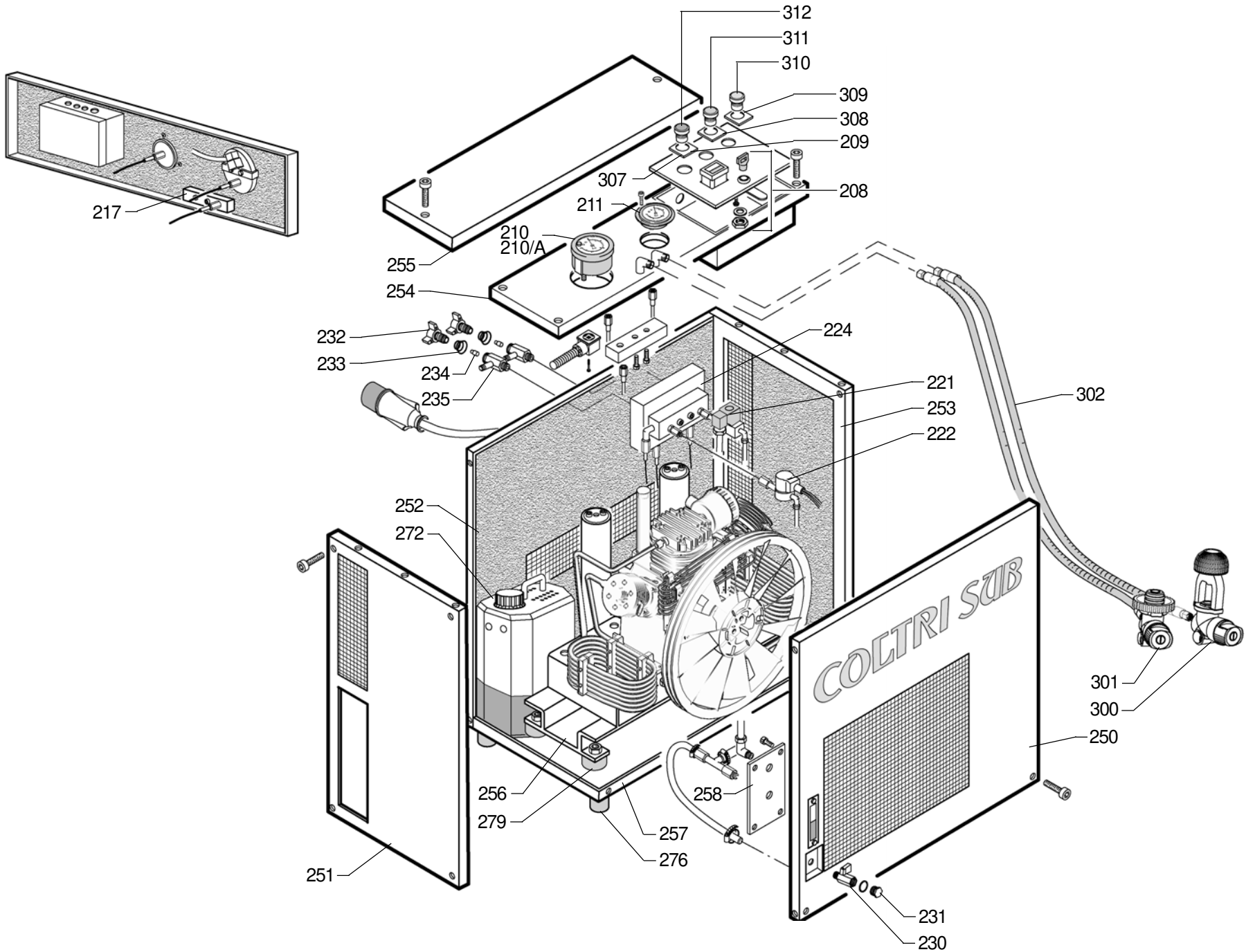
**MCH 26-32/ET condensate trap**





## MCH 26-32/ET condensate trap

POS.	CODE	DESCRIPTION
023	13-03-0023	6 mm. COOLING PIPE
036	13-00-0036	8 mm. PIPE
069	13-04-0226	HP 300 mm. PIPE
089	13-00-0089	10 mm. 2nd-3rd STAGE COOLING PIPE
091	13-00-0048	8x25 TCE SCREW
092	13-00-0092	LOWERED 8x20 TCE SCREW
094	13-00-0094	FILTER-HOLDING PLATE
096	13-00-0096	CONDENSATE TRAP
102	13-00-0102	TRAP-HOLDING BRACKET
103	13-00-0018	8 mm. NUT
145	13-00-0025	STRAIGHT 1/4 - PIPE FITTING 6 mm.
146	13-00-0146	CORNER 1/4 - PIPE FITTING 6 mm.
147	13-00-0147	V.M.P. BODY
148	13-00-0148	V.M.P. STEEL BALL
149	13-00-0149	SMALL V.M.P. PISTON
150	13-00-0150	SET OF BELLEVILLE WASHERS
151	13-00-0151	V.M.P. CAP
165	13-00-0165	SAFETY VALVE ADJUSTMENT COVER
166	13-00-0166	SAFETY VALVE SPRING
167	13-00-0167	SMALL SAFETY VALVE PISTON
168	13-00-0168	SMALL S.V. PISTON O-RING
169	13-00-0169	SAFETY VALVE BODY
170	13-00-0170	NYLON SAFETY VALVE SEAT
171	13-00-0171	SAFETY VALVE SEAT SPRING
172	13-00-0172	SAFETY VALVE O-RING
173	13-00-0173	SAFETY VALVE CONNECTOR
174	13-00-0174	STRAIGHT 1/8 PIPE FITTING 6
175	13-00-0174	STRAIGHT 1/8 PIPE FITTING 6
176	13-00-0174	STRAIGHT 1/8 PIPE FITTING 6
178	13-00-0178	CORNER 1/4 PIPE FITTING 10 mm.
179	13-03-0179	SECOND STAGE SAFETY VALVE
181	13-00-0181	UPPER TRAP/FILTER TRAP CAP
181/A	13-00-181A	UPPER 1/8 HOLE TRAP CAP
182	13-00-0182	UPPER TRAP CAP O-RING
183	13-00-0182	UPPER TRAP CAP O-RING
184	13-00-0184	LOWER TRAP CAP
198	13-00-0144	CORNER 1/8 - PIPE FITTING 6 mm.
215	13-04-0215	HP 400 mm. PIPE
322	13-04-0430	ALUMINIUM BLOCK



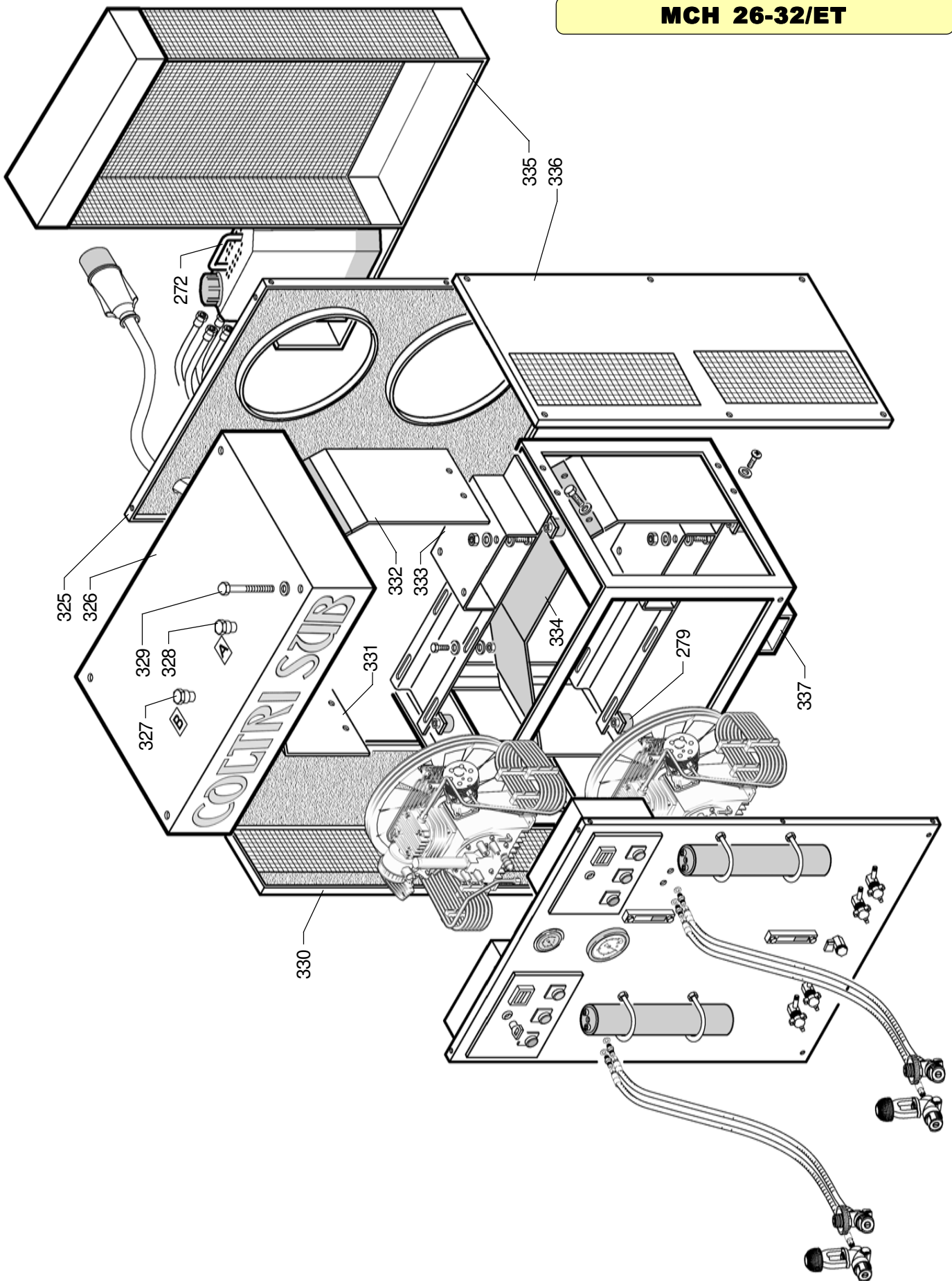
**MCH 13-16/ET**

**MCH 13-16/ET**

POS.	CODE	DESCRIPTION
208	13-04-0208	COMPLETE LOCK
209	13-04-0209	SWITCHBOARD PANEL
210	SC000310	280 BAR PRESSURE SWITCH
210/A	SC000315	330 BAR PRESSURE SWITCH
211	13-04-0211	PRESSURE GAUGE WITH FLANGE
217	13-04-0217	RELOAD RAMP ALUMINIUM BLOCK
221	13-04-0221	LP CONDENSATION DISCHARGE SOLENOID VALVE
222	13-04-0222	HP CONDENSATION DISCHARGE SOLENOID VALVE
224	13-04-0224	CONDENSATION DISCHARGE ALUMINIUM BLOCK
230	13-04-0230	OIL DISCHARGE COCK
231	13-04-0231	1/2" OIL DISCHARGE CAP
232	13-00-0164	CONDENSATE DISCHARGE HANDWHEEL
233	13-00-0163	CONDENSATE DISCHARGE SPRING
234	13-00-0162	NYLON CONDENSATE DISCHARGE
235	13-00-0161	CONDENSATE DISCHARGE TAP CASING
250	13-04-0400	COMPACT FRONT PANEL
251	13-04-0401	COMPACT LEFT-HAND SIDE PANEL
252	13-04-0402	COMPACT REAR PANEL
253	13-04-0403	COMPACT RIGHT-HAND SIDE PANEL
254	13-04-0404	COMPACT UPPER INSTRUMENT PANEL
255	13-04-0405	COMPACT UPPER PANEL
256	13-04-0406	MOTOR-COMPRESSOR SUPPORT
257	13-04-0407	BASE
258	13-04-0408	COMPACT OIL LEVEL PLATE
272	13-04-0272	CONDENSATION DISCHARGE CAN COMPLETE WITH PIPE FITTINGS
276	16-05-030	VIBRATION-DAMPING SUPPORT
279	13-04-0279	VIBRATION DAMPNER WITH DOUBLE ATTACHMENT
300	SC000450	BC INT COCK
301	SC000460	BC DIN 200 BAR COCK
301/A	SC000470	BC DIN 300 BAR COCK
302	13-04-238	HP 1200 mm. PIPE
307	13-04-0203	OFF PLATE
308	13-04-0204	ON PLATE
309	13-04-0205	MANUAL PURGE PLATE
310	13-04-0202	YELLOW CONDENSATION DISCHARGE BUTTON
311	13-04-0201	GREEN START BUTTON
312	13-04-0200	RED STOP BUTTON



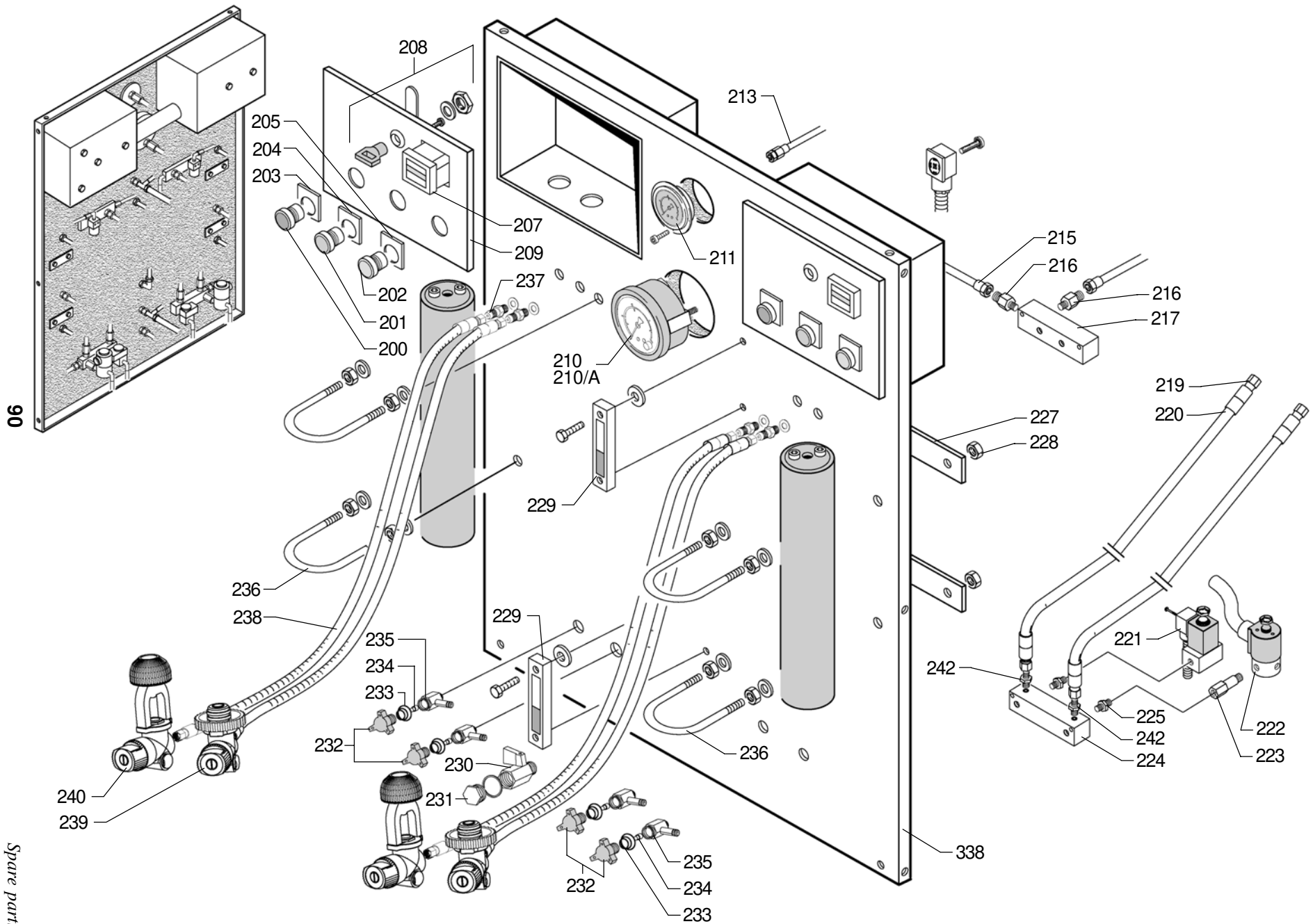
**MCH 26-32/ET**





**MCH 26-32/ET**

POS.	CODE	DESCRIPTION
272	13-04-0272	CONDENSATION DISCHARGE CAN COMPLETE WITH PIPE FITTINGS
279	13-04-0279	VIBRATION DAMPNER WITH DOUBLE ATTACHMENT
325	13-04-0409	PUMP UNITS REAR PANEL
326	13-04-0410	COMPACT UPPER PANEL
327	13-04-0411	OIL REFILL CAP B
328	13-04-0412	OIL REFILL CAP A
329	13-04-0413	COMPACT STAY BOLT M6
330	13-04-0414	COMPACT LEFT-HAND SIDE PANEL
331	13-04-0415	LEFT INTERNAL CONVEYOR
332	13-04-0416	RIGHT INTERNAL CONVEYOR
333	13-04-0417	MOTOR-COMPRESSOR SUPPORT
334	13-04-0418	UPPER INTERNAL CONVEYOR
335	13-04-0419	COMPACT REAR PANEL
336	13-04-0420	COMPACT RIGHT-HAND SIDE PANEL
337	13-04-0421	BASE



**MCH 26-32/ET front panel**

Spare parts

COLTRIS S.p.A.



## MCH 26-32/ET front panel

POS.	CODE	DESCRIPTION
200	13-04-0200	RED STOP BUTTON
201	13-04-0201	GREEN START BUTTON
202	13-04-0202	YELLOW CONDENSATION DISCHARGE BUTTON
203	13-04-0203	OFF PLATE
204	13-04-0204	ON PLATE
205	13-04-0205	MANUAL PURGE PLATE
207	13-04-0207	HOUR COUNTER
208	13-04-0208	COMPLETE LOCK
209	13-04-0209	SWITCHBOARD PANEL
210	SC000310	280 BAR PRESSURE SWITCH
210/A	SC000315	330 BAR PRESSURE SWITCH
211	13-04-0211	PRESSURE GAUGE WITH FLANGE
213	13-04-0213	HP 400 mm. PRESSURE GAUGE HOLDING MICROTUBE
215	13-04-0215	HP 400 mm. PIPE
216	13-00-0174	STRAIGHT 1/8 PIPE FITTING 6 mm.
217	13-04-0217	RELOAD RAMP ALUMINIUM BLOCK
219	13-04-0219	HP 400 mm. PIPE
220	13-04-0220	HP 1000 mm. PIPE
221	13-04-0221	LP CONDENSATION DISCHARGE SOLENOID VALVE
222	13-04-0222	HP CONDENSATION DISCHARGE SOLENOID VALVE
223	13-04-0223	CONNECTOR WITH SOLENOID VALVE FILTER
224	13-04-0224	CONDENSATION DISCHARGE ALUMINIUM BLOCK
225	13-04-0225	1/4 GAS - 1/4 NPT PIPE FITTING
227	13-04-0227	FILTER REINFORCEMENT PLATE
228	13-00-0018	8 mm. NUT
229	13-04-0229	LVO 127/10 OIL LEVEL
230	13-04-0230	OIL DISCHARGE COCK
231	13-04-0231	1/2" OIL DISCHARGE CAP
232	13-00-0164	CONDENSATE DISCHARGE HANDWHEEL
233	13-00-0163	CONDENSATE DISCHARGE SPRING
234	13-00-0162	NYLON CONDENSATE DISCHARGE
235	13-00-0161	CONDENSATE DISCHARGE TAP CASING
236	13-00-0093	FILTER-HOLDING BRACKET
237	13-00-0174	STRAIGHT 6 mm. PIPE 1/8 FITTING
238	13-04-0238	HP 1200 mm. PIPE
239	SC000470	BC DIN 200 BAR COCK
239/A	SC000460	BC DIN 300 BAR COCK
240	SC000450	BC INT COCK
242	13-00-0174	STRAIGHT 6 mm. PIPE 1/8 FITTING
338	13-04-0422	26-32/ET FRONT PANEL



**COLTRI SUB**

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