

# AEROTECNICA COLTRI®

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USE AND MAINTENANCE MANUAL

## MCH24 ET-CNG

## MCH20 ET-CNG

High pressure compressors for natural gas compression

# **MCH20 ET-CNG/ MCH24 ET-CNG**

**HIGH PRESSURE COMPRESSORS FOR PURE BREATHING AIR AND TECHNICAL GASES**

**IMPORTANT**



**BEFORE USING THE COMPRESSOR READ THIS  
MANUAL CAREFULLY**

Dear Customer,

Thank you for choosing an **AEROTECHNICA COLTRI** compressor. This manual is provided together with the compressor to aid you in the use of the machine and ensure that your work produces the best possible results.

Please read all the instructions and information provided on the following pages. Ensure that the manual is at the disposal of the personnel who will be using/managing the compressor and carrying out any maintenance on it.

Should you require any clarification, when using the compressor for the first time or at any other time it is used, please remember that **AEROTECHNICA COLTRI** are at your complete disposal.

Should you need to contact us our **fax number** is: **+39 030 9910283**

For routine or unscheduled maintenance note that **AEROTECHNICA COLTRI** international technical service is able to provide you with assistance and spare parts as and when required.

To ensure that your requests are dealt with quickly the following information is provided:

Manufacturer's data:     **AEROTECHNICA COLTRI Spa**  
Via Colli Storici, 177  
25010 SAN MARTINO DELLA BATTAGLIA (BRESCIA) - ITALY  
Telefono : +39 030 9910301 - +39 030 9910297  
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**DICHIARAZIONE DI CONFORMITA'**  
**DECLARATION OF- CONFORMITY**

In accordo alle Direttive ATEX 94/9/EC, PED 97/23/EC, Macchine 98/37/EC  
 In accordance to Directive ATEX 94/9/EC, PED 97/23/EC, Machine 98/37/EC

Dichiariamo sotto la nostra responsabilità che la progettazione, la fabbricazione, i controlli e le prove del gruppo compressore per metano sotto specificato sono conformi alle Direttive ATEX 94/9/EC, PED 97/23/EC, Macchine 98/37/EC

We declare under our responsibility that the design, manufacturing, inspection and test of the compressor assembly for natural gas listed below meet the requirements of the Directives ATEX 94/9/EC, PED 97/23/EC, Machine 98/37/EC

Descrizione Equipment type	Compressor MCH 20/24
Nr. Fabbrica Serial Nr.	
Anno di fabbricazione Manufacturing year	2008
Pressione max. ammissibile Max allowable pressure	200 bar
 II 3G EEx T4	
Procedura di valutazione di conformità - ALLEGATO VIII - Modulo: controllo di fabbricazione interno Conformity assessment procedure – Annex VIII - Module: Internal Manufacturing Control	
Norme armonizzate applicate Harmonized standards applied	EN 13463-1 EN 13463-1

DESENZANO DEL GARDA, 19/05/2008

**Chairman of the  
Board of Directors**

*Carlo Coltri*



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**QUICK GUIDE****WARNING**

- This guide is intended only as a rapid introduction to use of the compressor.
- This guide is not meant to replace the use and maintenance manual.
- This compressor must not be used before reading the entire use and maintenance manual.

**Preliminary tasks:**

- Position the compressor in the selected area (see chapter “5”)
- Connect the gas intake extension (see section “5.3.2”).
- Check the oil level; if the compressor is new fill the oil sump with the oil supplied with the compressor (see section “7.6”).
- Connect the electric motor to the main power socket (see section “5.3.3”);
- Check that the cooling fan rotates in the direction indicated by the arrow on the cover; if it turns the other way invert two of the three phases on the mains power (see section “6.1.2”).
- Connect up the refill hoses (see section “7.12”).
- Check the safety valve is working (see section “7.8”);

**Vehicle refill (see section “6.5”):**

- fit the hose connector 1 on the vehicle connector and pressurize the nozzle
- start the compressor;

**When refill is complete**

- shutdown occurs automatically at set pressure;
- depressurize the nozzle and disconnect the connector from the vehicle

**Maintenance:**

- After the first 5 working hours change the lubricating oil and filter again (see section “7.6.3”).
- Check the lubricating oil level every 5 hours (see section “7.6.2”).
- Change the lubricating oil and filter every 100 hours (see section “7.6.3”).
- Periodically change the gas intake filter (see section “7.7”).
- Check transmission belt tension and if necessary change them (see section “7.9”).
- Discharge the condensate (see section “7.10”) every week.
- Periodically replace the active carbon filters / molecular sieve (see section “7.11”).
- Periodically replace the refill hose (see section 7.12)

<b>CHAPTER 1 - GENERAL</b>	<b>9</b>
1.1 Preliminary information	9
1.2 Required operator training	10
1.3 Important information for the user	10
1.4 Foreword	11
1.5 Warranty	11
1.6 Assistance	12
1.7 Responsibility	12
1.8 Purpose of the machine	13
1.9 Where the machine may be used	15
1.10 Running in and testing the compressor	15
1.10.1 Tightening torque values	15
<b>CHAPTER 2 - BASIC INFORMATION ON THE COMPRESSOR</b>	<b>16</b>
2.1 Description of the compressor	16
2.2 Identification the compressor	16
2.3 General instructions	17
<b>CHAPTER 3 - SAFETY REGULATIONS</b>	<b>18</b>
3.1 General safety rules	18
3.1.1 Know the compressor	18
3.1.2 Protective clothing	18
3.1.3 Keep emergency equipment nearby	18
3.1.4 Warn others when doing checks/maintenance	18
3.2 General precautions	19
3.2.1 Important safety information	20
3.2.2 Accident prevention	20
3.2.3 Working safety	20
3.2.4 Residual risk zones	21
3.3 Safety info labels: location	22
3.3.1 Safety info labels: description	22
3.4 General safety regulations	24
3.4.1 Care and maintenance	24
3.4.2 Fire extinguishers and first aid	24
3.5 Maintenance precautions	25
3.5.1 Warning signs	25
3.5.2 Tools	25
3.5.3 Personnel	25
3.5.4 Keep the compressor clean	25
3.5.5 Periodic replacement of essential safety parts	25
<b>CHAPTER 4 - TECHNICAL DATA</b>	<b>26</b>
4.1 Technical characteristics	26
4.1.1 Crankcase, crankshaft, cylinder, pistons	26
4.1.2 Valves	26
4.1.3 Safety valves	26
4.1.4 Cooling pipes, lubrication	26
4.1.5 Frame, guards	26
4.2 Machine parts	27
4.3 Technical specifications table	28
4.3.1 Noise level	28
4.3.2 Dimensions and weight	29

**CONTENTS**

<b>CHAPTER 5 - HANDLING AND INSTALLATION</b>	<b>30</b>
5.1 Unpacking	30
5.2 Handling	30
5.3 Installation	30
5.3.1 Positioning	30
5.3.2 Gas intake extension connection	31
5.3.3 Electrical connection	31
<b>CHAPTER 6 - USING THE COMPRESSOR</b>	<b>32</b>
6.1 Preliminary checks before using for the first time	32
6.1.1 Filling with lubricating oil	32
6.1.2 Checking for proper electrical connection	32
6.2 Checks to be run at the start of each working day	33
6.2.1 Lubricating oil level check	33
6.2.2 Checking that the refill hoses are in good condition	33
6.2.3 Storing technical documentation	33
6.3 Control panel	34
6.3.1 Power indicator light	34
6.3.2 Direction of rotation indicator light	35
6.3.3 Lubricating oil level warning light	35
6.3.4 ON pushbutton	35
6.3.5 Stop pushbutton	35
6.3.6 Manual condensate discharge pushbutton	36
6.3.7 Cabin interior / cooling air temperature	36
6.3.8 Hour counter	36
6.3.9 Lubrication oil circuit pressure gauge	36
6.3.10 1st stage pressure gauge	37
6.3.11 2nd stage pressure gauge	37
6.3.12 3rd stage pressure gauge	37
6.3.13 Working pressure gauge	37
6.3.14 Adjustable automatic shutdown pressure switch	38
6.3.15 Refill hose connection	38
6.3.16 Emergency pushbutton	38
6.4 Preliminary tasks	39
6.4.1 Safety valve checks	40
6.5 Bottle refill	41
<b>CHAPTER 7 - MAINTENANCE</b>	<b>43</b>
7.1 Foreword	43
7.2 General	43
7.3 Unscheduled work	43
7.4 Scheduled maintenance table	44
7.5 Troubleshooting	44
7.6 Checking and changing the lubricating oil and filter	45
7.6.1 Oil table	45
7.6.2 Checking the oil level	45
7.6.3 Changing the lubricating oil and filter	46
7.7 Changing the intake filter	47
7.8 Checking the safety valve	48

7.9 Transmission belts	40
7.9.1 Checking transmission belt tension	40
7.9.2 Changing the transmission belts	49
7.10 Condensate discharge	50
7.10.1 "SILENT" model automatic condensate discharge	50
7.10.2 "OPEN V.M." model automatic condensate discharge	50
7.11 Active carbon filters / molecular sieve	51
7.11.1 Filter replacement frequency calculation table	51
7.11.2 Changing the active carbon filters / molecular sieve	51
7.12 Changing the flex hoses	53
<b>CHAPTER 8 - STORAGE</b>	<b>54</b>
8.1 Stopping the machine for a brief period	54
8.2 Stopping the machine for a long period	54
<b>CHAPTER 9 - DISMANTLING AND PUTTING OUT OF SERVICE</b>	<b>55</b>
9.1 Waste disposal	55
9.2 Dismantling the compressor	55
<b>CHAPTER 10 - INSTRUCTIONS FOR EMERGENCY SITUATIONS</b>	<b>56</b>
10.1 Fire	56
<b>CHAPTER 11 - MAINTENANCE REGISTER</b>	<b>57</b>
11.1 Assistance service	57
11.2 Scheduled maintenance	57
11.3 Using the compressor under heavy-duty conditions	57
11.4 The Customer Care Centre	57
11.5 Scheduled maintenance registry coupons	58
<b>CHAPTER 12 - NOTES</b>	<b>61</b>

## 1 - GENERAL

### 1.1 PRELIMINARY INFORMATION

Do not destroy or modify the manual and update it with additional inserts only.

Machine type: Compressore ad alta pressione per aria respirabile e/o gas tecnici  
Model: **MCH-20 / MCH-24**  
Revision n°: 00  
Edition: 01/2008

Manufacturer's data: **AEROTECNICA COLTRI Spa**  
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Appendices:  
- Safety regulations

## 1.2 REQUIRED OPERATOR TRAINING

This manual must be read carefully:

- all compressor operators / maintenance personnel must read this entire manual with due care and attention and observe the instructions/information contained herein.
- Company owners ensure that the operator has the required training for operation of the compressor and that he/she has read the manual.

## 1.3 IMPORTANT INFORMATION FOR THE USER

The information/instructions for compressor use contained in this manual concern the  
**AEROTECNICA COLTRI compressor Mod.:**

### **MCH-20 / MCH-24**

The instruction manual must be read and used as follows:

- read this manual carefully; treat it as an essential part of the compressor;
- the instruction manual must be kept where it can readily be consulted by compressor operators and maintenance staff;
- keep the manual for the working life of the compressor;
- make sure updates are incorporated in the manual;
- make sure the manual is given to other users or subsequent owners in the event of resale;
- keep the manual in good condition and ensure its contents remain undamaged;
- do not remove, tear or re-write any part of the manual for any reason;
- keep the manual protected from damp and heat;
- if the manual is lost or partially damaged and its contents cannot be read it is advisable to request a copy from the manufacturer.

Important: you must understand the following symbols and their meaning. They highlight essential information:

**IMPORTANT** Refers to additional information or suggestions for proper use of the compressor.



**DANGER** Refers to dangerous situations that may occur during use of the compressor: aims to ensure worker safety.



**WARNING** Refers to dangerous situations that may occur during use of the compressor: aims to prevent damage to objects and the compressor itself.



## 1.4 FOREWORD

The regulations/instructions for use contained in this manual constitute an essential component of the supplied compressor.

These regulations/instructions are intended for an operator who has already been trained to use this type of compressor. They contain all the information necessary and essential to safety and efficient, proper use of the compressor.

Hurried or careless preparation leads to improvisation, which is the cause of accidents. Before beginning work, read the following suggestions carefully:

- 1) before using the compressor, gain familiarity with the tasks to be completed and the admissible working position;
- 2) the operator must always have the instruction manual to hand;
- 3) program all work with due care and attention;
- 4) you must have a detailed understanding of where and how the compressor is to be used;
- 5) before starting work make sure that safety devices are working properly and that their use is understood; in the event of any doubts do not use the compressor;
- 6) observe the warnings given in this manual with due care and attention;
- 7) constant and careful preventive maintenance will always ensure a high level of safety when using the compressor. Never postpone repairs and have them carried out by specialized personnel only; use only original spare parts.

## 1.5 WARRANTY

### IMPORTANT



The materials supplied by AEROTECNICA COLTRI are covered by a 1 year warranty, the validity of which begins when the compressor is put into service as proven by the delivery document.

**AEROTECNICA COLTRI shall repair or replace those parts it acknowledges to be faulty during the warranty period.**

**In replacing the faulty part AEROTECNICA COLTRI shall not be liable for any other expenses sustained by the dealer or his customer such as presumed damage (present or future), lost earnings or fines.**

**Routine and unscheduled maintenance must be carried out in compliance with the instructions contained in this manual. Should the required work not be covered by the manual or assistance be required you are advised to contact AEROTECNICA COLTRI directly by fax, even where agreements have already been made on the phone. AEROTECNICA COLTRI cannot be held liable for any delays or failure to execute work.**

**AEROTECNICA COLTRI cannot be held liable for any damage or malfunctions caused by work carried out on the compressor by unauthorized personnel.**

**AEROTECNICA COLTRI guarantees that its compressors are free from defects design, workmanship and the used materials for a period of 1 year starting from the date of delivery of the compressor; should the customer note any flaws and/or defects he must report them, in writing, to AEROTECNICA COLTRI within 2 months of their discovery otherwise the warranty shall be rendered null and void.**

The warranty only covers flaws and faults that occur where the compressor is used properly in compliance with the instructions contained in this manual and where periodic maintenance is carried out.

The warranty does not cover faults caused by improper use of the compressor, exposure to atmospheric agents (rain etc.) or damage during transport; all materials subject to wear and those subject to periodic maintenance are not covered by the warranty and are to be paid for by the customer in full; in any event the warranty is rendered null and void if the compressor is tampered with or if work is carried out on it by personnel who have not been authorized by **AEROTECNICA COLTRI**.

A compressor that has been acknowledged as faulty on account of flaws in design, workmanship or used materials shall be repaired or replaced free of charge by **AEROTECNICA COLTRI** at its plant in San Martino della Battaglia (BRESCIA); costs regarding transport, delivery of spare parts and any materials subject to wear shall be met by the customer.

Should warranty-covered work need to be carried out on the customer's premises, travel and accommodation costs for personnel sent by **AEROTECNICA COLTRI** shall be met by the customer.

The act of taking delivery of machines and/or faulty components or the sending of technicians to assess the presumed defects and/or flaws reported by the customer does not in itself imply acknowledgement that the defect is covered by warranty.

Repairs and/or replacements made by **AEROTECNICA COLTRI** during the warranty period do not in any way prolong the latter itself.

Acknowledgement that a defect is covered by warranty does not in itself mean that **AEROTECNICA COLTRI** is in any way liable to award compensation.

**AEROTECNICA COLTRI** cannot be held liable for any other direct or indirect damages imputable to compressor defects and flaws (loss of production or earnings etc.).

## 1.6 ASSISTANCE

**AEROTECNICA COLTRI** technicians are at your disposal for all routine/unscheduled maintenance work. Please forward your request for assistance to **AEROTECNICA COLTRI** by sending a fax or e-mail to:

<b>AEROTECNICA COLTRI</b>	
<b>Fax.</b>	+39 030 9910283
	<a href="mailto:coltrisub@coltrisub.it">coltrisub@coltrisub.it</a>

## 1.7 RESPONSIBILITY

**AEROTECNICA COLTRI** considers itself exonerated from any responsibility or obligation regarding injury or damage caused by:

- failure to observe the instructions contained in this manual that concern the running, use and maintenance of the compressor;
- violent actions or incorrect manoeuvres during use or maintenance of the compressor;
- modifications made to the compressor without prior written authorization from **AEROTECNICA COLTRI**;
- incidents beyond the scope of routine, proper use of the compressor.

In any case, should the user impute the incident to a defect of the compressor, he/she must demonstrate that the damage has been a major and direct consequence of this "defect".

### WARNING



**Maintenance and repairs must only be carried out using original spare parts. AEROTECNICA COLTRI cannot be held liable for any damages caused by failure to observe this rule.**

**The compressor is guaranteed as per the contractual agreements made at the time of sale.**

**Failure to observe the regulations and instructions for use contained in this manual shall render the warranty null and void.**

## 1.8 PURPOSE OF THE MACHINE

The compressor mod. **MCH20 ET-CNG / MCH24 ET-CNG** has been designed and built for the purpose of obtaining excellent quality Compressed Natural Gas by drawing it from the residential pipeline. The gas is free from any sulfur components or any other corrosive media. The gas is passed through an intake filter and, after compression is intended to be stored in vehicle tank at 200 bar to be used as a fuel.

The compressor can also be used to obtain other non-breathable gases for industrial use such as:

- Nitrogen
- Helium
- Air

Any other use is inappropriate: the manufacturer cannot be held liable for any personal injury or damage to objects / the machine itself caused by improper use.

**DANGER** - Use the compressor in areas free from dust, risk of explosion, corrosion and fire.



- Improper use could have serious consequences for the user.
- Do not disconnect the hose from the fittings or the clamp when under pressure.
- Change the gas purification filters regularly as described in section “7.11.2 Changing the active carbon filters”.
- Drain the condensate regularly as illustrated in section “7.10 Condensate discharge”.
- The power lead plug must be disconnected:
  - if there is a problem during use
  - before carrying out any cleaning or maintenance tasks.
- Never pull the plug out by tugging the lead. Make sure the lead is not bent at a sharp angle and that it does not rub against any sharp edges. Use of extensions is advised.
- Never run the compressor when:
  - the power lead is damaged;
  - there is evident damage;
  - the side doors are open.
- All routine and unscheduled maintenance tasks must be carried out with the compressor at standstill, the electrical power supply disconnected and the pumping circuit depressurized.
- After switching off the compressor wait about 30 minutes before carrying out any maintenance tasks so as to prevent burns.
- The high pressure flex hose that connects to the bottle (also called the refill hose) must be in good condition, especially in the areas near the fittings.
- The plastic sheath that covers the pipe must not show any signs of abrasion otherwise damp could get in, corrode the steel braid and weaken it.
- The hose must be changed periodically or when it shows signs of wear. Failure to observe this rule could seriously endanger the users' safety.
- Make sure the minimum bending radius of the hose is no less than 250 mm.

To ensure maximum working efficiency, **AEROTECNICA COLTRI** have constructed the compressor with carefully selected components and materials.

The compressor is tested prior to delivery.

Continued compressor efficiency over time will also depend on proper use and maintenance as per the instructions contained in this manual.

All the components, connections and controls used in its construction have been designed and built to a high degree of safety so as to resist abnormal strain or in any case a strain greater than that indicated in the manual. Materials are of the finest quality; their introduction and storage in the company and their utilisation in the workshop are controlled constantly so as to prevent any damage, deterioration or malfunction.

## **DANGER**



- Before carrying out any work on the compressor each operator must have a perfect understanding of how the compressor works, know how to use the controls and have read the technical information contained in this manual.

- It is forbidden to use the compressor under conditions / for purposes other than those indicated in this manual and **AEROTECNICA COLTRI** cannot be held liable for breakdowns, problems or accidents caused by failure to observe this rule.
- Check that the fittings provide a proper seal by wetting them with soapy water: eliminate any leaks.
- Do not attempt to repair high pressure hoses by welding them.
- Do not empty the ~~vehicle~~ completely, not even during winter storage as this practice prevents damp air getting in.
- It is forbidden to tamper with, alter or modify, even partially, the systems and equipment described in this instruction manual, especially as safety guards and safety symbols are concerned.
- It is also forbidden to carry out work in any way other than that described or to neglect the illustrated safety tasks.
- The safety information and the general information given in this manual are highly important.

## 1.9 WHERE THE MACHINE MAY BE USED

The compressor mod. **MCH20 ET-CNG / MCH24 ET-CNG** has been designed and built for the purpose of obtaining excellent quality compressed natural gas by drawing it from the pipeline, free from any corrosive / poisonous compound.

The natural gas is passed through an intake filter and, after the compression cycle, is injected in vehicle bottle(s) constructed to contain CNG at high pressure. The compressor must only be used in environments having the characteristics described in the following table.

AREA OF MACHINE USE: ESSENTIAL DATA TABLE		
Temperature ambient	(°C)	min. -15° - Max. +40°
Air humidity	(%)	max.95%
Max tilt angle (bank)	%	6

Check that the area in which the compressor is **not confined space**. The place of installation should have free air exchange with no dust and no risk of corrosion or fire.

If ambient temperatures exceed 40°C consult manufacturer.

Make sure that lighting in the area is sufficient to identify every detail (such as the writing on the info plates/stickers); use artificial lighting where daylight on its own is insufficient.

## 1.10 RUNNING IN AND TESTING THE COMPRESSOR

Each compressor is carefully run and tested prior to delivery.

A new compressor must nevertheless be used with caution during the first 5 working hours so as to complete proper running of its components.

If the compressor is subject to an excessive workload during initial use, its potential efficiency will be prematurely compromised and functionality soon reduced.

After the first 5 hours carry out - in addition to the scheduled maintenance - the following tasks:

- change the compressor oil;
- change the oil filter;
- check and adjust nuts and bolts;

### WARNING



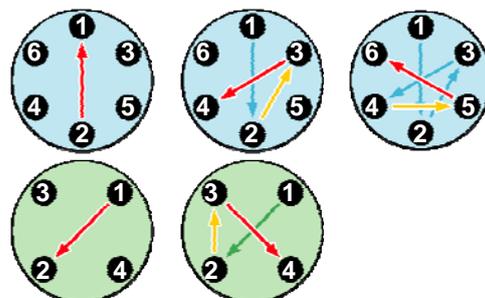
**When changing the oil filter, inspect the internal part and check for any deposits; if they are present track down the cause before restarting the compressor.**

### 1.10.1 Tightening torque values

The table shows tightening torques for bolts or hexagonal-head screws or socket screws lubricated with grease, except for specific cases indicated in the manual. Pipe connections (swivel nuts) should be finger tight plus an additional 1/2 turn.

Tightening torque values	
Thread	Max. torque
M6 - 1/4"	<b>10Nm (7ft-lbs)</b>
M8 - 5/16"	<b>25Nm (18ft-lbs)</b>
M10 - 3/8"	<b>45Nm (32ft-lbs)</b>
M12 - 1/2"	<b>75Nm (53ft-lbs)</b>
M14 - 9/16"	<b>120Nm (85ft-lbs)</b>
M16 - 5/8"	<b>200Nm (141ft-lbs)</b>

### 6 bolt and 4 bolt torque sequence



## 2 - BASIC INFORMATION ON THE COMPRESSOR

### 2.1 DESCRIPTION OF THE COMPRESSOR

High pressure compressor for natural gas and industrial gases.

Compatible process gases:

- Nitrogen
- Helium
- Air



### 2.2 IDENTIFICATION THE COMPRESSOR

Each compressor has an identification label attached to its frame.

<b>AEROTECNICA COLTRI S.r.l.</b>		
Via Colli Storici 177 25010 DESENZANO D/G (BS) ITALY Tel. 030/9910301-9910297 Fax. 030/9910283		
MODEL	MCH 24 ET-CNG	
TYPE	SC000296	
S/N.	0010	
YEAR	2005	
MOTOR	ELECTRIC THREEPHASE	

## 2.3 GENERAL INSTRUCTIONS



- This manual must be read carefully before transporting, installing, using or carrying out any maintenance on the compressor.
- It must be preserved carefully in a place known to compressor users, managers and all transport/installation/maintenance/repair/final dismantling personnel.
- This manual indicates the purposes for which the compressor can be used and gives instructions for its transport, installation, assembly, adjustment and use. It also provides information on maintenance tasks, ordering spare parts, residual risks and staff training.
- It should be born in mind that the use and maintenance manual can never replace proper experience; some maintenance jobs are particularly difficult and in this regard the manual only offers general guidelines on the most important tasks, which must be carried out by personnel with proper training (e.g. acquired during training courses run by the manufacturer).
- This manual is an integral part of the compressor and must be stored in a suitable container near the compressor until its final demolition. If the manual is lost or damaged a copy can be requested from the manufacturer.
- Make sure all users have understood the regulations for use and the meaning of the symbols on the compressor.
- Observance of these technical instructions can prevent accidents: instructions have been drawn up in compliance with EEC Machinery Directive 89/392 and subsequent amendments.
- In any case always observe national safety regulations.
- Do not remove or damage guards, labels or notices, especially those required by law.
- The adhesives attached to the compressor are there for safety purposes. They must be replaced if they become illegible.
- This manual reflects the technical knowledge available at the time the compressor was sold and cannot be considered inadequate simply because updated at a later time on the basis of new experience.
- The manufacturer reserves the right to update products and manuals, without any obligation to update preceding products or manuals except in exceptional circumstances.
- To request or receive any updates or additions to this use and maintenance manual (which shall be considered an integral part of the manual) apply via the contact numbers given in section "1.6 Assistance".
- Should you have any other queries or suggestions as to how to improve the manual please contact the manufacturer.
- Should you sell the compressor AEROTECNICA COLTRI invites you to provide us with the details of the new owner so that any new additions to the manual can be sent on.

## 3 - SAFETY REGULATIONS

### 3.1 GENERAL SAFETY RULES

#### 3.1.1 Know the compressor

The compressor must only be used by qualified personnel. They must have an understanding of the arrangement and function of all the controls, instruments, indicators, warning lights and the various info plates/labels.

#### 3.1.2 Protective clothing

All operators must use accident prevention items such as gloves, hard hat, eye goggles, accident prevention shoes and ear defenders against noise.



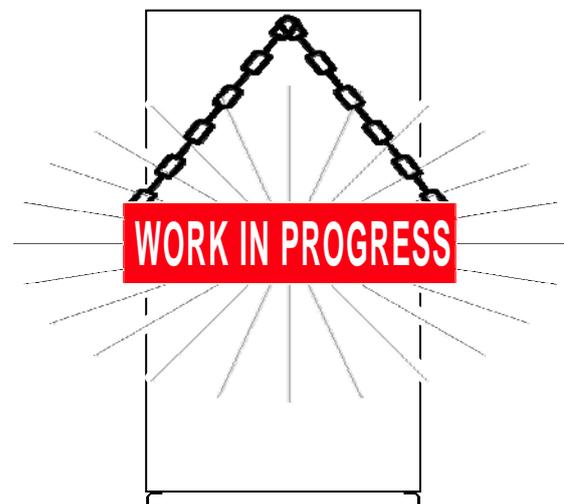
#### 3.1.3 Keep emergency equipment nearby

Make sure a first aid cabinet and a CO<sub>2</sub> fire extinguisher are near the compressor. Keep the extinguisher fully loaded. Use according to standards in force.



#### 3.1.4 Warn others when doing checks/maintenance

Apply a sign with the legend: "WORK IN PROGRESS" on all sides of the compressor. Check the compressor carefully every day it is used as per the task list given in this manual.



## 3.2 GENERAL PRECAUTIONS

- The EEC Machinery Directive 89/392 provides the following definitions (appendix 1, 1.1.1):
  - «**DANGEROUS ZONE**»: any zone inside and/or near a machine in which the presence of an exposed person constitutes a risk for his/her security and health.
  - «**EXPOSED PERSON**»: any person wholly or partially inside a dangerous zone.
  - «**OPERATOR**»: the person(s) charged with the task of installing, running, maintaining, cleaning, repairing and transporting the machine.

### IMPORTANT



- Before carrying out any task or operation with the compressor it is compulsory to read and follow the instructions given in the use and maintenance manual. Doing so during work is too late: improper use or an erroneous manoeuvre could cause serious damage or injury.
- The employer must provide workers with detailed information on the risk of accident, especially risks deriving from noise, use of safety devices and the general accident prevention regulations provided for by international laws or standards or national standards within the country of use. All operators must observe both international accident prevention standards and the national ones relevant to the country of use.  
Bear in mind that the European Union has issued directives concerning worker health and safety: these include EEC directives 89/391, 89/686, 89/654, 89/655, 89/656, 86/188, 92/58 and 77/576 which all employers are legally obliged to comply with.
- Before carrying out any work on the compressor each operator must have a perfect understanding of how the compressor works, know how to use the controls and have read the technical information contained in this manual.

### WARNING



It is forbidden to tamper with or replace compressor parts without obtaining prior authorization from AEROTECNICA COLTRI.  
The use of accessories, tools, materials subject to wear or spare parts other than those recommended by the manufacturer and/or illustrated in this manual can constitute a source of danger to operators and/or damage the machine.  
Any modification to the compressor that has not been expressly authorised by AEROTECNICA COLTRI shall exonerate the manufacturer from any civil or penal liability.

### IMPORTANT



- Removing or tampering with any safety device is strictly forbidden.
- All installation, routine or unscheduled maintenance work must be carried out with the compressor at standstill and disconnected from the electrical power supply.
- Once the compressor has been cleaned the operator must check for any worn, damaged or loose parts; in this case seek assistance from the maintenance technician.  
It is especially important to check that flexible hoses or other parts subject to wear are in good condition. Check also for any leaking of oil or other dangerous substances. If such situations arise it is forbidden to restart the compressor before the situation is resolved. If these problems are observed at the end of the refilling the operator must, before leaving the machine unattended, place a sign on the compressor indicating that maintenance work is in progress and that it must not be restarted.

## IMPORTANT



- Never place hands or introduce screwdrivers, keys or other tools into moving parts.
- Never clean with flammable fluids.
- Periodically check the info plates/labels and restore/replace them where necessary.
- The workplace must be kept clean, tidy and free from objects that might hinder movement.
- Operators must avoid carrying out “awkward” tasks in uncomfortable positions that might cause imbalance.
- Operators should be aware of the risk of entrapment caused by clothes or hair getting caught up in moving parts; wear a cap to contain long hair.
- Necklaces, bracelets and rings can also be a source of danger.
- Workplace lighting must be adequate for the work in progress. Insufficient or excessive lighting can generate risks.
- Always observe the instructions, accident prevention regulations and the warnings contained in this manual.

### 3.2.1 Important safety information

The compressor has been designed and built according to the state of the art and complies with technical regulations in force concerning compressors for the production of high pressure natural gas. The laws, regulations, standards and directives in force for such machines have been complied with.

Materials, parts, production procedures and quality controls all comply with the strictest safety and reliability standards.

Using the compressor for the purposes described in this manual, handling it with due diligence and carrying out maintenance and overhauls according to proper working practices will ensure long lasting performance and functionality.

### 3.2.2 Accident prevention

The manufacturer cannot be held liable for accidents that occur during use of the compressor as a result of the user's non-observance of the laws, regulations, standards and directives in force for high pressure compressors. The compressor has been designed for use in weather conditions as refer to “1.9 Where the machine may be used”.

### 3.2.3 Working safety

The constructor cannot be held liable for malfunction or damage if the compressor:

- is used for purposes other than that for which its is intended;
- is not handled or maintained according to the instructions specified in this manual;
- is not periodically and continually maintained as instructed or if non-original spare parts are used;
- machine parts are modified or replaced without written authorisation from the manufacturer, especially where the efficiency of safety devices has been reduced or eliminated;
- where it is used outside the admissible temperature range.

## 3.2.4 Residual risk zones

### **DANGER**

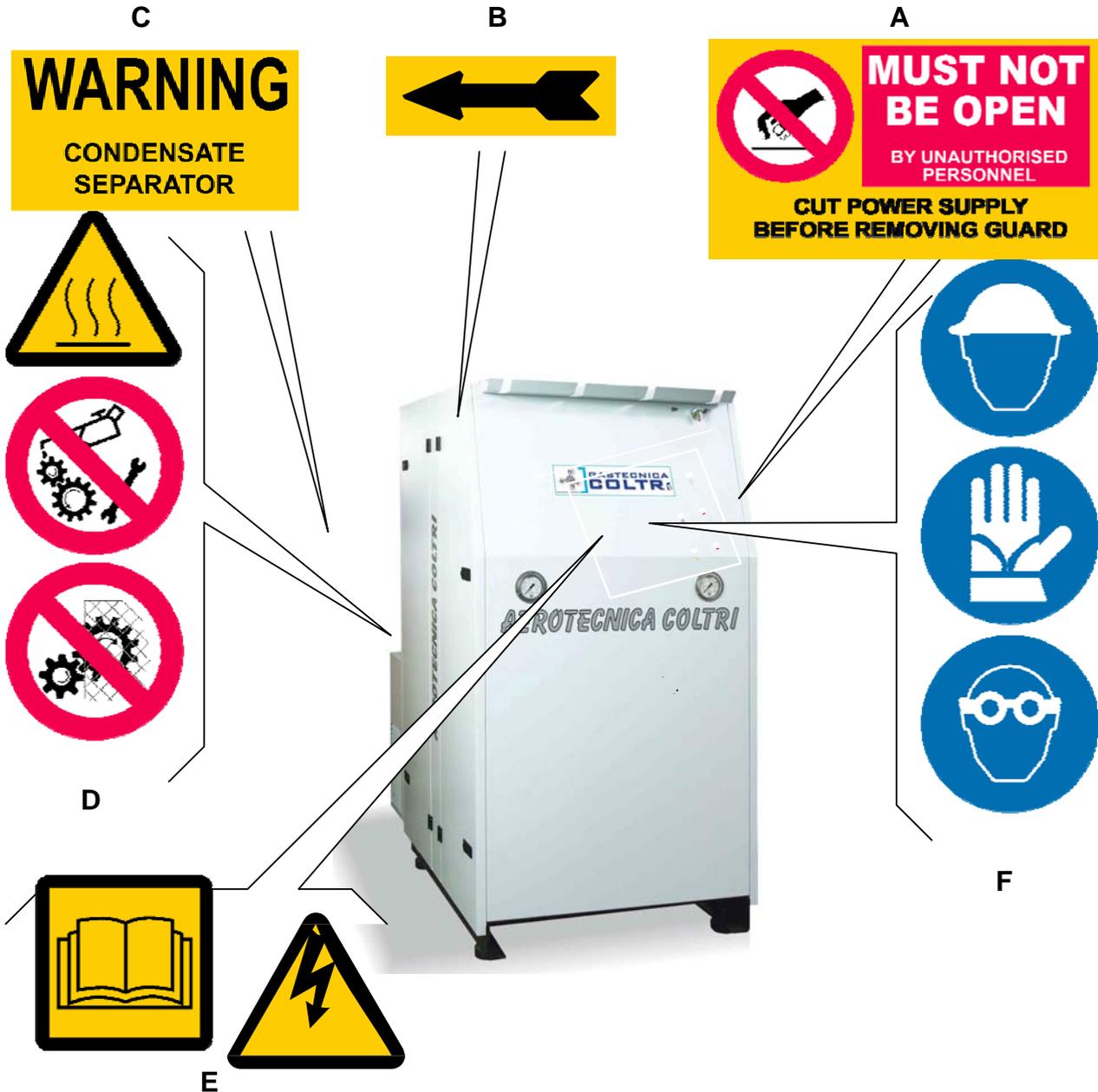


In some compressor zones there remain residual risks that were not possible to eliminate at the design stage or for which safety guards could not be provided without compromising the functionality of the MCH20 ET-CNG / MCH24 ET-CNG. To prevent accidents all operators must be aware of the residual risks on this compressor.

#### Residual risk zones:

- 1 Risk of polluting the produced gas due to the possibility of mixing lubricating oil vapours with the compressed gas being produced.
- 2 Danger of direct contact with operator in the event of hose burst during bottle refill.

**3.3 SAFETY INFO LABELS: LOCATION**



**3.3.1 Safety info labels: description**

Warning label.  
 Unauthorized, unqualified personnel are forbidden from opening the control panel.  
 The power supply must always be disconnected before carrying out any work on the control panel.



B

Cooling fan direction of rotation info label.  
When using the machine for the first time check that the fan rotates in the direction indicated by the arrow. If the fan rotates against the direction of the arrow invert two of the three phases on the main power lead.



C

Condensate collection tank info label.  
This points out that the condensate separator must be emptied regularly as per the instructions in this manual.



D

Hot parts warning label.  
Label warning that lubrication and maintenance must never be carried out with the compressor running.  
Label warning that safety devices and guards must not be removed.



E

Label warning against presence of live parts.  
Warning plate; read the use and maintenance manual and the appendices carefully before running the compressor.



F

Label with ideogram indicating that hard hat must be worn.  
Label with ideogram indicating that protective gloves must be worn.  
Label with ideogram indicating that eye goggles must be worn.



## 3.4 GENERAL SAFETY REGULATIONS

---

### 3.4.1 Care and maintenance

---

Damage and accidents are often caused by maintenance errors, such as:

- no oil,
- insufficient cleaning,
- compressed gas circuit inefficiency (flexible hoses damaged, loose pipes, screws etc.).

Maintenance work must be carried out with due care and attention: your safety depends on it.

Never postpone repairs.

Repairs must only be carried out by specialized or authorized personnel.

Always observe the following safety regulations, even when you become completely familiar with working procedures:

- Keep the compressor and the surrounding area clean at all times.
- Before starting work check that safety devices/guards are in good working order.
- Make sure no-one is in the compressor danger zone. Interrupt work if anyone is in the danger zone and tell them to leave.
- Never leave the machine unattended when it is on.

### 3.4.2 Fire extinguishers and first aid

---

- Check that a fire extinguisher is present. Make sure you know where it is.
- Periodically check that extinguishers are full and operators know how to use them.
- The location of the first aid cabinet must be known.
- Check the first aid cabinet periodically to make sure it contains disinfectant, bandages, medicines etc.
- Fire drills must be known.
- Make sure a phone number for emergency medical assistance is kept nearby.

#### **IMPORTANT**

**The provision of a fire extinguisher is the responsibility of the owner of the compressor.**



## 3.5 MAINTENANCE PRECAUTIONS

### 3.5.1 Warning signs

Before doing any maintenance work, stop the engine and make sure the compressed air system is depressurized.

**If other people start the engine or act on the control pushbuttons/keys while maintenance work is in progress there is a risk of serious injury or death.**

To obviate these dangers always place warning signs around the compressor before carrying out maintenance.



### 3.5.2 Tools

Use only manufacturer-recommended tools; do not use worn, damaged, poor quality or improvised tools as they can cause injury.

#### WARNING



**The manufacturer cannot be held liable for any damage or injury caused by the use of tools that are not prescribed or modified without authorisation.**

### 3.5.3 Personnel

The routine maintenance tasks described in this manual must only be carried out by trained, authorised personnel.

For component maintenance/revision tasks not covered by this manual please contact **AEROTECNICA COLTRI**

### 3.5.4 Keeping the compressor clean

Oil and grease stains, scattered tools or broken pieces constitute a danger to personnel as they may cause slips and falls. Always keep the compressor and the surrounding work area clean and tidy.

Clean the compressor with a pressurised hot water or steam jet and commercially available detergents. Do not use diesel, petrol or solvents as the former leave an oily film that causes dust to stick while solvents (even where weak) damage the paintwork and can lead to rust.

If the water jet gets inside the electrical parts it could, in addition to oxidising the contacts, prevent the machine being started or even cause **a sudden, unexpected start**.

For this reason **never** use water or steam jets on sensors or connectors.

### 3.5.5 Periodic replacement of essential safety parts

Periodically check the following components, which are important for fire prevention:

- compressed gas system: main compressed gas circuit delivery hoses;
- bottle refill system: flex hoses for bottle refill.

Even though they may appear to be in good condition, these components must be periodically replaced with new ones. Over time these components tend to deteriorate.

Should any of these parts prove to be faulty, replace or repair them ahead of schedule.

## 4 - TECHNICAL DATA

### 4.1 TECHNICAL CHARACTERISTICS

#### 4.1.1 Crankcase, crankshaft, cylinders, pistons

The crankcase is made of aluminium alloy; the flange with the roller bearings that support the crankshaft is kept oil-tight with the crankcase by O-rings.

The crankshaft and the connecting rods run on roller bearings only. The four connecting rods are fitted on the crankshaft with a single crank angle.

The cylinders are made of cast iron and feature traditional multiple piston rings.

#### 4.1.2 Valves

The 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> stage valves are inserted in the head seats and held in place by a bracketing system.

The 4<sup>th</sup> stage valves are disassembled by removing the head.

#### 4.1.3 Safety valves

The safety valve is pre-adjusted during assembly of the compressor and prevents it being damaged in the event of a malfunction. The feed pressure, as a function of the valve, is as follows:

225 Bar - (3200 PSI)

#### **WARNING**



**It is strictly forbidden to carry out any adjustments to the valve to raise its factory preset pressure.**

**Tampering with the safety valve can cause serious damage and renders the warranty null and void.**

#### 4.1.4 Cooling pipes, lubrication

The cooling pipes are made of stainless steel.

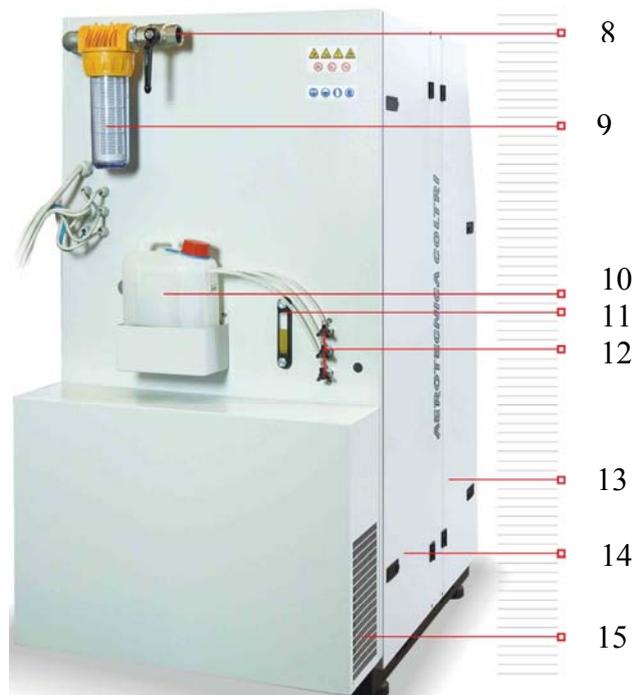
Lubrication with low pressure oil pump, delivery distributor and paper oil filter with clogging safety valve.

#### 4.1.5 Frame, guards

Compressor is equipped with a solid frame and guards in order to protect operator from direct contact with rotating equipment like electric motor, pulley, belt, fan and also hot surfaces like cylinders and related accessories.

## 4.2 MACHINE PARTS

- 1) exit CNG to car tank, 5m / 16 feet flexible hose and fueling nozzle
- 2) recharge pressure gage
- 3) oil pressure gage
- 4) soundproof cabin
- 5) air cooling intake
- 6) door
- 7) door
- 8) suction connector valve to natural gas pipeline
- 9) Intake gas filter
- 10) Condensate drain tank
- 11) Compressor oil level
- 12) Manual condensate drain
- 13) door
- 14) door
- 15) air cooling inlet



## 4.3 TECHNICAL SPECIFICATIONS TABLE

Construction	high pressure compressor with forced air cooling and 4 compression stages
Max. peak non-continuous pressure	225bar - 3300PSI
Flow rate <b>MCH-20</b>	333 l/min. - 20 m <sup>3</sup> /h - 11,7 CFM
Flow rate <b>MCH-24</b>	400 l/min. - 24 m <sup>3</sup> /h - 14 CFM
Cylinder diameter	120-60-32-14 mm - 4,72-2,36-1,25-0,55 inches
Piston stroke	50 mm
Pumping unit <b>MCH-20</b>	900 rpm
Pumping unit <b>MCH-24</b>	1200 rpm
Intermediate pressures 1 <sup>st</sup> stage	3,2bar - 50PSI
2 <sup>nd</sup> stage	16bar - 260PSI
3 <sup>rd</sup> stage	70bar - 1000PSI
4 <sup>th</sup> stage	200bar - 2950PSI
Oil pressure	4 bar cold 1,5 bar during routine use 1 bar minimum pressure
Motor power <b>MCH-20</b>	7.5 Kw
Motor power <b>MCH-24</b>	9 Kw
Voltage and frequency	400V - 50Hz 400V - 60Hz 230V - 50Hz 230V - 60Hz

### 4.3.1 Noise level

The **MCH20 ET-CNG / MCH24 ET-CNG** compressors have been designed and built to reduce noise pollution to a minimum. Compressor noise levels were measured in the "operator" (work) area.

SILENT:



OPEN V.M.:



#### WARNING



Should the compressor be used where the daily noise exposure level is greater than 80 dBA, the employer must apply all the relevant worker health and safety measures. Where necessary operators must use personal protection such as ear defenders.

**4.3.2 Dimensions and weights**



Approximate weight = 450 kg

## 5 - HANDLING AND INSTALLATION

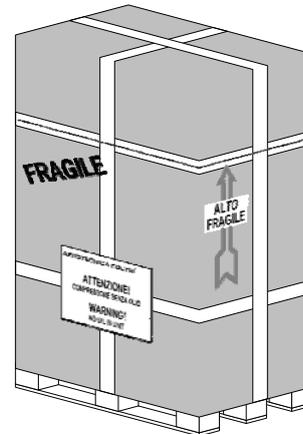
### 5.1 UNPACKING

The **MCH20 ET-CNG / MCH24 ET-CNG** compressor is sent fully assembled, with the flex hoses separate.

The compressor is packed in a cardboard box on a pallet; the latter is placed on a euro pallet to simplify handling and transport.

The box containing the compressor must be moved according to the instructions shown on the box itself. The machine is supplied with the following as standard:

- 1 refill hose, 3000 mm long with NGV-1 nozzle;
- use and maintenance manual
- appendix to the use and maintenance manual (Safety standards)
- Lubricating oil (5 litres)



### 5.2 HANDLING

After separating the compressor from its packaging it can be transported to the designated placement area. Transfer will require the use of a fork-lift or transpallet (of suitable load-bearing capacity): the forks must be inserted in the feet of the europallet on which the compressor is positioned. The compressor has runners for handling with fork-lift trucks or transpallets.

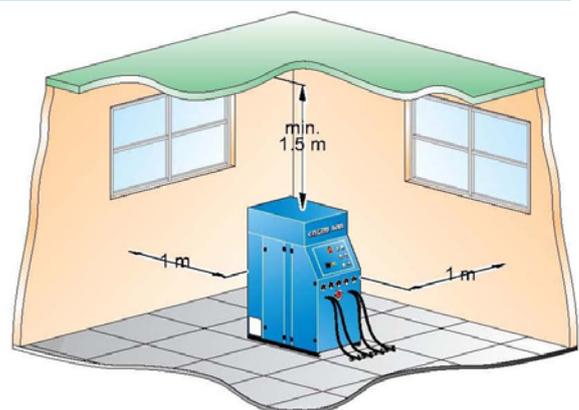
**IMPORTANT** Proceed with the utmost care when lifting, transferring and positioning the compressor.

### 5.3 INSTALLATION

Before proceeding with the installation tasks described below, read Chapter 3 "SAFETY REGULATIONS" carefully.

#### 5.3.1 Positioning

- Position the compressor in the designated area and check it is level. For compressor dimensions please consult section 4.3 "Technical specifications table".
- Check that the area in which the compressor is to be positioned is adequately ventilated: good air exchange (more than one window), no dust and no risk of explosion, corrosion or fire.
- If ambient temperatures exceed 45°C air conditioning will be necessary.
- Position the compressor no closer than 1 m to surrounding walls; the gap between compressor and ceiling should be at least 1.5 m. These distances ensure proper compressor operation and proper cooling of the pumping unit.
- Make sure that lighting in the area is sufficient to identify every detail (such as the writing on the info labels); use artificial lighting where daylight is on its own insufficient.



### 5.3.2 Gas intake extension connection

If the compressor is installed in an area distant from the gas regulator, a proper pipe should be installed between gas regulator and compressor. For correct sizing of the pipe please consult our assembly team.

- a flexible hose should be installed between gas pipe and compressor inlet
- Connect the extension hose to the fitting.
- Fit the supplementary gas intake filter on the end of the extension hose.
- Position the end of the extension with the intake filter and also high pressure side in a properly ventilated area sheltered from weather and pollution.
- Protect the intake hose against the wind.
- Check that there are no kinks or breaks along the hose. If it is damaged replace it.



**Use only a flexible hose with internal steel braiding reinforcement so as to prevent kinks and a consequent reduction of cross-section.**



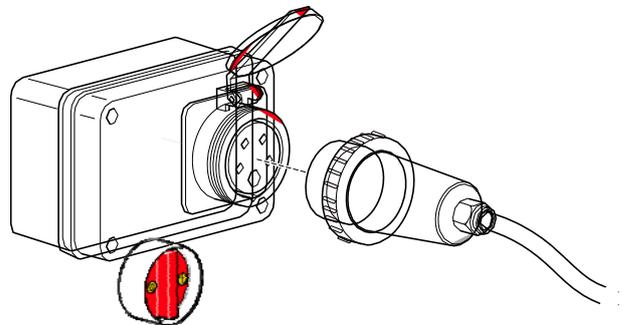
### 5.3.3 Electrical connection

The compressor is delivered together with power lead and plug three-phase 32A 3P+N+E.

To connect up to the power supply just insert the plug in the mains power socket.

Check that the data on the compressor ID plate is compatible with main power supply, especially as regards rated current and voltage.

The main power system must have an efficient ground (earth); check that the earth resistance value complies with the protection / operational requirements of the compressor electrical system.



**Before inserting the plug, check that the electrical system complies with the standards in force in the country of installation. A proper earth (ground) system is an essential safety requisite.**

**An efficient compressor ground (earth) system is an essential compressor safety requisite.**

**The mains power connection plug must be type-approved in compliance with the relevant standards and have an ON-OFF switch (not supplied).**



## 6 - USING THE COMPRESSOR

### 6.1 PRELIMINARY CHECKS BEFORE USING FOR THE FIRST TIME

The operator must check that the compressor is supplied with:

- use and maintenance manual;
- appendix to the use and maintenance manual;

If the compressor is sold on the customer/user must provide the purchaser with a complete, undamaged use and maintenance manual.

#### 6.1.1 Filling with lubricating oil

At the time of delivery the compressor does not contain lubricating oil; this is supplied together with the compressor in cans contained in the packaging.

For filling instructions see section "7.6.3 Changing the lubricating oil and filter".

#### 6.1.2 Checking for proper electrical connection

Check for proper connection of electrical phases by checking that the cooling fan rotates in the direction indicated on the label (a) on the fan cover.

If the direction of rotation is not as indicated by the arrow the warning light on the control panel comes on; it will then be necessary to disconnect the electrical power supply and invert two of the three phases on the main power lead.

**DANGER**

Before carrying out this task disconnect the compressor from the mains power supply.

Do not invert or disconnect the ground (earth) wire (yellow/green).

## 6.2 CHECKS TO BE RUN AT THE START OF EACH WORKING DAY

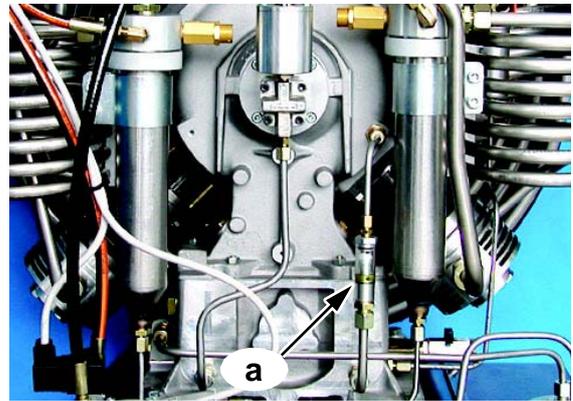
Inspect the exterior of the compressor (couplings, pipes, pneumatic components etc.) and check for any oil leaks. Replace parts where necessary or contact **AEROTECNICA COLTRI**.

### 6.2.1 Lubricating oil level check

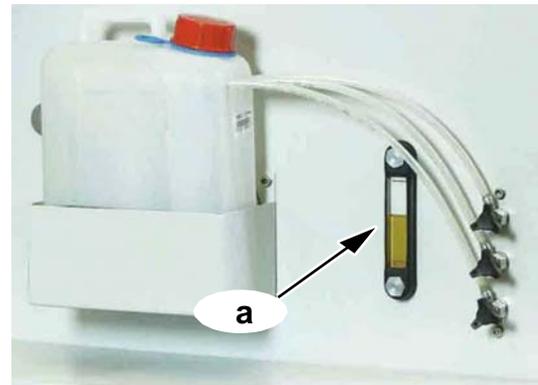
Check that the level of lubricating oil (a) is within acceptable limits (i.e. between min. and max.).

Note that an excessive quantity of oil can cause infiltrations in the cylinders and leave deposits on the valves while too low a level prevents proper lubrication and could cause engine seizure.

If the oil level is not within the minimum and maximum limits top up or drain as described in section "7.6.3 Changing the lubricating oil and filter".



Version produced up to 31-12-2005



Version 2008

### 6.2.2 Checking that the refill hoses are in good condition

Inspect the refill hoses and make sure there are no cuts, holes, abrasions, leaks etc. If necessary replace with new hoses.

### 6.2.3 Storing technical documentation

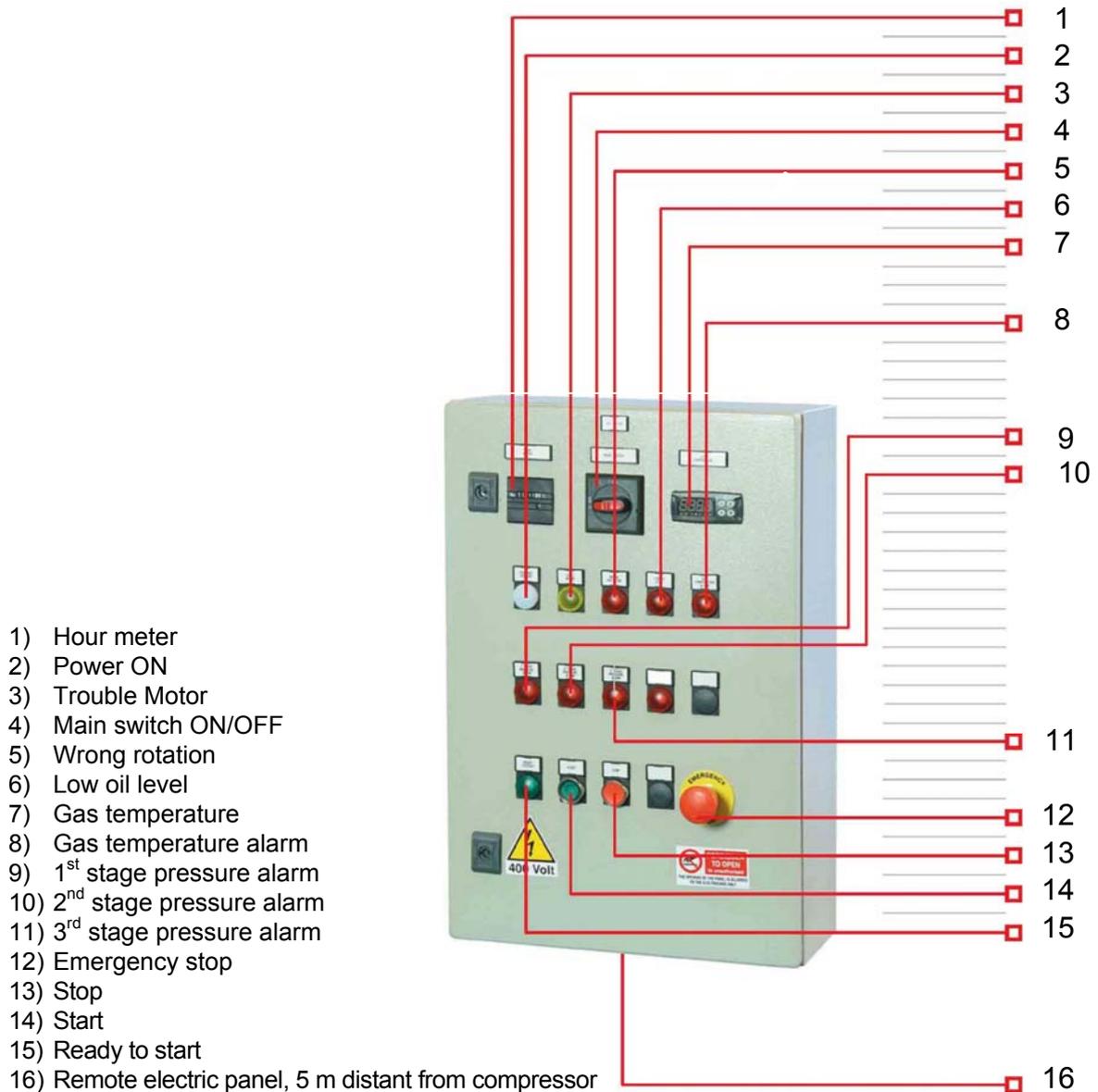
The use and maintenance manual and its appendices must be stored carefully and must always be kept where they can be accessed easily for immediate consultation.

#### **WARNING**



The use and maintenance manual is an integral part of the compressor and must always be handed over in the event of a change of ownership.

**6.3 CONTROL PANEL**



**6.3.1 Power indicator light**

When the power indicator light is on the compressor is powered.

## 6.3.2 Direction of rotation indicator light

---

If the direction of rotation indicator light comes on this means that the main power phases are inverted. To restore proper operation disconnect from the electrical power supply and invert two of the three phases on the main power lead plug.

### **DANGER**



**Before carrying out this task disconnect the compressor from the mains power supply.  
Do not invert or disconnect the ground (earth) wire (yellow/green).**

---

## 6.3.3 Lubricating oil level warning light

---

When the lubricating oil level warning light is on the oil level in the cup is too low. restore the oil level as described in section "7.6.3 Changing the lubricating oil and filter".

## 6.3.4 On push button

---

Press the green ON pushbutton to start the compressor.  
The compressor will run until the pressure setting on the adjustable pressure switch has been reached or the safety valve is activated.

## 6.3.5 Stop push button

---

Press the stop pushbutton to shut down the compressor.  
Check that the stop pushbutton is working properly at the start of each working day: do this by switching on the compressor and pressing the pushbutton; if the compressor does not stop immediately after pressing disconnect the compressor from the mains power supply and contact **AEROTECNICA COLTRI**.

## 6.3.6 Gas temperature warning

---

The outlet gas temperature is measured continuously and in case of exceeding over 65°C, the compressor will be shut down and related lamp will turn ON. The temperature may only be reset after obtaining authorization from **AEROTECNICA COLTRI**.

This task must only be carried out by qualified personnel.

### WARNING



Temperature parameters must not be changed without prior authorisation from **AEROTECNICA COLTRI**: doing so will render the warranty null and void (where still valid).

---

## 6.3.7 Emergency pushbutton

---

The emergency pushbutton shuts down the compressor immediately. It must be used in danger or emergency situations.

Pressing the pushbutton shuts down compressor operation and the pushbutton remains press-locked; to reset the pushbutton rotate it

Check that the emergency pushbutton is working properly at the start of each working day: do this by switching on the compressor and pressing the pushbutton; if the compressor does not stop immediately after pressing disconnect the compressor from the mains power supply and contact **AEROTECNICA COLTRI**.

## 6.3.8 On/Off Key

---

On/Off Key is designed to switch the main power On or Off.

Prior to performing any maintenance operation, switch the key to OFF position to make sure that electrical supply is completely disconnected.

## 6.3.9 Lubricating oil circuit pressure gauge

---

The gauge indicates the pressure inside the lubricating oil circuit.

If pressure is less than 1 bar check: oil level, oil filter, oil viscosity.

If pressure is higher than 4 bar there is an obstruction along the circuit; change the oil filter and restart the machine. If pressure is still high contact **AEROTECNICA COLTRI**.

Compressor oil pressures are as follows:

- 4 bar cold
- 1.5 bar working pressure
- 1 bar minimum pressure

## 6.3.10 1<sup>st</sup> stage pressure switch

---

The pressure switch protects the compressor against over-pressure in stage 1. If pressure is higher than 4 bar (60 PSI), it will automatically switch off the compressor.  
Contact **AEROTECNICA COLTRI** in this case.

## 6.3.11 2<sup>nd</sup> stage pressure switch

---

The pressure switch protects the compressor against over-pressure in stage 1. If pressure is higher than 20 bar (290 PSI), it will automatically switch off the compressor.  
Contact **AEROTECNICA COLTRI** in this case.

## 6.3.12 3<sup>rd</sup> stage pressure switch

---

The pressure switch protects the compressor against over-pressure in stage 1. If pressure is higher than 80 bar (1200 PSI), it will automatically switch off the compressor.  
Contact **AEROTECNICA COLTRI** in this case.

## 6.3.13 Working pressure gauge

---

The gauge indicates gas pressure as it exits the compressor.  
If the compressor fails to reach the pressure set on the pressure switch, switch off the compressor and contact **AEROTECNICA COLTRI**.

Working pressure:

200 bar - 2950 PSI

---

**WARNING**



**IT IS ABSOLUTELY FORBIDDEN TO TAMPER WITH THE EMERGENCY PUSHBUTTON.**

---

## 6.4 PRELIMINARY TASKS

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### 6.4.1 Safety valve checks

---

Check that safety valves are working properly by starting the compressor with the end taps closed: this will raise circuit pressure fast and trip the valves when their pressure setting is reached.

The valves are pre-adjusted to 225 bar (3200 PSI).

Check that the vehicle fueling to be refilled are in good condition: they must have been tested by the relevant authorities (stamped and/or certified). Run a visual check on the exterior.

Check that hoses and relevant fittings are in good condition.

After being refilled do not empty the vehicle tank completely, not even during winter storage or long periods of inactivity: this will stop humidity getting in.

---

**IMPORTANT**

**Tampering with the safety valve to increase the pressure setting is strictly forbidden. Tampering with the safety valve can seriously damage the compressor, cause serious injury to personnel and renders the warranty null and void.**

---

**IMPORTANT**

**Should the safety valve fail to work properly contact the AEROTECNICA COLTRI assistance service.**

---

## 6.5 VEHICLE REFILL



During refill the no unauthorized person should touch the compressor and/or other parts of system. It is preferred to perform the fueling at ambient temperature of 15 °C.

### WARNING



During bottle refill those not involved in the refill procedure must maintain a safety distance of at least 3 meters. Also, it is forbidden to disconnect the hoses from the fittings or the filling nozzle while the machine is under pressure.

### DANGER



Should vehicle tank show evident signs of internal/external corrosion, do not refill even if they have been tested.

### WARNING



Use only tested vehicles (as proven by a test stamp and/or certificate). The vehicle refill pressure is shown on the vehicle itself. It is forbidden to refill them at a pressure greater than that indicated.

The available bottle refill connectors are:

**TK4**  
NGV1 fueling nozzle for cars  
International Standard



**TK4i**  
NGV1 fueling nozzle for cars  
Italian standard

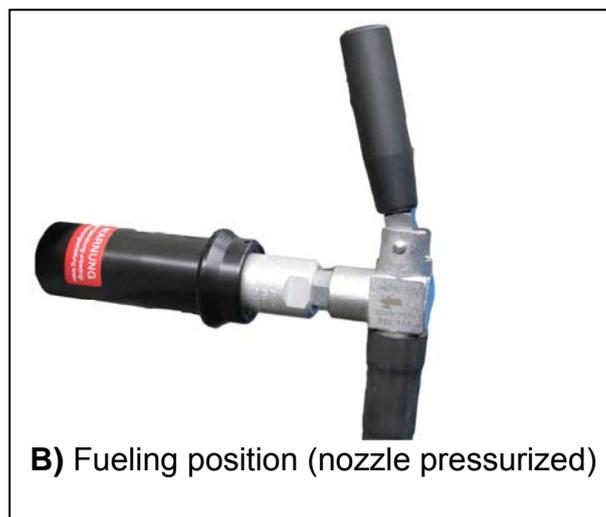


**TK22**  
Fueling nozzle for buses and trucks



To refill the bottles proceed as follows:

- Turn the filling valve and secure it in the direction of nozzle to depressurize the nozzle (position A)
- Push the fueling nozzle to the car receptacle
- Secure the hose and make sure that it stands well
- Check that the bleed valve is closed by rotating it clockwise
- Turn the filling valve and secure it in the direction of hose to pressurize the nozzle (position B)
- Start the compressor by pressing the push button on control panel
- When the fueling has been completed, the compressor shuts down automatically
- Turn the filling valve back and secure it in the direction of nozzle to depressurize the nozzle (position A)



**IMPORTANT** If an emergency situation arises during refill, press the stop pushbutton .



The compressor is nevertheless equipped with a safety system that shuts it down automatically when:

- The pressure setting on the pressure switch has been reached.
- The electrical power supply is temporarily cut.
- The electric motor overload device is tripped.
- The temperature in the cabin goes higher than limit
- The pressure in compressor goes higher than limit

Following an emergency shutdown always make sure the cause of the emergency has been eliminated before proceeding with another refill.

## 7 - MAINTENANCE

**WARNING**

Maintenance tasks must only be carried out by the AEROTECNICA COLTRI / BARCDKLY Customer Assistance Service or qualified personnel.

**DANGER**

All maintenance tasks must be carried out with the compressor off and the power lead unplugged from the mains socket.

### 7.1 FOREWORD

To obtain the best possible performance from the compressor and ensure a long working life for all its parts it is essential that personnel follow the use and maintenance instructions with extreme diligence. It is thus advisable to read the information below and consult the manual every time an inconvenience arises. For further information please contact our assistance centre:

**Contact the AEROTECNICA COLTRI Spa Maintenance Service Centre**  
**Tel. +39 030 99 10 297**  
**Fax. +39 030 99 10 283**  
**e-mail: coltrisub@coltrisub.it**

### 7.2 GENERAL

- Proper preservation of the compressor requires thorough cleaning.
- This type of refill station, designed and built according to the most advanced technological criteria, requires only minimum preventive and routine maintenance.
- Before carrying out any maintenance tasks, run checks and/or controls on the compressor, switch off the compressor, remove the plug from the mains socket.
- The residual pressure present in the compressor (pumping circuit) must be released.
- During disassembly and re-assembly of the compressor, always use suitable wrenches/tools so as not to damage the relevant components.
- Loosen stiff parts with a copper or plastic mallet.
- When refitting parts make sure they are clean and lubricated sufficiently.
- Compressor maintenance tasks must only be carried out by authorized personnel and recorded in the chapter "11 Maintenance register" of this manual.

### 7.3 UNSCHEDULED WORK

Involves repair and/or replacement of the mechanical parts of one or more compressor components: this work normally needs doing only after some years of use. If substantial modifications are made, the manufacturer cannot be held liable for any dangers that might arise. This work must be carried out by the assistance centre.

## 7.4 SCHEDULED MAINTENANCE TABLE

Maintenance	Every day	Every week	Every 200 hr	Every 500 hr	1000 (hours)	2000 (hours)	4000 (hours)	10000 (hours)
Lubricating oil level check	○							
Automatic shutdown check		○						
Condensate drainage			○					
Belt wear and tension			○				●	
Gas intake filter						○	●	
Fitting/hose leak check						○		
Oil filter and oil change					●			
Separator cleaning					○			
Suction/discharge valves replacement						○	●	
HP oil separator replacement							●	
HP filter body replacement							○	●
Motor/electrical switches check						○		
Compressor main parts						○		
HP molecular & carbon filter replacement				●				
Fueling hose replacement								●

○ Checking and cleaning      ● Change

## 7.5 TROUBLESHOOTING

Problem	Cause	Solution
- The electric motor does not start	• Phase missing	• Check fuses or condenser
- Rotation speed and flow rate decrease	• Motor power too low • The belt slips	• Check the motor and the line • Restore proper belt tension
- The flow rate diminishes without rpm decreasing	• Valves not working • 4th stage piston worn • Fittings loose / leaking seals • Intake filter clogged • Intake extension kinked • Piston or piston rings worn	• Contact technical assistance • Contact technical assistance • Check for leaks with soapy water and eliminate them • Replace filter • Straighten, use stiffer pipe • Contact technical assistance
- Oil / Water is sent to vehicle	• Cartridge filter exhausted • Piston rings worn	• Replace • Contact technical assistance
- Compressor overheats	• Direction of rotation wrong • Cooling tubes dirty • Incomplete valve closure (causing overload of another stage)	• Check direction of rotation • Contact technical assistance
- Over flow shutdown	High pressure hose/tube is broken	• Contact technical assistance • replace broken part
- Over pressure shutdown	• Pressure more than limit in compressor • Valves not working	• Contact technical assistance

## 7.6 CHECKING AND CHANGING THE LUBRICATING OIL AND FILTER

After putting the compressor into service the oil filter and the lubricating oil itself must be changed after the first 50 (fifty) working hours.

Replacement of the filter and the lubricating oil must be done every 1000 hours working hours or annually.

**IMPORTANT** The compressor must be placed on a solid surface with a tilt of no more than 5°.



### DANGER



Do not carry out these tasks if the compressor has only just shut down; wait for the compressor to cool.

Any oil spilt during the oil/filter change could cause personnel to slip; wear protective garments and anti-slip footwear and remove any traces of oil immediately.

Both oil and filter are classified as special wastes and must therefore be disposed of in compliance with the anti-pollution laws in force.

All maintenance work must be carried out with the compressor OFF and the power supply lead unplugged from the mains socket.

### 7.6.1 Oil table

Sump capacity	liters	4,5
Recommended oils		COLTRI OIL CE750 CHEMLUBE 751 ANDEROL 755

### 7.6.2 Checking the oil level

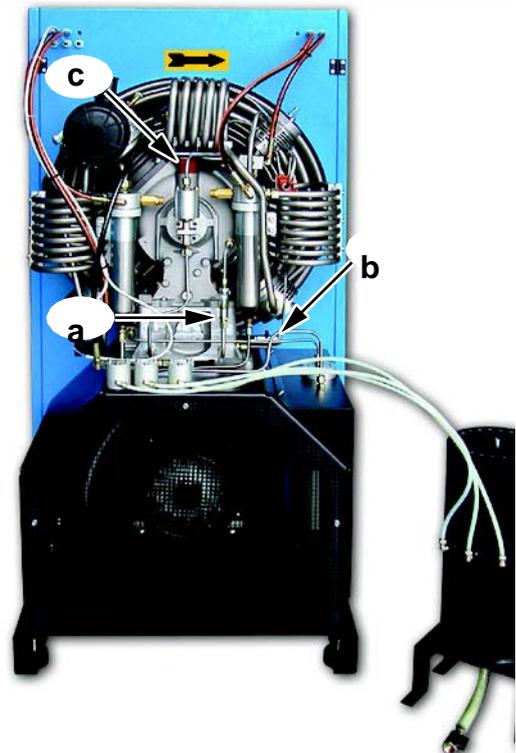
The oil level must be checked every day.  
The oil level must be between the minimum and the maximum shown on the oil level indicator (a).

If the oil level is above the maximum level:

- position a recipient under the drain tap (b) so that the oil flows into the exhausted oil recipient;
- open the drain tap and let the oil flow out until the oil level returns within the max. and min. limits;
- close the drain tap (b).

If the oil level is below the minimum level:

- open the top-up plug (c);
- top up with oil until the level returns within the max. and min. limits;
- close the top-up plug (c).

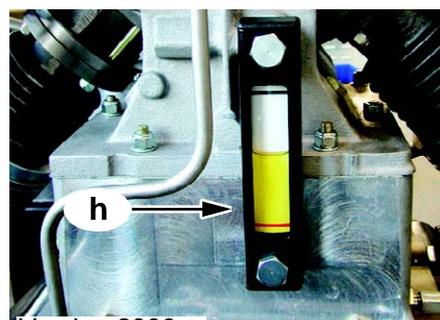
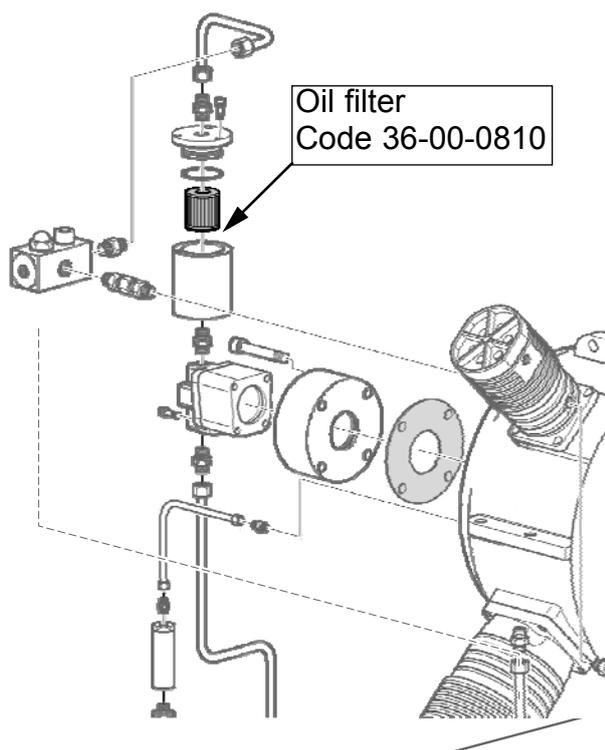
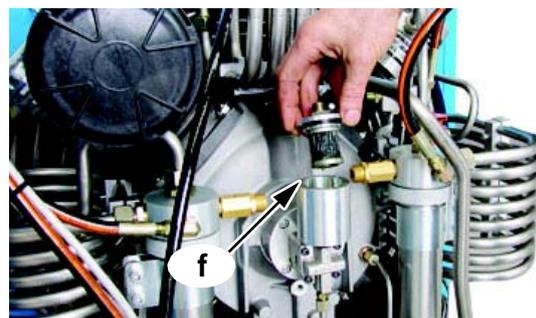
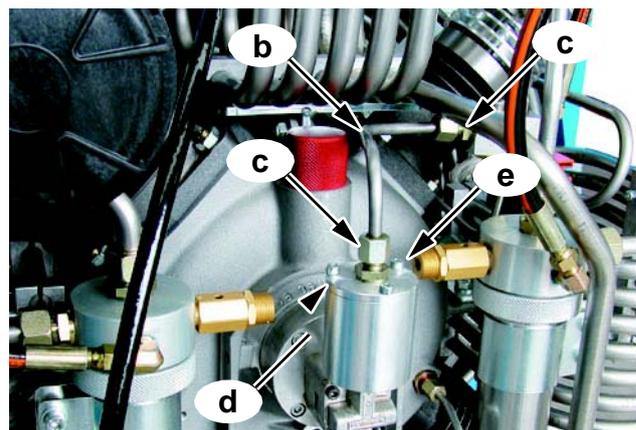
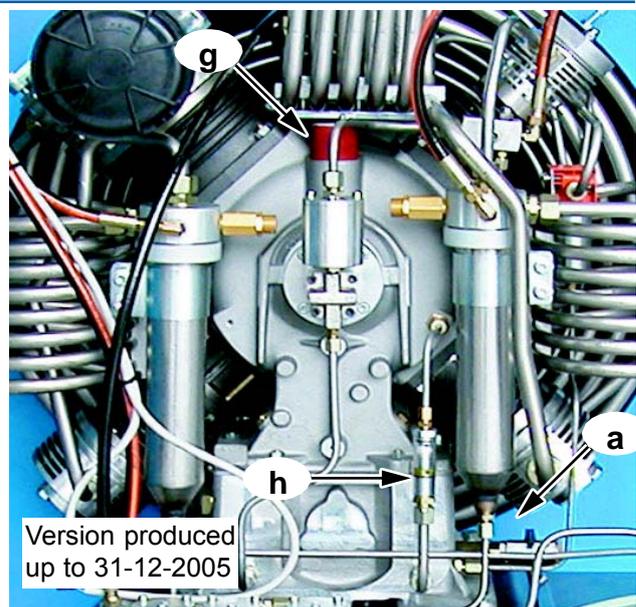


**7.6.3 Changing the lubricating oil and filter**

The lubricating oil must be changed every 1000 working hours or annually. Every time the lubricating oil is changed the oil filter must be changed too.

To change the oil proceed as described:

- position a recipient under the drain tap (a) so that the oil flows into the exhausted oil recipient (recipient capacity of at least 5 liters required).
- open the top plug (g).
- open the plug (a) and let all the oil flow out.
- unscrew the fittings (c) and remove the pipe (b).
- remove the fixing screws (e) and the cover (d).
- replace the filter (f) with a new one.
- re-close the plug (d) with the screws (e).
- put the pipe (b) back and tighten the fittings (c).
- close the drain tap (a).
- remove the top-up plug (g).
- fill the oil sump with 4.5 liters of oil from top oil plug (see "7.6.1 Oil table").
- close the oil top plug (g).
- switch on the compressor and run it with no pressure for 30 seconds.
- switch off the compressor and remove the plug from the mains socket.
- check the oil level (h); if it is not between the min. and max. limits proceed with the tasks described in paragraph "7.6.2 Checking the oil level".



## 7.7 CHANGING THE INTAKE FILTER

After putting the compressor into service the intake filter must be changed after the first 50 working hours. The gas intake must then be changed every 2000 working hours or annually.



### DANGER



Do not carry out these tasks if the compressor has only just shut down; wait for the compressor to cool.  
All maintenance work must be carried out with the compressor OFF and the power supply lead unplugged from the mains socket.

The gas intake filter must be changed every 2000 working hours or annually.

To change the filter proceed as follows:

- unscrew the air filter cover by rotating it anti clockwise;
- remove the inlet gas filter cartridge ;
- replace the cartridge with a new one;
- re-close the cover : screw it back on clockwise.



### IMPORTANT



If the “suction pressure too low” error repeats while the suction pressure is not low, the cartridge of intake filter has to be replaced.

## 7.8 CHECKING THE SAFETY VALVE

The final safety valve protects bottles from being filled with gas at too high pressure; the valve setting is made at the time of testing the compressor.

The safety valve must be tested at compressor overhauls. This test has to be done by especially trained personnel after attaching the coupling to the bottle by start the compressor with the bottle taps closed. Once you have checked, using the gauge, that the safety valve trips properly at maximum working pressure, open the taps and start the refill.

**IMPORTANT** Should the safety valve fail to operate properly contact the AEROTECNICA COLTRI technical assistance service.



## 7.9 TRANSMISSION BELTS

Belt tension must be checked every 200 hour or monthly.

The transmission belts must be replaced every 4000 working hours of the compressor work.

### DANGER

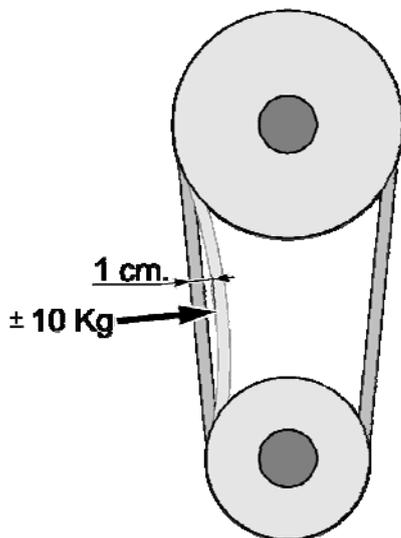


Do not carry out these tasks if the compressor has only just shut down; wait for the compressor to cool.

All maintenance work must be carried out with the compressor OFF and the power supply lead unplugged from the mains socket.

### 7.9.1 Checking transmission belt tension

To check for proper transmission belt tension (a) exert a pressure of approximately 10 Kg on the belts; check that the belts do not flex by more than 1 cm with respect to their original position. Should they flex more than this the belts must be replaced.

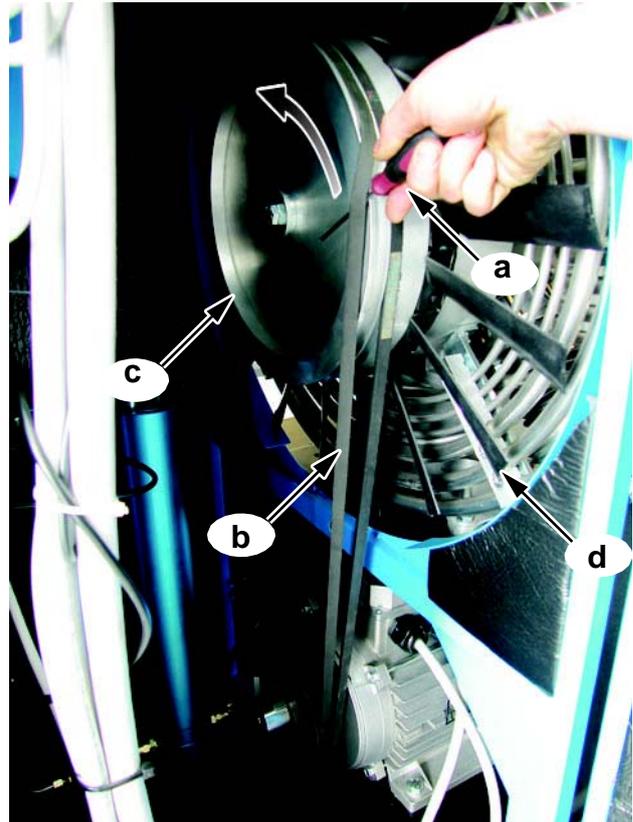


### 7.9.2 Changing the transmission belts

To replace the transmission belts proceed as follows:

- insert a screwdriver (a) between the first belt (b) and the pulley (c) of the cooling fan (d);
- rotate the fan (d) anticlockwise until the belt comes out of the pulley groove;
- repeat the procedure on the second belt;
- change the belts with new ones: make sure the belt model and length are exact, check that the characteristics of the new belt are identical to those of the old one;
- insert the new belt on the internal groove of the electric motor pulley (e);
- insert the belt on the internal groove of the fan pulley while simultaneously turning the fan by hand until the belt slips perfectly into the groove of the pulley (second photo);
- check that the belt is inserted perfectly in the grooves of the two pulleys and that belt tension is correct;
- insert the second belt and carry out the same procedure described for the first belt.

If belt tension is not correct contact the **AEROTECNICA COLTRI** technical assistance service.



## 7.10 CONDENSATE DISCHARGE

**IMPORTANT** The condensate must be drained every week.



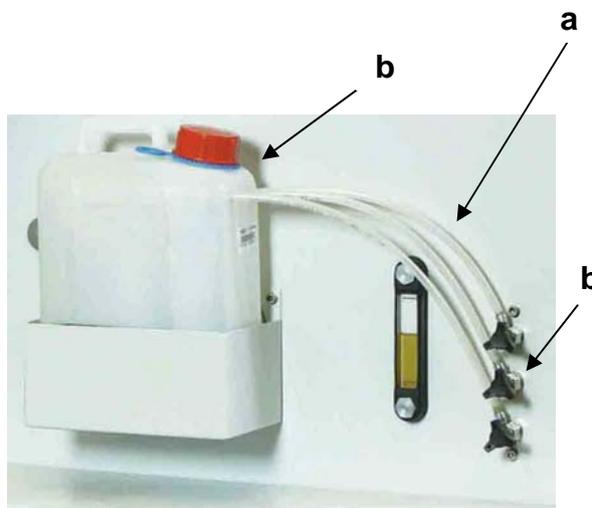
**DANGER**



Do not carry out these tasks if the compressor has only just shut down; wait for the compressor to cool.  
All maintenance work must be carried out with the compressor OFF and the power supply lead unplugged from the mains socket.

### 7.10.1 "SILENT" model automatic condensate discharge

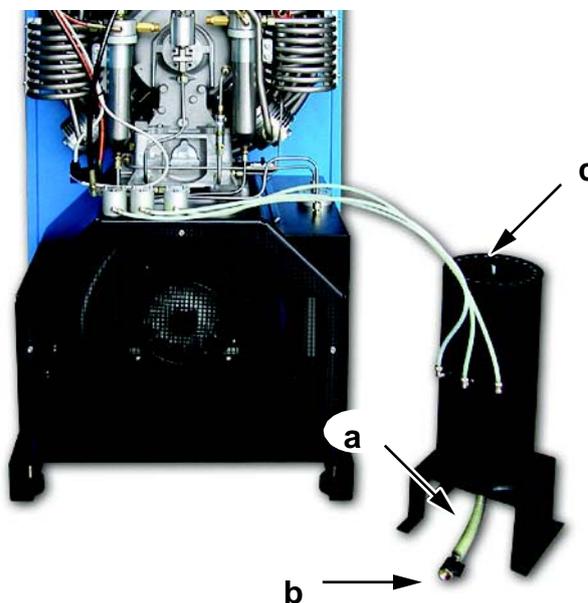
For the **SILENT** model proceed as follows: insert the condensate drain hose (a) into a condensate collection recipient (b) and open the drain valve (c). Normally it should be no water with lubricating oil during refills. In case of water presence, the molecular sieve cartridge should be replaced. If condensate oil is mixed with water, contact the gas supplying company because of too humid inlet gas. The condensate must be disposed of as per the instructions in section "9.1 Waste disposal".



### 7.10.2 "OPEN V.M." model automatic condensate discharge

For the **OPEN V.M.** model proceed as follows: raise the container (c), insert the drain hose (a) in a condensate collection container or can, open the valve (b) and drain all the condensate; re-close the valve.

The condensate must be disposed of as per the instructions in section "9.1 Waste disposal".  
Normally there should be no water in the condensate. In case you find water in the condensate, contact your natural gas supplier to increase the quality of delivered gas.



**7.11 ACTIVE CARBON FILTERS / MOLECULAR SIEVE**

The active carbon filter must be replaced at intervals calculated on the basis of the characteristics of the environment in which the compressor is located. To calculate these intervals refer to the table below. The filter must nevertheless be replaced before any liquid water can be found in vehicle..

**IMPORTANT** If the intake gas to compressor contains sulfur compounds, sulfur removal filter should be installed at suction side.



**IMPORTANT** For compressors used in the USA and CANADA the use of LAWRENCE FACTOR filtration cartridges is recommended.



**DANGER** Do not carry out these tasks if the compressor has only just shut down; wait for the compressor to cool. All maintenance work must be carried out with the compressor OFF and the power supply lead unplugged from the mains socket. Depressurize the entire compressor circuit before carrying out any maintenance tasks.



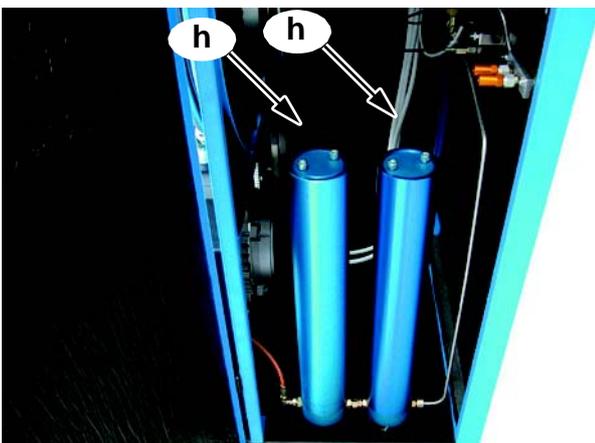
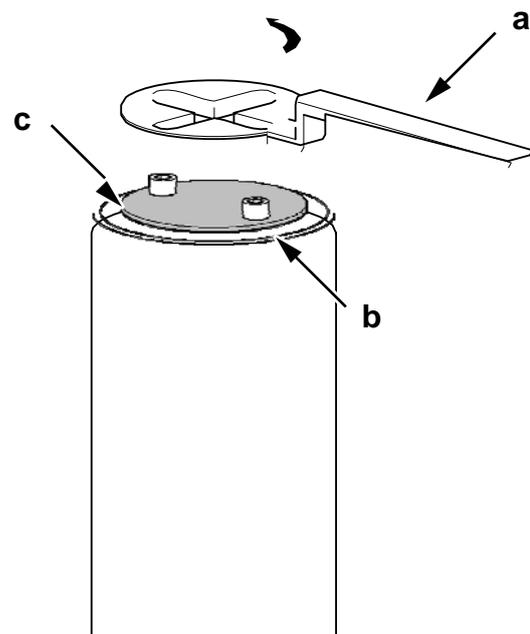
**7.11.1 High Pressure filter replacement frequency calculation table**

Temperature (°C)	Temperature (°F)	Correction factor	Filter duration (hours) MCH-36	Filter duration (hours) MCH-30
50	122	0,2	(55x0,2)=11	(67x0,2)=13
40	104	0,34	(55x0,34)=19	(67x0,34)=23
30	86	0.57	(55x0.57)=31	(67x0.57)=38
<b>20</b>	<b>68</b>	<b>1</b>	<b>55</b>	<b>67</b>
10	50	1,20	(55x1,20)=66	(67x1,20)=80
5	41	1,40	(55x1,40)=77	(67x1,40)=94
0	32	1,60	(55x1,60)=88	(67x1,60)=107

**7.11.2 Changing the active carbon filter / molecular sieve**

To change the active carbon filters (h) proceed as follows:

- vent all the compressed air inside the circuit;
- use the wrench (a) to apply leverage on the screw heads (b) of the plug (c) and rotate counter clockwise;

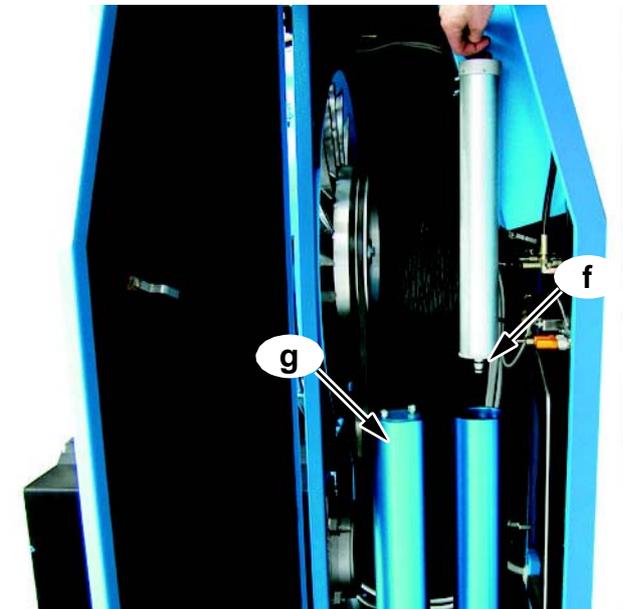
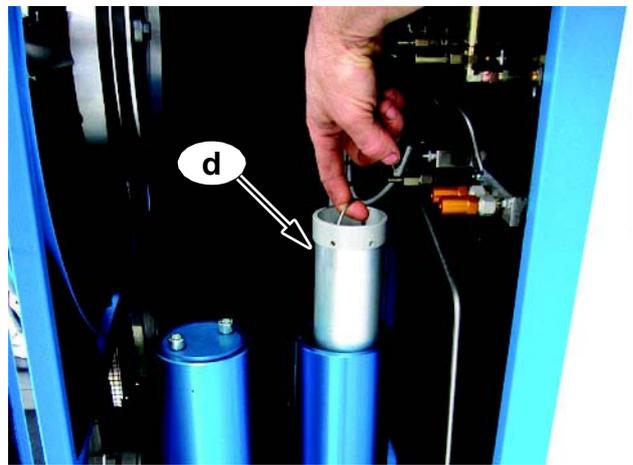
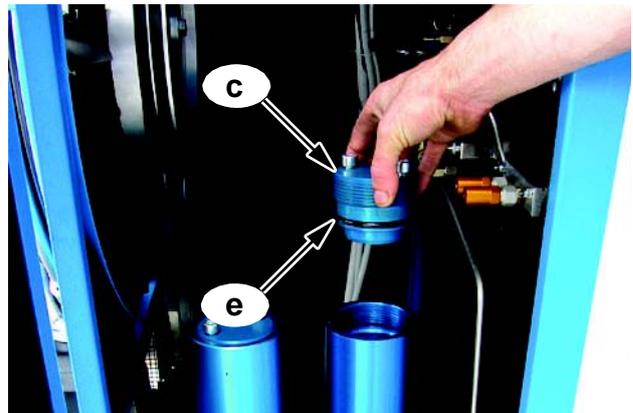
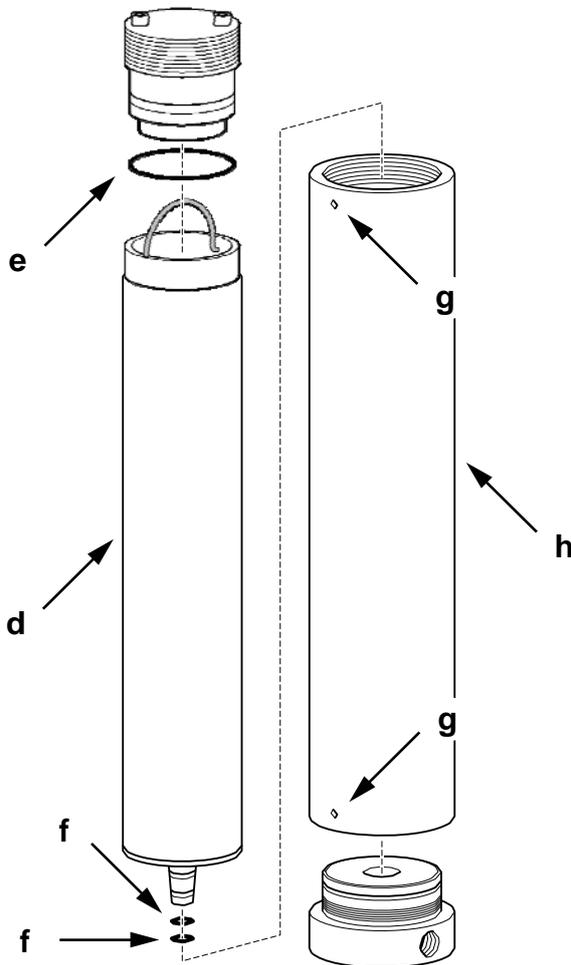


- remove the filter plug (c);
- remove the active carbon filter cartridge (d) and replace it with a new one;
- replace the O-ring (e) on the plug (c) every time the filter is changed;
- close the filter and screw it on with the wrench (a).

There are sealing O-rings (e-f) on the plug and the filter cartridge; if these O-rings deteriorate, the gas is released via the venting hole (g).

If you notice any venting from this hole replace the O-rings.

When replacing the O-rings observe the precautions described at the start of the section.



## WARNING



The active carbon filters are classified as special waste: they must be disposed of in compliance with the anti-pollution standards in force.

## IMPORTANT



Every time the compressor is used the filtration cartridge (d) must be fitted inside the active carbon filters (h).

**7.12 CHANGING THE FLEXBLE HOSES****IMPORTANT**

The hoses must be changed periodically (every 5 years or every 10000 hours) or when they show signs of abrasion/wear/damage.

The bending radius of the hoses must not be less than 250 mm

**DANGER**

Do not carry out these tasks if the compressor has only just shut down; wait for the compressor to cool.

All maintenance work must be carried out with the compressor OFF and the power supply lead unplugged from the mains socket.

Vent the air from the compressor before carrying out any maintenance tasks.

Tank refill pressure is very high; therefore, before refilling the tanks check that the hoses are perfectly connected and in good condition. Check also that the nozzle has no leak so as to prevent the dangers that derive from hose whiplash.

When the tanks are being refilled unauthorized personnel must remain at a distance of at least 3 meters.

It is strictly forbidden to disconnect the hoses from the fittings or refill tap when the machine is under pressure.

To change the bottle refill hoses proceed as follows:

- disconnect the bottle refill hoses by unscrewing the fittings (17 mm wrench);
- replace the old hoses with new ones;
- screw the hoses onto the connectors;
- use a dynamometric wrench to tighten the hoses to the compressor with a torque of 15 Nm.

## 8 - STORAGE

Should the compressor not be used, it must be stored in a dry sheltered area at an ambient temperature of between 0 °C and 40 °C.

Store the compressor away from sources of heat, flames or explosive.

### 8.1 STOPPING THE MACHINE FOR A BRIEF PERIOD

If you do not intend to use the compressor for a brief period proceed with general cleaning.

### 8.2 STOPPING THE MACHINE FOR A LONG PERIOD

If you do not intend to use the compressor for a long period, extract the active carbon filter cartridge.

Run the compressor for a few minutes without actually filling the vehicle so as to flush out all the residual condensate. Stop the compressor, disassemble the intake filter, restart the compressor and spray a few drops of oil into the air intake hole so that a light film of lubricant is aspirated and penetrates the interior of the compressor. Stop the compressor and refit the gas intake filter. Clean the external parts: eliminate any moisture, salt or oil deposits. Protect the compressor from dust and water by storing it in a clean, dry place. Switch off the machine via the main switch and remove the plug from the mains power socket.

Proceed with a thorough general cleaning of all machine parts.

During machine downtimes it is advisable to run the compressor for 20 minutes every 15 days.

## 9 - DISMANTLING AND PUTTING OUT OF SERVICE

Should you decide not to use the compressor or any of its parts any longer you must proceed with its dismantling and putting out of service.

These tasks must be carried out in compliance with the standards in force.

**WARNING**

Should the compressor, or a part of it, be out of service its parts must be rendered harmless so they do not cause any danger.

**WARNING**

Bear in mind that oil, filters or any other compressor part subject to differentiated waste collection must be disposed of in compliance with the standards in force.

### 9.1 WASTE DISPOSAL

Use of the compressor generates **waste** that is classified as **special**. Bear in mind that residues from industrial, agricultural, crafts, commercial and service activities not classified by quality or quantity as urban waste must be treated as special waste. Deteriorated or obsolete machines are also classified as special waste.

Special attention must be paid to active carbon filters as they cannot be included in urban waste: observe the waste disposal laws in force where the compressor is used.

Bear in mind that it is compulsory to record loading/unloading of exhausted oils, special wastes and toxic-harmful wastes that derive from heavy/light industry processes. Exhausted oils, special wastes and toxic-harmful waste must be collected by authorized companies.

It is especially important that exhausted oils be disposed of in compliance with the laws in the country of use.

### 9.2 DISMANTLING THE COMPRESSOR

**IMPORTANT**

Disassembly and demolition must only be carried out by qualified personnel.



Dismantle the compressor in accordance with all the precautions imposed by the laws in force in the country of use. Before demolishing request an inspection by the relevant authorities and relative report.

Disconnect the compressor from the electrical system.

Eliminate any interfaces the compressor may have with other machines, making sure that interfaces between remaining machines are unaffected.

Empty the tank containing the lubricating oil and store in compliance with the laws in force.

Proceed with disassembly of the individual compressor components and group them together according to the materials they are made of: the compressor mainly consists of steel, stainless steel, cast iron, aluminum and plastic parts.

Then scrap the machine in compliance with the laws in force in the country of use.

**IMPORTANT**

At every stage of demolition observe the safety regulations contained in this manual carefully.



## **10 - INSTRUCTIONS FOR EMERGENCY SITUATIONS**

### **10.1 FIRE**

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In the event of fire use a CO<sub>2</sub> extinguisher in compliance with the relevant standards in force.  
Contact the fire brigade.

## 11 - MAINTENANCE REGISTER

### 11.1 ASSISTANCE SERVICE

Customers continue to receive assistance after the purchase of a compressor. To this end **AEROTECNICA COLTRI** has created an assistance network covering the entire country.

#### IMPORTANT



**Our qualified technicians are at your disposal at any time to carry out maintenance work or repairs; we use only original spare parts so as to ensure quality and reliability.**

### 11.2 SCHEDULED MAINTENANCE

The scheduled maintenance program is designed to keep your compressor in perfect working order. Some simple tasks, described in this manual, can be carried out directly by the customer; others, instead, require that the work be carried out by trained personnel. For the latter we recommend you always contact our assistance network.

This section provides a simple tool with which to request assistance and register completed scheduled maintenance work.

Start-up and maintenance checks/tasks, once completed by our qualified technician, are registered in this maintenance chapter by way of an official stamp, signature and inspection date; the number of working hours is also registered.

The maintenance schedules/coupons easily let you know when our assistance service should be contacted to carry out work.

### 11.3 USING THE COMPRESSOR UNDER HEAVY-DUTY CONDITIONS

Where compressors are used in particularly difficult conditions (high levels of pollution, presence of solid particulate in suspension etc.), scheduled maintenance tasks must be carried out more frequently as per the advice given by our assistance network.

### 11.4 THE CUSTOMER CARE CENTRE

Our qualified technicians are constantly in contact with the head offices of our company where there is an assistance network coordination and support centre, better known as the Customer Care Centre.

To contact us:

Telephone: **+39 030 9910301**

**+39 030 9910297**

Fax: **+39 030 9910283**

E-mail: **coltrisub@coltrisub.it**

**11.5 SCHEDULED MAINTENANCE REGISTRY COUPONS**

<i>Type of work and notes</i>	<i>Date</i>
<p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>	<b>'Assistance' service stamp</b>
	<b>Maintenance technician's signature</b>
	.....
	.....
	.....

<i>Type of work and notes</i>	<i>Date</i>
<p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>	<b>'Assistance' service stamp</b>
	<b>Maintenance technician's signature</b>
	.....
	.....
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<i>Type of work and notes</i>	<i>Date</i>
<p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>	<b>'Assistance' service stamp</b>
	<b>Maintenance technician's signature</b>
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<i>Type of work and notes</i>	<i>Date</i>
<hr/>	<hr/>
	<b>'Assistance' service stamp</b>
	<hr/>
	<b>Maintenance technician's signature</b>
	<hr/>

<i>Type of work and notes</i>	<i>Date</i>
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	<b>'Assistance' service stamp</b>
	<hr/>
	<b>Maintenance technician's signature</b>
	<hr/>

<i>Type of work and notes</i>	<i>Date</i>
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	<b>'Assistance' service stamp</b>
	<hr/>
	<b>Maintenance technician's signature</b>
	<hr/>

<i>Type of work and notes</i>	<i>Date</i>
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.....	<b>'Assistance' service stamp</b>
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.....	
.....	<b>Maintenance technician's signature</b>
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<i>Type of work and notes</i>	<i>Date</i>
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.....	<b>'Assistance' service stamp</b>
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.....	<b>Maintenance technician's signature</b>
.....	.....

<i>Type of work and notes</i>	<i>Date</i>
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.....	<b>'Assistance' service stamp</b>
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.....	
.....	<b>Maintenance technician's signature</b>
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