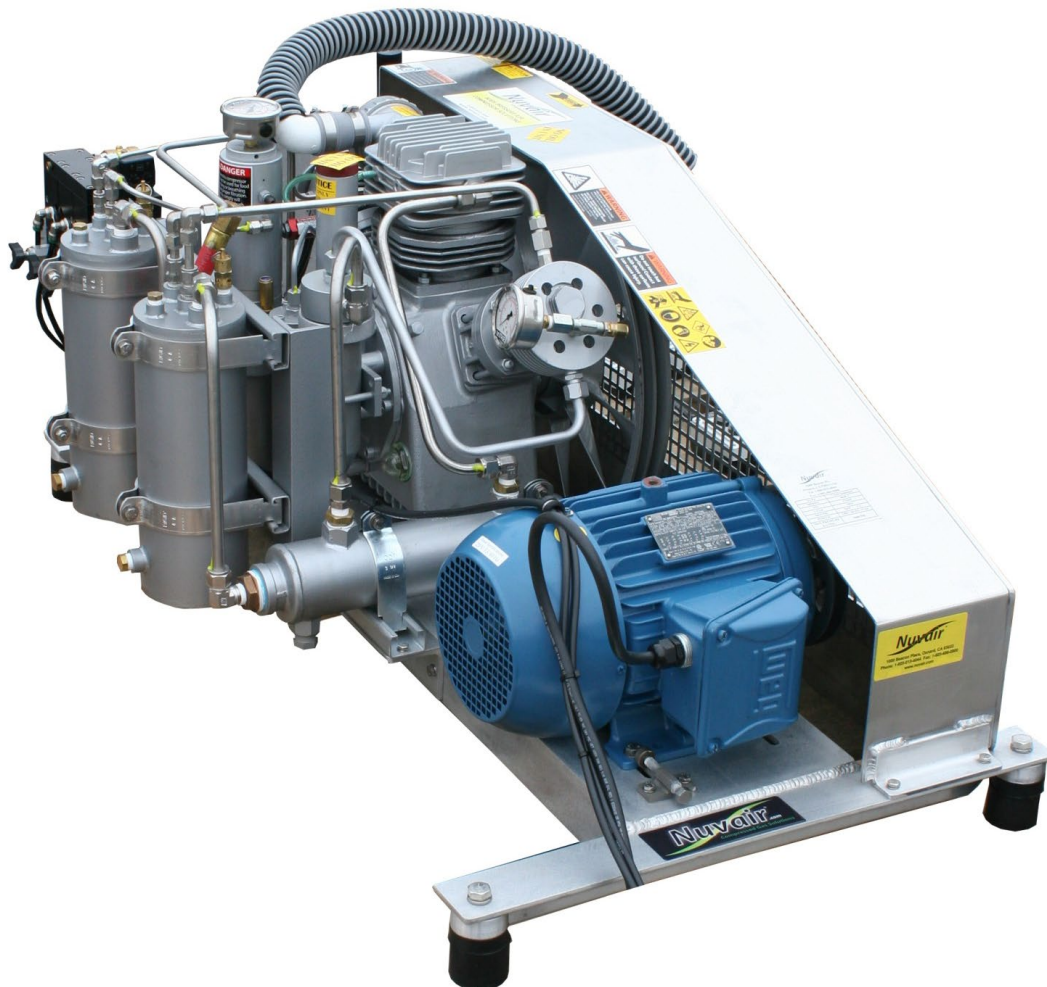




Operation Manual

Water Cooled MCH13 · MCH16 Electric Compressor



SKU 8019-WC · 8022-WC

www.nuvair.com

If you have any questions on this equipment, please contact Technical Support at:

Nuvair
1600 Beacon Place
Oxnard, CA 93033 USA

Phone: +1.805.815.4044
Fax: +1.805.486.0900
Email: info@Nuvair.com

Hours: Monday through Friday
8:00 AM to 5:00 PM Pacific Time



WARNING

This Operation Manual contains important safety information and should always be available to those personnel operating this equipment. Read, understand, and retain all instructions before operating this equipment to prevent injury or equipment damage.

Every effort was made to ensure the accuracy of the information contained within. Nuvair, however, retains the right to modify its contents without notice.

Under Nuvair's system of continuous improvement, certain components may be updated or changed as higher quality or more efficient parts and assemblies become available.

Nuvair will make every effort to update manuals as parts and functional aspects change. However, the look or location of components on your product may differ from those in this manual if improvements have been made that do not affect functionality or operational procedures.

Units pictured may also be equipped with different options than those on your product. In this case, the basic operational and maintenance guidelines will still apply.

If you have problems or questions after reading the manual, stop and call Nuvair at +1.805.815.4044 for information.

Table of Contents

1.0	Introduction	6
1.1	Symbol Conventions	6
1.2	System Description	6
1.3	Required Operator Training	7
1.4	Important Information for the User.....	7
1.5	Foreword.....	8
1.6	Assistance.....	8
1.7	Responsibility	9
1.8	Purpose of the Machine.....	9
1.9	Where the Compressor May be Used.....	11
1.10	Running and Testing the Compressor.....	11
2.0	Safety Warnings.....	11
2.1	Safety and Operation Precautions	12
2.2	High Risk Areas of Compressor	13
3.0	Compressor Overview	14
3.1	Component Identification.....	14
3.2	System Components	15
3.3	Water Cooled Compressor Operating Notes	16
3.4	Before Starting a Water Cooled Compressor.....	16
4.0	General Safety Rules	17
4.1	Protective Clothing.....	17
4.2	Emergency Equipment	17
4.3	Checks and Maintenance	17
4.4	Care and Maintenance.....	17
4.5	Tools	17
4.6	Keep the Compressor Clean.....	18
4.7	Periodic Replacement of Essential Safety Parts.....	18
5.0	Safety Information Labels: Location & Description	19
6.0	Typical Water Cooled Compressor Parts	20
7.0	Compressor Specifications.....	21
7.1	Unpacking and Installation	22
7.2	Air Intake Extension Kit	22
8.0	Checks for the Start of Each Working Day	23
8.1	Lubricating Oil Level Check	23
8.2	Check Refill Hoses	23
8.3	Check the Safety Valves	23
8.4	Gauge	24
8.5	Auto Drain Bypass	24
8.6	Visual CO & Moisture Indicator Housing	24
8.7	Pressure Controls	24
8.8	Storing Technical Documentation.....	24

9.0	Tank Refill Procedure	24
10.0	Maintenance	27
10.1	Foreword	27
10.2	General	27
10.3	Unscheduled Work	27
10.4	Scheduled Maintenance Table	28
10.5	Troubleshooting	29
10.6	Checking the Oil Level	29
10.7	Changing the Lubricating Oil and Filter	30
10.8	Tightening Torque Values	31
10.9	Changing the Air Intake Filter	31
10.10	Transmission Belts	32
10.11	Checking Transmission Belts	32
10.12	Changing Transmission Belt	32
10.13	Changing Air Filtration Cartridge/s	32
10.14	Condensate Discharge	34
10.15	Changing Flex Hoses	34
10.16	Safety Valves	35
11.0	Storage	37
11.1	Stopping the Machine for a Brief Period	37
11.2	Stopping the Machine for an Extended Period	37
11.3	Dismantling and Putting the Compressor Out of Service	37
11.4	Waste Disposal	37
11.5	Dismantling the compressor	38
12.0	Instructions for Emergency Situations	38
12.1	Fire	38
13.0	Maintenance Register	38
13.1	Customer Service	38
13.2	Scheduled Maintenance	38
13.3	Using the compressor under heavy duty conditions	39
13.4	Nuvair Customer Care Contact	39
14.0	Spare Parts List	39
15.0	Service Log	40
16.0	Appendix	41
16.1	Supply and Breathing Air Specifications	41
16.2	Filter Element Life Factors	41
17.0	Nuvair Compressor System Warranty	42

Separate Manuals Included:

Compressor Parts Manual

Table of Figures

Figure 1. Water cooled compressor overview.....	7
Figure 2. Protective clothing examples.....	17
Figure 3. “Do Not Use” sign.	17
Figure 4. Safety labels used on Nuvaair compressors.	19
Figure 5. Water cooled compressor block parts diagram.....	20
Figure 6. Illustration of proper positioning.....	22
Figure 7. Typical remote air intake kit.	22
Figure 8. Oil level viewer.....	23
Figure 9. Safety valve example.	23
Figure 10. Visual indicator housing and elements.....	24
Figure 11. Dial-a-Pressure Switch (top image) and Pressure Switch.	24
Figure 12. Tank refill illustration (DIN valve pictured).....	25
Figure 13. Manual bleed valves.	27
Figure 14. Checking and changing lubricating oil.....	30
Figure 15. Interior view of compressor block.	30
Figure 16. 6-bolt and 4-bolt torque sequence.....	31
Figure 17. Changing standard air intake filter.....	31
Figure 18. Transmission belt tension.	32
Figure 19. Changing the transmission belt.	32
Figure 20. Example of external air filtration system.....	32
Figure 21. Changing air filter cartridge.	33
Figure 22. Filter cartridge and cartridge parts.....	33
Figure 23. Condensate tank.	34
Figure 24. High pressure air outlet.	35
Figure 25. Safety valve locations.....	36

1.0 Introduction

This manual will assist you in the proper set-up, operation, and maintenance of the **Nuvair Water Cooled MCH 13 · MCH16** line of high-pressure air compressors. Be sure to read the entire manual.





Nuvair water cooled compressors are available in different configurations and two compressor sizes. The **water cooled compressor** can be configured for breathing air or industrial use. Compressor accessories may be added as optional equipment, so your customized compressor may look different than images contained in this manual.

Required and optional compressor components include, but are not limited to, the following:

- **Power Source:** Electric motor, gasoline engine, or diesel engine, and transmission belt
- **Compressor Block:** Pulley, crankcase, shaft cylinders, pistons, cooling tubes, coalescing tower
- **Gauge/s:** Interstage pressure, final pressure
- **Valves:** Pressure maintaining, check, condensate discharge, tank refill
- **Air Intake Extension:** Snorkel, hose
- **Filtration:** Intake, breathing air output
- **Automatic Shutdowns:** Set pressure, high temperature, low oil
- **Drains:** Manual condensate discharge, automatic condensate discharge, condensate collection bucket
- **Monitors:** Visual carbon monoxide indicator, visual moisture indicator, electronic gas analyzer/s
- **Hose/s:** Tank refill

1.1 Symbol Conventions

This manual uses certain words and symbols to call your attention to conditions, practices or techniques that may directly affect your safety. Pay particular attention to information introduced by the following symbols or words:

SYMBOL	MEANING	DESCRIPTION
	DANGER	Indicates an imminently hazardous situation, which if not avoided, will result in serious personal injury or death.
	CAUTION	Indicates a potentially hazardous situation, which if not avoided, could result in serious personal injury or death.
	WARNING	Indicates a potentially hazardous situation, which if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.
	NOTICE	Notifies people of installation, operation or maintenance information which is important but not hazard related.

1.2 System Description

Nuvair MCH13 · MCH16 water cooled high-pressure air compressors can be used in a wide variety of continuous duty breathing air or industrial air applications. Powered by an electric motor, the **MCH13 · MCH16 water cooled compressor** is compact in design and portable. Onboard CGA Grade E air purification comes standard for breathing air quality output.

Water Cooled MCH13 · MCH16 Electric

With several options available to meet your specific needs, the portability and dependability of the **Nuvair water cooled** MCH13 or MCH16 makes this an ideal continuous duty compressor. It delivers up to 5000 psi (345 bar) at 11.3 SCFM (320 L/min).

Water cooled compressors are designed for hot or poorly ventilated areas. It is the most convenient, efficient, and effective way to cool your high-pressure compressor. It is perfect for engine rooms on liveaboards and other vessels where ambient temperature is high. Water is much more efficient than air at absorbing and heat in a normal climate. Instead of air, water cooled compressors use seawater or freshwater for cooling. The compressor can be used for both air and nitrox (up to EANx40) production.

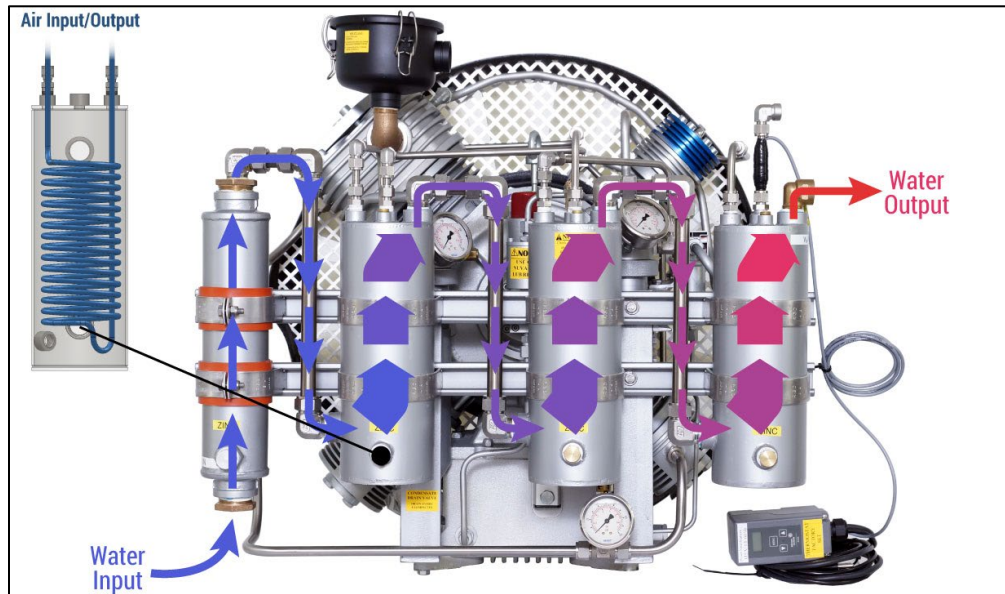


Figure 1. Water cooled compressor overview.

When the machine is running, water is pumped through the coolers. The water coolers are used in place of the regular air cooling tubes. The heated water can then be directed overboard.

A temperature probe is attached to the compressor's air lines which prevents the unit from running without sufficient water flow. The cooling water flow switch will not allow compressor to run with inadequate water flow. This is to prevent overheating. A zinc anode is located on each cooler to protect it from corrosion.

1.3 Required Operator Training



NOTICE

This manual must be read carefully and in its entirety.

- 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.

1.4 Important Information for the User

The information/instructions for compressor use contained in this manual concern the **Nuvair Water Cooled MCH13 · MCH16 Series** of high-pressure compressors.

The instruction manual must be read and used as follows:

- Read this manual carefully; treat it as an essential part of the compressor.

Water Cooled MCH13 · MCH16 Electric

- 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.

1.5 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. The contained information is necessary and essential to efficient and 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) Plan 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.

1.6 Assistance

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

Phone: +1.805.815.4044
Fax: +1.805.486.0900
Email: info@Nuvair.com



NOTICE

Before contacting us, please complete the *Compressor Troubleshooting Checklist*, available at <https://nuvair.com/faq/Compressor-Troubleshooting.pdf>. Completing the checklist will streamline your customer support experience.

1.7 Responsibility

Nuvair 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 maneuvers during use or maintenance of the compressor.
- Modifications made to the compressor without prior written authorization from Nuvair.
- Incidents beyond the scope of routine, proper use of the compressor



WARNING

Maintenance and repairs must only be carried out using original spare parts and qualified technicians. Nuvair 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

This high-pressure compressor has been designed and built for the purpose of producing breathing air (with proper filtration) or industrial air (without filtration) by drawing ambient air from the surrounding environment. Unless a remote air intake is used, the compressor area must be free from any harmful fumes or other contaminants. Surrounding air is pulled through an intake air filter, compressed, and passed through breathing air filtration (if so equipped) before it is stored in tanks (cylinders) constructed to contain air at high pressure. The compressor can also be used for the pumping of gases:

- Nitrogen
- Helium
- Nitrox mixtures up to 40%

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



DANGER

Use only tested and certified storage tanks. Do not exceed the indicated storage tank working pressure.

- **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 hoses from fittings or clamps when under pressure.**
- **Change the air purification filters (if so equipped) regularly as described in section 12.9.**
- **Drain the condensate regularly as illustrated in section 12.15.**
- **Compressor power (electric, gas or diesel) must be disconnected and/or disabled before carrying out any cleaning or maintenance tasks.**

Water Cooled MCH13 · MCH16 Electric

- On electric models, never pull a plug out by tugging the cord. Make sure the cord is not bent at a sharp angle and that it does not rub against any sharp edges. Use of extensions is not advised.
- On electric models, never operate the compressor when the power cord is damaged, or the power supply covers/guards are removed.
- All routine and unscheduled maintenance tasks must be carried out with the compressor at a standstill with all lines depressurized.
- After switching off the compressor, wait about 30 minutes before carrying out any maintenance tasks to prevent burns.
- The high-pressure flex hose that connects to external components must be in good condition, especially in the areas near the fittings.
 - The plastic sheath that covers the hose must not show any signs of abrasion otherwise moisture can seep in, compromise the fiber braid, and weaken it.
 - The hose must be changed periodically (yearly) or when it shows signs of wear.
 - Failure to observe this rule could seriously endanger users' safety.
 - Make sure the minimum bending radius of the hose is no less than 250 mm (9.8 inches).

To ensure maximum working efficiency, Nuvair has 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 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 utilization in the workshop are controlled constantly to prevent any damage, deterioration, or malfunction.



DANGER

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

- Using the compressor under conditions or for purposes other than those indicated in this manual is prohibited, and Nuvair 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. Stop the compressor, relieve pressure, and eliminate any leaks immediately when detected. Do not tighten fittings while under pressure.
- Do not attempt to repair high pressure tubes by welding them or while the compressor is running.
- Do not empty storage tanks completely—not even for long term storage—as this practice allows damp air to get in and eventually corrode the tank.
- 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 very important.

1.9 Where the Compressor May be Used

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		Minimum: +41°F (+5°C); Maximum: +113°F (+45°C)
Air Humidity		Maximum: 80%
Tolerated Weather Conditions	rain hail snow	None
Maximum Tilt Angle (bank)		6% grade (less than 4°)

Check that the area in which the compressor is to be positioned is adequately ventilated: good air exchange (more than one window) with no dust and no risk of explosion, corrosion, or fire.

If ambient temperatures exceed 113°F (45°C), air conditioning is required to compress air. For nitrox compression, ambient temperature should not exceed 105°F (41°C).

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

1.10 Running and Testing the Compressor

Each compressor is carefully tested prior to delivery. A new compressor must nevertheless be used with caution during the first five (5) working hours to complete proper break-in 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 starting up the compressor, let it run for 5–6 minutes with minimal load pressure. To do this, open the fill whip valve. Muffle the escaping air sound by with a clean rag or sock.

After the first 25 hours carry out in addition to the scheduled maintenance the following tasks:

- Change the compressor oil (and oil filter on pressure lubricated models)
- Check and tighten nuts and bolts
- Check transmission belt tension



WARNING

When changing the oil filter, inspect the filter element and check for any deposits. If metal or carbon deposits are present, locate the source before restarting the compressor.

2.0 Safety Warnings

Nuvair has taken extreme care in providing you with the information you will need to operate this system. However, it is up to you to carefully read this manual and make the appropriate decisions about system safety.



WARNING

This equipment is used to provide breathing air or nitrox for the purpose of life support. Read this manual in its entirety. Failure to heed the warnings and cautions contained in this document may result in severe injury or death.



WARNING

The equipment you will be using to compress air or nitrox will expose you to both low- and high-pressure gas. Gas, even under moderate pressures, can cause extreme bodily harm. Never allow any gas stream to be directed at any part of your body.



WARNING

Any pressurized hose can cause extreme harm if it comes loose or separates from its restraint (or termination) while under pressure and strikes any part of your body. Use appropriate care in making and handling all gas connections.



WARNING

Do not use any form of mineral oil or synthetic lubricant not rated for the compressor in this system. Use only the recommended compressor lubricant. Never mix the compressor lubricant with other lubricants. The use of improper lubricants can lead to fire or explosions, which may cause serious personal injury or death.

2.1 Safety and Operation Precautions

Because a compressor is a piece of machinery with moving and rotating parts, the same precautions should be observed as with any piece of machinery of this type where carelessness in operations or maintenance is hazardous to personnel. In addition to the many obvious safety precautions, those listed below must also be observed:

1. Read all instructions completely before operating any compressor or nitrox system.
2. For installation, follow all local safety codes, as well as the National Electrical Code (NEC) and the Occupational Safety and Health Administration (OSHA) standards.
3. Electric motors must be securely and adequately grounded. This can be accomplished by wiring with a grounded, metal-clad raceway system to the compressor starter; by using a separate ground wire connected to the bare metal of the motor frame; or other suitable means.
4. Protect all power cables from contacting sharp objects. Do not kink power cables and never allow the cables to contact oil, grease, hot surfaces, or chemicals.
5. Make certain that power source conforms to the requirements of your equipment.
6. Do not attempt to remove any parts without first relieving the entire system of pressure.
7. Do not attempt to service any part while the system is operating.
8. Do not operate the system at pressures more than its rating.
9. Do not operate compressor at speeds more than its rating.
10. Periodically check all safety devices for proper operation. Do not change pressure setting or restrict operation in any way.
11. Be sure no tools, rags or loose parts are left on the compressor system.
12. Do not use flammable solvents for cleaning the air inlet filters or elements and other parts.
13. Exercise cleanliness during maintenance and when making repairs. Keep dirt away from parts by covering parts and exposed openings with clean cloth or Kraft paper.
14. Do not operate the compressor without guards, shields, and screens in place.
15. Do not install a shut-off valve in the compressor discharge line, unless a pressure relief valve, of proper design and size, is installed in the line between the compressor unit and shut-off valve.
16. Do not operate in areas where there is a possibility of inhaling carbon monoxide, carbon dioxide, nitrogen, or flammable or toxic fumes.

Water Cooled MCH13 · MCH16 Electric

17. Be careful when touching the exterior of a recently run electric, gasoline, or diesel motor - it may be hot enough to be painful or cause injury. With modern motors this condition is normal if operated at rated load - modern motors are built to operate at higher temperatures.
18. Inspect unit daily to observe and correct any unsafe operating conditions found.
19. Compressed air can be a serious hazard. Always use caution. Never direct air stream at any part of the body as this can cause injuries.
20. Compressed air from this machine must not be used for food processing or breathing air without adequate downstream filters, purifiers and controls and periodic air quality testing.
21. Always use an air pressure-regulating device at the point of use, and do not use air pressure greater than marked maximum pressure.
22. Check hoses for weak or worn conditions before each use and make certain that all connections are secure.

The user of any compressor or nitrox system manufactured by NuVair is hereby warned that failure to follow the preceding Safety and Operation Precautions can result in injuries or equipment damage. However, NuVair does not state as fact or does not mean to imply that the preceding list of Safety and Operation Precautions is all-inclusive, and further that the observance of this list will prevent all injuries or equipment damage.

2.2 High Risk Areas of Compressor

Some areas of the compressor pose a level of operator/bystander risk that were not possible to eliminate at the design stage or for which safeguards could not be provided without compromising the functionality of the compressor. Users must be aware of these hazards and potential injury associated with each area.



DANGER

To prevent accidents and injuries, all operators must be aware of the potential high-risk areas of the compressor unit:

1. Air contamination. Danger of contaminating produced air due by exposing the air intake to exhaust fumes or lubricating oil vapors.
2. Electrical dangers. Use the machine with suitable environmental protections, especially against water and humidity.
3. Heat-related dangers. Use the machine with suitable safety devices and after switching off the machine, wait 30 minutes for the machine to cool down before carrying out maintenance work.
4. Noise. Danger deriving from noise emitted by the compressor.
5. Fire risk.
6. Entanglement. Risk of being crushed, dragged, or entangled by transmission belts.
7. Impact. Danger of impact/abrasion with the cooling fan.
8. Impact. Danger operator injury or death if high-pressure hoses fail.

3.0 Compressor Overview

In this section are representative images of the **water cooled MCH13 · MCH16 compressor** powered by electric motor. The layout of your **water cooled compressor** may be customized with optional equipment and/or made-to-order framing. Because of this, your compressor's appearance may differ from what is represented in this manual.

3.1 Component Identification

The **water cooled MCH13/16 compressor** pictured below has standard equipment. Special equipment related to the compressor's water cooling system is highlighted here. Click on SKU numbers for link to website product page.

Water Coolers (x 2)
[SKU 9425](#)

Heat Exchanger
[SKU C10](#)

Replacement Anode¹ (x 2)
[SKU E-1Z](#)
Check monthly

Replacement Anode²
[SKU E-2Z](#)
Check monthly

¹Complete Zinc Anode
1/2" x 2" with 3/8" plug
[SKU E1](#)
Replace anode when 2/3 consumed.

²Complete Zinc Anode
5/8" x 2" with 1/2" plug
[SKU E2](#)
Replace anode when 2/3 consumed.

Attach water to inlet and outlet as labeled.
Arrow on flow switch indicates proper flow direction.
Compressor will not start if water is flowing the wrong direction.

3.2 System Components

All features of the standard MCH13 · MCH16 apply to this product in addition to the custom features of a water cooled compressor.

Standard Equipment

Coltri MCH13 or MCH16 High Pressure Air Compressor

- Rugged 5000 psi (345 bar) three-stage block

5.5 hp or 7.5 hp Electric Motor

- 220V, 230V, or 440V / E1 or E3 / 50 Hz or 60 Hz

First Stage Copper/Nickel Heat Exchanger

- Heat exchanger has zinc anode to increase life

Second and Third Stage Water Coolers (Cooling Towers)

- Both cooling towers have zinc anode to increase life

2 Condensate Separators

Oil Level Sight Gauge

Loadless Start

Water Flow Shutdown Switch

High Water Temperature Shutdown Switch

Stainless Steel Tubing

Marine Grade 6061 Aluminum Frame

Rubber Vibration Isolating Frame Feet

Pressurized Oil Lubrication

Nuvair 455 Food Grade Lubricant

Optional Equipment

Tropical and Tropical Plus compressor block for high heat/humidity applications

External Filtration System

Motor Starter

Preset Pressure Shutdown Switch

Dial-a-Pressure User Adjustable Shutdown Switch

Stainless Steel Frame

Hour Meter

Automatic Condensate Drains (Auto Drains)

Low Oil Shutdown Switch

Interstage Pressure Gauges - Panel or Pump Mounted

Visual CO / Moisture Indicator

Nuvair 751 Diester Based Lubricant

3.3 Water Cooled Compressor Operating Notes

1. Water connections should be made as labeled. Water flows into the cooling system at the Flow Switch. An arrow located on the Flow Switch body indicates the proper flow direction. There should be no restrictions placed at or after the cooling water outlet.



NOTICE

Water flow is required to EXCEED 2 gallons per minute (GPM, or 7.6 L/min). The Flow Switch activates at 2 GPM, therefore a danger exists that the compressor will shut down if the flow is inconsistent and fluctuates too close to that flow volume.

2. To protect the cooling system, check the zinc anodes in each heat exchanger every 30 days to ensure zinc material is present. The zinc material should be consumed slowly. If zinc is not being consumed, lack of metal contact at the threads, or the zinc not being seated tightly into the plug can cause this. If 2/3 or more of the zinc material has been consumed, replace with SKU 3851276.



NOTICE

Metal-to-metal contact must be made between the threads of the anode plugs and the heat exchanger bodies. Pipe dope, such as Rector Seal #5, is recommended for sealing the plug when reinstalling. Do not use Teflon tape.

3. If your unit is equipped with a temperature switch between the first and second stages, it will shut the compressor off if the air temperature leaving the heat exchanger reaches approximately 350°F (177°C).
4. Flush the cooling system every SIX (6) MONTHS with a descaling flush to keep water passages clear of marine growth and to maintain proper water flow.

3.4 Before Starting a Water Cooled Compressor

1. Electrical power must be connected by a qualified electrician. The unit does not have wrong rotation protection, and running the compressor backward for even a short amount of time can cause damage.
2. Make water connections as labeled. Water should flow into the final stage cooling tower at a rate of at least **2 gallons per minute**. There should be no restrictions placed at or after the outlet located at the first stage heat exchanger.
3. If equipped with auto drains, the auto drain solenoid must be secured with the provided screw.
4. Connected plugs as labeled at the low oil switch, air high temperature switch, and water high temperature switch. The unit will not run if any of these connections are missing.

**Questions? Problems? Stop Work and Call Nuvair for Assistance
+1.805.815.4044**

4.0 General Safety Rules

The compressor must only be used by qualified personnel. They must fully understand the arrangement and function of all the controls, instruments, indicators, warning lights and the various information labels.

4.1 Protective Clothing

All operators must use accident prevention items such as gloves, hard hat, eye goggles, accident prevention shoes and ear defenders against noise (Figure 2).



Figure 2. Protective clothing examples.

4.2 Emergency Equipment

Make sure first aid supplies and a fire extinguisher rated for use on electrical equipment are nearby. In the United States, extinguishers with a Class C rating are designed for use with fires involving energized electrical equipment.

4.3 Checks and Maintenance

When work is being performed on the compressor, apply “DO NOT START” signs on all sides of the compressor to prevent accidental startup of a compressor undergoing repair/maintenance (Figure 3).

Inspect the compressor carefully every day it is used as per the checklist given in this manual.

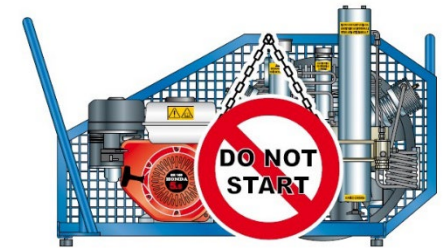


Figure 3. “Do Not Use” sign.

4.4 Care and Maintenance

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

- No oil
- Insufficient cleaning
- Compressed air circuitry insufficiency (flex hose damage, loose pipes, screws, bolts, 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:

- Always keep the compressor and surrounding area clean.
- Before stating work check that safety devices/guards are in good working order.
- Make sure no one is in the compressor danger zones. Interrupt work if anyone enters the danger zone. Tell them to leave.
- Never leave the machine unattended when it is running.

4.5 Tools

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



WARNING

Nuvair cannot be held liable for any damage or injury caused by using tools that are not prescribed or are modified without authorization.

4.6 Keep 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 pressurized hot water or steam jet and commercially available detergents. Do not use diesel, petrol or solvents as the former leaves 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 oxidizing 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.

4.7 Periodic Replacement of Essential Safety Parts

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

- Compressed air system: main compressed air circuit delivery hoses.
- Tank refill system: Flex hoses for cylinder refilling.

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.

5.0 Safety Information Labels: Location & Description

Safety information labels are affixed to various parts of the compressor unit. Understand the meaning of each label and follow any instructions given on any label. The labels are self-explanatory with a warning/danger graphic and a description in English of the hazard. Decals used on the **Water Cooled** series are pictured below. Your compressor may you some or all of the labels based upon optional equipment.

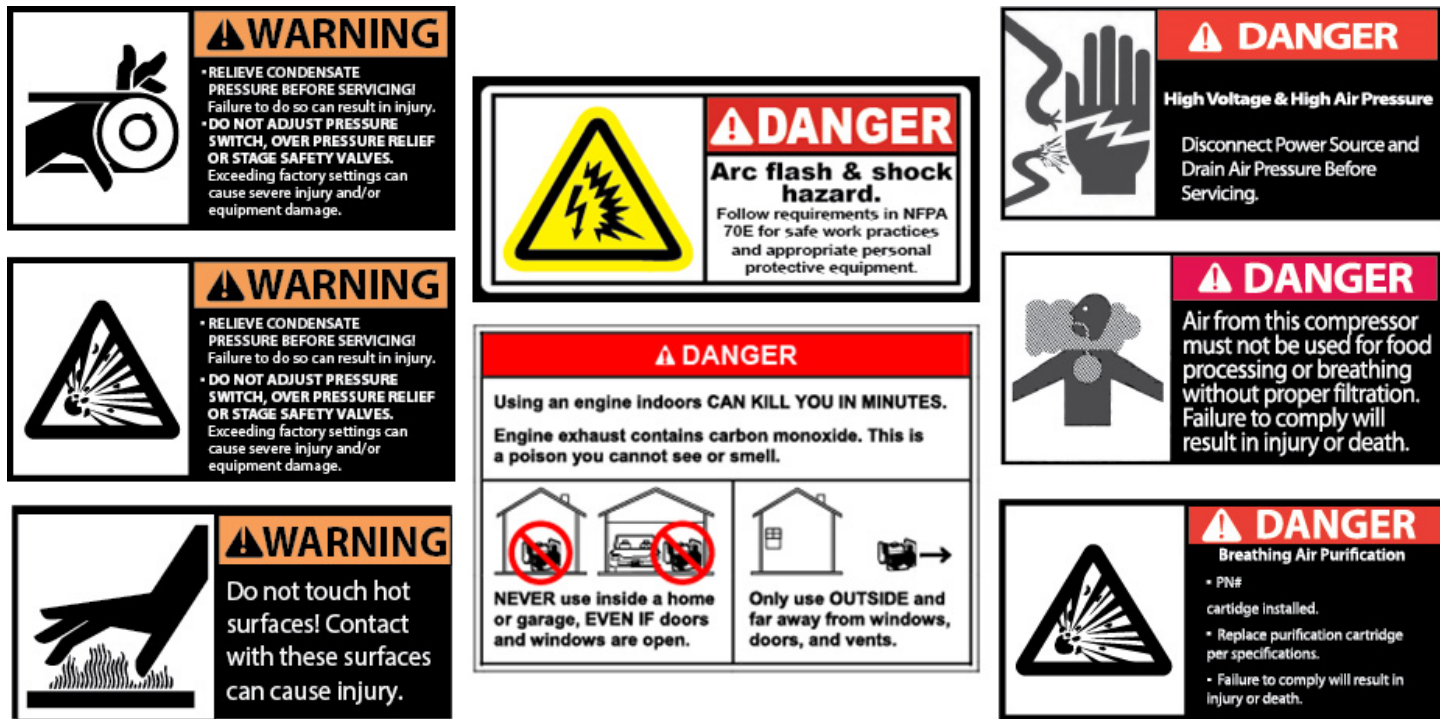


Figure 4. Safety labels used on Nuair compressors.

6.0 Typical Water Cooled Compressor Parts

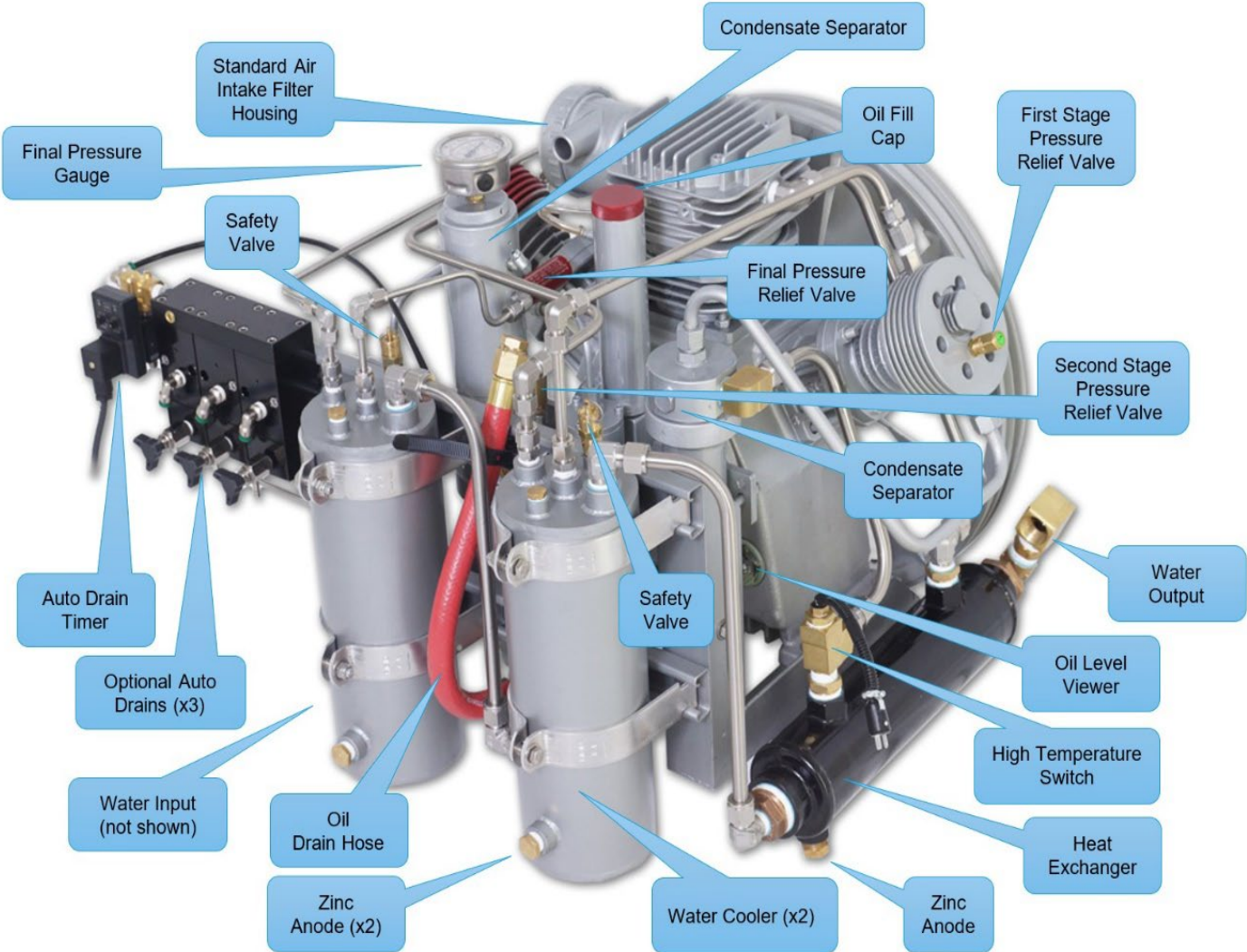


Figure 5. Water cooled compressor block parts diagram.

7.0 Compressor Specifications

Your compressor specifications may vary based upon customizations ordered.

Model	Water Cooled MCH13	Water Cooled MCH16
Fill Time*	~11 Minutes	~9 Minutes
Charging Rate*	8.4 SCFM (238 L/min)	11.3 SCFM (320 L/min)
CFM FAD	7 CFM (200 L/min)	9.4 CFM (266 L/min)
Power	5.5 hp (4 kW) Electric	7.5 hp (5.5 kW) Electric
208-230V / E1 / 50 or 60Hz**	25A SKU 8019.1-WC	34A SKU 8022.1-WC
208-230V / E3 / 60 Hz	14A SKU 8019.2-WC	20A SKU 8022.2-WC
440-480V / E3 / 60 Hz	7A SKU 8019.3-WC	10A SKU 8022.3-WC
230V / E3 / 50 Hz	12A SKU 8019.5-WC	14A SKU 8022.5-WC
380-400V / E3 / 50 Hz	9A SKU 8019.6-WC	13A SKU 8022.6-WC
RPM	1200	1450
Sound Level @ 3 Meters	81 dB	82 dB
Max Operating Pressure	5000 psi (345 bar)	
Number of Stages	3	
Number of Fill Hoses	1-2	
Condensate Drain	Manual (Auto Drain Optional)	
Dimensions (L x W x H)	45 x 21 x 31 in (114 x 53.3 x 78.7 cm)	
Weight	297 lb (134.7 kg)	
Lubrication	Capacity 1.8 L	
Breathing Air Quality	DIN 3188 - CGA Grade E - NFPA 1500 - EN12021	

*Fill time based on 80 cu ft cylinder from 500 to 3000 psi.



CAUTION

Ambient room temperature should never exceed +113°F (45°C) during operation of the compressor system. For nitrox systems, maximum ambient temperature is +105°F (41°C). Operation at higher temperatures may lead to system damage and malfunction.

7.1 Unpacking and Installation

- Please read all information supplied before physically installing the compressor system.
- Unpack the system and remove from the pallet. Visually inspect the system to make sure there has been no damage during shipping. If damaged, please call Nuair to file a damage report. Please take photos and supply detailed information about the damage.
- Place the system in a permanent location allowing a minimum spacing of 39 inches (1 m) from adjacent walls and inches 59 inches (1.5 m) from ceiling (Figure 7).
- Select a location where ambient room temperature complies with stated requirements.
- Make sure the installation space is well ventilated.

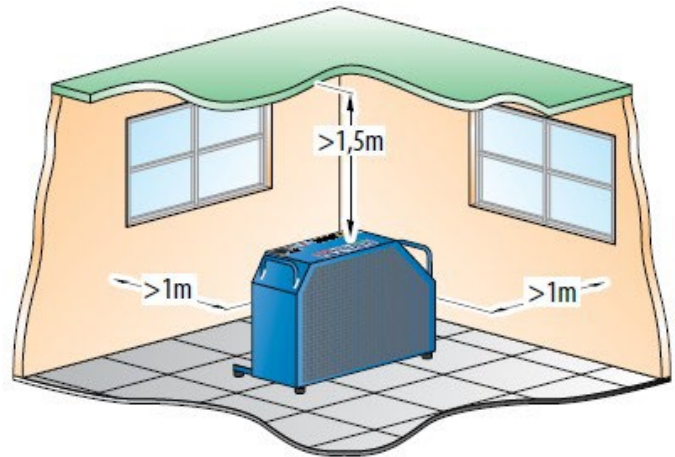


Figure 6. Illustration of proper positioning.

7.2 Air Intake Extension Kit

If the electric powered compressor is installed in an area without the necessary ventilation requisites described in section 7.1, it will be necessary to install a remote air intake extension kit leading in from outdoors or a place with the required ventilation requisites. If the compressor is powered by gas or diesel engine, then a remote intake is required.

- The kit (like the one pictured in Figure 7, which is available as an option, [SKU NUVRAI-STD-16](#)), must be connected to the compressor air intake.
- Connect extension pipe to fitting.
- Fit the supplementary intake filter on the end of the extension pipe.
- Position the end of the extension with the air intake filter in a properly ventilated area sheltered from weather and exhaust fumes.
- Point the air intake against the wind.
- Check that there are no kinks or breaks along the pipe. If it is damaged replace it.



Figure 7. Typical remote air intake kit.



DANGER

Allowing exhaust fumes from a combustion engine to enter the compressor air intake will prove fatal to anyone breathing compressed air from this system.

8.0 Checks for 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 **Nuvair**.

8.1 Lubricating Oil Level Check

Check that the level of lubricating oil is within acceptable limits (i.e., between minimum and maximum in the oil level viewers). Note that an excessive quantity of oil can leave deposits on the valves while too low a level prevents proper lubrication and could cause compressor seizure.

If the oil level is below the minimum limit shown in Figure 8, add additional oil.

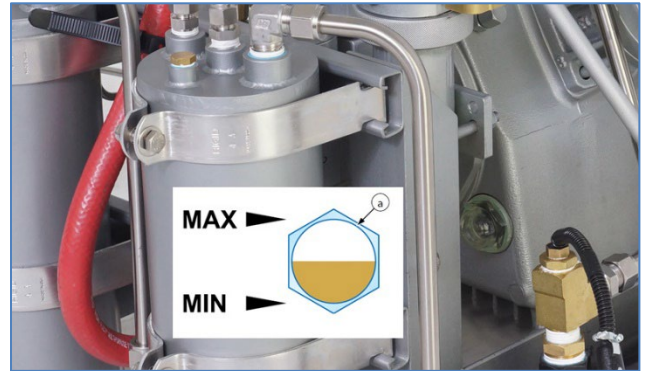


Figure 8. Oil level viewer.

8.2 Check Refill Hoses

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

8.3 Check the Safety Valves

The final safety valve (also known as a “pressure relief valve,” shown in Figure 10) protects storage tanks and the compressor from excessive pressure; the valve setting is made at the time of compressor testing. Safety valves are available in different pressures depending on customer specifications. Available safety valve pressures include:

- 3364 psi (232 bar)
- 3625 psi (250 bar)
- 3988 psi (275 bar)
- 4350 psi (300 bar)
- 4786 psi (330 bar)
- 6454 psi (445 bar)

The safety valve must be tested every 250 working hours of the compressor. To check the safety valve:

- Set the pressure to a pressure higher than that of the valve setting.
- After attaching all fill whips to tanks, start the compressor with the tank valves closed.
- Using the final pressure gauge, note when the safety valve trips to ensure the valve activates at the maximum working pressure.

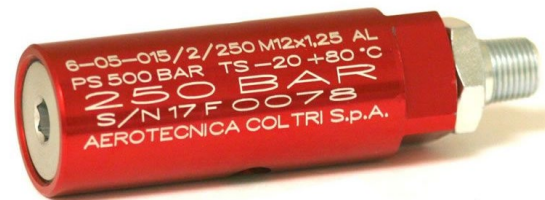


Figure 9. Safety valve example.



CAUTION

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. Should the safety valve fail to work properly, contact Nuvair Technical Support.

8.4 Gauge

Final Fill Pressure

The gauge atop the final condensate separator indicates the pressure as it exits the compressor.

8.5 Auto Drain Bypass

Activating the auto drain bypass allows for a loadless start of the compressor.

8.6 Visual CO & Moisture Indicator Housing

Adjacent to the auto drain bypass is the carbon monoxide and moisture visual indicator housing. Visual indicators warn compressor operators of an impending need to change filter cartridges.

At the core of this unit are elements. The elements contain reagents that respond to a specific contaminant within a determined range. The elements (replacement SKU 592-6) detect the presence of carbon monoxide (CO) and moisture (H₂O).

Since the indicator elements “see” the gas at actual operating pressure and conditions, it is fairly accurate and is helpful in determining cartridge lifespan. However, it does not take the place of scientific instruments nor give quantitative measurements.



Figure 10. Visual indicator housing and elements.

8.7 Pressure Controls

As an option, the compressor can be equipped with a choice of one of two types of automatic start/stop systems (Figure 11).

- Pressure Switch: Shuts down the compressor at a set high pressure.
- Dial-A-Pressure Switch: Allows the operator to dial-in a high pressure for the compressor to automatically stop at when the pressure is reached during the filling process.

8.8 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 review.



WARNING

This Operation Manual contains important safety information and should always be available to those personnel operating this equipment. Read, understand, and retain all instructions before operating this equipment to prevent injury or equipment damage.



Figure 11. Dial-a-Pressure Switch (top image) and Pressure Switch.

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

9.0 Tank Refill Procedure



NOTICE

During refill, the operator must be in the work area. During the tank refill phase, it is advisable to submerge tanks in cold water to reduce the drop in pressure that accompanies tank cooling.



WARNING

During tank refill, those not involved in the refill procedure must maintain a safety distance of at least 9 feet (3 meters). Also, it is forbidden to disconnect the hoses from the fittings or the high-pressure out connection while the machine is under pressure. If an emergency occurs during refill, shut down the compressor immediately.



DANGER

Should tanks show evident signs of internal or external corrosion, do not refill them even if they have been tested.



WARNING

Use only tested tanks (as proven by a test stamp and/or certificate). The working and tank refill pressures are stamped on the tanks themselves. It is forbidden to refill them at a pressure greater than that indicated.

Different fill valves are available at the time of purchase. Variations include INT (Yoke), DIN232, DIN300, and SCBA. To refill tanks, follow procedures described below and as illustrated in Figure 12:

- Check that tanks to be refilled are in good condition.
 - Tanks must be inspected as required by local law and have evidence (stamped or label) attesting to said certification or inspection.
 - Conduct a visual inspection of the tank/s exterior.
- Check that fill whips and associated fittings are in good condition.
- Set the desired fill pressure using the dial-a-pressure switch.
- Fit the hose connector (a) to the fill valve (b).
- Screw in the fill valve knob (c) until it is tightened.
- Check that the bleed valve (f) is closed by rotating it clockwise.
- Open the valve (d) by rotating it counterclockwise.
- Start the compressor.
- Open the valve (e) by rotating it counterclockwise.
- Once refilling has been completed wait for automatic shutdown of the compressor with the pressure switch.
- Close valves (d) and (e) by rotating them clockwise.
- Open the bleed valve (f) by rotating it anticlockwise until all the residual air in the whip has been expelled.
- Unscrew the fill valve knob (c) by rotating it counterclockwise.

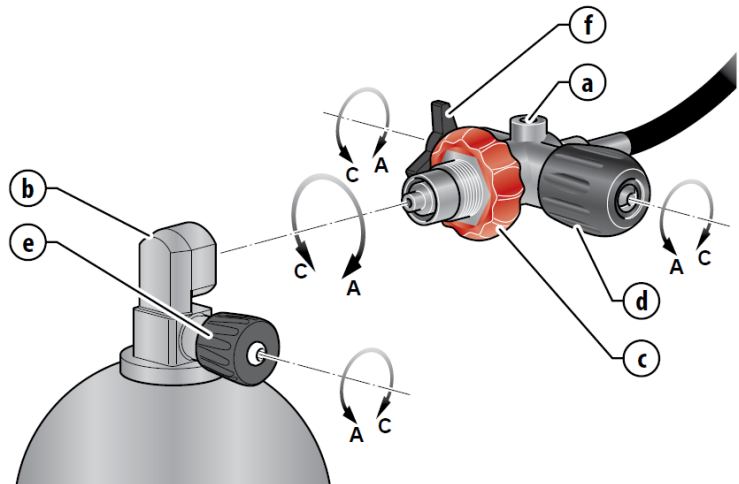


Figure 12. Tank refill illustration (DIN valve pictured).

- Disconnect the tank fill valve.

Never drain a tank completely, not even for seasonal storage or long periods of inactivity. Pressure prevents internal damage caused by moisture intrusion.

10.0 Maintenance

10.1 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 Nuvair:

Phone: +1.805.815.4044
Email: info@Nuvair.com



DANGER

Do not carry out these tasks if the compressor has just shut down and is hot; 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 wall socket.



DANGER

Depressurize the entire compressor circuit before carrying out any maintenance tasks. To depressurize the compressor, open the drain valve (Figure 13).

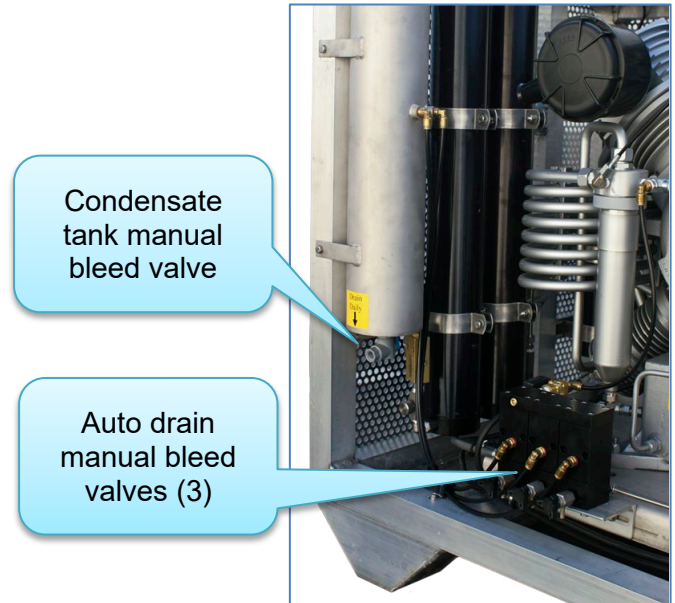


Figure 13. Manual bleed valves.

10.2 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 and all lines must be released.
- During disassembly and reassembly 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 Service Log of this manual.

10.3 Unscheduled Work

Unscheduled work involves repairs and/or replacement of the mechanical parts of one or more compressor components. This work normally needs to be done 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 a Nuvair approved mechanic.

10.4 Scheduled Maintenance Table

Maintenance interval times are for typical use and may vary based on the conditions under which the compressor is used.

Hourly Maintenance	5	10	30	40	50	250	500	1000	2000	3000	4000
Condensate Container Discharge	○	○			○						
Automatic Shutdown Check	○				○						
Lubricating Oil Level Check					○						
Main Functions Check						○					
Clean Condensate Discharge Valves						○					
Condensate Discharge Nylon							●				
Condensate Discharge Valves									●		
Belt Wear and Tension						○		●			
Cleaning the Separator Filter Element						○	○				
Oil Change						● ^{1,2}					
1 st , 2 nd , 3 rd Stage Valves							○	●			
HP Water/Oil Separator										●	
HP Filter Body										●	
Elastic Bands 1 st , 2 nd , 3 rd Stage								●	●		
Check and Replace HP Flex Hoses							○	●			
Fittings/Hose Leak							○				
General Checkup							○				
1 st and 2 nd Stage Safety Valves									●		
Safety Valves								●			

○ Checking and cleaning ● Change

¹ Nuvair recommends oil changes every 250 hours of runtime, or once per year, whichever is less.

² Change oil every 100 hours when compressor is used with nitrox.

Annual Maintenance	Years			
	1	5	10	15
Air Intake Filter	●			
Lubricating Oil & Filter Change	●			
Condensate Separator & Filter				●
Hyperfilter Complete				●
Separator Filter Element Cleaning	○			
HP Flex Hoses		●		
Safety Valve			●	
Transmission Belt Wear & Tension	●			

○ Checking and cleaning ● Change

10.5 Troubleshooting

Problem	Cause	Solution
Compressor overheats	<ul style="list-style-type: none"> • Cooling tubes dirty • Incomplete valve closure (causing overload of another stage) • Poor ventilation 	<ul style="list-style-type: none"> • Clean cooling tubes • Contact technical support • Contact technical support
Rotation speed and flow rate decrease	<ul style="list-style-type: none"> • Motor power too low • The belt slips 	<ul style="list-style-type: none"> • Check the motor • Restore drive belt tension
The flow rate diminishes without RPM decreasing	<ul style="list-style-type: none"> • Valves not working • 4th stage piston worn • Fittings loose / leaking seals • Intake filter clogged • Intake extension kinked • Piston or piston rings worn 	<ul style="list-style-type: none"> • Contact technical support • Contact technical support • Check for leaks with soapy water and eliminate them • Replace filter • Straighten, use stiffer pipe • Contact technical support
Air smells of oil	<ul style="list-style-type: none"> • Cartridge filter exhausted • Piston rings worn • Condensate not being drained 	<ul style="list-style-type: none"> • Replace filter • Contact technical assistance • Check auto drains and manually drain more often

10.6 Checking the Oil Level

The oil level must be checked every five (5) working hours of the compressor. The oil level must be between the minimum and the maximum shown on the oil level viewer (Figure 8).

If the oil level is above the maximum level:

- Position a receptacle under the drain hose so that the oil flows into the exhausted oil receptacle.
- Open the drain valve and let the oil flow out until the oil level returns within the maximum and minimum limits.
- Close the drain valve.

If the oil level is below the minimum level:

- Open the top fill plug.
- Top off with oil until the level returns within the maximum and minimum limits.
- Close the fill plug.



CAUTION

After running the compressor, the lubricant will be very hot. Take care when removing the drain plug and draining the lubricant to avoid burns.



NOTICE

Recommended nitrox compressor lubricant is changed when the first 25 hours of use is reached, then change lubricant in 100-hour cycles or annually.



CAUTION

Wear gloves when handling compressor lubricant. If contact with skin is made, wash the skin surface with soap and water.



CAUTION

Always wear goggles when handling compressor lubricant. These materials can cause eye irritation. If you accidentally get lubricant into your eyes, flush with fresh water for 15 minutes and contact a physician if irritation develops.



CAUTION

Compressor lubricant should be recycled after use at a licensed facility in accordance with Federal, State, and local regulations.

10.7 Changing the Lubricating Oil and Filter

The lubricating oil must be changed every 250 working hours or annually.¹ To change the oil:

- Position the supplied oil drain hose in a used oil receptacle with a capacity of at least 0.5 gal (2 L).
- Remove the oil fill cap (plug).
- Remove the oil drain hose brass end cap.
- Drain oil into used oil receptacle.
- Replace the oil drain hose brass end cap.
- Remove crankcase breather cap to vent crankcase while filling with new oil.
- Fill the crankcase with 1.8 L (0.48 gal) of oil via the oil fill cap.
- Close the oil fill cap (plug).
- Switch on the compressor and run it depressurized for 30 seconds.
- Switch off the compressor.
- Check the oil level using the oil level viewer. If the oil level is not within the allowed limits, top up or drain off.
- Replace the oil fill plug.

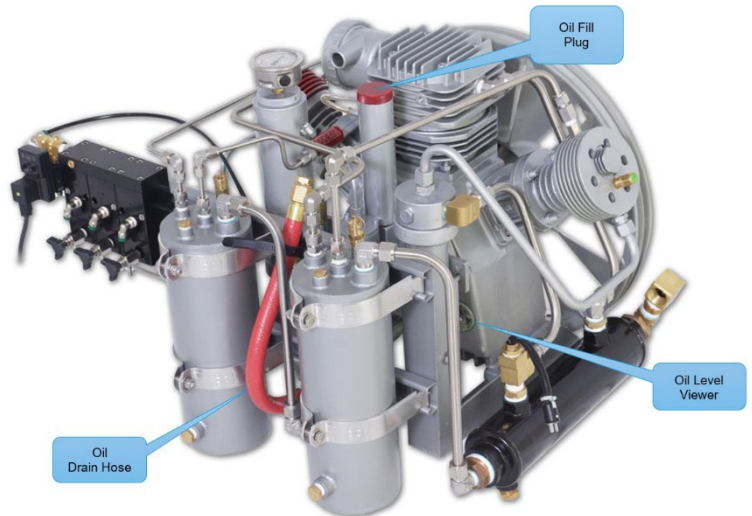


Figure 14. Checking and changing lubricating oil.

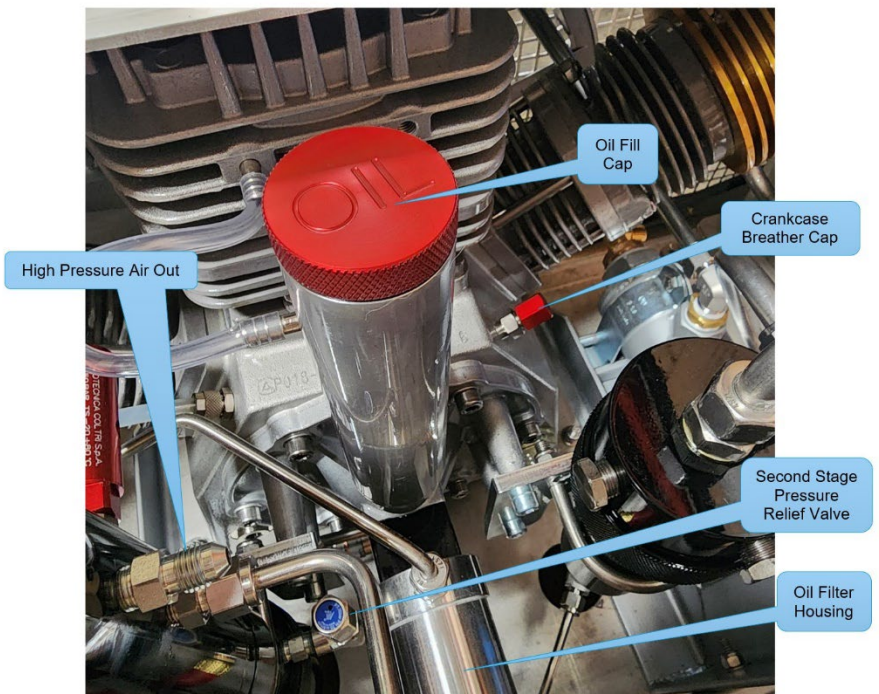


Figure 15. Interior view of compressor block.

¹ According to Coltri specifications, a new compressor using synthetic lubricants can operate up to 1000 hours between oil changes. At Nuvaair, we prefer to have oil changed every 250 hours (or once per year, whichever interval is less) unless you are taking advantage of an oil analysis program that confirms the oil is still good.

10.8 Tightening Torque Values

The table below shows tightening torques for bolts or hexagonal-head or cylindrical-head recessed hexagonal bolts and screws, except for specific cases indicated in the manual.

Pipe connections (swivel nuts, compression fittings) should be finger tight plus an additional 1/2 turn.

Tightening Torque Values	
Thread	Maximum Torque
M6 - 1/4"	10 Nm (7 ft-lb)
M8 - 5/16"	25 Nm (18 ft-lb)
M10 - 3/8"	45 Nm (32 ft-lb)
M12 - 1/2"	75 Nm (53 ft-lb)
M14 - 9/16"	120 Nm (85 ft-lb)
M16 - 5/8"	200 Nm (141 ft-lb)

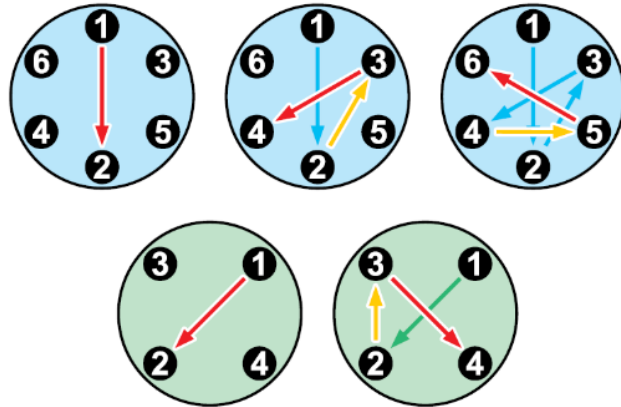


Figure 16. 6-bolt and 4-bolt torque sequence.

10.9 Changing the Air Intake Filter

The air intake filter must be changed after the first 50 hours. The air intake filter must then be changed every 250 working hours or annually. Rotate the filter cartridge in the filter housing 90° every 50 hours.

To change the standard air intake filter:

- Remove the air filter cover (a) by rotating counterclockwise.
- Remove the air filter cartridge (b)
- Replace the cartridge with a new one (SKU SC000370)
- Close the cover (a) by rotating clockwise

If your compressor is equipped with a remote air intake (Figure 7), replace the filter cartridge (SKU 14) at the end of the remote air intake where the filter housing is located.

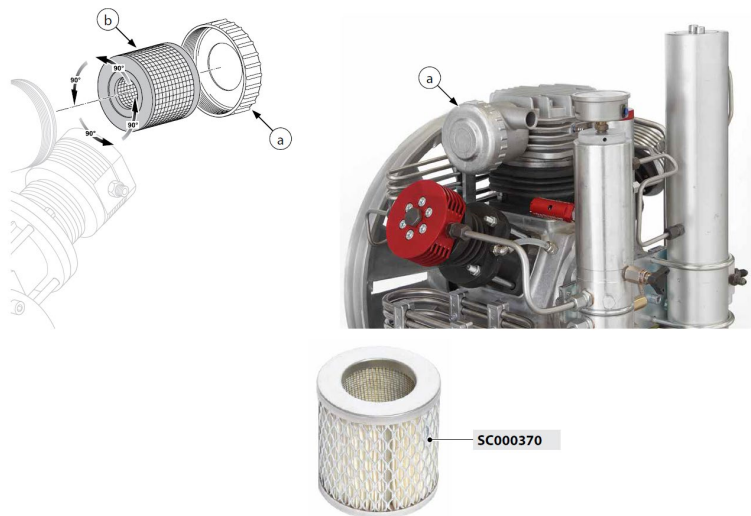


Figure 17. Changing standard air intake filter.



DANGER

Do not carry out these tasks if the compressor has just shut down and is hot; 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 wall socket.



NOTICE

If the compressor is used in a dusty environment, the filter change interval should be reduced to every 50 hours, or more frequently as required.

10.10 Transmission Belts

Belt tension must be checked monthly. The transmission belts must be replaced every 500 working hours of the compressor.



DANGER

Do not carry out these tasks if the compressor has just shut down and is hot; 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 wall socket.

10.11 Checking Transmission Belts

To check for proper transmission belt tension (g, Figure 18) exert a pressure of approximately 22 lb (10 kg) on the belt; check the belts do not flex by more than 1 cm (0.39 in) with respect to its original position. Should they flex more than this, the belts must be replaced.

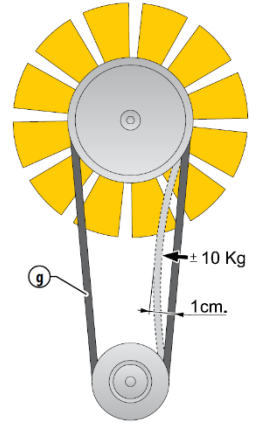


Figure 18.
Transmission belt tension.

10.12 Changing Transmission Belt

To replace the transmission belt, proceed as follows (see Figure 19):

- Insert a screwdriver (a) between the first belt (b) and the pulley (c) of the cooling fan (d).
- Rotate the fan (d) counterclockwise until the belt comes out of the pulley groove.
- Change the belt with a new one. Make sure the belt model and length are the same. 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 motor pulley (c).
- Insert the belt on the internal groove of the fan pulley (d) while simultaneously turning the fan by hand until the belt slips perfectly into the groove of the pulley.
- Check that the belt is inserted perfectly in the grooves of the two pulleys and that belt tension is correct.

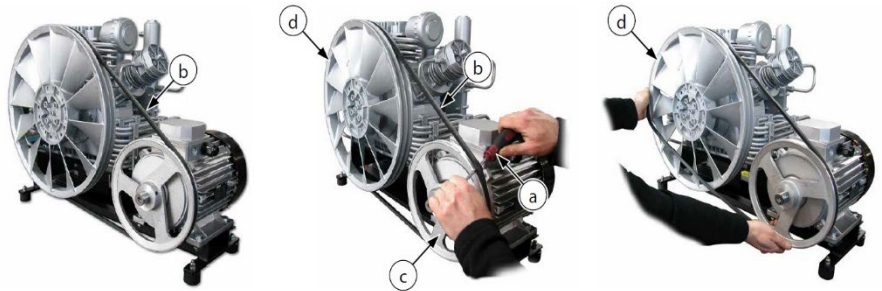


Figure 19. Changing the transmission belt.

If belts (b) tension is not correct contact Nuvair for technical assistance.

10.13 Changing Air Filtration Cartridge/s

Correct filtering system component maintenance ensures that the quality of the air exiting the compressor complies with the international breathing air standards or industrial air uses.



Figure 20. Example of external air filtration system.

Nuvair MCH13 · MCH16 Water Cooled compressors do not have onboard air filtration. For proper industrial or breathing air applications, an externally mounted filtration system, like [SKU 6071-2X35-6K](#) (Figure 20), is required.

The air filtration element/s (cartridge/s) must be replaced at intervals calculated on the characteristics of the environment in which the compressor is located. To calculate these intervals, refer to the table in section 10.14.

The filter cartridge must be replaced before the air develops an unpleasant smell, when the litmus test paper mounted inside the cartridge element turns white or a color other than blue.

See section 16.2 for details on filter element “life factors.”

CAUTION
A special breathing air filter element (containing a desiccant blend, activated carbon, and a carbon monoxide catalyst) must be used with this gasoline engine powered compressor.

- Shut down the compressor system.
- Open and leave open the drain valve/s (Figure 13) to vent all pressure from the circuit.
- Use the wrench (a, Figure 22) to apply leverage on the screw heads (b) of the plug (c) and rotate counterclockwise. If a filter wrench (SKU TL-033) is not available, a large screwdriver can be used to unscrew the filter plug (1, Figure 22).
- Remove the filter plug (2, Figure 22).
- Remove the first cartridge (3, Figure 22) and the second cartridge; replace both with new cartridge elements. Place pressure on each cartridge (4, Figure 22) to seat the element fully into the canister.
- Replace the O-ring (e, Figure 22) on the plug (c) every time the filter is changed.
- Reinstall cap to canister by rotating clockwise and tightening with screwdriver or cap wrench.
- There are sealing O-rings (e-f, Figure 22) on the plug and the filter cartridge. If these O-rings deteriorate, the air 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.
- Close the drain valve/s.

DANGER
Do not carry out these tasks if the compressor has just shut down and is hot; 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 wall socket.



Figure 21. Changing air filter cartridge.

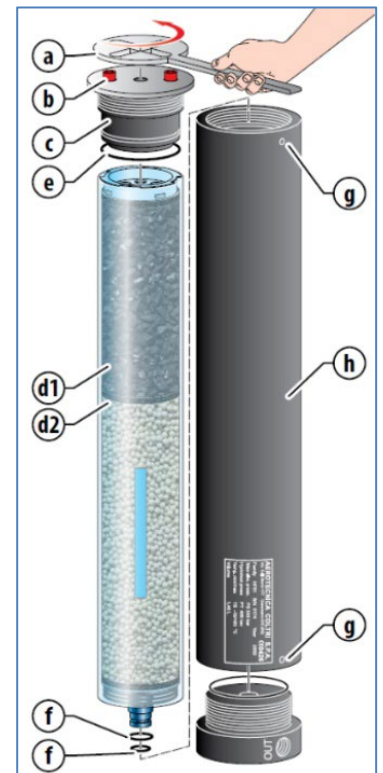


Figure 22. Filter cartridge and cartridge parts.



WARNING

Be sure that all pressure has been relieved from the system prior to opening any filtration canister. Failure to vent pressure from the system prior to opening the canister can lead to serious personal injury or death. Difficulty turning the filter cap may indicate there still is pressure in the filter canister.



CAUTION

If the compressor is in an area where there is high humidity and high heat, the life of all filtration elements may be as little as 35% of rated operating capacity. Check the compressor manual and appendix for details on Filter Element Life Factors.

10.14 Condensate Discharge

An outflow of condensate water with lubricating oil is normal during refills: the quantity will depend on the level of humidity in the air. The condensate must be disposed of as per your local “Waste disposal” rules.



NOTICE

The condensate tank must be drained at the end of every working day or every 2 to 3 hours of operation. The compressor condensate must be drained every 5-10 minutes of operation.

The condensate is collected in a tank (Figure 23); periodically check this tank to prevent overflow and consequent leakage of the condensate liquid. The tank is equipped with a sensor that will alarm if the condensate tank is overfull.

To empty the tank, remove the condensate drain hose, disconnect the sensor, and empty the tank. Reverse the process to reinstall the tank components and put the can back in its housing.

An outflow of condensate water with lubricating oil is normal during refills: the quantity will depend on the level of humidity in the air. Condensate must be disposed of according to the instructions shown in section 11.4, Waste Disposal.

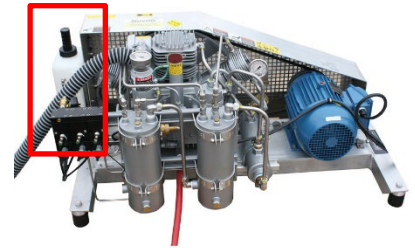


Figure 23. Condensate tank.



WARNING

Auto drains must be checked for proper operation weekly.

10.15 Changing Flex Hoses

The hoses must be changed periodically (every 5 years or every 3000 hours) or when they show signs of abrasion/wear/damage. The bending radius of the hoses must not be less than 250 mm (9.8 in).



DANGER

Do not carry out these tasks if the compressor has just shut down and is hot; 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 wall socket.



DANGER

Depressurize the entire compressor circuit before carrying out any maintenance tasks. To depressurize the compressor, open the drain valve (a, Figure 13).

Tank refill pressure is extremely high. Therefore, before refilling the tanks check that hoses are correctly connected and in good condition. Check also that the valves on any unused hoses are closed properly to prevent the dangers associated with hose whipping.

To change the tank 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 connector.
- Use a dynamometric wrench to tighten the hoses on the compressor with a torque of 15 Nm.



WARNING

When the tanks are being refilled, unauthorized personnel must remain at a distance of at least 3 meters (10 feet). It is strictly forbidden to disconnect the hoses from the fittings or refill valve when the machine is under pressure.

10.16 Safety Valves

Safety valves must be replaced every 10 years or 5000 hours. There are five (5) safety valves installed on the compressor (Figure 25).

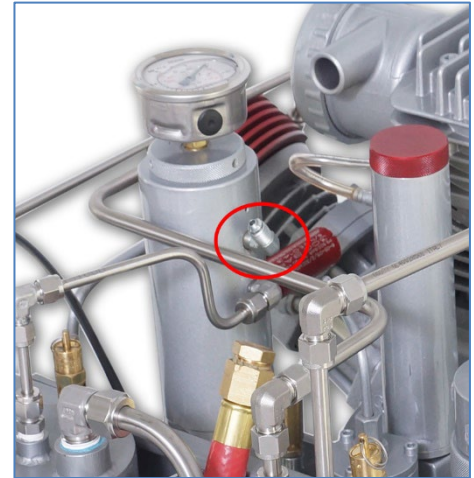


Figure 24. High pressure air outlet.



DANGER

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.

Should safety valves fail to work properly, contact Nuair for technical assistance.

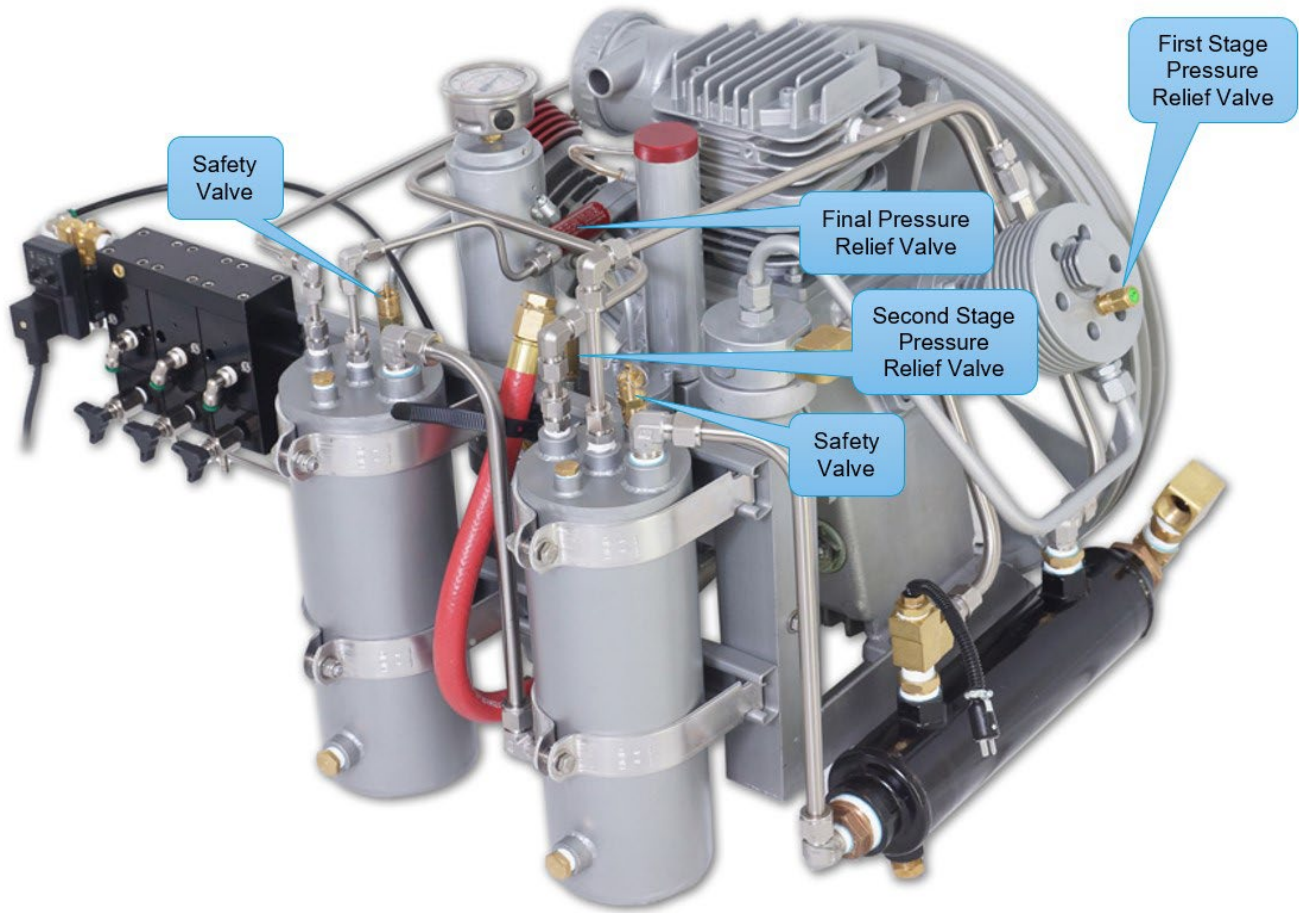


Figure 25. Safety valve locations.

11.0 Storage

Should the compressor not be used, it must be stored in a dry sheltered area at an ambient temperature of between +32°F and +104°F (0°C and +40°C). Store the compressor away from sources of heat, flames or explosive.

11.1 Stopping the Machine for a Brief Period

If you do not intend to use the compressor for a brief period proceed with general cleaning. Once the compressor has cooled down you should wipe off dirt, dust and moisture on the compressor and the surrounding area.

11.2 Stopping the Machine for an Extended 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 tanks 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 air 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 clean of all machine parts. During machine downtimes it is advisable to run the compressor for 20 minutes every 15 days.

11.3 Dismantling and Putting the Compressor 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 it 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.

11.4 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.



NOTICE

Disassembly and demolition must only be carried out by qualified personnel. At every stage of demolition observe the safety regulations contained in this manual carefully.



WARNING

The active carbon filters are classified as special waste once the compressor has been used to make air. They must be disposed of in compliance with the local antipollution standards in force.

11.5 Dismantling the compressor

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. 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.

12.0 Instructions for Emergency Situations

12.1 Fire

In the event of fire, use a CO₂ extinguisher in compliance with the relevant standards in force. Contact the fire department.

13.0 Maintenance Register

13.1 Customer Service

Customers continue to receive assistance after the purchase of a compressor. To this end **Nuvair** has created a customer service network covering the entire country.

13.2 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 office. 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.

13.3 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.

13.4 Nuvair Customer Care Contact

Telephone: +1.805.815.4044
 Fax: +1.805.486.0900
 E-mail: info@Nuvair.com
 Web: www.Nuvair.com/

14.0 Spare Parts List

Compressor System Components	Type	Part Number
Compressor Lubricant, Food Grade (nitrox compatible)	Nuvair 455 (1 gal)	9406
Compressor Lubricant, Industrial Grade	Nuvair 751 (1 gal)	9403
High Pressure Air Filter Elements for CAN-35	Drying Filter Cartridge	NUV65677-M-B
	Breathing Air Filter	NUV65427-MHC
Standard Air Intake Filter Element		SC000370
Remote Air Intake Filter Element		14
Transmission Belt		A78
CO & Moisture Visual Element Replacements		592-6
Filter Tower Wrench	Stainless Steel	TL-033
Replacement Zinc Anode 5/8" x 2"	For Heat Exchanger	E-1Z
Replacement Zinc Anode 1/2" x 2"	For Water Coolers (x2)	E-2Z
Oil Filter	For Pressure Lube Models	36-06-006/R
500-Hour Compressor Service Kit	Can Vary Based on Model	6015 Series
1000-Hour Compressor Service Kit	Can Vary Based on Model	6016 Series

16.0 Appendix

16.1 Supply and Breathing Air Specifications

All supply and breathing air must meet the following requirements of CGA G-7.1-1997. Periodic air quality testing to assure compliance is recommended. All breathing air for diving produced by a downstream compressor must be purified to meet Grade E quality, and periodic air quality testing to assure compliance is mandatory.

Item	Grade D	Grade E
Oxygen	19.5-23.5%	20-22%
Carbon Dioxide (maximum)	1000 PPM	1000 PPM
Carbon Monoxide (maximum)	10 PPM	10 PPM
Hydrocarbons (maximum)	Not specified	25 PPM
Water Vapor (maximum)	Not specified	Not specified
Dew Point (maximum) ¹	Not specified	Not specified
Oil & Particles (maximum) ²	5 mg/m ³	5 mg/m ³
Odor	None	None

Notes:¹ Dew point of supply air must be >10°F (6°C) colder than coldest ambient air expected.

² Supply air delivered to the membrane system must contain <0.003 PPM oil vapor.

16.2 Filter Element Life Factors

Breathing air filter element life is typically rated by manufacturer based on an air temperature of 80°F at the filter inlet. Under normal operation this temperature is +12°F (+5°C) warmer than the ambient air, resulting in an equivalent ambient temperature rating at +68°F (+20°C).

To determine element life at a different ambient temperature, multiply the rated life by the life factor listed below:

Filter Temperature	Ambient Temperature	Filter Element Life Factor
53°F (12°C)	41°F (5°C)	2.6 × Life
62°F (17°C)	50°F (10°C)	1.8 × Life
71°F (23°C)	59°F (16°C)	1.35 × Life
80°F (27°C)	68°F (20°C)	1 × Life
89°F (32°C)	77°F (25°C)	0.8 × Life
96°F (36°C)	84°F (29°C)	0.55 × Life
105°F (41°C)	93°F (34°C)	0.45 × Life
114°F (46°C)	102°F (39°C)	0.35 × Life

17.0 Nuvair Compressor System Warranty

Nuvair extends a limited warranty, which warrants the compressor system to be free from defects in materials and workmanship under normal use and service for a limited period. All other Original Equipment Manufacturer (OEM) components used in the system are warranted only to the extent of the OEM's warranty to Nuvair. Nuvair makes no warranty with respect to these OEM components, and only warrants the workmanship that Nuvair has employed in the installation or use of any OEM component. This warranty is not transferable.

Nuvair will, at its discretion and according to the terms as set forth within, replace or repair any materials which fail under normal use and service and do not exhibit any signs of improper maintenance, misuse, accident, alteration, weather damage, tampering, or use for any other than the intended purpose. Determination of failure is the responsibility of Nuvair, which will work together with the customer to adequately address warranty issues. When any materials are repaired or replaced during the warranty period, they are warranted only for the remainder of the original warranty period. This warranty shall be void and Nuvair shall have no responsibility to repair or replace damaged materials resulting directly or indirectly from the use of repair or replacement parts not approved by Nuvair.

Maintenance Items

Any materials which are consumed, or otherwise rendered not warrantable due to processes applied to them, are considered expendable and are not covered under the terms of this policy. This includes maintenance and consumable items listed as part of a suggested maintenance program included with system documentation.

Return Policy

Application for warranty service can be made by contacting Nuvair during regular business hours and requesting a Return Material Authorization (RMA) number. Materials that are found to be defective must be shipped, freight prepaid, to the Nuvair office in Oxnard, California USA. Upon inspection and determination of failure, Nuvair shall exercise its options under the terms of this policy. Warranty serviced materials will be returned to the customer via Nuvair's preferred shipping method, at Nuvair's expense. Any expedited return shipping arrangements to be made at the customer's expense must be specified in advance.

Limitation of Warranty and Liability

Repair, replacement, or refund in the manner and within the time provided shall constitute Nuvair's sole liability and the purchaser's exclusive remedy resulting from any nonconformity or defect. Nuvair shall not in any event be liable for any damages, whether based on contract, warranty, negligence, strict liability or otherwise, including without limitation any consequential, incidental, or special damages, arising with respect to the equipment or its failure to operate, even if Nuvair has been advised of the possibility thereof. Nuvair makes no other warranty or representation of any kind, except that of title, and all other warranties, express or implied, including warranties of merchantability and fitness for a particular purpose, are hereby expressly disclaimed. No salesman or other representative of Nuvair has authority to make any warranties.



Nuvair
Phone +1.805.815.4044
Fax +1.805.486.0900
Address 1600 Beacon Place
Oxnard, CA 93033 USA
Email info@nuvair.com
Website www.Nuvair.com

Rev. 04-2024