Nuvair®

Compressed Gas Solutions

Operation Manual
MCH60

Notes:

Notes:

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 Required Operator Training 6
1.2 Important Information for the User 6
1.3 Foreword 7
1.4 Assistance 7
1.5 Responsibility 7
1.6 Purpose of the Machine 8
1.7 Where the Compressor May be Used 9
1.8 Running and Testing the Compressor 10
2.0 Safety Warnings 10
3.0 Safety and Operation Precautions 11
Compressor Layout 12
4.0 Start Guide & Use of the Dashboard 14
4.1 Quick Start Guide 14
4.2 Lead Compressor vs. Lag Compressor 15
4.3 Compressor Unavailable 15
4.4 Global Alarms 15
4.5 Run Hours Screen 18
4.6 Nuvair Page 19
5.0 System Components 19
6.0 Compressor Specifications 20
6.1 Unpacking and Installation 20
6.2 Electrical Connection 21
7.0 Checks for the Start of Each Working Day 21
7.1 Lubricating Oil Level Check 21
7.2 Check Refill Hoses 21
7.3 Storing Technical Documentation 21
8.0 Gauge Panel 21
9.0 Overpressure Safety Valves 22
10.0 Pressure Controls 22
11.0 Maintenance 23
11.1 Foreword 23
11.2 General 24
11.3 Unscheduled Work 24
11.4 Scheduled Maintenance Table 24
11.5 Troubleshooting 25
11.6 Checking and changing the lubricating oil and filter 25

11.7 Checking the Oil Level 26
11.8 Changing the Lubricating Oil and Filter 27
11.9 Tightening Torque Values 28
11.10 Changing the Air Intake Filter 28
12.0 Transmission Belts 29
12.1 Checking Transmission Belts 29
12.2 Changing Transmission Belts 29
13.0 Changing Air Filtration Cartridges 30
13.1 Temperature Effect on Filter Life 31
13.2 Condensate Discharge 31
14.0 Power Requirements 32
14.1 Amperage Load for System 32
14.2 Rotation Check 32
15.0 Storage 32
15.1 Stopping the Machine for a Brief Period 33
15.2 Stopping the Machine for an Extended Period 33
15.3 Dismantling and Putting the Compressor Out of Service 33
15.4 Waste Disposal 33
15.5 Dismantling the compressor 34
16.0 Instructions for Emergency Situations 34
16.1 Fire 34
17.0 Maintenance Register 34
17.1 Customer Service 34
17.2 Scheduled Maintenance 34
17.3 Using the compressor under heavy duty conditions 34
17.4 Nuvair Customer Care Contact 34
18.0 Spare Parts List 35
19.0 Service Log 36
20.0 Appendix 37
20.1 Supply and Breathing Air Specifications 37
20.2 Filter Element Life Factors 37
21.0 Nuvair Compressor System Warranty 38
22.0 PLC Wiring Schematics 41

Separate Manuals Included:

Compressor Parts Manual

1.0 Introduction

This manual will assist you in the proper set-up, operation, and maintenance of the Nuvair MCH60 compressor packages. Be sure to read the entire manual. Throughout this manual we will use certain words to call your attention to conditions, practices or techniques that may directly affect your safety. Pay particular attention to information introduced by the following signal words:

⚠ Danger

Indicates an <u>imminently</u> hazardous situation which, if not avoided, will result in serious injury or death.

⚠ Warning

Indicates a potentially hazardous situation which, if not avoided, could result in serious personal injury or death.

⚠ Caution

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.

1.1 Required Operator Training

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.

1.2 Important Information for the User

The information/instructions for compressor use contained in this manual concern the **Nuvair MCH60 Series**.

- 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.

1.3 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.

1.4 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

1.5 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.

1.6 Purpose of the Machine

This high-pressure compressor has been designed and built for the purpose of producing breathing air by drawing it from the surrounding environment. The surrounding environment air must be free from any harmful fumes or contaminates. The air is pulled through an intake air filter, compressed, and passed through breathing air filtration before it is stored in tanks 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 / the machine itself caused by improper use.

⚠ Danger

- **Use only tested, certified storage tanks: do not exceed the working pressure indicated on them.**
- **Drain air from tanks before filling when tanks have not been used for an extended period.**
- **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 air purification filters regularly as described in section 13.0.**
- **Drain the condensate regularly as illustrated in section 13.2: Condensate Discharge.**
- **The power must be disconnected and locked out before carrying out any cleaning or maintenance tasks.**
- **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.**
- **Never operate the compressor when the power cord is damaged.**
- **All routine and unscheduled maintenance tasks must be carried out with the compressor at a standstill, the electrical power supply disconnected or locked out and all lines are depressurized.**
- **After switching off the compressor wait about 30 minutes before carrying out any maintenance tasks to prevent burns.**

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 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 or for purposes other than those indicated in this manual 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 and eliminate any leaks immediately when detected.**
- **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.**

1.7 Where the Compressor May be Used

This high-pressure compressor has been designed and built for the purpose of producing breathing air by drawing it from the surrounding environment. The surrounding environment air must be free from any harmful fumes or contaminates. The air is passed through an intake air filter, compressed, and run through breathing air filtration before it is passed to the high-pressure output connection. 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: +104°F (+40°C)
Air Humidity		Maximum: 80%
Tolerated Weather Conditions	rain hail snow	None
Max Tilt Angle (bank)		15%

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 will be required. 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.

- When pumping nitrox, ambient temperature maximum is +100°F (+38°C) and maximum fill pressure is 3600 psi (250 bar).

1.8 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 breaking 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.

During its initial use, open the high-pressure outlet and allow the compressor to run up to the PMV setting of about 2000 psi.

After the first 25 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 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.

3.0 Safety and Operation Precautions

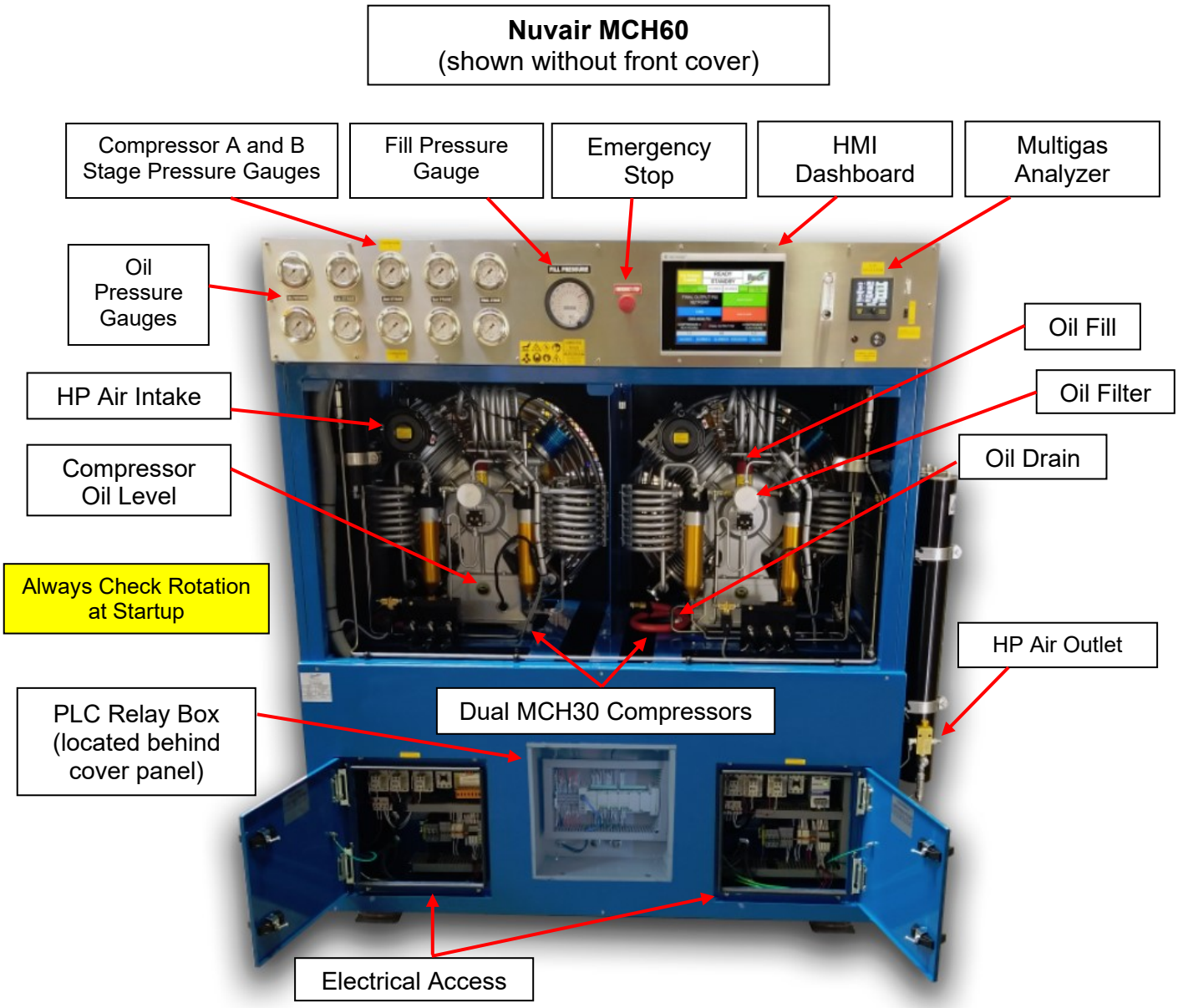
Because a compressor is a piece of machinery with moving and rotating parts, the same precautions should be observed as with any piece of machinery of this type where carelessness in operations or maintenance is hazardous to personnel. In addition to the many obvious safety precautions, those listed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

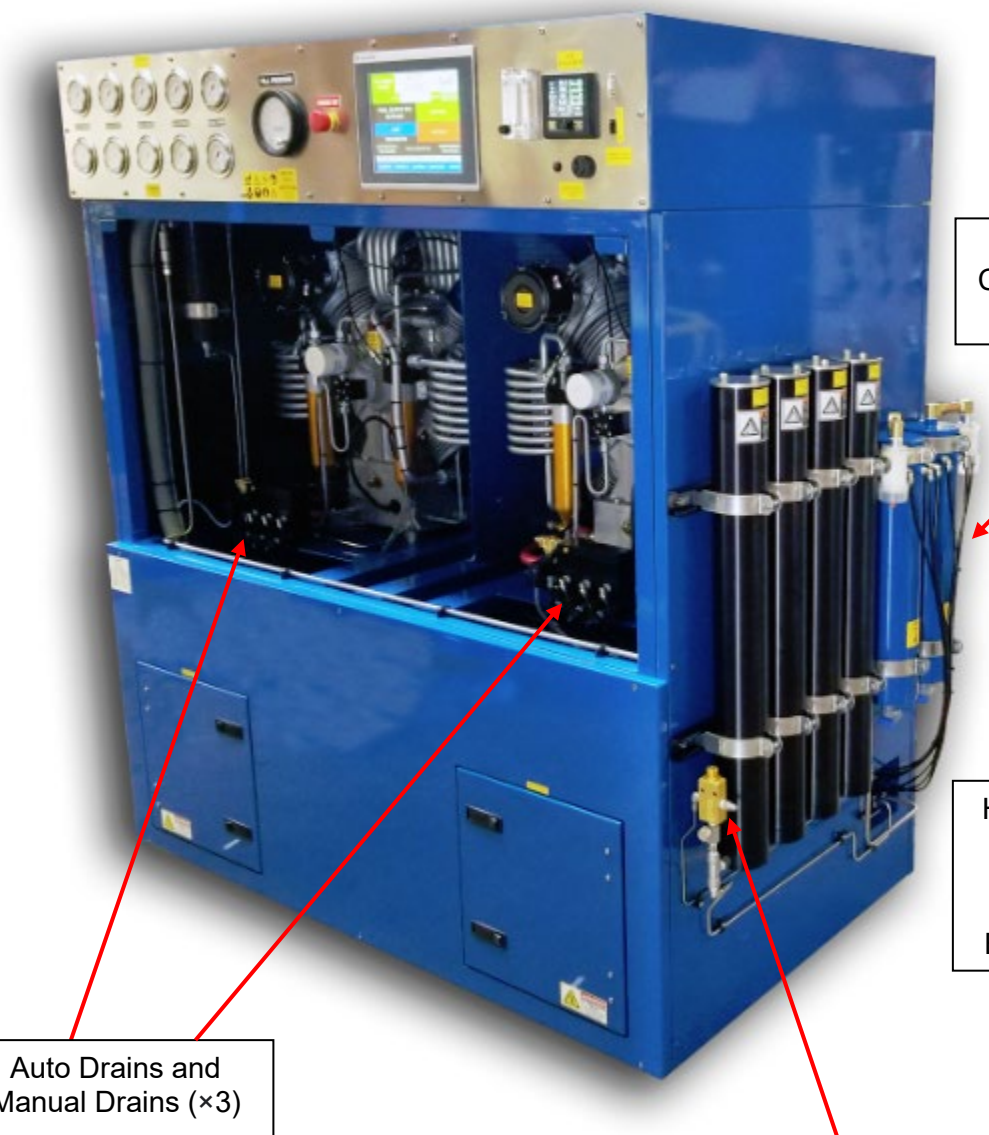
1. Read all instructions completely before operating any compressor or nitrox system.
2. For installation, follow all local electrical and safety codes, as well as the National Electrical Code (NEC) and the Occupational Safety and Health Administration (OSHA) standards.
3. Electric motors must be securely 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. Pull main electrical disconnect switch and disconnect any separate control lines, if used, before attempting to work or perform maintenance. “Tag Out” or “Lock Out” all power sources.
7. Do not attempt to remove any parts without first relieving the entire system of pressure.
8. Do not attempt to service any part while System is in an operational mode.
9. Do not operate the System at pressures more than its rating.
10. Do not operate compressor at speeds more than its rating.
11. Periodically check all safety devices for proper operation. Do not change pressure setting or restrict operation in any way.
12. Be sure no tools, rags or loose parts are left on the Compressor System.
13. Do not use flammable solvents for cleaning the Air Inlet Filters or elements and other parts.
14. 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.
15. Do not operate the compressor without guards, shields, and screens in place.
16. 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.
17. Do not operate in areas where there is a possibility of inhaling carbon monoxide, carbon dioxide, nitrogen, or flammable or toxic fumes.
18. 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.
19. Inspect unit daily to observe and correct any unsafe operating conditions found.
20. Do not “play around” with compressed air, or direct air stream at body, as this can cause injuries.

21. Compressed air from this machine absolutely must not be used for food processing or breathing air without adequate downstream filters, purifiers and controls and periodic air quality testing.
22. Always use an air pressure-regulating device at the point of use, and do not use air pressure greater than marked maximum pressure.
23. 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.

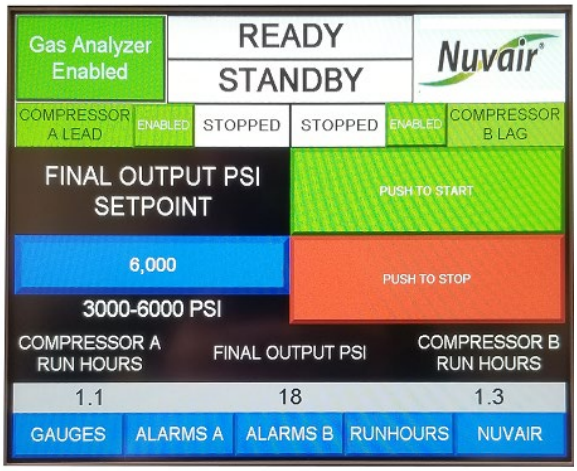
Compressor Layout

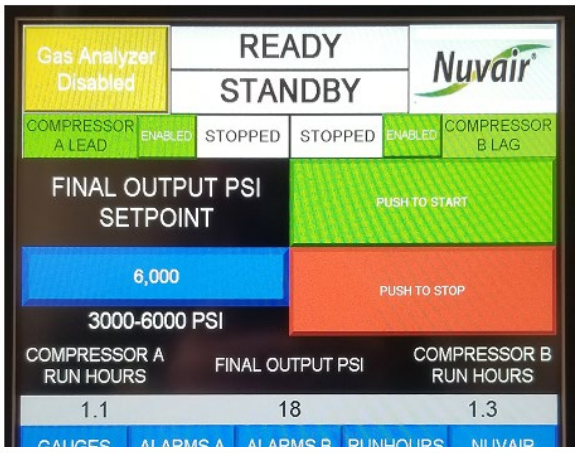


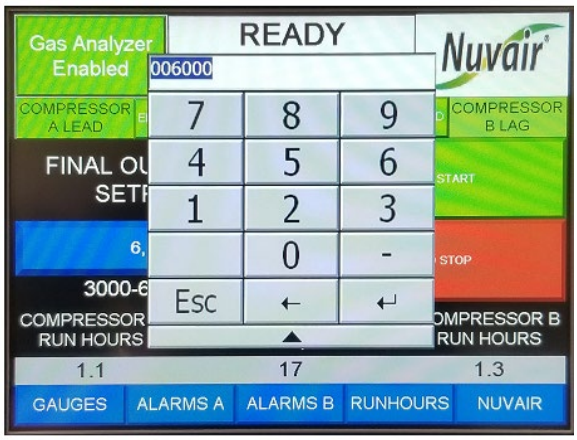

Condensate Collection Container Attached to Auto Drains. (Drain Daily)
HP Filter Replacements
NUV65677
Drying Filter (×3)
NUV65437
Breathing Air Filter (×1)
Auto Drains and Manual Drains (×3)
High Pressure Out Connection

4.0 Start Guide & Use of the Dashboard

The Nuvair MCH60 is equipped with an HMI (human machine interface) touchscreen system controller called the *Dashboard*. The Dashboard allows users to monitor compressor activity, identify alarm events. Please refer to the Quick Start Guide (section 4.1) for an overview of Dashboard operations.







4.1 Quick Start Guide

1. Turn power on to unit.
2. Turn on Multigas Analyzer.
   a. If analyzer is alarming, press green “Gas Analyzer Enabled” button on the dashboard display. This will allow the user to run the machine to clear any gas analyzer alarms.
   b. Once the alarm is cleared, you must press the “Gas Analyzer Disabled” button to enable the analyzer shut down functions.
3. Select the blue box under “Final Output PSI Setpoint.” This will open a digital keypad to input the desired shutdown pressure.
   a. Once you input your desired pressure on the digital keypad, press the ↵ button to save it.
   b. The pressure will now be displayed in the blue box.
4. Once you have inputted your desired pressure, press “Push to Start” to start the *Lead Compressor*.
5. The Lead Compressor will run by itself for four (4) minutes.
   a. At the 4-minute mark, the dashboard looks for a 100 psi increase in output pressure. If a 100 psi increase in pressure is not detected from the startup pressure, the lag compressor will start.
   b. The dashboard checks for a 100 psi pressure increase every two (2) minutes. The lag compressor can start at any time.
6. Once the compressor reaches its set pressure, it will turn itself off and will not restart unless restarted by a technician.
7. To turn the unit off, press “Push to Stop.”

On the following pages are expanded descriptions of Dashboard functions and alarm states.

4.2 Lead Compressor vs. Lag Compressor

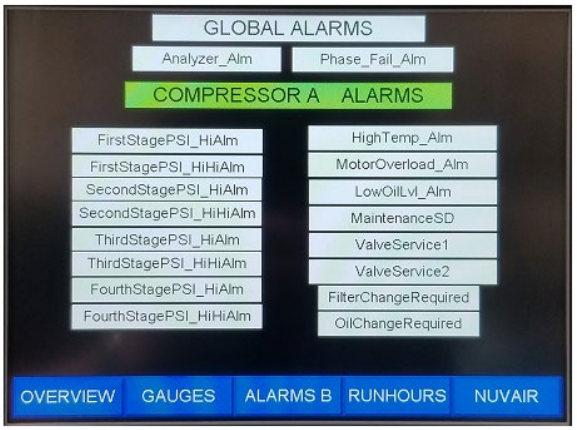
The Dashboard automatically designates “Lead Compressor” and “Lag Compressor.” The designation changes every seven (7) days so the operating hours of each compressor are balanced.

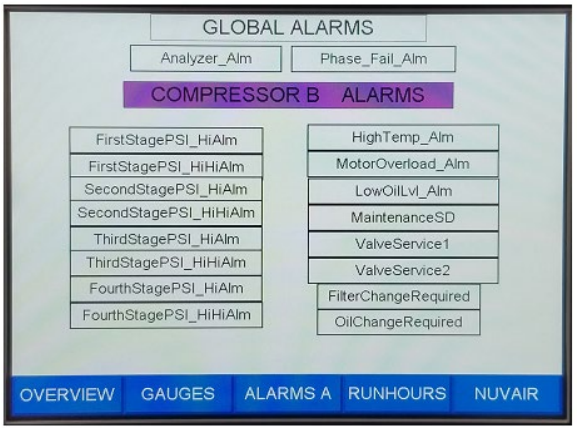
4.3 Compressor Unavailable

If for any reason a compressor must be disabled, press the green “Enabled” button. The button turns yellow and reads “Disabled.” The adjacent green button (either “Compressor A Lead/Lag” or “Compressor B Lead/Lag”) will turn gray and read “Compressor Unavailable.”

Once a compressor is made unavailable the unit can no longer turn on. Maintenance or repairs can be done.

4.4 Global Alarms





When an alarm setpoint is reached, the button color turns yellow and the system will either (a) sound an alarm, and/or (b) shut down the compressor.

Global Alarm definitions:

AIT_Shutdown_Alm
Gas analyzer out of range. The system shuts down immediately and sounds an alarm.

Analyzer_Alm
The gas analyzer reading is outside of setpoints. The system shuts down immediately and sounds an alarm.

ESTOP
Check emergency stop push button. The system shuts down with the E-Stop button is pushed.

FailToRun_Alm
Compressor A should be running but is not. Alarm sounds.

FailToRun_AlamB
Compressor B should be running but is not. Alarm sounds.

FilterChangeRequired
Compressor A alert. After 250 hours of runtime, breathing filters change is required. Alarm sounds. MaintenanceSD timer activates.

FilterChangeRequired_B
Compressor B alert. After 250 hours of runtime, breathing filters change is required. Alarm sounds. MaintenanceSD_B timer activates.

FirstStageTemp_HiAlm
Compressor A alert. The compressor first stage temperature is high and requires evaluation. Alarm sounds.

FirstStageTemp_HiAlm_B
Compressor B alert. The compressor first stage temperature is high and requires evaluation. Alarm sounds.

FirstStagePSI_HiAlm
Compressor A alert. The compressor first stage pressure is high and requires evaluation. Alarm sounds.

FirstStagePSI_HiAlm_B
Compressor B alert. The compressor first stage pressure is high and requires evaluation. Alarm sounds.

FirstStagePSI_HiHiAlm
Compressor A alert. The compressor first stage pressure is critically high. The system shuts down immediately and sounds an alarm.

FirstStagePSI_HiHiAlm
Compressor B Alert. The compressor first stage pressure is critically high. The system shuts down immediately and sounds an alarm.

FirstStagePSI_LoAlm
Compressor A alert. The compressor first stage pressure is low and requires evaluation. Alarm sounds.

FirstStagePSI_LoAlm_B
Compressor B alert. The compressor first stage pressure is low and requires evaluation. Alarm sounds.

FirstStagePSI_HiHiAlm
The compressor first stage pressure is critically high. The system shuts down immediately and sounds an alarm.

FourthStagePSI_HiAlm
Compressor A alert. The compressor fourth (final) stage pressure is high and requires evaluation. Alarm sounds.

FourthStagePSI_HiAlm_B
Compressor B alert. The compressor fourth (final) stage pressure is high and requires evaluation. Alarm sounds.

FourthStagePSI_HiHiAlm
Compressor A alert. The compressor fourth (final) stage pressure is critically high. The system shuts down immediately and sounds an alarm.

FourthStagePSI_HiHiAlm_B
Compressor B alert. The compressor fourth (final) stage pressure is critically high. The system shuts down immediately and sounds an alarm.

HiTemp_Alm
Compressor A alert. The head temperature is high. The system shuts down immediately and sounds an alarm.

HiTemp_Alm_B
Compressor B alert. The head temperature is high. The system shuts down immediately and sounds an alarm.

LowOilLvl_Alm
Compressor A alert. The compressor oil level is low. The system shuts down immediately and sounds an alarm.

LowOilLvl_Alm_B
Compressor B alert. The compressor oil level is low. The system shuts down immediately and sounds an alarm.

MaintenanceSD
Compressor A notification. The maintenance shutdown timer of 168 hours (7 calendar days) begins its countdown when a scheduled system maintenance alarm (ValveService1, ValveService2, FilterChangeRequired, or OilChangeRequired) activates. If required service is not performed within one week, Compressor A shuts down and will not restart without a reset code issued by Nuvair.

MaintenanceSD_B
Compressor B notification. The maintenance shutdown timer of 168 hours (7 calendar days) begins its countdown when a scheduled system maintenance alarm (ValveService1, ValveService2, FilterChangeRequired, or OilChangeRequired) activates. If required service is not performed within one week, Compressor B shuts down and will not restart without a reset code issued by Nuvair.

MotorOverload_Alm
Compressor A alert. The compressor motor is overloaded. The system shuts down immediately and sounds an alarm.

MotorOverload_Alm_B
Compressor B alert. The compressor motor is overloaded. The system shuts down immediately and sounds an alarm.

OilChangeRequired
Compressor A alert. After 250 hours of runtime, compressor oil change is required. Alarm sounds. MaintenanceSD timer activates.

OilChangeRequired_B
Compressor B alert. After 250 hours of runtime, compressor oil change is required. Alarm sounds. MaintenanceSD_B timer activates.

Phase_Fail_Alm
The compressor rotation is incorrect. The system shuts down immediately and sounds an alarm.

SecondStagePSI_HiAlm
Compressor A alert. The compressor second stage pressure is high and requires evaluation. Alarm sounds.

SecondStagePSI_HiAlm_B
Compressor B alert. The compressor second stage pressure is high and requires evaluation. Alarm sounds.

SecondStagePSI_HiHiAlm
Compressor A alert. The compressor second stage pressure is critically high. The system shuts down immediately and sounds an alarm.

SecondStagePSI_HiHiAlm_B
Compressor B alert. The compressor second stage pressure is critically high. The system shuts down immediately and sounds an alarm.

SecondStagePSI_LoAlm
Compressor A alert. The compressor second stage pressure is low and requires evaluation. Alarm sounds.

SecondStagePSI_LoAlm_B
Compressor B alert. The compressor second stage pressure is low and requires evaluation. Alarm sounds.

ThirdStagePSI_HiAlm
Compressor A alert. The compressor third stage pressure is high and requires evaluation. Alarm sounds.

ThirdStagePSI_HiAlm_B
Compressor B alert. The compressor third stage pressure is high and requires evaluation. Alarm sounds.

ThirdStagePSI_HiHiAlm
Compressor A alert. The compressor third stage pressure is critically high. The system shuts down immediately and sounds an alarm.

ThirdStagePSI_HiHiAlm_B
Compressor B alert. The compressor third stage pressure is critically high. The system shuts down immediately and sounds an alarm.

ThirdStagePSI_LoAlm
Compressor A alert. The compressor third stage pressure is low and requires evaluation. Alarm sounds.

ThirdStagePSI_LoAlm_B
Compressor B alert. The compressor third stage pressure is low and requires evaluation. Alarm sounds.

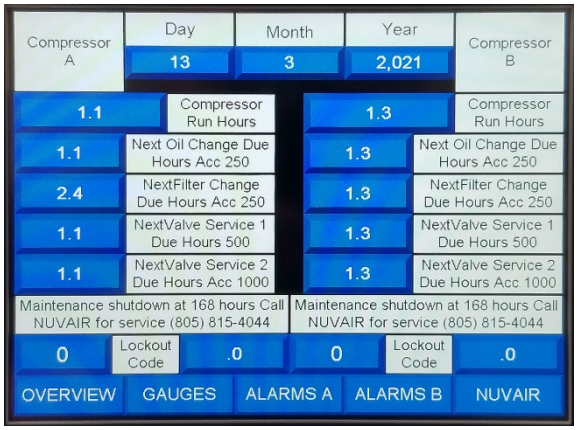
ValveService1
Compressor A alert. After 500 hours of runtime, a 500-hour valve service is required. Alarm sounds and activates maintenance shutdown. MaintenanceSD timer activates.

ValveService1_B
Compressor B alert. After 500 hours of runtime, a 500-hour valve service is required. Alarm sounds and activates maintenance shutdown. MaintenanceSD_B timer activates.

ValveService2
Compressor A alert. After 1000 hours of runtime, a 1000-hour valve service is required. Alarm sounds. MaintenanceSD timer activates.

ValveService2_B
Compressor B alert. After 1000 hours of runtime, a 1000-hour valve service is required. Alarm sounds. MaintenanceSD_B timer activates.

4.5 Run Hours Screen



The run hours page is dedicated to how many hours are accumulated for different maintenance items. The page displays:

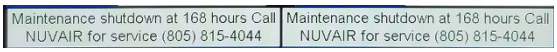
- Current date by day, month, and year.
- Compressor A (left) and Compressor B (right) Timers:

  Different timers track the required service schedule of each compressor. The timers include:

  - COMPRESSOR RUN HOURS
    Total runtime. Does not reset.
  - NEXT OIL CHANGE DUE
    Every 250 hours of runtime. Resets after service is performed with new lockout code.
  - NEXT FILTER CHANGE DUE
    Breathing filters every 250 hours of runtime. Resets after service is performed with new lockout code.
  - NEXT VALVE SERVICE 1
    A 500-hour valve service is required. Resets after service is performed with new lockout code.

- NEXT VALVE SERVICE 2
  A 1000-hour valve service is required. Resets after service is performed with new lockout code.

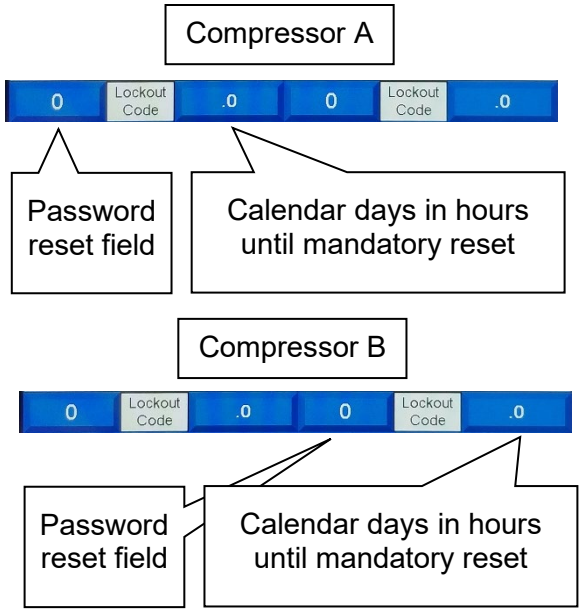
- Maintenance Shutdown Timer



  Indicates the number of hours remaining on Compressor A (left box) and Compressor B (right box) before the compressor shuts down because required maintenance is overdue. For additional details on this timer, see MaintenanceSD in Global Alarms section 4.4.

- Password Resets

  This row of blue buttons allows the user to reset passwords and indicates the number of hours until a mandatory password reset is required. The left two blue buttons are associated with Compressor A and the right two blue buttons are associated with Compressor B (see image, right).



- Change Screen Buttons

  The bottom row of blue buttons (pictured below) control which screens are visible on the Dashboard:

  - OVERVIEW
    Changes display to Overview screen.
  - GAUGES
    Changes display to Gauges screen.
  - ALARMS A
    Changes display to Alarms A screen.
  - ALARMS B
    Changes display to Alarms B screen.
  - NUVAIR
    Changes display to Nuvair (technician only) screen.

4.6 Nuvair Page

This page is locked and only for qualified technical support to enable and disable alarms.

5.0 System Components

- Two (2) Coltri MCH30 High Pressure Air Compressors
  - Each Compressor: 4 Cylinder, 4 Stage, Air Cooled
- Digital Multigas Analyzer: CO / Moisture / CO_2 / VOC
- Hour Meter
- Electric Motor: 208-230 V, 440 V, or 460 V; 3 Phase, 50 Hz or 60 Hz
- Interstate Pressure Gauges
- (3) Condensate Separators on Each Compressor
- Large Stainless Steel Interstage Cooling Tubes
- Low Pressure Oil Pump with Filter

- Oil Level Sight Gauge and Oil Pressure Gauge
- Automatic Condensate Drains
- Loadless Start
- Low Oil Shutdown Switch
- Final Stage Head
- High Temp Switch set at 350°F
- (4) CAN-35 Filtration Towers
    - (3) Dyer Filter Elements
    - (1) Triplex Filter Element
    - 130,000 cu ft
- Aluminum frame with isolation vibration mounts

Lubricant:

- Nuvair 455™ Food Grade Lubricant (standard)
- Nuvair 751™ Diester Based Lubricant (optional)

6.0 Compressor Specifications

Compressor Models	**Two (2) Coltri MCH30**	
Charging Rate Filling an 80 cu ft tank from 500 psi	20.4 SCFM (577 L/min) × 2 Total Charging Rate: 40.8 SCFM (1154 L/min)	
Maximum Operating Pressure	6000 psi (414 bar)	
Pumping Unit RPM	1100	
Number of Stages	4 × 2	
Lubrication	Pressure Lubrication, capacity 1.2 gal (4.5 L) × 2	
Oil Pressure	**cold** **routine use** **minimum pressure**	58 psi (4 bar) 21.75 psi (1.5 bar) 14.5 psi (1 bar)
Air Quality	Grade E	

⚠ Caution

Ambient room temperature should never exceed 113°F (45°C) during operation of the Compressor System. Operation at higher temperatures may lead to system damage and malfunction.

6.1 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 Nuvair 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 36” from adjacent walls. Select a location where ambient room temperature is a minimum of +41°F (+5°C) to a maximum +104°F (+40°C).
- Make sure the installation space is well ventilated.

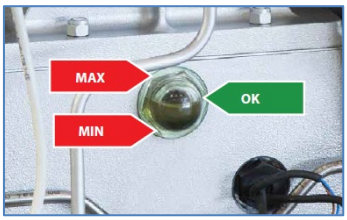
6.2 Electrical Connection

- Please read all information supplied before connecting electricity to the compressor system.
- You should hire a licensed electrician to install any electric compressors purchased from Nuvair.
- The compressor is delivered with raw leads ready to be installed into a junction box.
- In the event a plug is needed, Nuvair recommends that the licensed electrician doing the install determines the plug necessary.
- Make sure your electrician follows approved and compliant standards for your location.

7.0 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**.

7.1 Lubricating Oil Level Check



Check that the level of lubricating oil is within acceptable limits (i.e., between minimum and maximum on the oil level viewer). 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 not within the minimum and maximum limits of the oil level viewer, top up or drain as described in section 11.8, “Changing the Lubricating Oil and Filter”.

7.2 Check Refill Hoses

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

7.3 Storing Technical Documentation

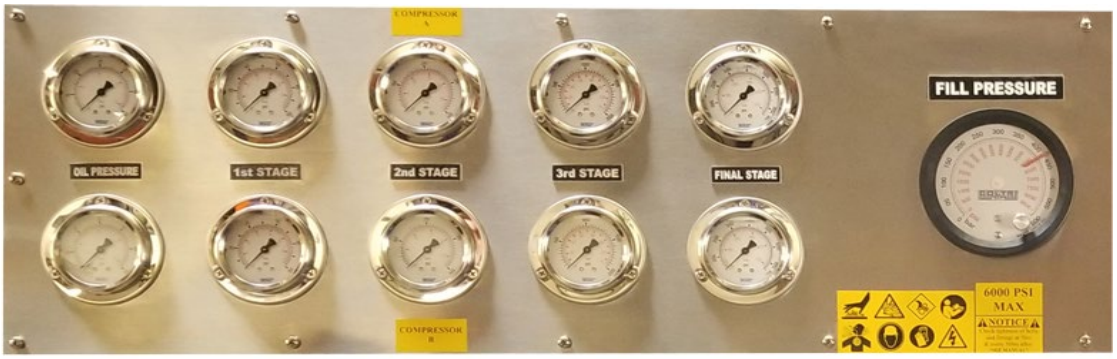
The use and maintenance manual and its appendices must be stored carefully and must always be kept where they can be accessed easily for immediate review.

⚠ 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.

8.0 Gauge Panel

The gauge panel matrix is described below, from left to right. Each compressor has five (5) individual gauges. Compressor A gauges are on the top row; Compressor B gauges are on the bottom row.



Oil Pressure
If no oil pressure or a high pressure reading occurs, switch off compressor and contact Nuvair.

Oil Pressure	58 psi (4 bar) 21.75 psi (1.5 bar) 14.5 psi (1 bar)	**Cold** **Routine Use** **Minimum Pressure**

1st Stage
This gauge indicates the pressure inside the first compression stage. If the pressure is not between 45 psi (3 bar) and 60 psi (4 bar), switch off the compressor and contact Nuvair.

2nd Stage
This gauge indicates the pressure inside the second compression stage. If the pressure is not between 230 psi (16 bar) and 290 psi (20 bar), switch off the compressor and contact Nuvair.

3rd Stage
This gauge indicates the pressure inside the third compression stage. If the pressure is not between 940 psi (65 bar) and 1200 psi (80 bar), switch off the compressor and contact Nuvair.

Final Stage
This gauge indicates the pressure as it exits the compressor. If the pressure fails to reach the pressure switch set pressure, switch off the compressor and contact Nuvair.

Fill Pressure
This dial-a-pressure switch allows users to set the desired pressure at the high-pressure out connection.

9.0 Overpressure Safety Valves

Each stage of the compressor is equipped with an overpressure relief valve to ensure that the unit will not be damaged if the pressure shutoff switch fails to work. The final stage valve is pre-adjusted to 3200 psi (225 bar), 4300 psi (300 bar), 4700 psi (330 bar), or 6000 psi (425 bar) depending on the final pressure specified when the unit was ordered.

⚠ 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.

10.0 Pressure Controls

The compressor is equipped with two types of automatic start/stop systems:

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

⚠ 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.

⚠ 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.

11.0 Maintenance

11.1 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

11.2 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.

11.3 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 qualified mechanic.

11.4 Scheduled Maintenance Table

Before Every Use		**Hours**											
Hourly Maintenance		**5**	**25**	**50**	**100**	**250**	**500**	**1000**	**2000**	**3000**	**4000**	**5000**	**20,000**
Condensate Container Discharge	○	○				●							
Air Intake Filter						●							
Lubricating Oil Check	○												
Lubricating Oil & Filter					**	●*							
Automatic Shutdown Check	○												
1st, 2nd, 3rd Stage Valves							○	●					
4th Stage Valves								●					
Condensate Separator & Filter						○							●
Hyperfilter Complete						○							
Separator Filter Element Cleaning								○					
1st, 2nd, 3rd Stage Segments									●				
4th Stage								●					
HP Flex Hoses				○						●			
Fitting/Hose Leak Check						○							
Safety Valve						○						●	
Coolers Tube											●		
Transmission Belt Wear & Tension						○	●						
Water & HP Oil Separator											●		

○ Checking and cleaning ● Change

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

** 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

11.5 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 drive 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 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	• Cartridge filter exhausted • Piston rings worn • Condensate not being drained	• Replace filter • Contact technical assistance • Check auto drains and manually drain more often
Compressor overheats	• Direction of rotation wrong • Cooling tubes dirty • Incomplete valve closure (causing overload of another stage) • Poor Ventilation	• Check direction of rotation • Clean cooling tubes • Contact technical support • Contact technical support

11.6 Checking and changing the lubricating oil and filter

During the compressor initial break-in period, the original oil filter and lubricating oil must be changed at the 25-hour runtime mark. After the initial change of lubricants and filter the oil and oil filter must be changed every 100 hours of use or annually, whichever comes first.

HP Compressor Lubricant: Only use lubricants rated for use with nitrox, such as Nuvair 455™ Synthetic Food Grade Lubricant or Nuvair 751™. **Never mix compressor lubricants.** Nuvair Compressors are shipped with Nuvair 455 Synthetic Food Grade Lubricant or Nuvair 751 in the compressor. Coltri OIL CE750 and Anderol 755 may also be used, but not mixed with Nuvair oil.

⚠ Warning

Use only the specified Nuvair lubricants in this system. The use of incompatible lubricants presents a risk of fire and/or explosion and may result in system damage. This can lead to severe personal injury and death.

⚠ Danger

Do not carry out these tasks if the compressor has only just shut down; wait for the compressor to cool. Pressure must be drained before opening LP fill plug.

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

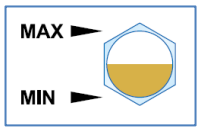
All maintenance work must be carried out with the compressor OFF and the power supply lead unplugged from the main socket.

11.7 Checking the Oil Level

⚠ Notice

The compressor must be placed on a solid surface with a tilt of no more than 15°.

The oil level must be checked every five (5) working hours of the compressor.



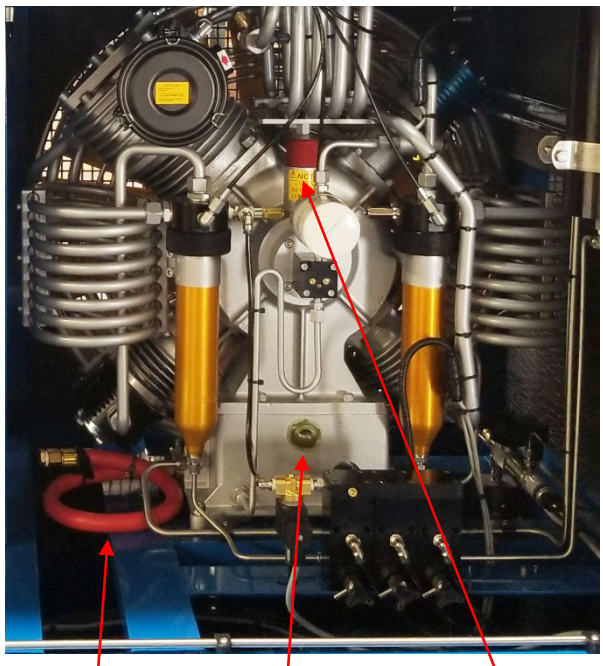
The oil level must be between the minimum and the maximum shown on the oil level viewer (left).

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

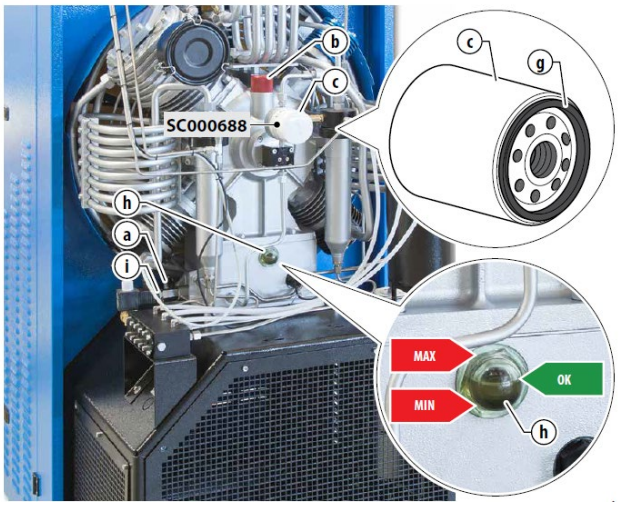
Always wear goggles when handling compressor lubricant. These materials can cause eye irritation. If you accidentally get lubricant into your eyes, flush with fresh water for 15 minutes and contact a physician if irritation develops.

⚠ Caution

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

11.8 Changing the Lubricating Oil and Filter

The lubricating oil must be changed every 250 working hours or annually.[1] Every time the lubricating oil is changed the oil filter must be changed also.

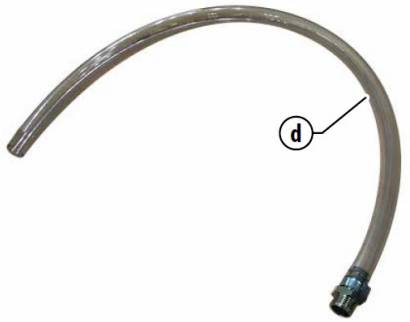


To change the oil:

- Position a used oil receptacle with a capacity of at least 1.2 gal (5 L) under the drain valve (a) so the oil flows into the receptacle. If necessary, use the supplied oil drainpipe (d), connecting the pipe fitting to the condensate drain tap (a).
- Open the top plug (b).
- Remove the plug (i), open the tap (a) and drain all the oil.
- Unscrew the filter (c) being sure to recover the oil

[1] According to Coltri specifications, a new compressor using synthetic lubricants can operate up to 1000 hours between oil changes. At Nuvair, 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.

inside it.



- Replace the filter (c) with a new one.
- Wet the gasket (g) of the filter with a little oil and firmly tighten the filter manually.
- Close the drain valve (a).
- Remove the top-up plug (b).
- Fill the oil sump with 3.5 L (0.92 gal) of oil from top oil plug (see “7.6.1 Oil table”).
- Close the oil top plug (b).
- Switch on the compressor and run it depressurized for 30 seconds.
- Switch off the compressor and remove the plug from the main power supply.
- Check the oil level (h); if the oil level is not within the allowed limits top up or drain off.
- Replace the plug (i).

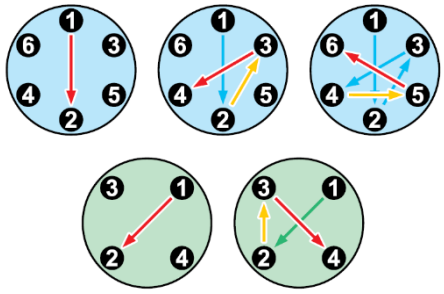
11.9 Tightening Torque Values

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.

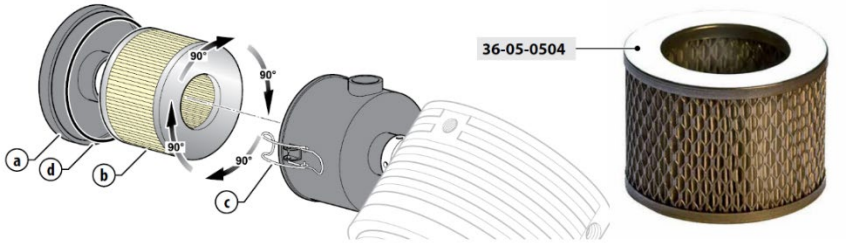
Tightening Torque Values	
Thread	**Maximum Torque**
M6 - 1/4”	**10** Nm (**7** ft-lb)
M8 - 5/16”	**25** Nm (**18** ft-lb)
M10 - 3/8”	**45** Nm (**32** ft-lb)
M12 - 1/2”	**75** Nm (**53** ft-lb)
M14 - 9/16”	**120** Nm (**85** ft-lb)
M16 - 5/8”	**200** Nm (**141** ft-lb)

6 Bolt and 4 Bolt Torque Sequence



11.10 Changing the Air Intake Filter

After putting the compressor into service, the intake filter must be changed after the first 50 working hours. The air filter must then be changed every 250 working hours or annually. If the compressor is used in a dusty environment, the filter change interval should be reduced to every 100 hours.

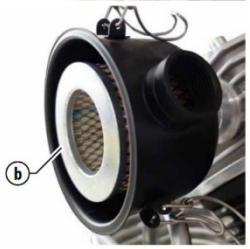


Rotate the filter cartridge inside the filter housing 90° every 50 hours.

Change the air filter as follows:

- Open clips (c) and remove the air filter cover (a).
- Remove the air filter cartridge (b).

- Replace the cartridge with a new one.
- Replace the O-ring (d) with a new one.
- Re-close the cover (a) and close the clips (c).



⚠ Danger

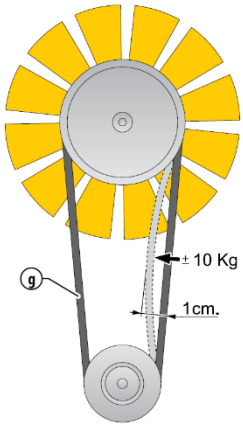
Do not carry out these tasks if the compressor has just shut down and is hot; wait for the compressor to cool down. All maintenance work must be carried out with the compressor OFF and the power supply lead unplugged from the wall socket.

⚠ Notice

If the compressor is used in a dusty environment the filter change interval should be reduced to every 100 hours.

12.0 Transmission Belts

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



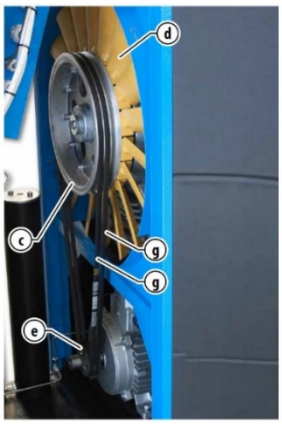
12.1 Checking Transmission Belts

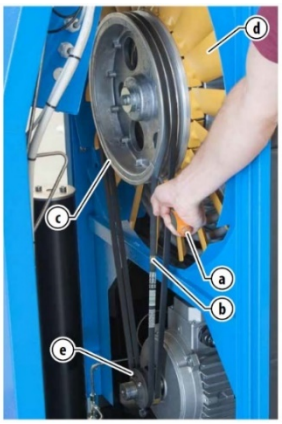
To check for proper transmission belt tension (g) exert a pressure of approximately 22 lb (10 kg) on the belt; check the belts do not flex by more than 1 cm (0.39 in) with respect to its original position. Should they flex more than this the belts must be replaced.

12.2 Changing 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.





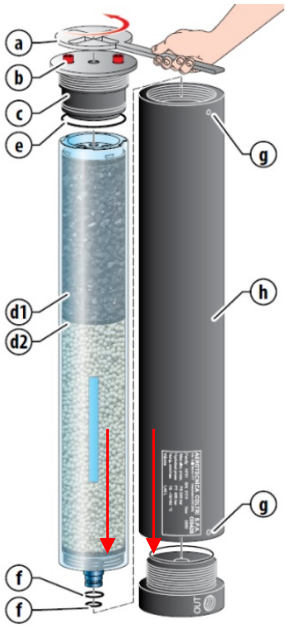
- Insert the new belt on the internal groove of the electric motor pulley (e).
- Insert the belt on the internal groove of the fan pulley while simultaneously turning the fan by hand until the belt slips perfectly into the groove of the pulley.
- Check that the belt is inserted perfectly in the grooves 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 belts (g) tension is not correct contact Nuvair for technical assistance.

13.0 Changing Air Filtration Cartridges

The MCH60 compressor comes standard with three (3) drying filters (SKU NUV65677) and one (1) breathing air filter (SKU NUV65247). Do NOT use any substitute. Change filter elements every 130,000 cubic feet of air pumped. If the compressor system is operated in high humidity and/or high temperature, filter elements must be changed more often. See 13.2 for details on filter element life factors.

- Shut down the compressor system.
- Open and leave open condensate auto drain manual bleed valves (pictured below) to vent all pressure from the circuit.
- Unscrew the filter canister cap by rotating counterclockwise (1).
- Remove the filter plug (2).
- Remove expended element from filter canister (3).
- Install new filter element. Place pressure on element to seat the element fully into the canister (4).
- Reinstall cap to canister by rotating clockwise and tightening with screwdriver or cap wrench.
- Close manual condensate valve.



Changing Filter O-rings

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

Replace the O-rings if venting from this hole is detected.

Auto Drain Manual Bleed Valves

⚠ 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.

13.1 Temperature Effect on Filter Life

This Filter Replacement Frequency Calculation Table is based on total hours of compressor runtime, whether the compressor runs in simplex (single compressor) or duplex (dual compressor) mode.

Filter Temperature		Filter Duration (in hours)
°F	°C	Total Compressors Hours
53	41	260
62	50	180
71	59	135
80	**27**	**100**
89	32	80
96	36	55
105	41	45
114	46	35

⚠ 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 antipollution standards in force.

⚠ 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.

13.2 Condensate Discharge

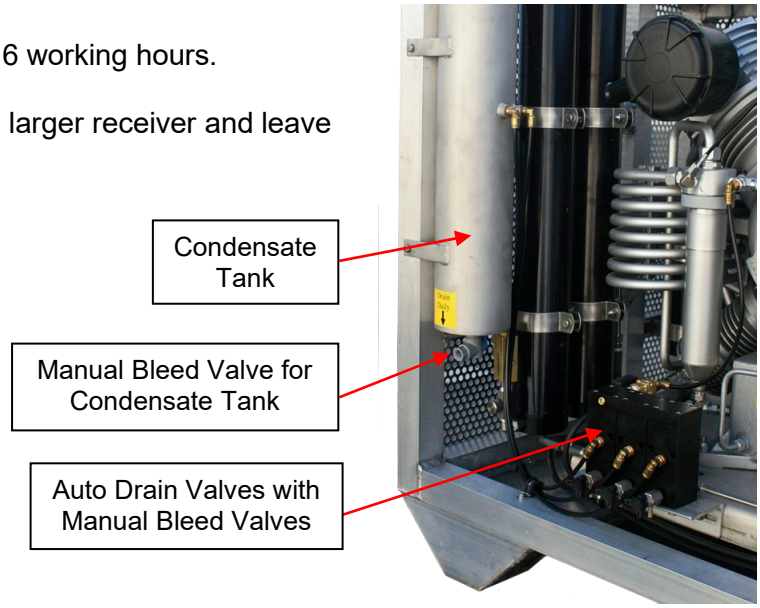
An outflow of condensate water with lubricating oil is normal during refills: the quantity will depend on the level of humidity in the air. The condensate must be disposed of as per your local “Waste disposal” rules.

To drain the condensate tank, open the manual bleed valve (pictured right) and drain into a portable container for disposal.

The condensate tank must be drained daily or every 6 working hours.

You may run a hose from the condensate tank into a larger receiver and leave the ball valve in the open position.

- Manually open auto drain valves each day to check for condensate and that the auto drains are functioning properly.



14.0 Power Requirements

⚠ Warning

Never use extension cords to provide power to your compressor system. The system must be properly wired according to national and local electrical codes by a qualified electrician. Improper wiring may lead to fires, which can cause serious personal injury or death.

Electrical wiring and connections should be made by a qualified electrician in accordance with all national and local electrical codes. Check all system specifications provided in this manual when working on the compressor system the main breaker at the power source must be “locked out” in the off position.

14.1 Amperage Load for System

208-230 V / E3 / 60 Hz	38 A 15 hp (11 kW) × 2
380-415 V / E3 / 50 Hz	21 A 15 hp (11 kW) × 2
440-480 V / E3 / 60 Hz	17 A 15 hp (11 kW) × 2

14.2 Rotation Check

Always turn on (bump) starter and run motor very briefly to check for proper direction of rotation. A sticker indicates proper rotation direction.

⚠ Notice

Operation in reverse direction for extended periods of time will cause a Reciprocating Compressor to run hot and perform poorly and may cause permanent damage.

15.0 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.

15.1 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.

15.2 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.

15.3 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 precede 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.

15.4 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.

15.5 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. 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.

⚠ Notice

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

16.0 Instructions for Emergency Situations

16.1 Fire

In the event of fire, use a CO_2 extinguisher in compliance with the relevant standards in force. Contact the fire department.

17.0 Maintenance Register

17.1 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.

17.2 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.

17.3 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.

17.4 Nuvair Customer Care Contact

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

18.0 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	Drying Filter Cartridge (×3)	NUV65677
	Breathing Air Filter Cartridge	NUV65247
Air Intake Filter Element		36-05-0504
Oil Filter	Spin On	SC000688
Transmission Belt		A90

19.0 Service Log

Date	Technician Name	Service Performed

20.0 Appendix

20.1 Supply and Breathing Air Specifications

All supply and breathing air must meet the following requirements of CGA G-7.1-1997. Supply air delivered to the Membrane System must be purified to meet Grade D or E quality, and periodic air quality testing to assure compliance is recommended. All breathing air for diving produced by the 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/m³	5 mg/m³
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.

All breathing nitrox produced for diving must be purified to meet these same requirements, except for oxygen content. Nitrox oxygen content must measure within ±1% O_2 of the specified value of the mixture using a properly calibrated oxygen analyzer (i.e., nitrox produced with a target content of 32% O_2 must measure in the range of 31-33% O_2). Periodic air quality testing to assure compliance is mandatory.

20.2 Filter Element Life Factors

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

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
53ºF (12ºC)	41ºF (5ºC)	2.6 × Life
62ºF (17ºC)	50ºF (10ºC)	1.8 × Life
71ºF (23ºC)	59ºF (16ºC)	1.35 × Life
80ºF (27ºC)	**68ºF (20ºC)**	**1 × Life**
89ºF (32ºC)	77ºF (25ºC)	0.8 × Life
96ºF (36ºC)	84ºF (29ºC)	0.55 × Life
105ºF (41ºC)	93ºF (34ºC)	0.45 × Life
114ºF (46ºC)	102ºF (39ºC)	0.35 × Life

21.0 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 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.

Additional Record of Changes

It is the responsibility of the owner of this product to register their ownership with Nuvair by sending the warranty card provided to Nuvair. This card is to establish registration for any necessary warranty work and as a means of communication that allows Nuvair to contact the user regarding this product.

The user must notify Nuvair of any change of address by the user or sale of the product. All changes or revisions to this manual must be recorded in this document to ensure that the manual is up to date.

Change Date	Description of Change

Notes:

22.0 PLC Wiring Schematics

(PLC wiring schematics on the following pages)

Notes:

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

Rev. 04.2021