Doosan Infracore
Portable Power

OPERATION and MAINTENANCE MANUAL

COMPRESSOR MODEL

P600/XP535WCU-T4i (E90)

HP450/VHP400WCU-T4i (E91)

This manual contains important safety information.
Do not destroy this manual.
This manual must be available to the personnel who operate and maintain this compressor.

Doosan Infracore Portable Power
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Statesville, N.C. 28625
DoosanPortablePower.com

P/N: 46614501 (07-2012) Rev A

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Foreword

Information

The contents of this manual are considered to be proprietary and confidential to Doosan Infracore Portable Power (herein referred to as “Portable Power”), and should not be reproduced without the prior written permission of Portable Power.

Nothing contained in this document is intended to extend any promise, warranty or representation, expressed or implied, regarding the Portable Power products described herein. Any such warranties or other terms and conditions of sale of products shall be in accordance with the standard terms and conditions of sale for such products, which are available upon request.

This manual contains instructions and technical data to cover all routine operation and scheduled maintenance tasks by operation and maintenance staff. Major overhauls are outside the scope of this manual and should be referred to an authorized Portable Power Service department.

All components, accessories, pipes, and connectors added to the compressed air system should be:

- of good quality, procured from a reputable manufacturer and, wherever possible, be of a type approved by Portable Power.
- clearly rated for a pressure at least equal to the compressor safety valve setting.
- compatible with the compressor oil.
- accompanied with instructions for safe installation, operation, and maintenance.

Details of approved equipment are available from the Portable Power Service departments. The use of repair parts other than those included within the approved parts list may create hazardous conditions over which Portable Power has no control. Therefore, Portable Power cannot be held responsible for equipment in which non-approved repair parts are installed.

Portable Power reserves the right to make changes and improvements to products without notice and without incurring any obligation to make such changes or add such improvements to products sold previously.

The intended uses of this compressor are outlined below and examples of unapproved usage are also given. However, Portable Power cannot anticipate every application or work situation that may arise. **If in doubt, consult supervision**.

This compressor has been designed and supplied for above ground operation to be used for compression of normal ambient air containing no additional gases, vapors, or particles within the ambient temperature range specified in the General Data Section of this manual.

This compressor should NOT be used:

A. For direct or indirect human consumption of the compressed air.

B. Outside the ambient temperature range specified in the General Data Section of this manual.

C. When an actual or foreseeable risk of hazardous levels of flammable gases or vapors exists.

D. With other than Portable Power approved components.

E. With guards, controls, or switches missing or disabled.

F. For storage or transportation of materials inside or on the enclosure.

Portable Power accepts no responsibility for errors in translation of this manual from the original English version.

You, as the customer, are expected to provide certain service and maintenance items. Your Portable Power dealer will provide all other more detailed service and maintenance items on a special preventive maintenance schedule for each compressor. It is very important that the minimum service and maintenance requirements explained in this manual be performed at the required intervals. Exceeding these intervals may reduce the reliability of the compressor.

The purpose of this manual is to train the operator with functions, operation, and basic service and maintenance requirements of the compressor. During the preparation of this manual, every effort was made to ensure the accuracy and adequacy of the contents.

Your Portable Power dealer will assist with setup and initial startup of the compressor and will also provide brief operating and service instructions. Before starting the compressor, this manual and instructions should be carefully read to obtain a thorough knowledge of the duties to be performed. Please take pride in the compressor, keep it clean and in good mechanical condition.

To enable proper maintenance records, Portable Power provides a Noise Emission Control Maintenance Log in the Noise Emission Section of this manual. The Noise Emission Section contains a recommended Maintenance schedule and provides space in the log for the technician to note what service and maintenance was done, by whom, where, and when.

Safety

Safety Precautions

Never operate the compressor without first observing all safety warnings and carefully reading the Operation and Maintenance Manual shipped from the factory with this compressor.

Ensure the operator reads and understands the decals and consults the manuals before operation or performing maintenance.

Ensure all maintenance personnel are adequately trained, competent, and have read the manuals.

Ensure all protective covers are in place and the canopy/doors are closed during operation.

The specification of this compressor is such that the compressor is not suitable for use in flammable gas risk areas. If such an application is required, all local regulations, codes of practice, and site rules must be observed. To ensure the compressor can operate in a safe and reliable manner, additional equipment such as gas detection, exhaust spark arrestors, and intake (shut-off) valves may be required, dependent on local regulations or the degree of risk involved.

A weekly visual check must be made of all fasteners/fixing screws securing mechanical parts. In particular, safety-related parts such as coupling hitch, drawbar components, wheels, tires, and lifting bail should be checked for total security.

All components which are loose, damaged, or unserviceable must be rectified without delay.

Air discharged from this compressor may contain carbon monoxide or other contaminants which will cause serious injury or death. Do not breathe discharged air.

This compressor produces loud noise with the doors open or service valve vented. Extended exposure to loud noise can cause hearing loss. Always wear hearing protection when doors are open or service valve is vented.

Never inspect or service the compressor without first disconnecting battery cable(s) to prevent accidental starting.

Do not use petroleum products (solvents or fuels) under high pressure as this can penetrate the skin and result in serious illness. Wear eye protection while cleaning the compressor with compressed air to prevent debris from injuring eye(s).

Rotating fan blade can cause serious injury. Do not operate without fan guard in place.

Use care to avoid contacting hot surfaces (engine exhaust manifold and piping, air receiver, and air discharge piping, etc.).

Ether is an extremely volatile, highly flammable gas. When it is specified as a starting aid, use sparingly. Do not use Ether if the engine has glow plugs or inlet heater starting aids. Engine damage will result.

Never operate the compressor with guards, covers, or screens removed. Keep hands, hair, clothing, tools, blow gun tips, etc. well away from moving parts.

Compressed Air

Compressed air can be dangerous if incorrectly handled. Prior to performing maintenance or service on the compressor, ensure all pressure is vented from the system and the compressor cannot be started accidentally.

Ensure the compressor is operating at the rated pressure and the rated pressure is known to all relevant personnel.

All air pressure equipment installed in, or connected to, the compressor must have safe working pressure ratings of at least the compressor safety valve setting.

If more than one compressor is connected to one common downstream plant, effective check valves and isolation valves must be fitted and controlled by work procedures, to ensure one compressor cannot accidentally be pressurized or over pressurized by another.

Compressed air must NOT be used for a direct feed to any form of breathing apparatus or mask.

Compressed air can cause serious injury or death. Relieve pressure before removing filler plugs/caps, fittings, or covers.

Air pressure can remain trapped in air supply line which can result in serious injury or death. Always carefully vent air supply line at tool or vent valve before performing any service or maintenance.

Discharged air contains a very small percentage of compressor lubricating oil and care should be taken to ensure downstream equipment is compatible.

If discharged air is to be ultimately released into a confined space, adequate ventilation must be provided.

When using compressed air, always use appropriate personal protective equipment.

All pressure containing parts, especially flexible hoses and their couplings, must be regularly inspected, be free from defects, and be replaced according to the manual instructions.

Avoid bodily contact with compressed air.

The safety valve located in the separator tank must be checked periodically for correct operation.

Whenever the compressor is stopped, air will flow back into the compressor from downstream devices or systems unless the service valve is closed. Install a check valve at the compressor service valve to prevent reverse flow in the event of an unexpected shutdown when the service valve is open.

Disconnected air hoses whip and can cause serious injury or death. Always attach a safety flow restrictor to each hose at the source of supply or branch line in accordance with OSHA Regulation 29CFR Section 1926.302(b).

Never allow the compressor to sit stopped with pressure in the separator tank or piping.

Exhaust System

Hot engine exhaust gas and hot exhaust system surfaces are produced during and after compressor operation. Avoid contact with exhaust gas and hot exhaust system surfaces. Keep flammable and combustible materials away. Do not operate compressor on, under, or near flammable or combustible materials.

The potential for higher temperatures is present when the exhaust aftertreatment system undergoes regeneration. Refer to Engine Manual for further safety instructions and information on the exhaust aftertreatment system and controls.

Materials

The following substances may be produced during the operation of this compressor:

- brake lining dust
- engine exhaust fumes

⚠ WARNING

Avoid inhalation of material substances.

Ensure that adequate ventilation of the cooling system and exhaust gases is maintained at all times.

The following substances are used in the manufacture of this compressor and may be hazardous to health if used incorrectly:

- antifreeze
- compressor oil
- engine oil
- preservative grease, lubricating grease
- rust preventative
- diesel fuel
- battery electrolyte

⚠ WARNING

Avoid ingestion, skin contact, and inhalation of fumes.

Should compressor oil come into contact with the eyes, irrigate with water for at least 5 minutes.

Should compressor oil come into contact with the skin, wash off immediately. Consult a physician if large amounts of compressor oil are ingested or if compressor oil is inhaled. Never give fluids or induce vomiting if the patient is unconscious or having convulsions.

Safety data sheets for compressor and engine oils should be obtained from the oil supplier.

Do NOT start or operate this compressor in a confined area. Avoid breathing exhaust fumes when working on or near the compressor.

This compressor may include such materials as oil, diesel fuel, antifreeze, brake fluid, oil/air filters, and batteries which may require proper disposal when performing maintenance or service tasks. Contact local authorities for proper disposal of these materials.

Battery

A battery contains sulfuric acid and can produce gases which are corrosive and potentially explosive. Avoid contact with skin, eyes, and clothing. In case of contact, flush area immediately with water.

Do not attempt to jump-start a frozen battery since this may cause it to explode.

Exercise extreme caution when using an external method to jump-start a unit. Verify the electrical systems on the weak battery system and the external jump system are the same voltage type system, 12VDC or 24VDC. Connect the Positive (+) terminal of the external system to the Positive (+) terminal on the weak system. Connect the Negative (-) terminal of the external system to the Negative (-) terminal of the weak system. Always disconnect the two systems in reverse order.

Radiator

Hot engine coolant and steam can cause injury. Ensure the Radiator Pressure Cap is removed with due care and attention.

Do not remove the pressure cap from a HOT radiator. Allow radiator to cool before removing pressure cap.

⚠ WARNING

Hot engine coolant and steam can cause injury. When adding coolant or antifreeze solution to the engine radiator, stop the engine and allow radiator to cool prior to releasing the radiator pressure cap. Using a cloth to protect the hand, slowly release the radiator pressure cap, absorbing any released fluid with the cloth. Do not remove the radiator pressure cap until all excess fluid is released and the engine cooling system fully depressurized.

⚠ WARNING

Follow the instructions provided by the antifreeze supplier when adding or draining the antifreeze solution. It is advisable to wear personal protective equipment to prevent skin and eye contact with the antifreeze solution.

Transport

When loading or transporting the compressor, ensure that the specified lifting and tie down points are used.

When loading or transporting the compressor, ensure that the towing vehicle, its size, weight, towing hitch, and electrical supply are all suitable to provide safe and stable towing at speeds either, up to the legal maximum for the country in which it is being towed or as specified for the compressor model if lower than the legal maximum. Do not exceed gross vehicle weight rating.

Before towing the compressor, ensure:

- the tires and towing hitch are in a serviceable condition and tires are properly inflated.
- the canopy is secure.
- all ancillary equipment is stored in a safe and secure manner.
- the brakes and lights are functioning correctly and meet necessary road traffic requirements.
- breakaway cables/safety chains are connected to the towing vehicle.

The compressor must be towed in a level attitude in order to maintain correct handling, braking, and lighting functions. This can be achieved by correct selection and adjustment of the vehicle towing hitch and, on variable height running gear, adjustment of the drawbar.

1. Ensure wheels, tires, and drawbar connectors are in safe operating condition and drawbar is properly connected before towing.
2. When parking, always use the handbrake and, if necessary, suitable wheel chocks.

Safety chains/breakaway cable and their adjustment (where fitted).

Ensure breakaway cable is securely coupled to the towed compressor and also to a substantial anchorage point on the towing vehicle.

Ensure cable length is as short as possible, while still allowing enough slackness for the towed compressor to articulate without the brake being applied.

Attach safety chains to the towing vehicle at substantial anchorage points of suitable strength.

Ensure effective chain length is as short as possible while still allowing normal articulation of the towed compressor and proper operation of the breakaway cable.

Decals

Decals are located on the compressor to point out potential safety hazards. Read and follow these instructions. If you do not understand these instructions, inform your supervisor.

(Red Background)

Indicates the presence of a hazard which WILL cause serious injury, death, or property damage, if ignored.

(Orange Background)

Indicates the presence of a hazard which CAN cause serious injury, death, or property damage, if ignored.

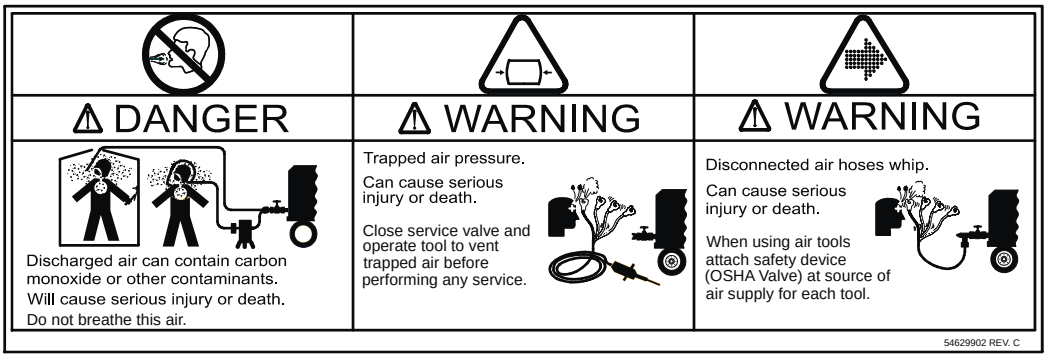
(Yellow Background)

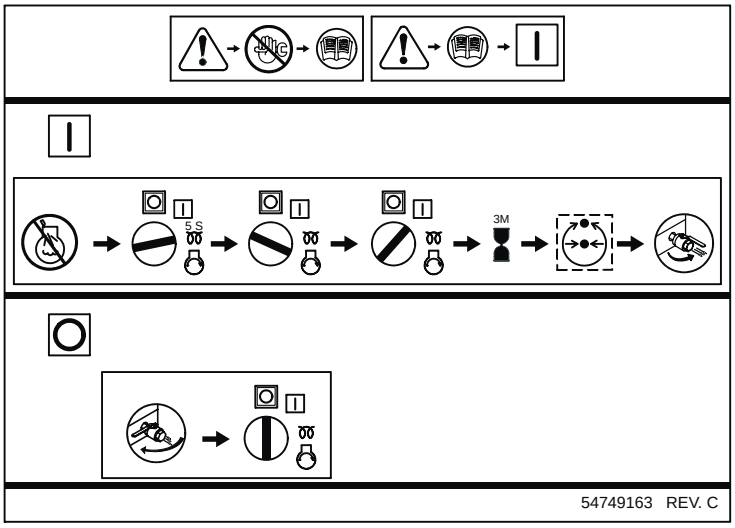
Indicates the presence of a hazard which WILL or CAN cause injury or property damage, if ignored.

(Blue Background)

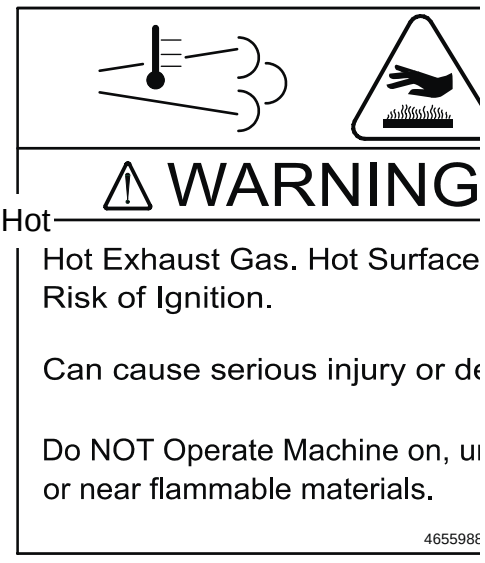
Indicates important set-up, operating, or maintenance information.

Free Safety Decals
To promote communication of Safety Warnings on products manufactured by the Portable Power Division in Statesville, N.C., Safety Decals are available FREE of charge. Safety Decals are identified by the decal heading: DANGER, WARNING, CAUTION, NOTICE.
Decal part numbers are located in the lower right hand corner of each decal and are also listed in the compressor Parts Manual. Submit orders for Safety Decals to the Statesville Parts Service Dept. The no charge order should contain only Safety Decals.
Help promote product safety! Ensure decals are present on the compressor. Replace decals that are not readable.

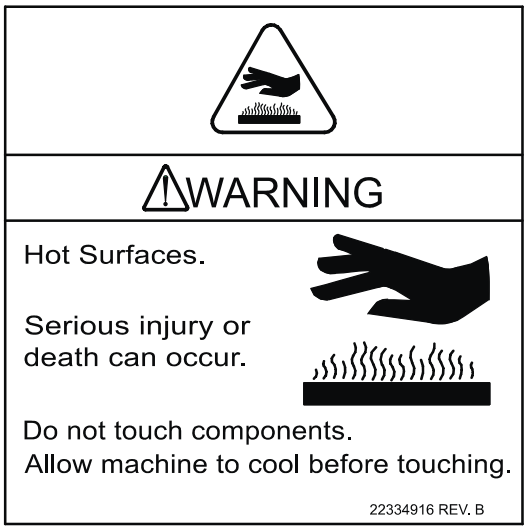

⚠ DANGER
Discharged air can contain carbon monoxide or other contaminants.
Will cause serious injury or death.
Do not breathe this air.
⚠ WARNING
Trapped air pressure.
Can cause serious injury or death.
Close service valve and operate tool to vent trapped air before performing any service.
⚠ WARNING
Disconnected air hoses whip.
Can cause serious injury or death.
When using air tools attach safety device (OSHA Valve) at source of air supply for each tool.
54629902 REV. C

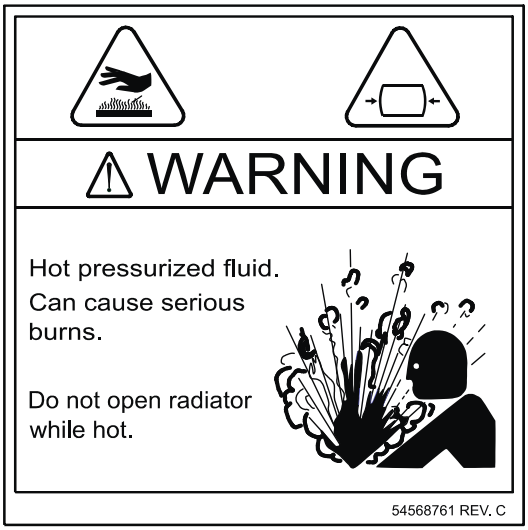

5 S
3M
54749163 REV. C


⚠ WARNING
High pressure air.
Can cause serious injury or death.
Relieve pressure before removing filler plugs/caps, fittings or covers.
54568795 REV. C

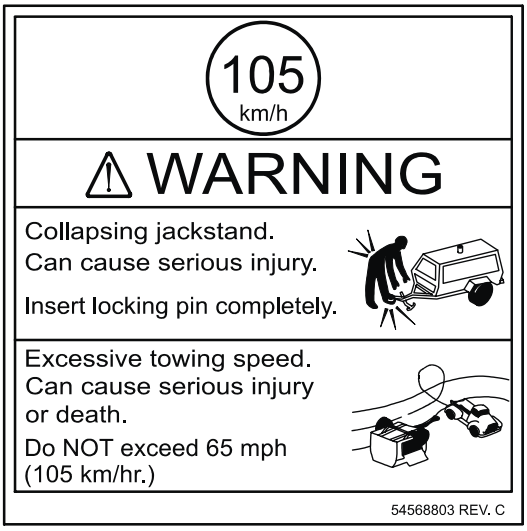

⚠ WARNING
Hot
Hot Exhaust Gas. Hot Surface
Risk of Ignition.
Can cause serious injury or de
Do NOT Operate Machine on, u
or near flammable materials.

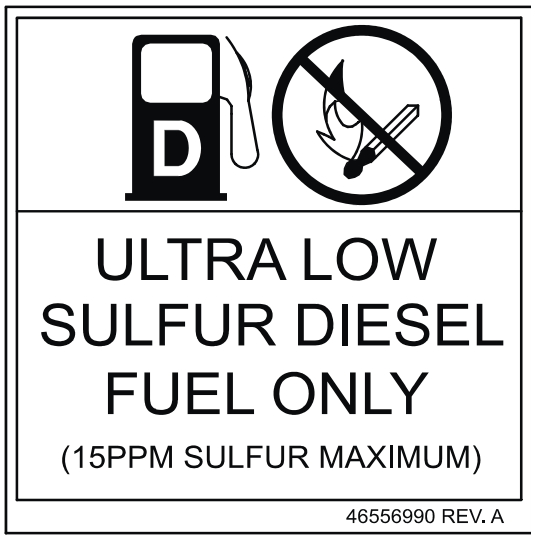

WARNING
Rotating fan blade.
Can cause serious injury.
Do not operate without guard in place.
54568779 REV. C


WARNING
Hot Surfaces.
Serious injury or death can occur.
Do not touch components.
Allow machine to cool before touching.
22334916 REV. B


WARNING
Hot pressurized fluid.
Can cause serious burns.
Do not open radiator while hot.
54568761 REV. C


WARNING
Combustible gas.
Can cause serious burns, blindness or death.
Keep sparks and open flames away from batteries.
54568753 REV. C

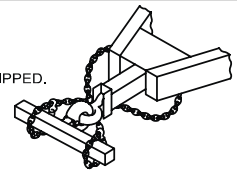

105
km/h
WARNING
Collapsing jackstand.
Can cause serious injury.
Insert locking pin completely.
Excessive towing speed.
Can cause serious injury or death.
Do NOT exceed 65 mph (105 km/hr.)
54568803 REV. C


D
ULTRA LOW SULFUR DIESEL FUEL ONLY
(15PPM SULFUR MAXIMUM)
46556990 REV. A

NOTICE

BEFORE TOWING

- ASSURE TOW VEHICLE HAS TOWING CAPACITY FOR WEIGHT OF THIS UNIT.
- CHOCK WHEELS AND SET PARKING BRAKE IF EQUIPPED.
- CHECK PINTLE EYE BOLTS FOR ANY LOOSENESS OR WEAR.
  - TIGHTEN OR REPLACE AS REQUIRED.
- POSITION TOW VEHICLE TO ALIGN HITCH WITH PINTLE EYE.
- STAND ASIDE WHILE :
  - OPERATING JACKS TO SEAT PINTLE EYE ON TO HITCH.
  - SECURE HITCH.
  - ATTACHING SAFETY CHAINS PER ILLUSTRATION.
  - ATTACHING BRAKE ACTUATOR BREAKAWAY CHAIN / CABLE (IF APPLICABLE).
  - CONNECTING LIGHTING PLUG (IF APPLICABLE).
  - CONNECT ELECTRIC BRAKE PLUG (IF APPLICABLE).
  - REMOVE WHEEL CHOCKS AND RELEASE PARKING BRAKE IF EQUIPPED.
  - TEST BRAKES.



DISCONNECT

- CHOCK WHEELS AND SET PARKING BRAKE IF EQUIPPED.
- STAND ASIDE WHILE :
  - DISCONNECTING SAFETY CHAINS.
  - DISCONNECTING BRAKE ACTUATOR BREAKAWAY CHAIN / CABLE (IF APPLICABLE).
  - DISCONNECTING LIGHTING PLUG (IF APPLICABLE).
  - DISCONNECTING ELECTRIC BRAKE PLUG (IF APPLICABLE).
  - OPERATING JACKS TO RAISE PINTLE EYE FROM HITCH.
- MOVE TOW VEHICLE.
- LEVEL MACHINE.

54604921 REV. E

CAUTION

DO NOT USE ETHER.

ENGINE DAMAGE WILL OCCUR.

This engine is equipped with an electric heater starting aid.

54454756 Rev. E

NOTICE

Remove This Panel To Clean Radiator And Oil Cooler.

Do Not Operate Machine With Panel Removed.

36529691 Rev. B

WARNING

FALLING OFF MACHINE CAN CAUSE SERIOUS INJURY OR DEATH.

USE LADDER AND HAND HOLDS TO ACCESS LIFTING BAIL.

22298343 REV.C

CAUTION

DO NOT WELD.

ELECTRONIC DAMAGE WILL OCCUR.

This engine is equipped with an electronic engine controller and other electronic components.

54749205 REV. B

NOTICE

LIFT POINT

54699400 REV. B

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Portable Power

COMPRESSOR NOISE EMISSION CONTROL INFORMATION

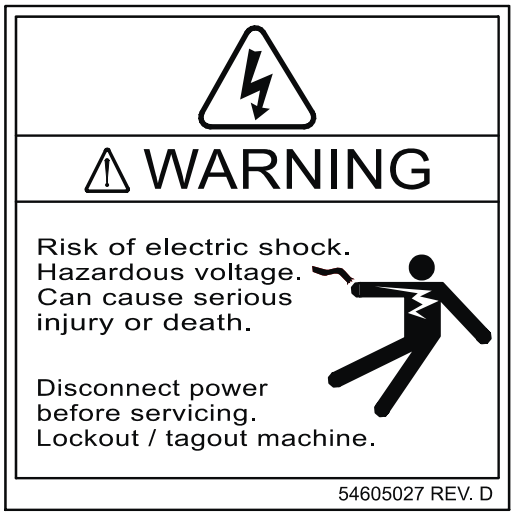
THIS COMPRESSOR CONFORMS TO U.S. E.P.A. REGULATIONS FOR NOISE EMISSIONS APPLICABLE TO PORTABLE AIR COMPRESSORS. THE FOLLOWING ACTS OR THE CAUSING THEREOF BY ANY PERSON ARE PROHIBITED BY THE NOISE CONTROL ACT OF 1972:

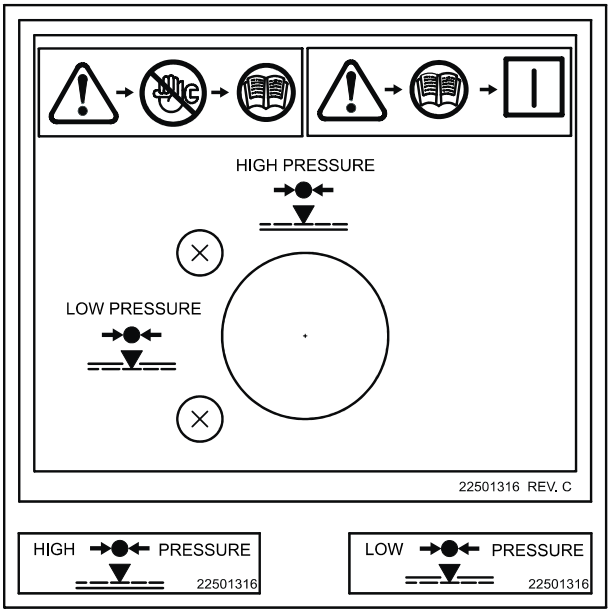
(A) THE REMOVAL OR RENDERING INOPERATIVE, OTHER THAN FOR THE PURPOSE OF MAINTENANCE, REPAIR, OR REPLACEMENT, OF ANY NOISE CONTROL DEVICE OR ELEMENT OF DESIGN INCORPORATED INTO THIS COMPRESSOR IN COMPLIANCE WITH THE NOISE CONTROL ACT;

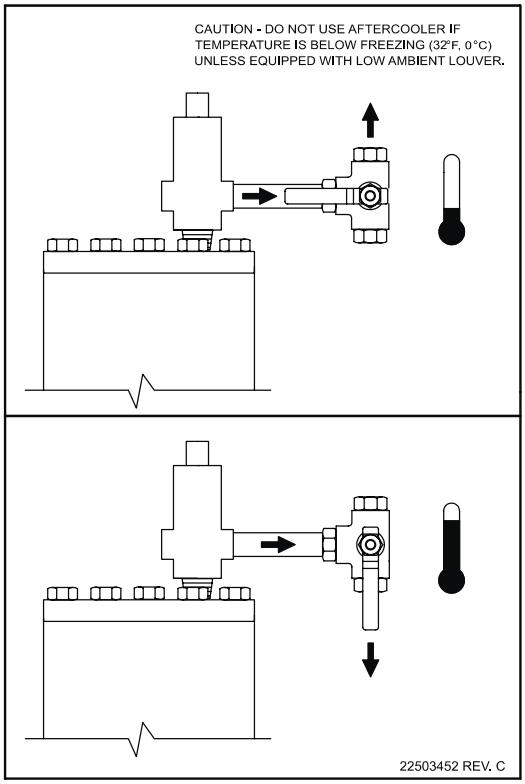
(B) THE USE OF THIS COMPRESSOR AFTER SUCH DEVICE OR ELEMENT OF DESIGN HAS BEEN REMOVED OR RENDERED INOPERATIVE.

TO ASCERTAIN POINT OF ORIGIN, DATE OF MANUFACTURE, AND RELATED INFORMATION VERIFYING COMPLIANCE TO E.P.A. REGULATIONS FOR NOISE EMISSIONS, PLEASE CONTACT YOUR NEAREST DOOSAN INFRACORE PORTABLE POWER DEALER AND REFERENCE YOUR COMPRESSOR SERIAL NUMBER.

36514602 REV. C

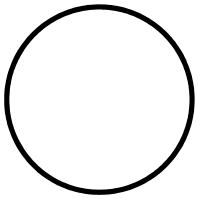




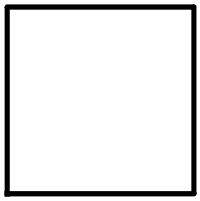


Decals

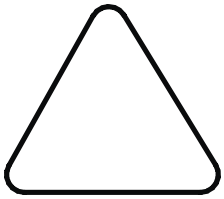
Graphic Form and Meaning of ISO Symbols



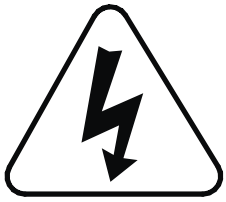
Prohibition / Mandatory



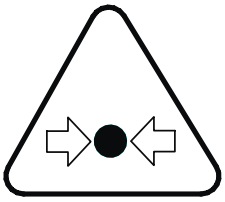
Information / Instructions



Warning

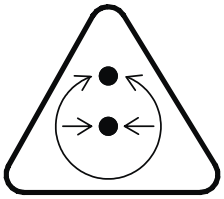


WARNING: Electrical Shock Risk



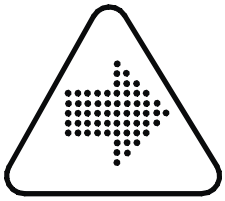
WARNING: Pressurized Component or System

WARNING: Hot Surface

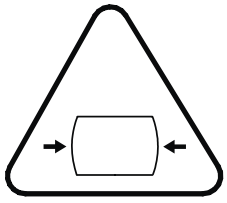


WARNING: Pressure Control

WARNING: Corrosion Risk

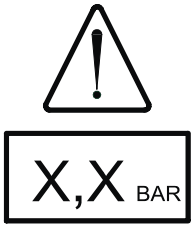


WARNING: Air/Gas Flow or Air Discharge



WARNING: Pressurized Vessel

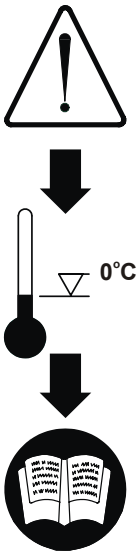
WARNING: Hot and harmful exhaust gas



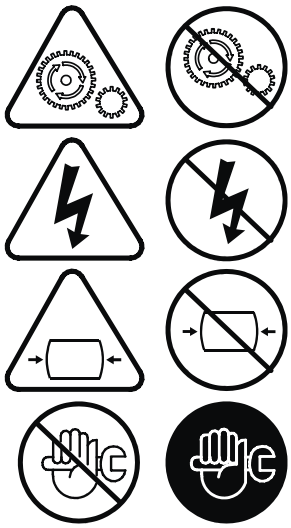
WARNING: Maintain correct tire pressure (Refer to the GENERAL INFORMATION section of this manua

WARNING: Flammable Liquid

WARNING: Before connecting the tow bar or commencing to tow consult the Operation and Maintenance Manual



WARNING: For operating temperature below 0°C, consult the Operation and Maintenance Manual



WARNING: Do not undertake any maintenance on this machine until the electrical supply is disconnected and the air pressure is totally relieved

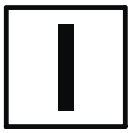
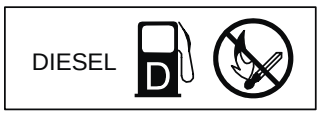
WARNING: Consult the Operation and Maintenance manual before commencing any maintenance

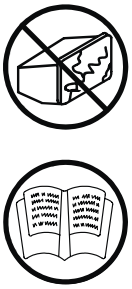
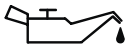
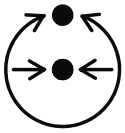
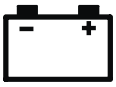
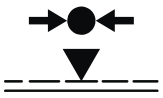
Do not Breathe the compressed air from this machine

Do not remove the Operation and Maintenance manual and manual holder from this machine

Do not stack

Do not operate the machine without the guard being fitted

 Do not stand on any service valve or other parts of the pressure system	  Do not operate with doors or enclosure open	 Do not use fork lift truck from this side
 Do not exceed trailer speed limit	 No open flames	 Do not open service valve before the air hose is attached
 Use fork lift truck from this side only	 Emergency stop	 Tie down point
 Lifting point	 ON (power)	 OFF (power)
 Read the Operation and Maintenance manual before operation or maintenance of this machine is undertaken	 When parking use prop stand, handbrake, and wheel chocks	 Compressor oil filling
 Diesel fuel No open flames	 Parking Brake	 Rough Service Designation Wet Location Operation

 Replace any cracked protective shield	 Oil drain	 Engine Oil
 Fuel level / point	 Pressure control	 Malfunction
 Battery charging condition	 Low pressure	 High pressure
 Engine malfunction	 High Compressor Temperature	 Compressor malfunction
 Low engine oil pressure	 Engine high temperature	

Noise Emission

Noise Emission

This section pertains only to compressors distributed within the United States.

⚠ WARNING

TAMPERING WITH NOISE CONTROL SYSTEM PROHIBITED

Federal law prohibits the following acts or the causing thereof:

(1) The removal or rendering inoperative by any persons, other than for purposes of maintenance, repair, or replacement, of any device or element of design incorporated into any new compressor for the purpose of noise control prior to its sale or delivery to the ultimate purchaser or while it is in use; or (2) the use of the compressor after such device or element of design has been removed or rendered inoperative by any person.

Among those acts included in the prohibition against tampering are these:

1. Removal or rendering inoperative any of the following:
   a. the engine exhaust system or parts thereof
   b. the air intake system or parts thereof
   c. enclosure or parts thereof
2. Removal of any of the following:
   a. fan shroud
   b. vibration mounts
   c. sound absorption material
3. Operation of the compressor with any of the enclosure doors open.

Compressor Noise Emission Control Information

A. The removal or rendering inoperative, other than for the purpose of maintenance, repair, or replacement of any noise control device or element of design incorporated into this compressor in compliance with the noise control act;

B. The use of this compressor after such device or element of design has been removed or rendered inoperative.

NOTE: the above information applies only to compressors that are built in compliance with the U.S. Environmental Protection Agency.

Portable Power reserves the right to make changes or add improvements without notice and without incurring any obligation to make such changes or add such improvements to products sold previously.

The Purchaser is urged to include the above provisions in any agreement for any resale of this compressor.

Maintenance Log

COMPRESSOR MODEL_____
SERIAL NO. _____
USER UNIT NO. _____

UNIT IDENTIFICATION	**DEALER OR DISTRIBUTOR FROM WHOM PURCHASED:**
Engine Make & Model:_____	
Serial No.:_____	_____
Purchaser or Owner:_____	_____
Address: _____	Date Purchased:_____

The Noise Control Act of 1972 (86 Stat. 1234) prohibits tampering with the noise control system of any compressor manufactured and sold under the above regulations, specifically the following acts or the causing thereof:

(1) the removal or rendering inoperative by any persons, other than for purposes of maintenance, repair, or replacement, of any device or element of design incorporated into new compressor for the purpose of noise control prior to its sale or delivery to the ultimate purchaser or while it is in use; or (2) the use of the compressor after such device or element of design has been removed or rendered inoperative by any person.

Noise Emission Warranty

The manufacturer warrants to the ultimate purchaser and each subsequent purchaser that this air compressor was designed, built and equipped to conform at the time of sale to the first retail purchaser, with all applicable U.S. EPA Noise Control Regulations.

This warranty is not limited to any particular part, component, or system of the air compressor. Defects in the design, assembly or in any part, component, or system of the compressor which, at the time of sale to the first retail purchaser, caused noise emissions to exceed Federal Standards are covered by this warranty for the life of air compressor.(40CFR204.58-1)

Introduction

The compressor for which this Maintenance Log is provided conforms to U.S. E.P.A. Regulations for Noise Emissions, applicable to Portable Air Compressors.

The purpose of this book is to provide (1) the Maintenance Performance Schedule for all required noise emission controls and (2) space so that the purchaser or owner can record what maintenance was done, by whom, where and when. The Maintenance Schedule and detailed instructions on the maintenance items are given on following page.

Maintenance Schedule

ITEM	AREA	PERIOD
A.	Compressed Air Leaks	As Detected
B.	Safety and Control Systems	As Detected
C.	Acoustic Materials	Daily
D.	Fasteners	100 hours
E.	Enclosure Panels	100 hours
F.	Air Intake & Engine Exhaust	100 hours
G.	Cooling Systems	250 hours
H.	Isolation Mounts	250 hours
I.	Engine Operation	See Operator's Manual
J.	Fuels & Lubricants	See Operator's Manual

A. Compressed Air Leaks

Correct all compressed air leaks during the first shutdown period after discovery. If severe enough to cause serious noise problems and efficiency loss, shut down immediately and correct the leak(s).

B. Safety and Control Systems

Repair or replace all safety and control systems or circuits as malfunction occurs. No compressor should be operated with either system bypassed, disabled, or nonfunctional.

C. Acoustic Materials

In daily inspections, observe these materials. Maintain all acoustic material as nearly as possible in its original condition. Repair or replace all sections that have: 1) sustained damage, 2) have partially separated from panels to which they were attached, 3) are missing, or have otherwise deteriorated due to severe operating or storage conditions.

D. Fasteners

All fasteners such as hinges, nuts, bolts, clamps, screws, rivets, and latches should be inspected for looseness after each 100 hours of operation. They should be retightened, repaired, or if missing, replaced immediately to prevent subsequent damage and noise emission increase.

E. Enclosure Panels

Enclosure panels should be inspected at 100 hour operational intervals. All panels that are warped, punctured, torn, or otherwise deformed, such that their noise containment function is reduced, should be repaired or replaced before the next operation interval. Doors, access panels, and hatch closures especially, should be checked and adjusted at this time to ensure continuous seating between gasket or acoustic material and the mating frame.

F. Air Intake and Engine Exhaust

Engine and compressor air intake and engine exhaust systems should be inspected after each 100 hours of operation for loose, damaged, or deteriorated components. Repairs or replacements should be made before the next period of use.

G. Cooling Systems

All components of the cooling system for engine water and compressor oil should be inspected every 250 hours of use. Any discrepancies found should be corrected before placing the compressor back in operation. Unrestricted airflow over the radiator and oil cooler must be maintained at all times during operation.

H. Isolation Mounts

Engine/airend isolation mounts should be inspected after each 250 hours of operation. Those mounts with cracks or splits in the molded rubber or with bent or broken bolts due to operation or storage in severe environments should be replaced with equivalent parts.

I. Engine Operation

Inspect and maintain engine condition and operation as recommended in the manuals supplied by the engine manufacturer.

J. Fuels and Lubricants

Use only the types and grades of fuels and lubricants recommended in the Operator and Maintenance Manual and Engine Manual.

MAINTENANCE RECORD FOR NOISE EMISSION CONTROL AND EXTENDED WARRANTY

ITEM NO.	DESCRIPTION OF WORK	HOURMETER READING	MAINT/ INSPECT DATE	LOCATION CITY/ STATE	WORK DONE BY (NAME)

General Data

General Data Information

MODEL	P600WCU-T4i	XP525WCU-T4i	HP450WCU-T4i	VHP400WCU-T4i
COMPRESSOR				
Air Delivery - cfm (m^3/min)	600 (170)	525 (14.9)	450 (12.7)	400 (11.3)
Rated Operating Pressure - psi (bar)	100 (6.9)	125 (8.6)	150 (10.3)	200 (13.8)
Safety Valve Setting - psi (bar)	200 (13.8)		250 (17.2)	
ENGINE				
Manufacturer	Cummins			
Model	QSB 6.7			
Rated Power at Full Load Speed - hp (kw)	173 (129) @ 2200 RPM			
Full Load Speed - rpm	2200	1950	2200	1950
Idle Speed - rpm	1500			
Idle Speed (warm-up) - rpm	1600			
Electrical System	24V			
FLUID CAPACITIES - U.S. Gallons (liters)				
Compressor Oil	9.5 (36)			
Engine Oil, including filter	4.6 (17.5)			
Engine Coolant	7.0 (26.5)			
Fuel Tank	73 (276)			
AMBIENT TEMPERATURE RANGE				
With Standard Features	10°F(-12°C) to 120°F (49°C)			
With Required Options	-10°F(-23°C) to 120°F (49°C)			
With Aftercooler or IQ System	32°F (0°C) to 110°F (43°C)			
OUT-OF-LEVEL				
Out-Of-Level Operating Limit	15°			

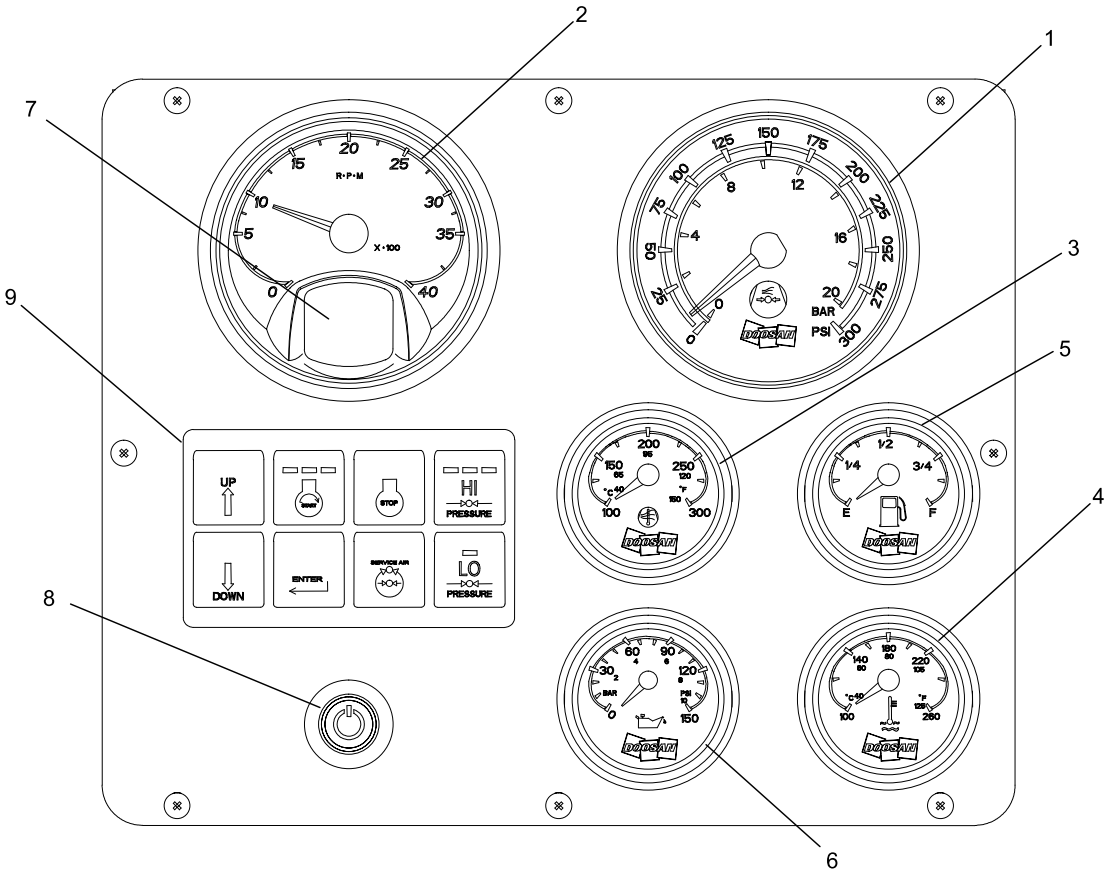
MEASUREMENTS/WEIGHTS	
Overall Length - feet (meters) (incl. bumper)	14.8 (4.5)
Overall Height - feet (meters)	6.7 (2.0)
Overall Width - feet (meters)	6.5 (1.98)
Operating Weight, with fuel - lb (kg)	4700 (2132)
Shipping Weight, less fuel - lb (kg)	4178 (1895)
RUNNING GEAR	
Tire Size	ST235/80R16
Tire Inflation Pressure - psi (bar)	65 (4.5)
Maximum Towing Speed - mph (km/hr)	65 (105)

⚠ CAUTION

Any departure from the specifications may make this equipment unsafe.

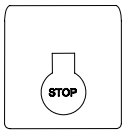
Operating Instructions

Control Panel

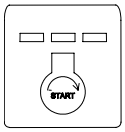


Control/Gauge Panel

1. Air Pressure Gauge: Indicates pressure (PSI) in the separator tank
2. Engine Tachometer: Indicates engine speed (RPM).
3. Compressor Temperature Gauge: Indicates airend discharge temperature.
4. Engine Coolant Temperature Gauge: Indicates engine coolant temperature.
5. Fuel Level Gauge: Indicates level of fuel in tank.
6. Engine Oil Pressure Gauge: Indicates engine oil pressure (PSI).
7. MidPort Displays compressor operating parameters and diagnostic codes.
8. Main Power Button: Start and Shutdown compressor control system and gauge panel.
9. KeyPad: Used to start and shutdown the compressor.



STOP: Shutdown the compressor.

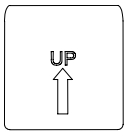


START: Initiates engine cranking.

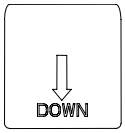
SERVICE AIR: Allows operator to load compressor after warm-up.

HI PRESSURE: Allows operator to switch to high pressure mode.

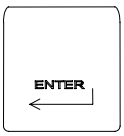
LO PRESSURE: Allows operator to switch to low pressure mode.



UP: Pressing and releasing the UP Button scrolls up through parameter lists and menu choices or increases a value one item/unit at a time. Pressing and holding the UP Button continuously scrolls up through parameter lists, menu choices, or increases a value until the end of the parameter list, menu choices, or maximum parameter value is reached.



DOWN: The DOWN Button functions identical to the UP Button with the exception that its direction for all displays, menu choices, and values is down or decreasing.



ENTER: Pressing and releasing this button provides enter functionality when the display requires you to choose a menu item, parameter selection, or value input. Pressing and holding this switch for approximately three seconds while any of the Main Screens are displayed brings up the Main Menu. Pressing the ENTER Button after an alert or fault has been displayed acknowledges the message and the display unit returns to the Default Screen.

FAULT AND ALERT

If a FAULT occurs, the display unit will display the SPN, FMI, OC, and description for Engine Fault or the CPR Code and Description for Compressor Error. An engine fault will be displayed only when the engine is shutdown. The Fault has to be acknowledged by the user by pressing the ENTER Button. The unit does not time out in the fault display. After 60 seconds, if the Fault is still active, the fault display will appear again on the screen and will remain until acknowledged by the user. This will continue to occur as long as the Fault is active.

See Figure 1.

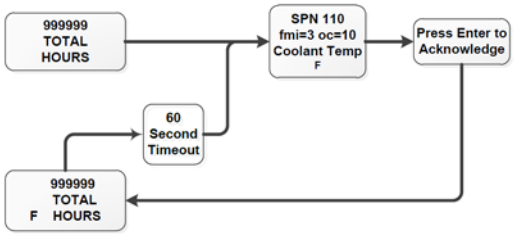


Figure 1

When present, an ALERT with the number of alert conditions will popup on the screen, the user will press the UP or DOWN Button to display the alert, or press the ENTER Button to acknowledge an alert has occurred. If there are multiple alerts, pressing the DOWN Button will scroll through the various alerts. All Faults and Alerts will be displayed until the engine shuts down and then the most severe Fault will be displayed as a Fault. Pressing the ENTER Button after the Alert has been displayed, acknowledges the message and the display unit returns to the Default Screen of Engine Hours. **See Figure 2.**

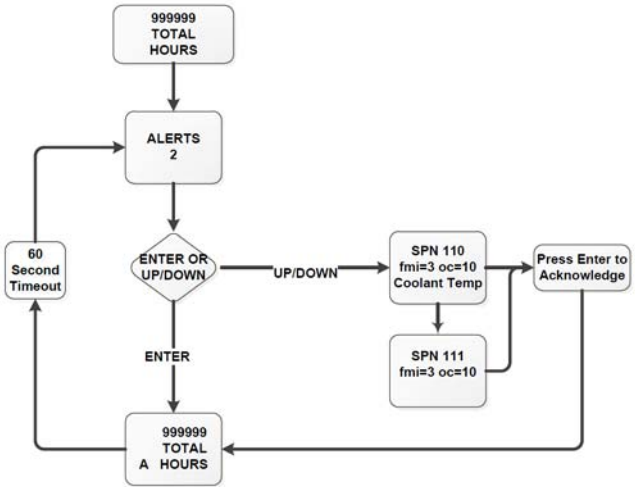


Figure 2

SERVICE INTERVAL

Service will popup on the screen after one of the two hour service channels has decremented to 5 hours. The user will press the UP or DOWN Button to display the service channels or press the ENTER Button to acknowledge a service has occurred. Pressing the ENTER Button after the service channels have been displayed, acknowledges the message and the display unit returns to the default screen. If service is between 5 and 0 hours or it remains at 0 hours, the SERVICE DUE display will appear every hour. To disable, the user can reset the hours to the OFF position by decreasing the value to OFF. **See Figure 3**.

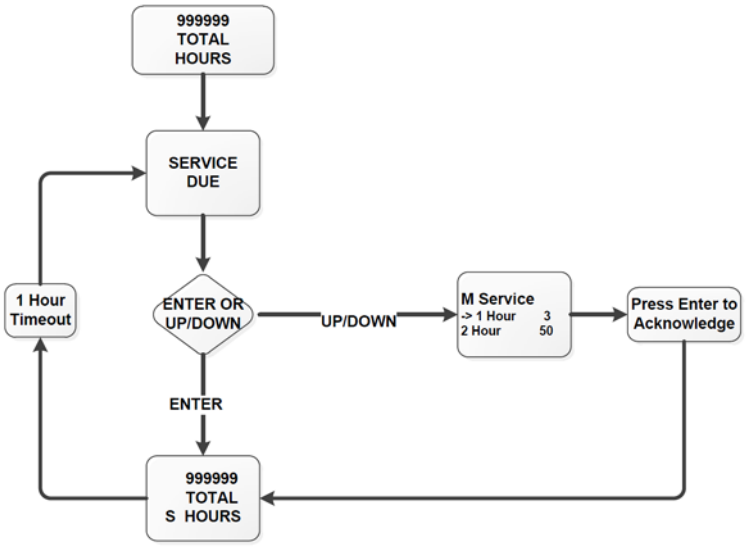


Figure 3

The service intervals can be changed by pressing the ENTER Button while on the default screen that displays the engine hours. Using the UP or DOWN Buttons to highlight the desired interval and press the ENTER Button to select. Use the UP and DOWN Buttons to increase or decrease the number of hours. Hours will decrement with every hour on the engine. Use the DOWN Button to highlight the Main Screen menu item and press the ENTER Button to return to the Default Screen of Engine Hours. **See Figure 4.**

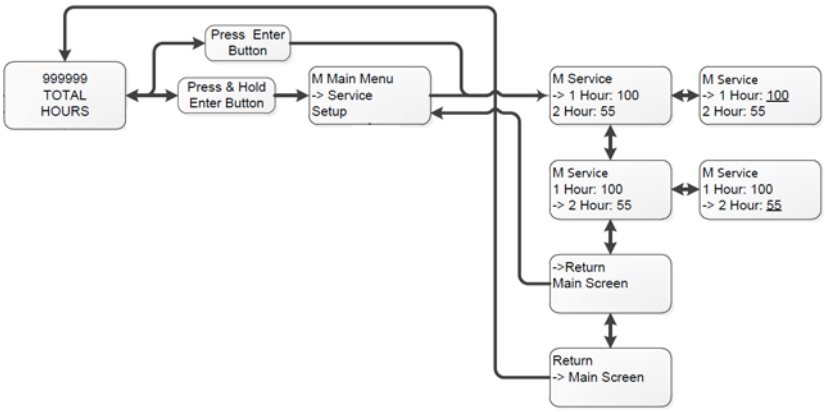


Figure 4

LANGUAGES AND UNITS

The MidPort is user configured to display in English, Spanish, or French languages and in either English or Metric units. The Language and Display units can be changed by accessing the Setup Menu. To access the Setup Menu, press and hold the ENTER Button while the Default Screen of Engine Hours is displayed until the Main Menu appears. Scroll to the Setup option using the DOWN Button then press the ENTER Button. Use the DOWN or UP Buttons to highlight the chosen unit and PRESS the ENTER Button to select. To return to the Default Screen of Engine Hours, use the DOWN Button to highlight the Main Screen menu item and press the ENTER Button. **See Figure 5.**

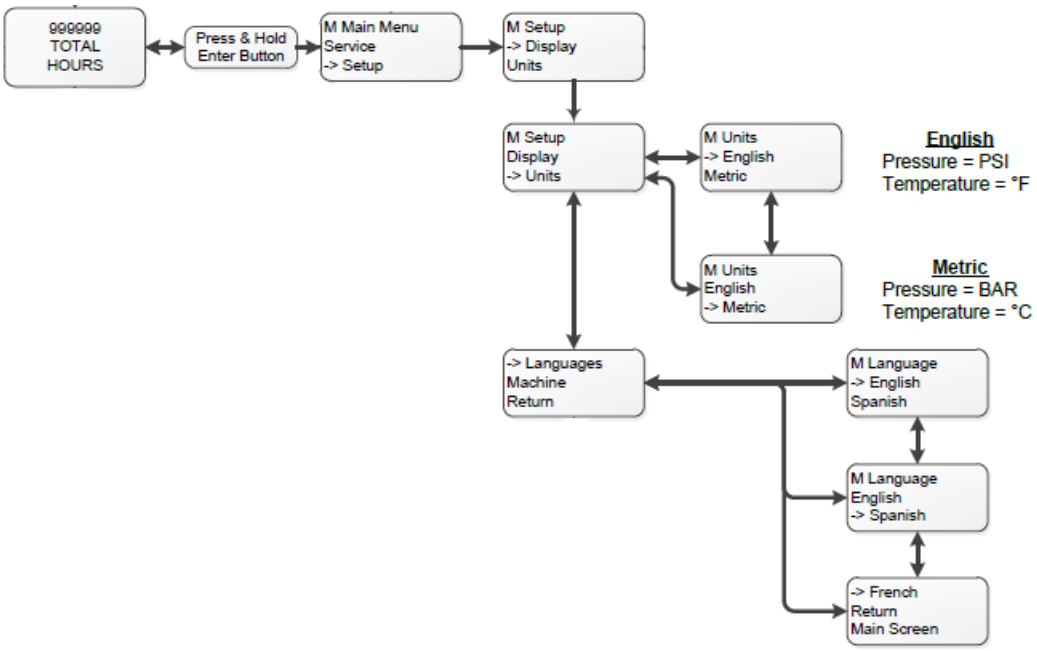


Figure 5

QUICKVIEW SCREENS (ENGINE AND COMPRESSOR PARAMETERS)

The Quick View Screens allow for easy viewing of up to 18 commonly used parameters by pressing the UP and DOWN Buttons. Pressing the UP and DOWN Buttons continuously loops through the Quick View Screens (i.e., when the last screen is reached pressing the DOWN Button displays the first screen and vice versa).

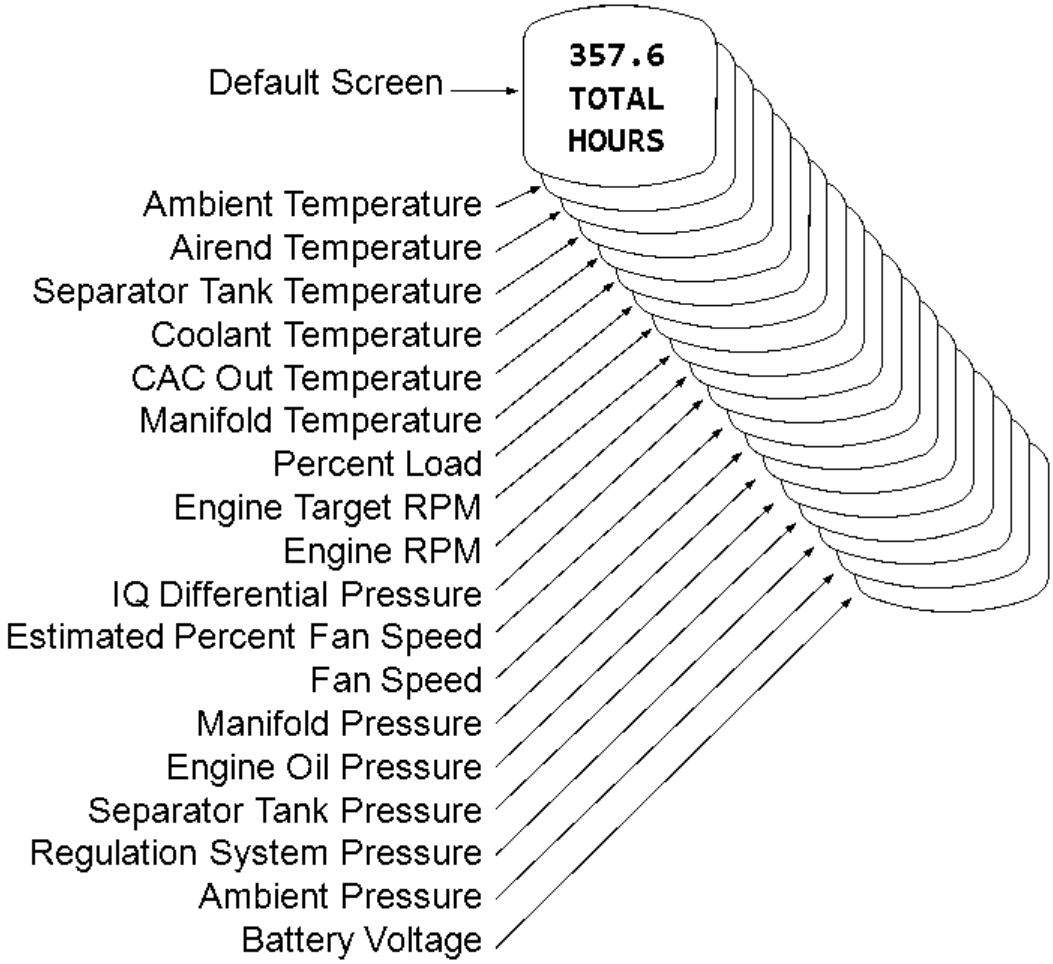


Figure 6

Note 1: Only the parameters that are available from the engine or compressor will be displayed.

Note 2: Unit times out after 3 minutes of inactivity and returns to the Default Screen of Engine Hours.

Note 3: Pressing the Enter Button while viewing a Quickview Screen will return to the Default Screen of Engine Hours.

DISPLAY SETUP

The Display Menu functions give users the ability to configure the LCD. Options for configuring the display include intensity, contrast, and viewing mode. To access the Display Menu:

1. Press and hold the ENTER Button while the Default Screen of Engine Hours is displayed until the Main Menu appears.
2. Scroll to the Setup option using the DOWN Button and press the ENTER Button.
3. Scroll to the Display option using the DOWN Button and press the ENTER Button.
4. Use the DOWN or UP Buttons to highlight and the ENTER Button to select the desired display setting. **See Figure 7**.
5. To return to the Default Screen of Engine Hours, use the DOWN Button to highlight the Main Screen menu item and press the ENTER Button. **Note:** Main Screen menu item returns the user back to the Default Screen of Engine Hours.

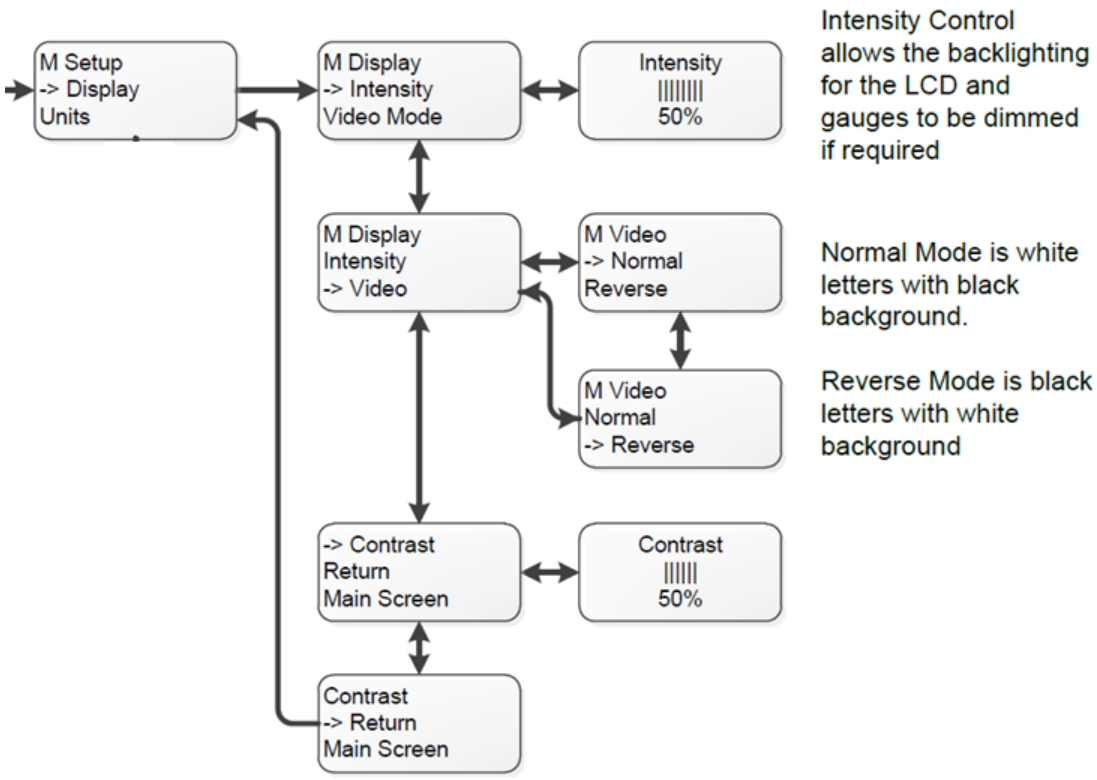


Figure 7

AUTO POWER OFF

The Compressor Control System has a power save feature designed to prevent drain on the batteries when the compressor engine is not running. If the Control Panel is powered ON and the engine has not run for 3 minutes (above 45°F (7°C) or 15 minutes at or below 45°F (7° C)), the control system will automatically power OFF. Power can be restored by pressing the Main Power Button.

In the event of a fault, this feature is not active and the power will remain on until the fault has been acknowledged or the control system is manually powered off.

WAIT TO START

When the Main Power Button is pressed, the display will initialize and the Wait to Start message will be displayed. While the Wait to Start message is displayed, the engine will receive heat from the intake heater if required. It is best to start the engine immediately after the Wait to Start message changes to Engine Total Hours.

Lifting

The central lifting bail allows the compressor to be lifted from a single point. Use hoist or crane capable of lifting compressor weight (See General Data).

⚠ WARNING

Falling off the compressor can cause serious injury or death. Use ladder and handholds to access lifting bail.

Before Towing

Ensure the tires, wheels and running gear are in good condition and secure.

High Speed Running Gear

- Use jack to raise or lower drawbar.
- Use tow vehicle whose towing capacity is greater than the weight of the compressor (See General Data).
- Do not tow the compressor in excess of the maximum towing speed (See General Data).
- Place wheel chocks under tires and/or set parking brake before disconnecting from towing vehicle.
- When raising or lowering drawbar, always stand to one side.

Setting Up

Place the compressor in an open, well-ventilated area. Ensure sufficient clearance for ventilation and exhaust requirements. Adequate clearance needs to be allowed around and above the compressor to permit safe access for specified maintenance tasks.

Position as level as possible. Do not exceed the out-of-level operating limit (See General Data).

When the compressor is to be operated out-of-level, it is important: (1) to keep the engine oil level near the high level mark (with the compressor level), and (2) to have the compressor oil level gauge show no more than mid-scale (with the compressor running at full load). Do not overfill either the engine oil or the compressor oil.

Ensure the compressor is positioned securely and on a stable foundation. Any risk of movement should be removed by suitable means, especially to avoid strain on air discharge piping.

Chock wheels and/or set parking brake.

Ensure all transport and packing materials are removed.

Compressor Mounting

Portable compressors, which are modified to remove the running gear and mount the compressor directly to trailers, truck beds, or frames, etc. may experience failure of the enclosure, frame, and/or other components. It is necessary to isolate the compressor package from the carrier base with a flexible mounting system. Such a system must also prevent detachment of the package from the carrier base in the event the isolators fail. Contact your Portable Power representative for flexible mounting kits.

Warranty does not cover failures attributable to mounting of the compressor package to the carrier base unless it is a Portable Power provided system.

Service Air Connection(s)

All air pressure equipment installed in or connected to the compressor must have safe working pressure ratings of at least the safety valve setting and materials compatible with the compressor oil (Refer to the General Data).

⚠ WARNING

Do not connect the air discharge on this compressor onto a common header with any other unit of any description, or any other source of compressed air, without first ensuring a check-valve is used between the header and the compressor. If this compressor is connected in parallel with another compressor of higher discharge pressure and capacity a safety hazard could occur in a back-flow condition.

⚠ WARNING

Unrestricted air flow from a hose will result in a whipping motion of the hose which can cause serious injury or death. A safety device must be attached to the hose at the source of supply to reduce pressure in case of hose failure or other sudden pressure release. Reference: OSHA regulation 29 CFR Section 1926.302 (b).

Air Hose Restraint Installation

Safety devices such as hose restraints (whipchecks) must be used to prevent hose whipping if a connection fails. Whipchecks are to be constructed of woven stainless steel, galvanized steel wire rope, or chain with a minimum strength adequate for the supplied pressure and hose diameter. Whipchecks must be fastened to suitable mounting points or shackles.

The mounts and/or shackles are to be of the same or greater strength as the whipchecks. An engineer should be consulted about suitability of whipchecks, mounts, mounting points, shackles, and fittings as well as strength rating of materials. Whipchecks must be used at the hose origination, termination, and each hose to hose connection.

Hoses can fail in areas other than at connecting points and require daily inspection of the hoses for:

- Cuts, cracks, or kinks
- Weakened clamps due to rust and corrosion
- Damaged connections
- Deformity
- Incorrect or incompatible components or fittings
- Any visual damage

Hoses must be selected that are rated for the application as to the maximum pressure and temperature to be encountered as well as compatible with the materials being conveyed inside the hose. Hoses must be compatible with the compressor oil.

Before Starting

Open Manual Blowdown Valve to ensure the separator tank has been vented of all pressure. Close the valve before starting. Inspect the complete installation including remote fuel lines (if any) and air hose routing and connections. Check battery for proper connections and condition.

⚠ WARNING

Combustible gas can cause severe burns, blindness, or death. Keep sparks and open flame away from battery.

Check the compressor oil level. Maintain the oil level between bottom and midway of the sight glass on the separator tank.

Check engine oil level. The proper level is labeled on the engine dipstick. Add oil when required. Do not overfill.

⚠ CAUTION

Exercise extreme caution when using an external method to jumpstart a unit. Verify the electrical systems on the weak battery system and the external jump system are the same voltage type system, 12VDC or 24VDC. Connect the Positive (+) terminal of the external system to the Positive (+) terminal on the weak system. Connect the Negative (-) terminal of the external system to the Negative (-) terminal of the weak system. Always disconnect the two systems in reverse order.

⚠ WARNING

Do not remove the pressure cap from a HOT engine radiator. The sudden release of pressure from a heated cooling system can result in a loss of coolant and possible severe personal injury.

⚠ WARNING

Hot pressurized fluid can cause serious burns. Do not open radiator while hot.

Check coolant to ensure coolant level is at or above minimum level when the engine is cold. Check engine coolant level at radiator pressure cap. Add coolant as required. Ensure pressure cap is installed properly and tightened.

NOTICE

If the appropriate mixture of antifreeze is not used during freezing temperatures, failure to drain the engine may cause costly engine damage. Never use water only, as corrosion inhibitors are required in engine coolant fluid.

⚠ CAUTION

No smoking, sparks, or open flame near fuel.

Check the fuel level and add fuel as necessary. Ultra-low sulfur diesel fuel (ULSD), with a maximum sulfur content of 15 ppm is required. If ultra-low sulfur diesel is not used, the engine could possibly not meet emissions regulations and the engine or aftertreatment system may be damaged. Refer to the Engine Operator Manual for fuel specifications.

NOTICE

To minimize condensation (water) in the fuel tank, it is recommended to fill the tank at the end of each day.

NOTE: Compressor will not allow engine starting if the fuel level is below the minimum fuel shut off level.

⚠ WARNING

Compressor produces loud noise with doors open. Extended exposure to loud noise can cause hearing loss. Wear hearing protection when doors or valve(s) are open.

Close the doors to maintain a cooling air path and to avoid recirculation of hot air. This will maximize the life of the engine and compressor and protect the hearing of surrounding personnel.

Ensure no one is IN or ON the compressor.

Ensure that the location of the Emergency Stop Button (if equipped) is known and recognized by its markings. Ensure that it is functioning correctly and that the method of operation is known.

⚠ WARNING

Ensure that the access panels for heat exchanger cleaning are closed and secure before starting the compressor. Rotating fan blades can cause serious injury or death. Do not operate without all guards in place.

Starting

⚠ CAUTION

Do not use ether or any other starting fluid. Starting fluids can cause an explosion, fire, and severe engine damage. The engine is equipped with an electric heater starting aid.

NOTICE

This compressor is equipped with a battery disconnect switch which disconnects power for long term storage. The switch is located on the fuel tank side.

This switch must be in the ON position to provide power to the Control Panel for starting the compressor.

1. Press the Main Power Button. 
2. When the Wait To Start message on the MidPort changes to Total Engine Hours =, press and release Green Start Button  .
3. Engine will crank until engine starts or engine starting time limit is reached. The first Green light on the Start Button will illuminate.
4. If engine fails to start, press Main Power Button  to remove power from engine, then repeat steps 1-3.
5. When engine starts, the first two lights on the Start Button will illuminate.
6. Wait for Engine Temperature to reach 150°F (65°C). Press Service Air Button.  The third light on the Start Button will illuminate.
7. The compressor will start in the Low Pressure Mode and the Low Pressure Light will be illuminated on the Low Pressure Button.
8. To change to the High Pressure Mode, press the High Pressure Button. Three lights on the button will illuminate.

⚠ CAUTION

To ensure an adequate flow of oil to the airend, never allow the discharge pressure to fall below 50 psi.

Normal Operation

The operator may observe and monitor operating parameters using the MidPort and gauges. In the event the compressor controller detects a parameter outside normal operating limits, the compressor will alert and/or shutdown, and display a diagnostic code.

In the event the compressor controller detects a parameter at a dangerously high or low level, the compressor will be automatically shut down with the cause of the shutdown shown on the MidPort.

Two Pressure Modes of Operation

The compressor is capable of operating at two pressure modes:

1. The Low Pressure Mode is activated by pressing the Lo Pressure Button. 

In this mode, the compressor will regulate according to the air demand, between 0 and rated air delivery (See General Data) at the lower regulated set pressure (See General Data). The regulated set pressure of this mode can be regulated as low as 80 psi.

2. The High Pressure Mode is activated by pressing the Hi Pressure Button. 

In High Pressure Mode, the compressor will regulate according to air demand, between 0 and rated air delivery (See General Data) at the higher regulated set pressure (See General Data). The regulated set pressure of this mode can be regulated as low as 80 psi.

The mode of the compressor can be changed between the Low and High at anytime. Engine speed will be lower at the HI Pressure Mode setting.

Operation - Loaded

Assume engine has been started and is running in the unload state at idle speed. If there is air demand (pressure falls below the load point pressure), compressor will load at idle speed by opening the inlet valve. As air demand rises and falls, engine speed is controlled between idle speed and full load speed to match the required flow while maintaining load point pressure.

Operation - Unloaded

If there is no air demand at idle speed (pressure rises above the unload point pressure), the compressor will unload by closing the inlet valve. The compressor then runs at idle speed unloaded with no air delivery. If air demand increases (pressure falls below the load point pressure), the compressor reloads to meet the required air demand.

Shutdown

1. Close the Service Valve.

2. Allow the engine to idle for 3 minutes to cool down.

3. Press the Red Stop Button 

4. Press the Main Power Button  when use of the compressor is not needed.

Note: Until Main Power Button is pressed, the gauges can be read and the MidPort can be navigated using the UP, DOWN, and ENTER Buttons.

5. If the Main Power Button is not pressed within 3 minutes (if ambient temperature is above 45°F (7°C) or 15 minutes if ambient temperature is 45°F (7°C) or below of the keypad use the compressor will automatically shut off.

NOTICE

Failure to allow turbocharger cool down prior to stopping can cause turbocharger damage.

NOTICE

This compressor is equipped with a battery disconnect switch which disconnects power for long term storage. The switch is located on the fuel tank side.

Do not use the battery disconnect switch for normal stopping. Wait 1 minute after stopping engine before turning the battery disconnect switch to the OFF position.

⚠ CAUTION

Use the Emergency Stop, if equipped, only for emergency conditions. Do not use for normal stopping. Emergency Stop must be reset before starting can be accomplished.

NOTICE

Once the engine stops, the Automatic Blowdown Valve will relieve pressure from the separator tank. If the Automatic Blowdown Valve fails to operate, pressure must be relieved from the system by means of the Manual Blowdown Valve.

⚠ WARNING

Pressure will remain in the system between the Minimum Pressure Valve and the Service Valve after shutdown and operation of the Automatic Blowdown Valve. This pressure must be relieved by disconnecting any downstream equipment and opening the Discharge Valve to atmosphere.

⚠ CAUTION

Never allow the compressor to sit stopped with pressure in the separator tank or piping. As a precaution, open the Service Valve.

Decommissioning

When the compressor is to be permanently decommissioned or dismantled, it is important to ensure that all hazard risk are either eliminated or recepient of the compressor notified. In particular:

- Do not destroy batteries or components containing asbestos without containing the materials safely.
- Do not dispose of any pressure vessel that is not clearly marked with its relevant data plate information or rendered unusable by drilling, cutting, etc.
- Do not allow lubricants or coolants to be released into land surfaces, water, or drains.
- Do not dispose of a complete compressor without documentation relating to instructions for its use.

Maintenance

General Information

This section refers to the various components which require periodic maintenance and replacement.

The Maintenance Schedule indicates the various components' descriptions and the intervals when maintenance has to take place. Fluid capacities can be found in the General Data Section of this manual. For any specification or specific requirement on service or preventative maintenance for the engine, refer to the Engine Manual.

Compressed air can be dangerous if incorrectly handled. Review all maintenance precautions listed below before attempting any maintenance work on the compressor.

Maintenance Precautions

Prior to attempting any maintenance work, ensure:

1. All pressure is vented from the system and the compressor cannot be started accidentally.
2. If the Automatic Blowdown Valve fails to operate, pressure must be gradually relieved by operating the Manual Blowdown Valve.
3. The discharge pipe/manifold area is depressurized by opening the discharge valve while keeping clear of any air flow.
4. Maintenance personnel are adequately trained, competent, and have read the Operation and Maintenance Manual.

Pressure will remain in the system between the Minimum Pressure Valve and the Service Valve after shutdown and operation of the Automatic Blowdown Valve. This pressure must be relieved by disconnecting any downstream equipment and opening the discharge valve to atmosphere.

Prior to opening or removing panels or covers inside a compressor, ensure:

1. Anyone entering the compressor is aware of the reduced level of protection and the additional hazards, including hot surfaces and intermittently moving parts.
2. The compressor cannot be started. Post warning signs and/or fit anti-start devices.
3. Battery cables are disconnected.

Prior to attempting any maintenance work on a running compressor, ensure:

1. The work carried out is limited to only those tasks which require the compressor to run.
2. The work carried out with safety protection devices disabled or removed is limited to only those tasks which require the compressor to be running with safety protection devices disabled or removed.
3. All hazards present are known (e.g. pressurized components, electrically live components, removed panels, covers and guards, extreme temperatures, inflow and outflow of air, intermittently moving parts, safety valve discharge).
4. Appropriate personal protective equipment is worn.
5. Loose clothing, jewelry, long hair etc. is made safe.
6. Warning signs indicating that Maintenance Work is in Progress are posted in a position that can be clearly seen.

Upon completion of maintenance task and prior to returning the compressor into service, ensure:

1. The compressor is suitably tested.
2. All guards and safety protection devices are refitted.
3. All panels are replaced, canopy and doors closed.
4. Hazardous materials are effectively contained and disposed of.

NOTICE

The maintenance schedule in this manual describes the service intervals that should be followed for normal applications of this compressor. This page may be reproduced and used as a checklist by service personnel.

In more severe applications (i.e., sandblasting, quarry drilling, well drilling, and oil and gas drilling) more frequent service intervals will be required to ensure long component life.

Dust and dirt, high humidity, and high temperatures will affect lubricant life and service intervals for components such as inlet air filters, oil separation elements, and oil filters.

Maintenance Schedule

	Initial 500 miles /850 km	Daily	Weekly	Monthly	Every 3 Months 500 hrs.	Every 6 Months 1000 hrs.	Every 12 Months 2000 hrs.
Compressor Oil Level		C					
Engine Oil Level		C					
*Radiator Coolant Level		C					
Gauges/Lamps		C					
*Air Cleaner Service Indicators		C					
Fuel Tank (Fill at end of day)		C				D	
*Fuel/Water Separator Drain		C					
Oil Leaks		C					
Fuel Leaks		C					
Drain Water From Fuel Filters		D					
Coolant Leaks		C					
Radiator Filler Cap		C					
*Emergency Stop		T					
*Lubricator (Fill)		C					
Air Cleaner Precleaner Dumps			C				
Fan/Alternator Belts			C				
Battery Connections/Electrolyte			C				
Hoses (Oil, Air, Intake, etc.)				C			
Automatic Shutdown System				C			
Air Cleaner System				C			
Compressor Oil Cooler Exterior				C			
*Engine Rad/Oil Cooler Exterior				C			
Engine Charge Air Cooler Exterior				C			
*Aftercooler Exterior				C			
Safety Valve					C		
Fasteners, Guards					C		

*Disregard if not appropriate for this particular compressor.

(1) or 3000 miles/5000km whichever is the sooner

C = Check (adjust, clean or replace as necessary)

CBT = Check before towing.

D = Drain

G = Grease

R = Replace

T = Test

CR = Check and report

W I = or when indicated if earlier.

	Initial 500 miles /850 km	Daily	Weekly	Monthly	Every 6Months 500 hrs.	Every 12 Months 1000 hrs	Every 48 Months 5000 hrs
Air Cleaner Elements					R/WI		
*Fuel/Water Separator Element					R		
Fuel Filter Element					R		
Engine Oil Change					R		
Engine Oil Filter					R		
*Engine Coolant Cond. Element					R		
Compressor Oil Filter Element					R		
Compressor Oil					R		
Oil Separator Element						R	
Separator Tank Exterior (2)						CR	
*Engine Coolant					C	R	
Engine Crankcase Breather Element						R	
*Water Pump Grease.						G	
Shutdown Switch Settings						T	
Scavenge Orifice & Related Parts						C	
Scavenge Line					C		
*Valve Clearance Check							C
*Feed Pump Strainer Cleaning						C	
*Injection Nozzle Check							C

*Disregard if not appropriate for this particular compressor.

(1) or 3000 miles/5000km whichever is the sooner

(2) or as defined by local or national legislation

C = Check (adjust, clean or replace as necessary)

CBT = Check before towing.

CR = Check and report

D = Drain

G = Grease

R = Replace

T = Test

W I = or when indicated if earlier.

	Initial 500 miles /850 km	Daily	Weekly	Monthly	3 Months 500 hrs.	6 Months 1000 hrs	12 Months 2000 hrs
*Brake linkage	C				C		
*Brakes	C				C		
*Lights (running, brake, & turn)		CBT					
*Pintle Eye Bolts		CBT					
*Tire Pressure and Condition			C				
*Wheel Lug Nuts				C			
*Running gear linkage				G			
*Running gear bolts(1)					C		
*Wheels (Bearings, Seals, etc.)						C	G
	2 Yrs	**4 Yrs**	**6 Yrs**				
Safety valve	C						
Hoses		R					
Separator tank (2) interior			C				

*Disregard if not appropriate for this particular compressor.

(1) or 3000 miles/5000km whichever is the sooner

(2) or as defined by local or national legislation

C = Check (adjust, clean or replace as necessary)

CBT = Check before towing.

CR = Check and report

D = Drain

G = Grease

R = Replace

T = Test

W I = or when indicated if earlier.

Refer to specific sections of the operator's manual for more information.

Scavenge Line

The scavenge line runs from the combined orifice/check valve at drop tube in the separator tank to the fitting located in the airend.

Check that the scavenge line and tube are clear of any obstruction. Refer to the Maintenance Schedule for recommended servicing intervals. Any blockage will result in oil carryover into the discharge air.

Compressor Oil Filter

Refer to the Maintenance Schedule for the recommended servicing intervals.

Removal

⚠ WARNING

Do not remove the filter(s) without first ensuring the compressor is shut off and the system has been completely relieved of all air pressure. (Refer to STOPPING in the OPERATING INSTRUCTIONS section of this manual).

Clean the exterior of the filter housing and remove the spin-on element.

Inspection

Inspect the oil filter head to be sure the gasket was removed with the oil filter element. Clean the gasket seal area on the oil filter head.

⚠ CAUTION

If there is any indication of the formation of varnishes, shellacs, or lacquers on the filter element, it is a warning that the compressor lubricating and cooling oil has deteriorated and should be changed immediately. Refer to LUBRICATION section.

NOTICE

Installing a new oil filter element when the old gasket remains on the filter head will cause an oil leak and can cause property damage.

Reassembly

Clean the filter gasket contact area and install the new element. Tighten until the gasket makes contact with the filter housing. Tighten an additional 1/2 to 3/4 of a revolution.

⚠ CAUTION

Start the compressor (refer to BEFORE STARTING and STARTING in the OPERATING INSTRUCTIONS section of this manual) and check for leakage before the compressor is put back into service.

Compressor Oil Separator Element

Refer to the Maintenance Schedule in this section for the recommended servicing intervals. If the element has to be replaced, then proceed as follows:

Removal

⚠ WARNING

Do not remove the filter(s) without first ensuring the compressor is shut off and the system has been completely relieved of all air pressure. (Refer to STOPPING in the OPERATING INSTRUCTIONS section of this manual).

Disconnect all hoses and tubes from the separator tank cover plate. Remove the drop tube from the separator tank cover plate and remove the cover plate. Remove the separator element.

Inspection

Examine the separator element. Examine all hoses and tubes, and replace if necessary.

Reassembly

Thoroughly clean the orifice/drop tube and filter gasket contact area before reassembly. Install the new element.

⚠ WARNING

DO NOT remove the staple from the anti-static gasket on the separator element since it serves to ground any possible static build-up. DO NOT use gasket sealant since this will affect electrical conductance.

Reposition the cover plate, taking care not to damage the gasket. Replace the cover plate screws tightening in a criss-cross pattern to the recommended torque (refer to the torque values in this section).

Reconnect all hoses and tubes to the separator tank cover plate.

Replace the compressor oil (refer to LUBRICATION section).

⚠ CAUTION

Start the compressor (refer to BEFORE STARTING and STARTING in the OPERATING INSTRUCTIONS section of this manual) and check for leakage before the compressor is put back into service.

Compressor Oil Cooler, Engine Radiator, and other Heat Exchangers

When grease, oil, and dirt accumulate on the exterior surfaces of the heat exchangers, the efficiency is impaired. It is recommended that the heat exchangers be cleaned per the Maintenance Schedule in this manual by a jet of compressed air. This should remove any accumulation of oil, grease, and dirt from the exterior cores of the cooler so the entire cooling area can radiate heat into the air stream. Access doors are located on each side of the compressor to provide access to aid in cleaning the heat exchangers.

⚠ WARNING

Ensure the heat exchanger access doors are closed and secure before starting the engine.

⚠ WARNING

Hot engine coolant and steam can cause injury. When adding coolant or antifreeze solution to the engine radiator, stop the engine and allow radiator to cool prior to releasing the radiator pressure cap. Using a cloth to protect the hand, slowly release the pressure cap, absorbing any released fluid with the cloth. Do not remove the pressure cap until all excess fluid is released and the engine cooling system fully depressurized.

⚠ WARNING

Follow the instructions provided by the antifreeze supplier when adding or draining the antifreeze solution. It is advisable to wear personal protective equipment to prevent skin and/or eye contact with the antifreeze solution.

Air Filter Elements

The air filter elements should be replaced regularly (refer to the Maintenance Schedule) or when indicated on the Control Panel, whichever comes first. The aircleaner precleaner dumps should be cleaned as indicated in the Maintenance Schedule (more frequently in dusty operating conditions).

Removal

⚠ CAUTION

Never remove and replace element(s) when the compressor is running.

Clean the exterior of the filter housing and remove the filter element by following instructions on the filter.

If the safety element is to be replaced, thoroughly clean the interior of the filter housing prior to removing the safety element.

Inspection

Check for cracks, holes, or any other damage to the element by holding it up to a light source or by passing a lamp inside.

⚠ CAUTION

If inspection reveals damage to the main element, the safety element must be replaced.

Check the seal at the end of the element and replace if any sign of damage is evident.

Reassembly

Assemble the new element into the filter housing ensuring the seal seats properly. Secure element following instructions on the filter.

Before restarting the compressor, ensure all clamps are tight.

Ventilation

Ensure air inlets and outlets are clear of debris etc.

Cooling Fan Drive

Every 3 months check to ensure fan drive mounting bolts to the engine have not loosened. If, for any reason, it becomes necessary to remove or re-tighten the mounting bolts, apply a good grade of commercially available thread locking compound to the bolt threads and tighten to 23Nm (17 ft-lbF) of torque.

The fan belt(s) should be checked monthly for wear and correct tensioning.

This compressor is equipped with a variable speed fan clutch and requires no periodic maintenance.

Fuel System

The fuel tank(s) should be filled daily or every eight hours. To minimize condensation in the fuel tank(s), it is advisable to top up after the compressor is shut down or at the end of each working day. Drain any sediment or condensate that may have accumulated in the tank(s). Refer to Maintenance Schedule.

Fuel Filter Water Separator

The fuel filter water separator contains a filter element which should be replaced as required by the Maintenance Schedule.

Charge Air Cooler Pipework

Foreign particles can damage the engine and turbocharger. Maintain internal cleanliness and integrity of the air filtration, intake piping, and charge air cooler piping to help avoid damage. Monthly inspect systems for leaks and that hoses, clamps, and connections are sealed. Check for damaged or deteriorated components. Pay careful attention to keep the internal surfaces clean, particularly when parts are removed for inspection or service.

Hoses

All components of the fuel, engine cooling, and air intake system should be checked monthly to keep the engine at peak efficiency.

At the recommended intervals, (see the Maintenance Schedule), inspect all of the intake lines to the air filter, and all flexible hoses used for air lines, oil lines, and fuel lines.

Every 3 months inspect all pipework for cracks, leaks, etc. and replace immediately if damaged.

Electrical System

⚠ WARNING

Disconnect the battery cables before performing any maintenance or service.

Check the security of electrical devices and sensors to ensure terminals and/or connectors are tight. Loose connections may cause local hot spot oxidation.

When removing connectors from electrical devices and sensors, inspect the terminals to ensure they have electrical grease on them. If electrical grease is not present or very minimal, add a small amount of Doosan Part No. 22409114 Electrical Grease to the terminals.

Dirty and/or corroded electrical terminals can be cleaned using electrical contact cleaner.

Inspect the components and wiring for signs of overheating (i.e., discoloration, charring of cables, deformation of parts, acrid smells, and blistered paint).

Battery

Keep the battery terminals and cable clamps clean and lightly coated with petroleum jelly to prevent corrosion. The battery restraint should be kept tight enough to prevent the battery from moving.

Pressure System

Regularly, it is necessary to inspect the external surfaces of the pressure system, from the Airend through to the Service Valve(s) including hoses, tubes, tube fittings, and the separator tank for visible signs of impact damage, excessive corrosion, abrasion, tightness, and chafing. Any suspect parts should be replaced before the compressor is put back into service.

Tire Pressure

See the General Data Section of this manual.

Running Gear/Wheels

Check wheel nut torque 20 miles (30 kilometers) after refitting the wheels. Refer to Torque Values later in this section.

Lifting jacks should only be used under the axle.

Bolts securing the running gear to the chassis should be checked for tightness (refer to the Maintenance Schedule for frequency). Re-tighten where necessary. Refer to Torque Values later in this section.

Lubrication

⚠ CAUTION

Always check the oil levels before a new compressor is put into service.

If, for any reason, the compressor oil has been drained, it must be re-filled with new oil before putting into operation.

Engine Oil

The engine oil and oil filter element should be changed at the engine manufacturer's recommended intervals. Refer to the Engine Operator Manual.

The Tier 4 engine in this compressor requires engine lubricating oil to ensure proper Aftertreatment System operation and engine durability. Doosan Tier 4 Premium Engine Oil is recommended. Refer to the Engine Operator Manual for engine oil specifications.

Compressor Oil

Refer to the Maintenance Schedule in this section for service intervals.

NOTE: If the compressor has been operating under adverse conditions or has suffered long shutdown periods, more frequent service intervals will be required.

⚠ WARNING

DO NOT, under any circumstances, remove any drain plugs or the oil filler plug from the compressor lubricating and cooling system without first ensuring the compressor is stopped and the system has been completely relieved of all air pressure (refer to STOPPING in the Operating Instructions Section of this manual).

Completely drain the separator tank, piping, and oil cooler by removing the drain plug(s) and collecting the used oil in a suitable container.

Replace the drain plug(s) ensuring that each one is secure.

NOTE: If the oil is drained immediately after the compressor has been in operation, most of the sediment will be in suspension and will drain more readily.

⚠ CAUTION

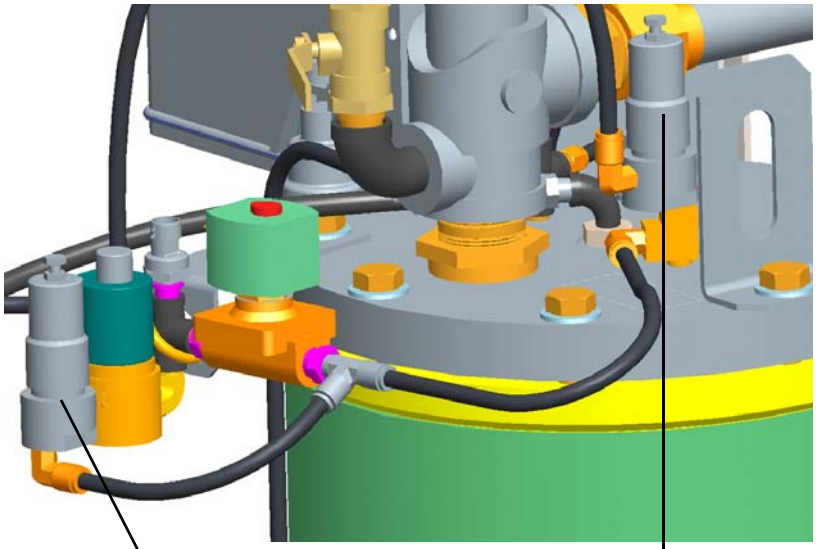
Some oil mixtures are incompatible and result in the formation of varnishes, shellacs, or lacquers which may be insoluble. Refer to the Portable Compressor Oil Chart.

Running Gear Wheel Bearings

Wheel bearings should be greased per the Maintenance Schedule in this manual. The type of grease used should conform to specifications below:

Grease	
Thickener Type	Lithium Complex
Dropping Point	215°C (419°F) Minimum
Consistency	NLGI No.2
Additives	EP, Corrosion & Oxidation Inhibitors
Viscosity Index	80 Minimum

Pressure Regulator Adjusting Instructions



Before Starting

1. Select Low Pressure Mode by pressing the LO Pressure Button.

2. At the Low Pressure Regulator, loosen the jam nut and turn screw counterclockwise until tension is no longer felt at the screw. Turn screw clockwise one full turn.

3. If high pressure regulation needs adjustment, repeat Step 2 at High Pressure Regulator.

4. Close Service Valves.

After Starting Unit

5. Push the Service Air Button on the Control Panel. The unit should speed up and then unload (and drop back to IDLE). With the unit unloaded, turn the adjusting screw on the Low Pressure Regulator clockwise until the discharge pressure gauge indicates 25 psi over the rated pressure. Tighten the pressure regulator jam nut.

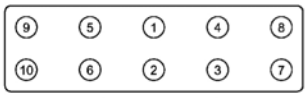
6. To adjust the high pressure regulation, repeat Step 5 on High Pressure Regulator except adjust pressure at idle to 25 psi over the rated pressure while in High Pressure Mode.

Note: The High Pressure Regulator must be set at a higher pressure than the Low Pressure Regulator.

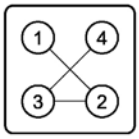
Torque Values

TABLE 1 INCH FASTENERS

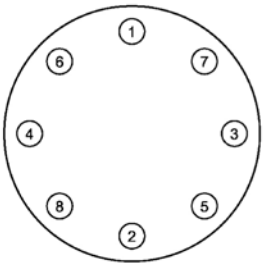
CAPSCREW OR NUT THREAD SIZE AND PITCH	NOMINAL DESIGN TORQUE			
	SAEJ249 GRADE 5 (HEAD MARKING)		SAEJ249 GRADE 8 (HEAD MARKING)	
	(Nm.)	(FT-LBF)	(Nm.)	(FT-LBF)
1/4 - 20	11	8	16	12
5/16 - 18	24	17	33	25
3/8 - 16	42	31	59	44
7/16 - 14	67	49	95	70
1/2 - 13	102	75	144	106
9/16 - 12	148	109	208	154
5/8 - 11	203	150	287	212
3/4 - 10	361	266	509	376



TYPICAL RECTANGULAR TORQUE PATTERN



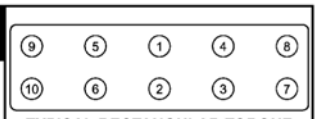
TYPICAL SQUARE TORQUE PATTERN



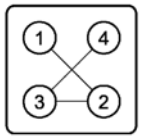
TYPICAL CIRCULAR TORQUE PATTERN

TABLE 2 METRIC FASTENERS

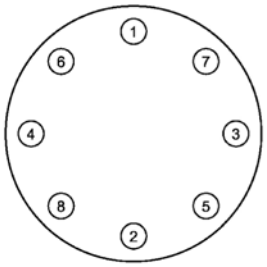
CAPSCREW OR NUT THREAD SIZE AND PITCH	NOMINAL DESIGN TORQUE					
	PROPERTY GRADE 8.8 (HEAD MARKING)		PROPERTY GRADE 10.9 (HEAD MARKING)		PROPERTY GRADE 12.9 (HEAD MARKING)	
	(Nm.)	(FT-LBF)	(Nm.)	(FT-LBF)	(Nm.)	(FT-LBF)
M6 X 1.0	11	8	15	11	18	13
M8 X 1.25	26	19	36	27	43	31
M10 X 1.5	52	38	72	53	84	62
M12 X 1.75	91	67	126	93	147	109
M14 X 2	145	107	200	148	234	173
M16 X 2	226	166	313	231	365	270
M20 X 2.5	441	325	610	450	713	526



TYPICAL RECTANGULAR TORQUE PATTERN



TYPICAL SQUARE TORQUE PATTERN



TYPICAL CIRCULAR TORQUE PATTERN

Note: Cooling Fan Drive Bolts (10.9 M8x1.25) should be torqued to 23Nm (17ft-lbF).

TABLE 3 WHEEL TORQUE CHART

Wheel Torque Chart - Inch			**Wheel Torque Chart - Metric**		
1/2” lug nuts	**Torque (Ft-Lbs)**			**Torque (N-m)**	**Torque (ft-Lbs)**
13” Wheel	80-90				
15” Wheel	105-115		M12 Bolts	85-95	62-70
16” Wheel	105-115		M14 Bolts	145-155	107-115
16.5” Wheel	105-115		M16 Bolts	175-185	129-137
5/8” Lug Nuts			M18 Bolts	205-215	151-159
16” Wheel	190-210				
17” Wheel	190-210				
9/16” Clamp nuts/Demountable Wheels					
14.5” Wheel	105-115				

Lubrication

General Information

Lubrication is an essential part of preventive maintenance, affecting to a great extent the useful life of the compressor. Different lubricants are needed and some components require more frequent lubrication than others. Therefore, it is important that the instructions regarding types of lubricants and the frequency of their application be explicitly followed. Periodic lubrication of the moving parts reduces to a minimum the possibility of mechanical failures.

The **Maintenance Schedule** shows those items requiring regular service and the interval in which they should be performed. A regular service program should be developed to include all items and fluids. These intervals are based on average operating conditions. In the event of extremely severe (hot, cold, dusty, or wet) operating conditions, more frequent lubrication than specified may be necessary.

All filters and filter elements for air and compressor oil must be obtained through Portable Power to ensure the proper size and filtration for the compressor.

Compressor Oil Change

These compressors are furnished with an initial supply of oil sufficient to allow operation until the first service interval indicated in the **Maintenance Schedule**. If a compressor has been drained of all oil, it must be refilled with new oil before it is placed in operation. Refer to specifications in the Portable Compressor Oil Chart.

NOTICE

Some oil types are incompatible when mixed and result in the formation of varnishes, shellacs, or lacquers which may be insoluble. Such deposits can cause serious troubles including clogging of the filters. DO NOT mix oils of different types and avoid mixing different brands. A type or brand change is best made at the time of a complete oil drain and refill.

If the compressor has been operated for the time/hours indicated in the **Maintenance Schedule**, it should be drained of oil. If the compressor has been operated under adverse conditions, or after long periods in storage, an earlier change may be necessary as oil deteriorates with time as well as by operating conditions.

⚠ CAUTION

In most severe applications (i.e., sandblasting, quarry drilling, well drilling, and oil and gas drilling) more frequent service intervals will be required to ensure long component life.

⚠ WARNING

High pressure air can cause severe injury or death from hot oil and flying parts. Always relieve pressure before removing caps, plugs, covers, or other parts from pressurized air system. Ensure that the air pressure gauge reads zero (0) pressure and ensure there is no air discharge when opening the manual blowdown valve.

An oil change is good insurance against the accumulation of dirt, sludge, or oxidized oil products.

Completely drain the separator tank, piping, and cooler. Note: If the compressor has been operating under adverse conditions or has suffered long shutdown periods, more frequent service intervals will be required. If the oil is drained immediately after the compressor has been run for some time, most of the sediment will be in suspension and, therefore, will drain more readily. However, the oil will be hot and care must be taken to avoid contact with the skin or eyes.

After the compressor has been drained of all old oil, close the drain valves and/or plugs and install new oil filter elements. Add oil in the specified quantity at the filler plug. Tighten the filler plug and run the compressor to circulate the oil. Check the oil level. DO NOT OVERFILL.

NOTICE

Portable Power provides compressor oil specifically formulated for Portable Compressors. Use of these fluids is required to obtain extended limited airend warranty.

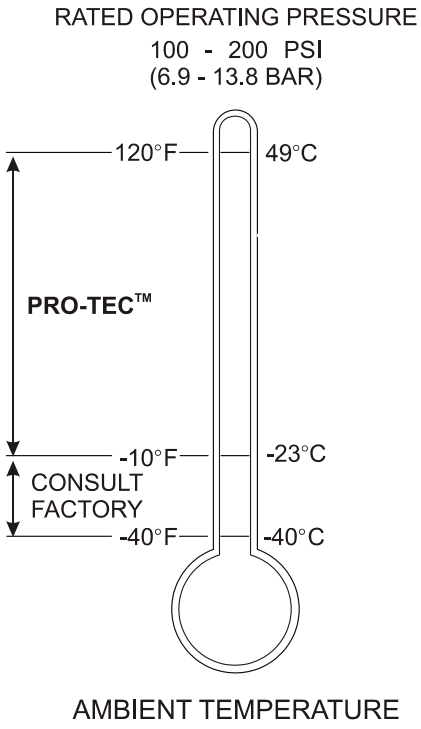
Portable Compressor Oil Chart

Refer to this chart for the correct compressor oil required. Note that the selection of oil is dependent on the rated operating pressure of the compressor and the ambient temperature expected to be encountered before the next oil change.

NOTE: Oils listed as “preferred” are required for extended warranty.

Compressor oil carryover (oil consumption) may be greater with the use of alternative oils.

Rated Operating Pressure	Ambient Temperature	Compressor Oil Specification
100 psi to 200 psi (6.9 to 13.8 bar)	-10°F to 120°F (-23°C to 49°C)	**Preferred: PRO-TEC™** Alternate: ISO Viscosity Grade 46 PAO, with rust and oxidation inhibitors, for rotary screw compressor service.
	Below -10°F (Below -23°C)	Consult Factory



Preferred Oils - Use of these oils with Doosan branded filters can extend airend warranty. Refer to the warranty policy for details or contact your representative.

Preferred Oils	1 gal. (3.8 Liter)	5 gal. (19.0 Liter)	55 gal. (208 Liter)	275 gal. (1041 Liter)
Pro-Tec	36899698	36899706	36899714	36899722
Tier 4 Engine Oil	46557017	46557016	46557015	

Troubleshooting

Introduction

Troubleshooting for a portable air compressor is an organized study of a particular problem or series of problems and a planned method of procedure for investigation and correction. The troubleshooting chart that follows includes some of the problems that an operator may encounter during the operation of a portable compressor.

The chart does not attempt to list all of the complaints that may occur, nor does it attempt to give all of the solutions for correction of the complaints. The chart does list the complaints that are most likely to occur. To use the Troubleshooting Chart:

A. Find the complaint depicted as a bold heading.

B. Follow down that column to find the potential cause or causes. The causes are listed in order to suggest an order to follow in troubleshooting.

Think Before Acting

Study the problem thoroughly and ask yourself these questions:

1. What were the warning signals that preceded the problem?
2. Has a similar problem occurred before?
3. What previous maintenance work has been done?
4. If the compressor will still operate, is it safe to continue operating to make further checks?

Do the Simplest Things First

Most problems are simple and easily corrected. For example, most complaints are “low capacity” which may be caused by too low an engine speed or “compressor overheats” which may be caused by low oil level.

Always check the easiest and most obvious things first. Following this simple rule will save time and trouble.

Double Check Before Disassembly

The source of most compressor troubles can be traced not to one component alone, but to the relationship of one component with another. Too often, a compressor can be partially disassembled in search of the cause of a certain problem and all evidence is destroyed during disassembly. Check again to be sure an easy solution to the problem has not been overlooked.

Find and Correct Basic Cause

After a mechanical failure has been corrected, be sure to locate and correct the cause of the problem so the same failure will not be repeated. For example, a complaint of “premature breakdown” may be corrected by repairing any improper wiring connections but something caused the defective wiring. The cause may be excessive vibration.

Troubleshooting Chart

Complaint	Cause	Correction
1. Compressor has stopped unexpectedly	Out of fuel.	Add clean fuel.
	Compressor oil temperature too high.	See Complaint #6.
	Engine coolant temperature too high.	Check coolant level. If low, add coolant. See Complaint #3.
	Engine oil pressure too low.	See Complaint #4.
	Loose or broken belts.	Tighten or replace belt set.
	Loose wire connection.	Check wires at switches and connectors to find loose connection. Make repairs. See Electronic Service Manual.
	Low fuel level fault.	If adequate fuel in the tank, check fuel level sender device. Replace if determined faulty. See Electronic Service Manual.
	Defective sensor.	Identify and check sensor. Replace if necessary. See Electronic Service Manual.
	Malfunctioning relay.	Identify and check relay. Replace if necessary. See Electronic Service Manual.
	Blown fuse.	Identify and replace fuse. See Electronic Service Manual.
	Engine malfunctioning.	See troubleshooting in Engine manual.
	Airend malfunctioning.	See Complaint #6.
2. Compressor won't start or run	Battery disconnect switch off.	Check switch position and operation.
	Emergency stop pushed.	Check emergency stop switch position and operation.
	Low battery voltage.	Check battery condition; recharge if necessary. Check electrolyte level; add if necessary. Check cable connections; clean and tighten as needed.
	Blown fuse.	Identify and replace fuse. See Electronic Service Manual.
	Malfunctioning main power switch.	Check switch. Replace if necessary. See Electronic Service Manual.
	Clogged fuel filters.	Service fuel filters. See Engine manual.
	Out of fuel.	Add clean fuel.
	Compressor oil temperature too high.	See Complaint #6.
	Engine coolant temperature too high.	Check coolant level. If low, add coolant. See Complaint #3.
	Engine oil pressure too low.	See Complaint #4.
	Loose wire connection.	Check wires at switches and connectors to find loose connection. Make repairs. See Electronic Service Manual.

Complaint	Cause	Correction
(continued) **2. Compressor won't start or run**	Defective sensor.	Identify and check sensor. Replace if necessary. See Electronic Service Manual.
	Malfunctioning relay.	Identify and check relay. Replace if necessary. See Electronic Service Manual.
	Engine malfunctioning.	See troubleshooting in Engine manual.
	Airend malfunctioning.	See Complaint #6.
3. High engine Coolant Temperature	Low coolant level.	Check coolant level. If low, add coolant.
	Loose or broken belts.	Tighten or replace belt set.
	Ambient temperature above rated ambient temperature range.	Operate in cooler environment.
	Dirty operating conditions.	Move compressor to cleaner environment.
	Dirty cooler(s).	Clean exterior of cooler(s).
	Compressor tilted beyond out-of-level operating limit.	Reposition or relocate compressor to be more level.
	Operating pressure too high.	Reduce pressure to rated operating pressure.
	Recirculation of cooling air.	Close enclosure doors. Close and secure access panels. Check for loose or missing belly pans.
	Loose wire connection.	Check wires at switches and connectors to find loose connection. Make repairs. See Electronic Service Manual.
4. Low Engine Oil Pressure	Low engine oil level.	Check oil level. If low, add oil.
	Compressor tilted beyond out-of-level operating limit.	Reposition or relocate compressor to be more level.
	Wrong engine oil.	Change engine oil. Review engine oil specification.
	Clogged engine oil filter.	Replace engine oil filter.
	Engine malfunctioning.	See troubleshooting in Engine manual.
	Loose wire connection.	Check wires at switches and connectors to find loose connection. Make repairs. See Electronic Service Manual.
5. Low electrical system voltage	Loose or broken belts.	Tighten or replace belt set.
	Loose wire connection.	Check wires at switches and connectors to find loose connection. Make repairs. See Electronic Service Manual.
	Low battery voltage.	Check battery condition; recharge if necessary. Check electrolyte level; add if necessary. Check cable connections; clean and tighten as needed.
	Malfunctioning alternator.	Repair or replace alternator.

Complaint	Cause	Correction
6. High compressor oil temperature	Ambient temperature above rated ambient temperature range.	Operate in cooler environment.
	Compressor tilted beyond out-of-level operating limit.	Reposition or relocate compressor to be more level.
	Low compressor oil level.	Add compressor oil. Look for and repair any leaks.
	Wrong compressor oil.	Change compressor oil. Review compressor oil specification.
	Dirty cooler(s).	Clean exterior of cooler(s).
	Dirty operating conditions.	Move compressor to cleaner environment.
	Clogged compressor oil filter(s).	Replace compressor oil filter(s) and change compressor oil.
	Loose or broken belts.	Tighten or replace belt set.
	Operating pressure too high.	Reduce pressure to rated operating pressure.
	Recirculation of cooling air.	Close enclosure doors. Close and secure access panels. Check for loose or missing belly pans.
	Malfunctioning compressor oil thermostat.	Replace thermostat element in conventional bypass valve, if equipped. Replace valve.
	Loose or broken belts.	Tighten or replace belt set.
	Malfunctioning minimum pressure valve.	Repair or replace valve.
	Blocked or restricted oil lines. Airend malfunctioning.	Clean by flushing, or replace lines. See Complaints #11, #12.
7. Low engine speed	Clogged fuel filters.	Service fuel filters. See Engine
		manual. Drain and clean fuel tanks.
	Operating pressure too high.	Add clean fuel. Reduce pressure to rated operating pressure.
	Clogged air filter element(s). Wrong air filter element(s).	Clean or replace air filter element(s). Install correct air filter element(s).
	Engine malfunctioning.	See troubleshooting in Engine manual.
	Airend malfunctioning.	See Complaints #11, #12.
8. Excessive vibration	Rubber mounting isolators loose or damaged.	Tighten or replace.
	Defective or imbalanced fan.	Replace fan.
	Defective airend drive coupling.	Replace coupling.
	Engine malfunctioning.	See troubleshooting in Engine manual.
	Airend malfunctioning.	See Complaints #7, #11, #12.
	Engine idle speed too low.	See Complaint #7. See Engine manual.

Complaint	Cause	Correction
9. Low air delivery / low cfm	Clogged air filter element(s).	Clean or replace air filter element(s).
	Incorrect pressure regulation adjustment.	Make adjustments per this manual.
	Malfunctioning inlet unloader	Inspect valve. Make adjustments per this manual.
	Wrong air filter element(s).	Install correct air filter element(s).
	Low engine speed	See Complaint #7. See Engine manual.
	Compressed air leaks.	Locate and repair leaks.
10. Short air filter life	Dirty operating conditions.	Move compressor to cleaner environment.
	Wrong air filter element(s).	Install correct air filter element(s).
	Inadequate air filter element cleaning.	Install new air filter element(s).
	Incorrect stopping procedure.	Comply with procedure in this manual.
11. Compressor will not unload	Malfunctioning inlet unloader	Inspect valve. Make adjustments per this manual.
	Malfunctioning pressure regulator.	Check pressure regulator. Check regulation lines for leaks.
	Ice in regulation lines and/or regulation orifice.	Apply heat to lines and/or orifice. Check operation of DC electric heaters, if equipped.
	Plugged vent leak.	Clean and/or replace.
12. Safety valve opens	Operating pressure too high.	Reduce pressure to rated operating pressure.
	Malfunctioning inlet unloader	Inspect valve. Make adjustments per this manual.
	Defective safety valve.	Replace safety valve.
	Compressor will not unload fast enough.	Check pressure regulator. Check regulation lines for leaks.
	Ice in regulation lines and/or regulation orifice.	Apply heat to lines and/or orifice. Check operation of DC electric heaters, if equipped.
13. Excessive carryover (compressor oil in the compressed air)	Blocked separator scavenge line.	Check scavenge line, drop tube, and orifice. Clean and replace as needed.
	Deteriorated separator element.	Replace separator element.
	Separator tank pressure too low.	Check the minimum pressure valve. Repair or replace as necessary.

Diagnostic Codes

The MidPort displays diagnostic codes for the compressor system and the engine. Listin of these codes are provided in this section.

The engine diagnostic codes can also be read with the engine manufacturer's service to service tool connector is provided in the electrical harness, providing access to the J193 network. For advanced engine troubleshooting, it is recommended that the manufacture service tools and service literature be used.

LCD Display	Display Name	Description	Type
CPR CODE 1 LOW ENGINE SPEED	Low Engine Speed	Engine speed less than 1100 RPM for 30 seconds.	FAULT
CPR CODE 2 HIGH ENGINE SPEED	High Engine Speed	Engine speed greater than 2300 RPM for 30 seconds.	FAULT
CPR CODE 3 WAIT 30 SEC RETRY START	Engine Crank Timeout	Engine crank attempt longer than 15 seconds above 50°F or longer than 30 seconds below 32°F.	FAULT
CPR CODE 4 OUT OF FUEL	Out of Fuel	Fuel level in tank below usable limit.	FAULT
CPR CODE 10 ENG SPEED RESPONSE	Engine Speed Response	Engine target idle speed not met within 10 seconds after loading compressor.	ALERT
CPR CODE 11 A/S ATTEMPT EXCEEDED	Autostart Attempts Exceeded	Compressor not started after 3 crank attempts.	FAULT
CPR CODE 12 FUEL LEVEL LOW	Low Fuel Level	Fuel level in tank approaching empty.	ALERT
CPR CODE 29 ENGINE SHUTDOWN ??	Engine Shutdown Unknown	Engine stopped without an engine diagnostic code.	FAULT
CPR CODE 30 HIGH AIREND TEMP	High Airend Discharge Temperature	Airend discharge temperature greater than or equal to 248^{o}F.	FAULT
CPR CODE 32 AIREND DISC TEMP SENSOR	Airend Discharge Temperature Sensor	Airend discharge temperature sensor reading out of range.	FAULT
CPR CODE 33 SEP TANK PRES SENSOR	Separator Tank Pressure Sensor	Separator tank pressure sensor reading out of range.	FAULT
CPR CODE 34 HIGH PRES AT START	High Separator Pressure at Start	Separator tank pressure greater than 20 psi at crank attempt.	ALERT
CPR CODE 35 HIGH SEP TANK PRES	High Separator Tank Pressure	Air pressure in the separator tank exceeded limit.	FAULT
CPR CODE 36 SAFETY VALVE OPEN	Safety Value Open	Safety relief valve on separator tank opened.	FAULT
CPR CODE 38 AIR FILTERS RESTRICTED	Intake Air Filters Restricted	Intake filters restricting air flow.	ALERT
CPR CODE 39 LOW SYSTEM VOLTAGE	Low System Voltage / Alternator Not Charging	Electrical system voltage below 25.5VDC.	ALERT
CPR CODE 42 FUEL LEVEL SENSOR	Fuel Level Sensor	Fuel level sensor reading out of range.	ALERT
CPR CODE 43 LOW SEP TANK PRES	Low Separator Tank Pressure	Separator tank pressure below 40 psi after compressor is loaded.	FAULT
CPR CODE 44 HIGH IQ FILTERS RSTR	High IQ Filter Restriction	IQ filters restricting air flow.	ALERT

LCD Display	Display Name	Description	Type
CPR CODE 50 HIGH SEP TANK TEMP	High Separator Tank Temperature	Separator tank temperature greater than or equal to 248°F.	FAULT
CPR CODE 51 COMPRESSOR ID INVALID	Compressor ID Invalid	The Titan controller and MidPort Display do not have a valid compressor ID.	FAULT
CPR CODE 52 IQ FILTERS RESTRICTED	IQ Filter Restricted	IQ filters restricted past usable level.	FAULT
CPR CODE 53 SEP TANK TEMP SENSOR	Separator Tank Temperature Sensor	Separator tank temperature sensor reading out of range.	FAULT
CPR CODE 54 REG SYSTEM PRES SENSOR	Regulation System Pressure Sensor	Regulation system pressure sensor reading out of range.	FAULT
CPR CODE 55 E-STOP ACTIVATED	Emergency Stop Activated	Emergency Stop button has been activated.	FAULT
CPR CODE 58 AMBIENT TEMP SENSOR	Ambient Temperature Sensor	Ambient temperature sensor reading out of range.	ALERT
CPR CODE 61 IQ FILTER PRES ERROR	IQ Filter Pressure Error	IQ filter outlet pressure reading higher than inlet pressure.	ALERT
CPR CODE 63 IQ DIFF PRES SENSOR	IQ Differential Pressure Sensor	IQ differential pressure sensor reading out of range.	ALERT
CPR CODE 71 ENG ECM COMMS	Engine ECM Communication	Communication between Titan controller and engine ECM not functional.	FAULT
CPR CODE 73 AUTOSTART CTRL COMMS	Auto Start Controller Communication	Communication between Titan controller and AutoStart controller not functional.	ALERT
CPR CODE 75 IQ TCU CTRL COMMS	IQ TCU Controller Communication	Communication between Titan controller and OTC controller not functional.	ALERT
CPR CODE 76 CPR CTRL COMMS	Compressor Controller Communication	Communication between Titan controller and Engine Tachometer with MidPort Display not functional.	ALERT
CPR CODE 77 KEYPAD COMMS	Keypad Communication	Communication between Titan controller and Keypad not functional.	FAULT

Engine Diagnostic Codes - Cummins Engine with CM2250 Controller

J1939 SPN	J1939 FMI	Cummins Code	J1939 SPN Description	J1939 FMI Description	Cummins Description
27	4	2272	Engine Exhaust Gas Recirculation 1 Valve Position	Voltage Below Normal, or Shorted to Low Source	EGR Valve Position Circuit - Voltage Below Normal, or Shorted to Low Source
81	16	2754	Engine Diesel Particulate Filter Intake Pressure	Data Valid but Above Normal Operating Range - Moderately Severe Level	Engine Particulate Trap Inlet Pressure - Data Valid But Above Normal Operating Range - Moderately Severe Level
84	2	241	Wheel-Based Vehicle Speed	Data Erratic, Intermittent or Incorrect	Vehicle Speed Sensor Circuit - Data Erratic, Intermittent, or Incorrect
84	10	242	Wheel-Based Vehicle Speed	Abnormal Rate of Change	Vehicle Speed Sensor Circuit tampering has been detected – Abnormal Rate of Change
91	0	148	Accelerator Pedal Position 1	Data Valid but Above Normal Operational Range - Most Severe Level	Accelerator Pedal or Lever Position Sensor Circuit – Abnormal Frequency, Pulse Width, or Period
91	1	147	Accelerator Pedal Position 1	Data Valid but Below Normal Operational Range - Most Severe Level	Accelerator Pedal or Lever Position Sensor Circuit – Abnormal Frequency, Pulse Width, or Period
91	2	1242	Accelerator Pedal Position 1	Data Erratic, Intermittent or Incorrect	Accelerator Pedal or Lever Position Sensor 1 and 2 - Data Erratic, Intermittent, or Incorrect
91	3	131	Accelerator Pedal Position 1	Voltage Above Normal, or Shorted to High Source	Accelerator Pedal or Lever Position Sensor Circuit - Voltage Above Normal, or Shorted to High Source
91	4	132	Accelerator Pedal Position 1	Voltage Below Normal, or Shorted to Low Source	Accelerator Pedal or Lever Position Sensor Circuit - Voltage Below Normal, or Shorted to Low Source
91	9	3326	Accelerator Pedal Position 1	Abnormal Update Rate	SAE J1939 Multiplexed Accelerator Pedal or Lever Sensor System - Abnormal update rate
91	19	287	Accelerator Pedal Position 1	Received Network Data in Error	SAE J1939 Multiplexing Accelerator Pedal or Lever Sensor System Error - Received Network Data In Error
93	2	528	Engine Net Brake Torque	Data Erratic, Intermittent or Incorrect	Auxiliary Constrained Operation Curve Validation Switch - Data Erratic, Intermittent, or Incorrect
95	16	2372	Fuel Pressure	Data Valid but Above Normal Operating Range - Moderately Severe Level	Fuel Filter Differential Pressure - Data Valid But Above Normal Operating Range - Moderately Severe Level
97	3	428	Water in Fuel Indicator	Voltage Above Normal, or Shorted to High Source	Water in Fuel Sensor Circuit - Voltage Above Normal, or Shorted to High Source
97	4	429	Water in Fuel Indicator	Voltage Below Normal, or Shorted to Low Source	Water in Fuel Sensor Circuit - Voltage Below Normal, or Shorted to Low Source
97	15	418	Water in Fuel Indicator	Data Valid but Above Normal Operating Range - Least Severe Level	Water in Fuel Indicator High - Data Valid but Above Normal Operational Range – Least Severe Level
97	16	1852	Water in Fuel Indicator	Data Valid but Above Normal Operating Range - Moderately Severe Level	Water in Fuel Indicator - Data Valid but Above Normal Operational Range - Moderately Severe Level
100	1	415	Engine Oil Pressure	Data Valid but Below Normal Operational Range - Most Severe Level	Oil Pressure Low – Data Valid but Below Normal Operational Range - Most Severe Level
100	2	435	Engine Oil Pressure	Data Erratic, Intermittent or Incorrect	Oil Pressure Sensor Circuit - Data Erratic, Intermittent, or Incorrect
100	3	135	Engine Oil Pressure	Voltage Above Normal, or Shorted to High Source	Oil Pressure Sensor Circuit - Voltage Above Normal, or Shorted to High Source
100	4	141	Engine Oil Pressure	Voltage Below Normal, or Shorted to Low Source	Oil Pressure Sensor Circuit - Voltage Below Normal, or Shorted to Low Source

J1939 SPN	J1939 FMI	Cummins Code	J1939 SPN Description	J1939 FMI Description	Cummins Description
108	9	3372	Barometric Pressure	Abnormal Update Rate	Turbocharger 1 Compressor Inlet Pressure - Abnormal Update Rate
108	19	3373	Barometric Pressure	Received Network Data in Error	Turbocharger 1 Compressor Inlet Pressure - Received Network Data In Error
110	0	151	Engine Coolant Temperature	Data Valid but Above Normal Operational Range - Most Severe Level	Coolant Temperature High - Data Valid but Above Normal Operational Range - Most Severe Level
110	3	144	Engine Coolant Temperature	Voltage Above Normal, or Shorted to High Source	Coolant Temperature Sensor Circuit – Voltage Above Normal, or Shorted to High Source
110	4	145	Engine Coolant Temperature	Voltage Below Normal, or Shorted to Low Source	Coolant Temperature Sensor Circuit – Voltage Below Normal, or Shorted to Low Source
110	14	1847	Engine Coolant Temperature	Special Instructions	Engine Coolant Temperature - Special Instructions
110	16	146	Engine Coolant Temperature	Data Valid but Above Normal Operating Range - Moderately Severe Level	Coolant Temperature High - Data Valid but Above Normal Operational Range - Moderately Severe Level
110	18	2789	Engine Coolant Temperature	Data Valid but Below Normal Operating Range - Moderately Severe Level	Engine Coolant Temperature - Data Valid But Below Normal Operating Range - Moderately Severe Level
110	31	2646	Engine Coolant Temperature	Not Available or Condition Exists	Engine Coolant Temperature - Condition Exists
110	31	2659	Engine Coolant Temperature	Not Available or Condition Exists	Engine Coolant Temperature - Condition Exists
111	1	235	Engine Coolant Level	Data Valid but Below Normal Operational Range - Most Severe Level	Coolant Level Low - Data Valid but Below Normal Operational Range - Most Severe Level
111	2	422	Engine Coolant Level	Data Erratic, Intermittent or Incorrect	Coolant Level - Data Erratic, Intermittent, or Incorrect
111	3	195	Engine Coolant Level	Voltage Above Normal, or Shorted to High Source	Coolant Level Sensor Circuit - Voltage Above Normal, or Shorted to High Source
111	4	196	Engine Coolant Level	Voltage Below Normal, or Shorted to Low Source	Coolant Level Sensor Circuit - Voltage Below Normal, or Shorted to Low Source
111	17	2448	Engine Coolant Level	Data Valid but Below Normal Operating Range - Least Severe Level	Coolant Level - Data Valid But Below Normal Operating Range - Least Severe Level
111	18	197	Engine Coolant Level	Data Valid but Below Normal Operating Range - Moderately Severe Level	Coolant Level - Data Valid but Below Normal Operational Range - Moderately Severe Level
157	0	449	Engine Injector Metering Rail 1 Pressure	Data Valid but Above Normal Operational Range - Most Severe Level	Fuel Pressure High - Data Valid but Above Normal Operational Range – Moderately Severe Level
157	0	1911	Engine Injector Metering Rail 1 Pressure	Data Valid but Above Normal Operational Range - Most Severe Level	Injector Metering Rail 1 Pressure - Data Valid but Above Normal Operational Range - Most Severe Level
157	1	2249	Engine Injector Metering Rail 1 Pressure	Data Valid but Below Normal Operational Range - Most Severe Level	Injector Metering Rail 1 Pressure - Data Valid but Below Normal Operational Range - Most Severe Level
157	3	451	Engine Injector Metering Rail 1 Pressure	Voltage Above Normal, or Shorted to High Source	Injector Metering Rail #1 Pressure Sensor Circuit - Voltage Above Normal, or Shorted to High Source
157	4	452	Engine Injector Metering Rail 1 Pressure	Voltage Below Normal, or Shorted to Low Source	Injector Metering Rail #1 Pressure Sensor Circuit - Voltage Below Normal, or Shorted to Low Source

J1939 SPN	J1939 FMI	Cummins Code	J1939 SPN Description	J1939 FMI Description	Cummins Description
157	16	553	Engine Injector Metering Rail 1 Pressure	Data Valid but Above Normal Operating Range - Moderately Severe Level	Injector Metering Rail #1 Pressure High – Data Valid but Above Normal Operational Range - Moderately Severe Level
157	18	559	Engine Injector Metering Rail 1 Pressure	Data Valid but Below Normal Operating Range - Moderately Severe Level	Injector Metering Rail #1 Pressure Low – Data Valid but Below Normal Operational Range - Moderately Severe Level
166	2	951	Engine Rated Power	Data Erratic, Intermittent or Incorrect	Cylinder Power Imbalance Between Cylinders - Data erratic, intermittent or incorrect
168	16	442	Battery Potential / Power Input 1	Data Valid but Above Normal Operating Range - Moderately Severe Level	Battery #1 Voltage High - Data Valid but Above Normal Operational Range – Moderately Severe Level
168	18	441	Battery Potential / Power Input 1	Data Valid but Below Normal Operating Range - Moderately Severe Level	Battery #1 Voltage Low - Data Valid but Below Normal Operational Range – Moderately Severe Level
171	9	3369	Ambient Air Temperature	Abnormal Update Rate	Turbocharger 1 Compressor Inlet Temperature Sensor - Abnormal Update Rate
171	19	3371	Ambient Air Temperature	Received Network Data in Error	Turbocharger 1 Compressor Inlet Temperature Sensor - Received Network Data In Error
190	0	234	Engine Speed	Data Valid but Above Normal Operational Range - Most Severe Level	Engine Speed High - Data Valid but Above Normal Operational Range - Most Severe Level
190	0	2468	Engine Speed	Data Valid but Above Normal Operational Range - Most Severe Level	Engine Crankshaft Speed/Position - Data Valid But Above Normal Operating Range - Moderately Severe Level
190	2	689	Engine Speed	Data Erratic, Intermittent or Incorrect	Primary Engine Speed Sensor Error – Data Erratic, Intermittent, or Incorrect
190	2	2321	Engine Speed	Data Erratic, Intermittent or Incorrect	Engine Speed / Position Sensor #1 - Data Erratic, Intermittent, or Incorrect
191	9	3328	Transmission Output Shaft Speed	Abnormal Update Rate	Transmission Output Shaft Speed - Abnormal update rate
191	16	349	Transmission Output Shaft Speed	Data Valid but Above Normal Operating Range - Moderately Severe Level	Transmission Output Shaft Speed - Data Valid but Above Normal Operational Range - Moderately Severe Level
191	18	489	Transmission Output Shaft Speed	Data Valid but Below Normal Operating Range - Moderately Severe Level	Transmission Output Shaft Speed - Data Valid but Below Normal Operational Range - Moderately Severe Level
411	2	1866	Engine Exhaust Gas Recirculation 1 Differential Pressure	Data Erratic, Intermittent or Incorrect	Exhaust Gas Recirculation (EGR) Valve Delta Pressure - Data Erratic, Intermittent or Incorrect
411	3	2273	Engine Exhaust Gas Recirculation 1 Differential Pressure	Voltage Above Normal, or Shorted to High Source	Exhaust Gas Recirculation (EGR) Valve Delta Pressure Sensor Circuit - Voltage Above Normal, or Shorted to High Source
411	4	2274	Engine Exhaust Gas Recirculation 1 Differential Pressure	Voltage Below Normal, or Shorted to Low Source	Exhaust Gas Recirculation (EGR) Valve Delta Pressure Sensor Circuit - Voltage Below Normal, or Shorted to Low Source
412	3	2375	Engine Exhaust Gas Recirculation 1 Temperature	Voltage Above Normal, or Shorted to High Source	Exhaust Gas Recirculation (EGR) Temperature Sensor Circuit - Voltage Above Normal, or Shorted to High Source
412	4	2376	Engine Exhaust Gas Recirculation 1 Temperature	Voltage Below Normal, or Shorted to Low Source	Exhaust Gas Recirculation (EGR) Temperature Sensor Circuit - Voltage Below Normal, or Shorted to Low Source
412	15	2961	Engine Exhaust Gas Recirculation 1 Temperature	Data Valid but Above Normal Operating Range - Least Severe Level	Exhaust Gas Recirculation (EGR) Temperature - Data Valid But Above Normal Operating Range - Least Severe Level
412	16	2962	Engine Exhaust Gas Recirculation 1 Temperature	Data Valid but Above Normal Operating Range - Moderately Severe Level	Exhaust Gas Recirculation (EGR) Temperature - Data Valid But Above Normal Operating Range - Moderately Severe Level

J1939 SPN	J1939 FMI	Cummins Code	J1939 SPN Description	J1939 FMI Description	Cummins Description
441	3	293	Auxiliary Temperature 1	Voltage Above Normal, or Shorted to High Source	Auxiliary Temperature Sensor Input # 1 Circuit - Voltage Above Normal, or Shorted to High Source
441	4	294	Auxiliary Temperature 1	Voltage Below Normal, or Shorted to Low Source	Auxiliary Temperature Sensor Input # 1 Circuit - Voltage Below Normal, or Shorted to Low Source
441	14	292	Auxiliary Temperature 1	Special Instructions	Auxiliary Temperature Sensor Input 1 - Special Instructions
441	14	1381	Auxiliary Temperature 1	Special Instructions	Auxiliary Temperature Sensor Input 1 - Special Instructions
558	2	431	Accelerator Pedal 1 Low Idle Switch	Data Erratic, Intermittent or Incorrect	Accelerator Pedal or Lever Idle Validation Circuit - Data Erratic, Intermittent, or Incorrect
558	13	432	Accelerator Pedal 1 Low Idle Switch	Out of Calibration	Accelerator Pedal or Lever Idle Validation Circuit - Out of Calibration
597	3	769	Brake Switch	Voltage Above Normal, or Shorted to High Source	Brake Switch Circuit - Voltage Above Normal, or Shorted to High Source
597	4	771	Brake Switch	Voltage Below Normal, or Shorted to Low Source	Brake Switch Circuit - Voltage Below Normal, or Shorted to Low Source
611	2	523	System Diagnostic Code #1	Data Erratic, Intermittent or Incorrect	OEM Intermediate (PTO) Speed switch Validation - Data Erratic, Intermittent, or Incorrect
611	4	2186	System Diagnostic Code #1	Voltage Below Normal, or Shorted to Low Source	Sensor Supply 4 Circuit-Voltage Below Normal, or Shorted to Low Source
611	16	2292	System Diagnostic Code #1	Data Valid but Above Normal Operating Range - Moderately Severe Level	Fuel Inlet Meter Device - Data Valid but Above Normal Operational Range - Moderately Severe Level
611	18	2293	System Diagnostic Code #1	Data Valid but Below Normal Operating Range - Moderately Severe Level	Fuel Inlet Meter Device Flow Demand Lower Than Expected - Data Valid But Below Normal Operational Range - Moderately Severe Level
612	2	115	System Diagnostic Code #2	Data Erratic, Intermittent or Incorrect	Engine Speed/Position Sensor Circuit lost both of two signals from the magnetic pickup sensor - Data Erratic, Intermittent, or incorrect
623	4	244	Red Stop Lamp	Voltage Below Normal, or Shorted to Low Source	Red Stop Lamp Driver Circuit - Voltage Below Normal, or Shorted to Low Source
627	2	1117	Power Supply	Data Erratic, Intermittent or Incorrect	Power Lost With Ignition On - Data Erratic, Intermittent, or Incorrect
627	12	351	Power Supply	Bad Intelligent Device or Component	Injector Power Supply - Bad Intelligent Device or Component
629	12	343	Controller #1	Bad Intelligent Device or Component	Engine Control Module Warning internal hardware failure - Bad Intelligent Device or Component
633	31	2311	Engine Fuel Actuator 1 Control Command	Not Available or Condition Exists	Fueling Actuator #1 Circuit Error – Condition Exists
639	2	426	J1939 Network #1, Primary Vehicle Network	Data Erratic, Intermittent or Incorrect	J1939 Network #1 - Data erratic, intermittent or incorrect
639	9	285	J1939 Network #1, Primary Vehicle Network	Abnormal Update Rate	SAE J1939 Multiplexing PGN Timeout Error - Abnormal Update Rate
639	13	286	J1939 Network #1, Primary Vehicle Network	Out of Calibration	SAE J1939 Multiplexing Configuration Error – Out of Calibration

J1939 SPN	J1939 FMI	Cummins Code	J1939 SPN Description	J1939 FMI Description	Cummins Description
640	14	599	Engine External Protection Input	Special Instructions	Auxiliary Commanded Dual Output Shutdown - Special Instructions
641	7	2387	Engine Variable Geometry Turbocharger Actuator #1	Mechanical System not Responding or Out of Adjustment	VGT Actuator Driver Circuit (Motor) - Mechanical System Not Responding or Out of Adjustment
641	9	2636	Engine Variable Geometry Turbocharger Actuator #1	Abnormal Update Rate	VGT Actuator Driver Circuit - Abnormal Update Rate
641	12	2634	Engine Variable Geometry Turbocharger Actuator #1	Bad Intelligent Device or Component	VGT Actuator Controller - Bad intelligent Device or Component
641	13	2449	Engine Variable Geometry Turbocharger Actuator #1	Out of Calibration	VGT Actuator Controller - Out of Calibration
641	15	1962	Engine Variable Geometry Turbocharger Actuator #1	Data Valid but Above Normal Operating Range - Least Severe Level	VGT/VFT Actuator Driver Over Temperature (Calculated) - Data Valid But Above Normal Operating Range - Least Severe Level
641	31	2635	Engine Variable Geometry Turbocharger Actuator #1	Not Available or Condition Exists	VGT Actuator Driver Circuit - Condition Exists
644	2	237	Engine External Speed Command Input	Data Erratic, Intermittent or Incorrect	External Speed Input (Multiple Unit Synchronization) - Data Erratic, Intermittent, or Incorrect
647	3	2377	Engine Fan Clutch 1 Output Device Driver	Voltage Above Normal, or Shorted to High Source	Fan Control Circuit - Voltage Above Normal, or Shorted to High Source
647	4	245	Engine Fan Clutch 1 Output Device Driver	Voltage Below Normal, or Shorted to Low Source	Fan Control Circuit - Voltage Below Normal, or Shorted to Low Source
651	5	322	Engine Injector Cylinder #01	Current Below Normal or Open Circuit	Injector Solenoid Cylinder #1 Circuit – Current Below Normal, or Open Circuit
652	5	331	Engine Injector Cylinder #02	Current Below Normal or Open Circuit	Injector Solenoid Cylinder #2 Circuit – Current Below Normal, or Open Circuit
653	5	324	Engine Injector Cylinder #03	Current Below Normal or Open Circuit	Injector Solenoid Cylinder #3 Circuit – Current Below Normal, or Open Circuit
654	5	332	Engine Injector Cylinder #04	Current Below Normal or Open Circuit	Injector Solenoid Cylinder #4 Circuit – Current Below Normal, or Open Circuit
655	5	323	Engine Injector Cylinder #05	Current Below Normal or Open Circuit	Injector Solenoid Cylinder #5 Circuit – Current Below Normal, or Open Circuit
656	5	325	Engine Injector Cylinder #06	Current Below Normal or Open Circuit	Injector Solenoid Cylinder #6 Circuit – Current Below Normal, or Open Circuit
677	3	584	Engine Starter Motor Relay	Voltage Above Normal, or Shorted to High Source	Starter Relay Driver Circuit- Voltage Above Normal, or Shorted to High Source
697	3	2557	Auxiliary PWM Driver #1	Voltage Above Normal, or Shorted to High Source	Auxiliary PWM Driver #1 - Voltage Above Normal, or Shorted to High Source
697	4	2558	Auxiliary PWM Driver #1	Voltage Below Normal, or Shorted to Low Source	Auxiliary PWM Driver #1 - Voltage Below Normal, or Shorted to Low Source
702	3	527	Auxiliary I/O #02	Voltage Above Normal, or Shorted to High Source	Auxiliary Input/Output 2 Circuit - Voltage Above Normal, or Shorted to High Source
703	3	529	Auxiliary I/O #03	Voltage Above Normal, or Shorted to High Source	Auxiliary Input/Output 3 Circuit - Voltage Above Normal, or Shorted to High Source

J1939 SPN	J1939 FMI	Cummins Code	J1939 SPN Description	J1939 FMI Description	Cummins Description
703	11	779	Auxiliary I/O #03	Root Cause Not Known	Warning Auxiliary Equipment Sensor Input # 3 (OEM Switch) - Root Cause Not Known
703	14	2195	Auxiliary I/O #03	Special Instructions	Auxiliary Equipment Sensor Input 3 Engine Protection Critical - Special Instructions
723	2	778	Engine Speed 2	Data Erratic, Intermittent or Incorrect	Engine Speed Sensor (Camshaft) Error – Data Erratic, Intermittent, or Incorrect
723	2	2322	Engine Speed 2	Data Erratic, Intermittent or Incorrect	Engine Speed / Position Sensor #2 - Data Erratic, Intermittent, or Incorrect
723	7	731	Engine Speed 2	Mechanical System not Responding or Out of Adjustment	Engine Speed/Position #2 Mechanical Misalignment Between Camshaft and Crankshaft Sensors - Mechanical System Not Responding Properly or Out of
729	3	2555	Engine Intake Air Heater Driver #1	Voltage Above Normal, or Shorted to High Source	Intake Air Heater #1 Circuit - Voltage Above Normal, or Shorted to High Source
729	4	2556	Engine Intake Air Heater Driver #1	Voltage Below Normal, or Shorted to Low Source	Intake Air Heater #1 Circuit - Voltage Below Normal, or Shorted to Low Source
974	3	133	Remote Accelerator Pedal Position	Voltage Above Normal, or Shorted to High Source	Remote Accelerator Pedal or Lever Position Sensor Circuit – Voltage Above Normal, or Shorted to High Source
974	4	134	Remote Accelerator Pedal Position	Voltage Below Normal, or Shorted to Low Source	Remote Accelerator Pedal or Lever Position Sensor Circuit – Voltage Below Normal, or Shorted to Low Source
974	19	288	Remote Accelerator Pedal Position	Received Network Data in Error	SAE J1939 Multiplexing Remote Accelerator Pedal or Lever Data Error - Received Network Data In Error
1073	3	2367	Engine (Compression) Brake Output #2	Voltage Above Normal, or Shorted to High Source	Engine Brake Actuator Driver Output 2 Circuit - Voltage Above Normal, or Shorted to High Source
1073	4	2363	Engine (Compression) Brake Output #2	Voltage Below Normal, or Shorted to Low Source	Engine Brake Actuator Driver Output 2 Circuit - Voltage Below Normal, or Shorted to Low Source
1075	3	2265	Engine Electric Lift Pump for Engine Fuel Supply	Voltage Above Normal, or Shorted to High Source	Fuel Priming Pump Control Signal Circuit – Voltage Above Normal, or Shorted to High Source
1075	4	2266	Engine Electric Lift Pump for Engine Fuel Supply	Voltage Below Normal, or Shorted to Low Source	Fuel Priming Pump Control Signal Circuit – Voltage Below Normal, or Shorted to Low Source
1112	3	2368	Engine (Compression) Brake Output #3	Voltage Above Normal, or Shorted to High Source	Engine Brake Actuator Driver 3 Circuit - Voltage Above Normal, or Shorted to High Source
1112	4	2365	Engine (Compression) Brake Output #3	Voltage Below Normal, or Shorted to Low Source	Engine Brake Actuator Driver Output 3 Circuit - Voltage Below Normal, or Shorted to Low Source
1136	3	697	Engine ECU Temperature	Voltage Above Normal, or Shorted to High Source	ECM Internal Temperature Sensor Circuit - Voltage Above Normal, or Shorted to High Source
1136	4	698	Engine ECU Temperature	Voltage Below Normal, or Shorted to Low Source	ECM Internal Temperature Sensor Circuit - Voltage Below Normal, or Shorted to Low Source
1172	3	691	Engine Turbocharger 1 Compressor Intake Temperature	Voltage Above Normal, or Shorted to High Source	Turbocharger 1 Compressor Inlet Temperature Circuit-Voltage Above Normal, or Shorted to High Source
1188	2	3925	Engine Turbocharger Wastegate Actuator 1 Position	Data Erratic, Intermittent or Incorrect	Engine Turbocharger Wastegate Actuator 1 Position - Data erratic, intermittent or incorrect
1209	2	2554	Engine Exhaust Gas Pressure	Data Erratic, Intermittent or Incorrect	Exhaust Gas Pressure - Data Erratic, Intermittent or Incorrect

J1939 SPN	J1939 FMI	Cummins Code	J1939 SPN Description	J1939 FMI Description	Cummins Description
1209	3	2373	Engine Exhaust Gas Pressure	Voltage Above Normal, or Shorted to High Source	Exhaust Gas Pressure Sensor Circuit - Voltage Above Normal, or Shorted to High Source
1209	4	2374	Engine Exhaust Gas Pressure	Voltage Below Normal, or Shorted to Low Source	Exhaust Gas Pressure Sensor Circuit - Voltage Below Normal, or Shorted to Low Source
1209	16	2764	Engine Exhaust Gas Pressure	Data Valid but Above Normal Operating Range - Moderately Severe Level	Exhaust Gas Pressure - Data Valid But Above Normal Operating Range - Moderately Severe Level
1231	2	3329	J1939 Network #2	Data Erratic, Intermittent or Incorrect	J1939 Network #2 - Data Erratic, Intermittent or Incorrect
1235	2	3331	J1939 Network #3	Data Erratic, Intermittent or Incorrect	J1939 Network #3 - Data Erratic, Intermittent or Incorrect
1347	3	272	Engine Fuel Pump Pressurizing Assembly #1	Voltage Above Normal, or Shorted to High Source	High Fuel Pressure Solenoid Valve Circuit – Voltage Above Normal, or Shorted to High Source
1347	4	271	Engine Fuel Pump Pressurizing Assembly #1	Voltage Below Normal, or Shorted to Low Source	High Fuel Pressure Solenoid Valve Circuit – Voltage Below Normal, or Shorted to Low Source
1347	7	281	Engine Fuel Pump Pressurizing Assembly #1	Mechanical System not Responding or Out of Adjustment	High Fuel Pressure Solenoid Valve #1 – Mechanical System Not Responding Properly or Out of Adjustment
1377	2	497	Engine Synchronization Switch	Data Erratic, Intermittent or Incorrect	Multiple Unit Synchronization Switch Circuit - Data Erratic, Intermittent, or Incorrect
1378	31	649	Engine Oil Change Interval	Not Available or Condition Exists	Change Lubricating Oil and Filter – Condition Exists
1388	3	297	Auxiliary Pressure #2	Voltage Above Normal, or Shorted to High Source	Auxiliary Pressure Sensor Input # 2 Circuit - Voltage Above Normal, or Shorted to High Source
1388	4	298	Auxiliary Pressure #2	Voltage Below Normal, or Shorted to Low Source	Auxiliary Pressure Sensor Input # 2 Circuit - Voltage Below Normal, or Shorted to Low Source
1388	14	296	Auxiliary Pressure #2	Special Instructions	Auxiliary Pressure Sensor Input 1 - Special Instructions
1623	2	3213	Tachograph Output Shaft Speed	Data Erratic, Intermittent or Incorrect	Tachograph Output Shaft Speed - Received Network Data In Error
1623	9	3186	Tachograph Output Shaft Speed	Abnormal Update Rate	Tachograph Output Shaft Speed - Abnormal update rate
1632	14	2998	Engine Torque Limit Feature	Special Instructions	Engine Torque Limit Feature - Special Instructions
1675	11	3737	Engine Starter Mode	Root Cause Not Known	Engine Starter Mode Overcrank Protection - Condition Exists
1800	16	2263	Battery 1 Temperature	Data Valid but Above Normal Operating Range - Moderately Severe Level	Battery Temperature - Data Valid but Above Normal Operational Range - Moderately Severe Level
1800	18	2264	Battery 1 Temperature	Data Valid but Below Normal Operating Range - Moderately Severe Level	Battery Temperature - Data Valid but Below Normal Operational Range - Moderately Severe Level
2623	3	1239	Accelerator Pedal #1 Channel 2	Voltage Above Normal, or Shorted to High Source	Accelerator Pedal or Lever Position Sensor 2 Circuit - Voltage Above Normal, or Shorted to High Source
2623	4	1241	Accelerator Pedal #1 Channel 2	Voltage Below Normal, or Shorted to Low Source	Accelerator Pedal or Lever Position Sensor 2 Circuit - Voltage Below Normal, or Shorted to Low Source

J1939 SPN	J1939 FMI	Cummins Code	J1939 SPN Description	J1939 FMI Description	Cummins Description
2630	3	2571	Engine Charge Air Cooler 1 Outlet Temperature	Voltage Above Normal, or Shorted to High Source	Engine Charge Air Cooler Outlet Temperature - Voltage Above Normal, or Shorted to High Source
2630	4	2572	Engine Charge Air Cooler 1 Outlet Temperature	Voltage Below Normal, or Shorted to Low Source	Engine Charge Air Cooler Outlet Temperature - Voltage Below Normal, or Shorted to Low Source
2789	15	2346	Engine Turbocharger 1 Calculated Turbine Intake Temperature	Data Valid but Above Normal Operating Range - Least Severe Level	Turbocharger Turbine Inlet Temperature (Calculated) - Data Valid but Above Normal Operational Range – Least Severe Level
2791	4	2351	Engine Exhaust Gas Recirculation 1 (EGR1) Valve Control	Voltage Below Normal, or Shorted to Low Source	EGR Valve Control Circuit - Voltage below normal, or shorted to low source
2791	5	2349	Engine Exhaust Gas Recirculation 1 (EGR1) Valve Control	Current Below Normal or Open Circuit	EGR Valve Control Circuit - Current below normal or open circuit
2791	6	2353	Engine Exhaust Gas Recirculation 1 (EGR1) Valve Control	Current Above Normal or Grounded Circuit	EGR Valve Control Circuit - Current above normal or grounded circuit
2791	7	2357	Engine Exhaust Gas Recirculation 1 (EGR1) Valve Control	Mechanical System not Responding or Out of Adjustment	EGR Valve Control Circuit - Mechanical system not responding or out of adjustment
2791	13	1896	Engine Exhaust Gas Recirculation 1 (EGR1) Valve Control	Out of Calibration	EGR Valve Controller - Out of Calibration
2797	13	2765	Engine Injector Group 1	Out of Calibration	Engine Injector Bank 1 Barcodes - Out of Calibration
3050	11	2637	Catalyst Bank 1 System Monitor	Root Cause Not Known	Aftertreatment Diesel Oxidation Catalyst Face Plugged - Root Cause Not Known
3050	17	2638	Catalyst Bank 1 System Monitor	Data Valid but Below Normal Operating Range - Least Severe Level	Aftertreatment Diesel Oxidation Catalyst System - Data Valid But Below Normal Operating Range - Least Severe Level
3050	18	1691	Catalyst Bank 1 System Monitor	Data Valid but Below Normal Operating Range - Moderately Severe Level	Aftertreatment Diesel Oxidation Catalyst System - Data Valid But Below Normal Operating Range - Moderately Severe Level
3058	31	2774	EGR System Monitor	Not Available or Condition Exists	Engine Exhaust Gas Recirculation (EGR) System - Condition Exists
3241	2	1667	Aftertreatment 1 Exhaust Gas Temperature 1	Data Erratic, Intermittent or Incorrect	Aftertreatment Exhaust Gas Temperature 1 - Data Erratic, Intermittent or Incorrect
3241	3	1666	Aftertreatment 1 Exhaust Gas Temperature 1	Voltage Above Normal, or Shorted to High Source	Aftertreatment Exhaust Gas Temperature 1 Circuit - Voltage Below Normal, or Shorted to Low Source
3241	4	1665	Aftertreatment 1 Exhaust Gas Temperature 1	Voltage Below Normal, or Shorted to Low Source	Aftertreatment Exhaust Gas Temperature 1 Circuit - Voltage Below Normal, or Shorted to Low Source
3241	13	1663	Aftertreatment 1 Exhaust Gas Temperature 1	Out of Calibration	Aftertreatment Exhaust Gas Temperature 1 Swapped - Out of Calibration
3242	0	3311	Aftertreatment 1 Diesel Particulate Filter Intake Gas Temperature	Data Valid but Above Normal Operational Range - Most Severe Level	Aftertreatment Diesel Particulate Filter Intake Gas Temperature – Data valid but above normal operational range – Most Severe Level
3242	2	3318	Aftertreatment 1 Diesel Particulate Filter Intake Gas Temperature	Data Erratic, Intermittent or Incorrect	Aftertreatment 1 Diesel Particulate Filter Intake Temperature - Data erratic, intermittent or incorrect
3242	3	3317	Aftertreatment 1 Diesel Particulate Filter Intake Gas Temperature	Voltage Above Normal, or Shorted to High Source	Aftertreatment 1 Diesel Particulate Filter Intake Temperature Sensor Circuit - Voltage above normal, or shorted to high source
3242	4	3316	Aftertreatment 1 Diesel Particulate Filter Intake Gas Temperature	Voltage Below Normal, or Shorted to Low Source	Aftertreatment 1 Diesel Particulate Filter Intake Temperature Sensor Circuit - Voltage below normal, or shorted to low source

J1939 SPN	J1939 FMI	Cummins Code	J1939 SPN Description	J1939 FMI Description	Cummins Description
3242	15	3254	Aftertreatment 1 Diesel Particulate Filter Intake Gas Temperature	Data Valid but Above Normal Operating Range - Least Severe Level	Aftertreatment 1 Diesel Particulate Filter Intake Temperature - Data Valid But Above Normal Operating Range - Least Severe Level
3242	16	3253	Aftertreatment 1 Diesel Particulate Filter Intake Gas Temperature	Data Valid but Above Normal Operating Range - Moderately Severe Level	Aftertreatment 1 Diesel Particulate Filter Intake Temperature - Data Valid But Above Normal Operating Range - Moderately Severe Level
3245	2	1878	Aftertreatment 1 Exhaust Gas Temperature 3	Data Erratic, Intermittent or Incorrect	Aftertreatment Exhaust Gas Temperature 3 - Data Erratic, Intermittent or Incorrect
3245	3	1876	Aftertreatment 1 Exhaust Gas Temperature 3	Voltage Above Normal, or Shorted to High Source	Aftertreatment Exhaust Gas Temperature 3 Circuit - Voltage Above Normal, or Shorted to High Source
3245	4	1877	Aftertreatment 1 Exhaust Gas Temperature 3	Voltage Below Normal, or Shorted to Low Source	Aftertreatment Exhaust Gas Temperature 3 Circuit - Voltage Below Normal, or Shorted to Low Source
3245	16	1972	Aftertreatment 1 Exhaust Gas Temperature 3	Data Valid but Above Normal Operating Range - Moderately Severe Level	Aftertreatment Exhaust Gas Temperature 3 - Data Valid But Above Normal Operating Range - Moderately Severe Level
3246	0	3312	Aftertreatment 1 Diesel Particulate Filter Outlet Gas Temperature	Data Valid but Above Normal Operational Range - Most Severe Level	Aftertreatment Diesel Particulate Filter Outlet Gas Temperature – Data valid but above normal operational range – Most Severe Level
3249	2	1676	Aftertreatment 1 Exhaust Gas Temperature 2	Data Erratic, Intermittent or Incorrect	Aftertreatment Exhaust Gas Temperature 2 - Data erratic, intermittent or incorrect
3249	3	1675	Aftertreatment 1 Exhaust Gas Temperature 2	Voltage Above Normal, or Shorted to High Source	Aftertreatment Exhaust Gas Temperature 2 Circuit - Voltage Below Normal, or Shorted to Low Source
3249	4	1674	Aftertreatment 1 Exhaust Gas Temperature 2	Voltage Below Normal, or Shorted to Low Source	Aftertreatment Exhaust Gas Temperature 2 Circuit - Voltage Below Normal, or Shorted to Low Source
3249	16	1968	Aftertreatment 1 Exhaust Gas Temperature 2	Data Valid but Above Normal Operating Range - Moderately Severe Level	Aftertreatment Exhaust Gas Temperature 2 - Data Valid But Above Normal Operating Range - Moderately Severe Level
3249	17	2742	Aftertreatment 1 Exhaust Gas Temperature 2	Data Valid but Below Normal Operating Range - Least Severe Level	Aftertreatment Exhaust Gas Temperature 2 - Data Valid But Below Normal Operating Range - Least Severe Level
3249	18	2743	Aftertreatment 1 Exhaust Gas Temperature 2	Data Valid but Below Normal Operating Range - Moderately Severe Level	Aftertreatment Exhaust Gas Temperature 2 - Data Valid But Below Normal Operating Range - Moderately Severe Level
3251	0	1922	Aftertreatment 1 Diesel Particulate Filter Differential Pressure	Data Valid but Above Normal Operational Range - Most Severe Level	Aftertreatment Particulate Filter Differential Pressure - Data Valid But Above Normal Operational Range - Most Severe Level
3251	2	1883	Aftertreatment 1 Diesel Particulate Filter Differential Pressure	Data Erratic, Intermittent or Incorrect	Aftertreatment Particulate Filter Differential Pressure Sensor - Data Erratic, Intermittent or Incorrect
3251	3	1879	Aftertreatment 1 Diesel Particulate Filter Differential Pressure	Voltage Above Normal, or Shorted to High Source	Aftertreatment Particulate Filter Differential Pressure Sensor Circuit - Voltage Above Normal, or Shorted to High Source
3251	4	1881	Aftertreatment 1 Diesel Particulate Filter Differential Pressure	Voltage Below Normal, or Shorted to Low Source	Aftertreatment Particulate Filter Differential Pressure Sensor Circuit - Voltage Below Normal, or Shorted to Low Source
3251	15	2639	Aftertreatment 1 Diesel Particulate Filter Differential Pressure	Data Valid but Above Normal Operating Range - Least Severe Level	Aftertreatment Particulate Filter Differential Pressure - Data Valid But Above Normal Operating Range - Least Severe Level
3251	16	1921	Aftertreatment 1 Diesel Particulate Filter Differential Pressure	Data Valid but Above Normal Operating Range - Moderately Severe Level	Aftertreatment Particulate Filter Differential Pressure - Data Valid But Above Normal Operating Range - Moderately Severe Level
3481	16	2778	Aftertreatment 1 Fuel Rate	Data Valid but Above Normal Operating Range - Moderately Severe Level	Aftertreatment Fuel Rate - Data Valid But Above Normal Operating Range - Moderately Severe Level
3509	3	386	Sensor supply voltage 1	Voltage Above Normal, or Shorted to High Source	Sensor Supply Voltage #1 Circuit – Voltage Above Normal, or Shorted to High Source

J1939 SPN	J1939 FMI	Cummins Code	J1939 SPN Description	J1939 FMI Description	Cummins Description
3509	4	352	Sensor supply voltage 1	Voltage Below Normal, or Shorted to Low Source	Sensor Supply Voltage #1 Circuit – Voltage Below Normal, or Shorted to Low Source
3510	3	227	Sensor supply voltage 2	Voltage Above Normal, or Shorted to High Source	Sensor Supply Voltage #2 Circuit – Voltage Above Normal, or Shorted to High Source
3510	4	187	Sensor supply voltage 2	Voltage Below Normal, or Shorted to Low Source	Sensor Supply Voltage #2 Circuit – Voltage Below Normal, or Shorted to Low Source
3511	3	239	Sensor supply voltage 3	Voltage Above Normal, or Shorted to High Source	Sensor Supply Voltage #3 Circuit - Voltage Above Normal, or Shorted to High Source
3511	4	238	Sensor supply voltage 3	Voltage Below Normal, or Shorted to Low Source	Sensor Supply Voltage #3 Circuit – Voltage Below Normal, or Shorted to Low Source
3512	3	2185	Sensor supply voltage 4	Voltage Above Normal, or Shorted to High Source	Sensor Supply 4 Circuit - Voltage above normal, or shorted to high source
3513	3	1695	Sensor supply voltage 5	Voltage Above Normal, or Shorted to High Source	Sensor Supply 5 - Voltage Above Normal, or Shorted to High Source
3513	4	1696	Sensor supply voltage 5	Voltage Below Normal, or Shorted to Low Source	Sensor Supply 5 - Voltage Below Normal, or Shorted to Low Source
3514	3	515	Sensor supply voltage 6	Voltage Above Normal, or Shorted to High Source	Sensor Supply 6 Circuit - Voltage above normal, or shorted to high source
3514	4	516	Sensor supply voltage 6	Voltage Below Normal, or Shorted to Low Source	Sensor Supply 6 Circuit - Voltage below normal, or shorted to low source
3555	17	1943	Ambient Air Density	Data Valid but Below Normal Operating Range - Least Severe Level	Ambient Air Density - Data Valid But Below Normal Operating Range - Least Severe Level
3556	16	2728	Aftertreatment 1 Hydrocarbon Doser	Data Valid but Above Normal Operating Range - Moderately Severe Level	Aftertreatment Fuel Injector 1 - Data Valid But Above Normal Operating Range - Moderately Severe Level
3597	3	1939	ECU Power Output Supply Voltage #1	Voltage Above Normal, or Shorted to High Source	ECU Power Output Supply Voltage 1 - Voltage Above Normal, or Shorted to High Source
3597	4	1941	ECU Power Output Supply Voltage #1	Voltage Below Normal, or Shorted to Low Source	ECU Power Output Supply Voltage 1 - Voltage Below Normal, or Shorted to Low Source
3597	18	1938	ECU Power Output Supply Voltage #1	Data Valid but Below Normal Operating Range - Moderately Severe Level	ECU Power Output Supply Voltage 1 - Data Valid But Below Normal Operating Range - Moderately Severe Level
3610	2	3135	Diesel Particulate Filter Outlet Pressure 1	Data Erratic, Intermittent or Incorrect	Aftertreatment Diesel Particulate Filter Outlet Pressure - Data Erratic, Intermittent or Incorrect
3610	3	3133	Diesel Particulate Filter Outlet Pressure 1	Voltage Above Normal, or Shorted to High Source	Aftertreatment Diesel Particulate Filter Outlet Pressure Sensor Circuit - Voltage Above Normal, or Shorted to High Source
3610	4	3134	Diesel Particulate Filter Outlet Pressure 1	Voltage Below Normal, or Shorted to Low Source	Aftertreatment Diesel Particulate Filter Outlet Pressure Sensor Circuit - Voltage Below Normal, or Shorted to Low Source
3667	3	3139	Engine Air Shutoff Status	Voltage Above Normal, or Shorted to High Source	Engine Air Shutoff Circuit - Voltage above normal, or shorted to high source
3667	4	3141	Engine Air Shutoff Status	Voltage Below Normal, or Shorted to Low Source	Engine Air Shutoff Circuit - Voltage below normal, or shorted to low source
3703	31	2777	Diesel Particulate Filter Active Regeneration Inhibited Due to Inhibit Switch	Not Available or Condition Exists	Particulate Trap Active Regeneration Inhibited Due to Inhibit Switch - Condition Exists

J1939 SPN	J1939 FMI	Cummins Code	J1939 SPN Description	J1939 FMI Description	Cummins Description
3936	15	1981	Aftertreatment Diesel Particulate Filter System	Data Valid but Above Normal Operating Range - Least Severe Level	Aftertreatment Diesel Particulate Filter System - Data Valid But Above Normal Operating Range - Least Severe Level
3936	16	3168	Aftertreatment Diesel Particulate Filter System	Data Valid but Above Normal Operating Range - Moderately Severe Level	Aftertreatment Diesel Particulate Filter System - Data Valid But Above Normal Operating Range - Moderately Severe Level
4765	0	3251	Aftertreatment 1 Diesel Oxidation Catalyst Intake Gas Temperature	Data Valid but Above Normal Operational Range - Most Severe Level	Aftertreatment 1 Diesel Oxidation Catalyst Intake Temperature - Data Valid But Above Normal Operating Range - Moderately Severe Level
4765	2	3315	Aftertreatment 1 Diesel Oxidation Catalyst Intake Gas Temperature	Data Erratic, Intermittent or Incorrect	Aftertreatment 1 Diesel Oxidation Catalyst Intake Temperature - Data erratic, intermittent or incorrect
4765	3	3314	Aftertreatment 1 Diesel Oxidation Catalyst Intake Gas Temperature	Voltage Above Normal, or Shorted to High Source	Aftertreatment 1 Diesel Oxidation Catalyst Intake Temperature Sensor Circuit - Voltage above normal, or shorted to high source
4765	4	3313	Aftertreatment 1 Diesel Oxidation Catalyst Intake Gas Temperature	Voltage Below Normal, or Shorted to Low Source	Aftertreatment 1 Diesel Oxidation Catalyst Intake Temperature Sensor Circuit - Voltage below normal, or shorted to low source
4765	13	3325	Aftertreatment 1 Diesel Oxidation Catalyst Intake Gas Temperature	Out of Calibration	Aftertreatment 1 Diesel Oxidation Catalyst Intake Temperature Swapped - Out of Calibration
4795	31	1993	Aftertreatment 1 Diesel Particulate Filter Missing	Not Available or Condition Exists	Aftertreatment Diesel Particulate Filter Missing - Condition Exists
4796	31	1664	Aftertreatment 1 Diesel Oxidation Catalyst Missing	Not Available or Condition Exists	Aftertreatment Diesel Oxidation Catalyst Missing - Condition Exists
5246	0	3712	Aftertreatment SCR Operator Inducement Severity	Data Valid but Above Normal Operational Range - Most Severe Level	Aftertreatment SCR Operator Inducement - Data valid but above normal operational range - Most Severe Level
5421	5	3922	Engine Turbocharger Wastegate Actuator 1	Current Below Normal or Open Circuit	Engine Turbocharger Wastegate Actuator - Current below normal or open circuit
5421	6	3923	Engine Turbocharger Wastegate Actuator 1	Current Above Normal or Grounded Circuit	Engine Turbocharger Wastegate Actuator - Current above normal or grounded circuit
5421	7	3921	Engine Turbocharger Wastegate Actuator 1	Mechanical System not Responding or Out of Adjustment	Engine Turbocharger Wastegate Actuator - Mechanical system not responding or out of adjustment
5421	11	3927	Engine Turbocharger Wastegate Actuator 1	Root Cause Not Known	Engine Turbocharger Wastegate Actuator - Root Cause Not Known
5421	11	3928	Engine Turbocharger Wastegate Actuator 1	Root Cause Not Known	Engine Turbocharger Wastegate Actuator - Condition Exists
5421	13	3918	Engine Turbocharger Wastegate Actuator 1	Out of Calibration	Engine Turbocharger Wastegate Actuator - Out of Calibration
5571	7	3727	High Pressure Common Rail Fuel Pressure Relief Valve	Mechanical System not Responding or Out of Adjustment	High Pressure Common Rail Fuel Pressure Relief Valve - Mechanical system not responding or out of adjustment
520199	3	193	Cruise Control (Resistive) Signal Circuit	Voltage Above Normal, or Shorted to High Source	Cruise Control (Resistive) Signal Circuit - Voltage Above Normal, or Shorted to High Source
520199	4	194	Cruise Control (Resistive) Signal Circuit	Voltage Below Normal, or Shorted to Low Source	Cruise Control (Resistive) Signal Circuit - Voltage Below Normal, or Shorted to Low Source
520320	7	2699	Crankcase Depression Valve	Mechanical System not Responding or Out of Adjustment	Crankcase Depression Valve - Mechanical System Not Responding or Out of Adjustment
520435	12	3222	Glow Plug Module	Bad Intelligent Device or Component	Glow Plug Module - Bad intelligent device or component

J1939 SPN	J1939 FMI	Cummins Code	J1939 SPN Description	J1939 FMI Description	Cummins Description
520441	3	3136	Engine Exhaust Gas Recirculation (EGR) Outlet Pressure Sensor Circuit	Voltage Above Normal, or Shorted to High Source	Engine Exhaust Gas Recirculation (EGR) Outlet Pressure Sensor Circuit - Above Normal, or Shorted to High Source
520441	4	3137	Engine Exhaust Gas Recirculation (EGR) Outlet Pressure Sensor Circuit	Voltage Below Normal, or Shorted to Low Source	Engine Exhaust Gas Recirculation (EGR) Outlet Pressure Sensor Circuit - Voltage Below Normal, or Shorted to Low Source
520442	3	3295	Engine Exhaust Gas Recirculation (EGR) Mixer Inlet Temperature Sensor Circuit	Voltage Above Normal, or Shorted to High Source	Engine Exhaust Gas Recirculation (EGR) Mixer Inlet Temperature Sensor Circuit - Voltage Above Normal, or Shorted to High Source
520442	4	3296	Engine Exhaust Gas Recirculation (EGR) Mixer Inlet Temperature Sensor Circuit	Voltage Below Normal, or Shorted to Low Source	Engine Exhaust Gas Recirculation (EGR) Mixer Inlet Temperature Sensor Circuit - Voltage Below Normal, or Shorted to Low Source
520448	31	3377	Engine Crankcase Ventilation Hose Disconnected	Not Available or Condition Exists	Engine Crankcase Ventilation Hose Disconnected - Condition Exists
520553	11	3924	Utility Reverse kW Fault	Root Cause Not Known	Utility Reverse kW Fault - Condition Exists
524286	31	952	Reserved for temporary use	Not Available or Condition Exists	Reserved for temporary use - Condition Exists
524286	31	953	Reserved for temporary use	Not Available or Condition Exists	Reserved for temporary use - Condition Exists

Options

IQ System

The IQ System is a complete, self-contained system which provides cooler, cleaner air than from a standard portable compressor. The system utilizes an integral aftercooler, high-efficiency filtration, and a patented condensate disposal system to provide the cool, clean air. The condensate disposal system injects all liquid condensed from the moisture separator and filters into the engine exhaust system where it is vaporized by heat. This eliminates the need for collecting the condensate and the added cost of disposing of the condensate which is often regulated by local, state, and/or federal regulations.

All drain points for the condensate handling system are heated with 24VDC heaters which are integral to the compressor heater system.

Standard configuration not to be operated below freezing.

NOTICE

Do not operate aftercooler at temperatures less than 0°C (32°F) unless equipped with Low Ambient IQ Option.

Theory of Operation

The compressed air exits the separator tank through the top cover piping and can then travel along one of two paths, selectable via manual valving.

One path allows Standard Operation, which bypasses the IQ System and delivers air quality equivalent to a standard oil-flooded portable compressor. If the IQ System is enabled by proper setting of the selector valve, the compressed air first enters the aftercooler.

The compressed air and condensate (water with a small amount of compressor oil) exits the aftercooler and enters the moisture separator where most of the condensate is removed. The compressed air then flows through two stages of filtration. The aerosol oil is removed down to approximately 0.01 ppm and all particulates are removed down to 0.01 micron.

Condensate drain lines are located at the bottom of the Moisture Separator and both filters.

The condensate lines are then piped together and the condensate is injected at a single point into the engine exhaust piping. The compressed air then travels through the check valve and out through the Service Air Valve. The Air Pressure Gauge on the instrument panel indicates the pressure inside the Separator Tank.

If the IQ System is bypassed (Standard Operation selected), the delivered air pressure will be approximately equal to the separator tank pressure. If the IQ System operation is selected, the delivered air pressure will be slightly less, depending on the restriction of the filters.

⚠ CAUTION

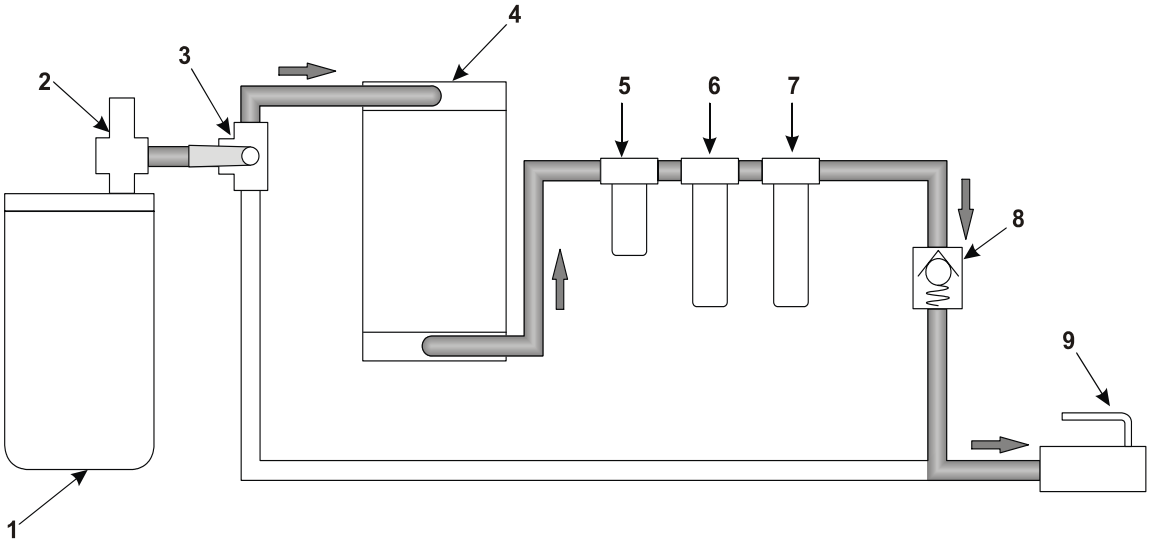
The compressor regulation system is adjusted to maintain regulated pressure at the Separator Tank. DO NOT adjust regulation to provide full rated pressure at the Service Valve when the IQ System is enabled. This will result in operation at excessive horsepower levels, causing overheating, reduced engine life, and reduced airend life.

NOTICE

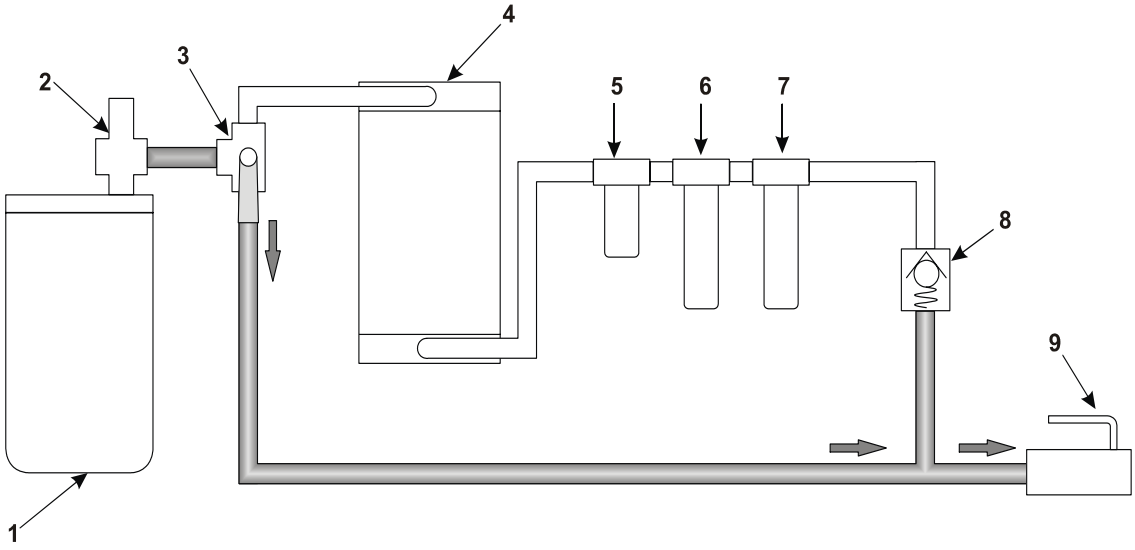
Keep all doors and panels closed during operation to direct proper flow of cooling air across the aftercooler and maintain aftercooling performance.

IQ System Configuration

IQ System Active



Standard Operation (IQ System Bypassed)



(1) Separator Tank	(6) Primary IQ Filter
(2) Minimum Pressure Valve	(7) Secondary IQ FIlter
(3) 3 Way Selector Valve	(8) Check Valve
(4) Aftercooler	(9) Service Valve
(5) Water Separator	

Maintenance

Daily Maintenance

Verify, during fullload (maximum compressed air delivery) operation, the IQ System filter restriction is not excessive. Filter restriction can be checked at the control panel. The compressor will shutdown if restriction exceeds recommended values.

⚠ CAUTION

Excessively restricted filter elements may cause an increase in the amount of aerosol water and oil carryover which could result in damage to downstream equipment. Normal service intervals should not be exceeded.

Weekly Maintenance

- Remove Y-strainer screens at the bottom of the moisture separator and both filters. Clean out any residue.
- Verify the orifices below the Y-strainers are not clogged.
- Verify the piping from the orifice purge points to the exhaust system is not clogged.

⚠ CAUTION

Blockage of the Y-strainers, orifices, or piping can result in flooding of the vessels with condensate. If flooding occurs, excessive condensate may enter the airstream and could result in damage to downstream equipment.

Yearly Maintenance

The normal maintenance interval on the primary and secondary IQ System filter elements is one year (earlier if pressure drop becomes excessive). High filter restriction will shutdown the compressor if restriction exceeds recommended values.

⚠ CAUTION

Excessively restricted filter elements may cause an increase in the amount of aerosol water and oil carryover, which could result in damage to downstream equipment. Normal service intervals should not be exceeded.

Filter Replacement

- With engine shutdown, ensure pressure is relieved from air system.
- Disconnect drains on the bottom of each filter housing. Inspect fittings and hoses for any blockage. Clean if necessary.
- Using a chain wrench or similar tool, loosen the housing. The housing should be removed by hand after initial loosening, taking care to prevent the housing from falling.
- Remove and replace the filter element being careful not to damage outer wrap.

Verify the part number and positions of new element vs. old element, as the two IQ filter stages are of different media.

- Put a small amount of petroleum jelly or other non-synthetic grease on the element O-Ring to aid installation into the filter head.
- Replace housing, making sure to not overtighten.
- Repeat the above procedure on the remaining filter element.
- Reconnect drains on the bottom of each filter housing.

Revision History

Rev.	EC Number	Comments
A	CN023581	Original release

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