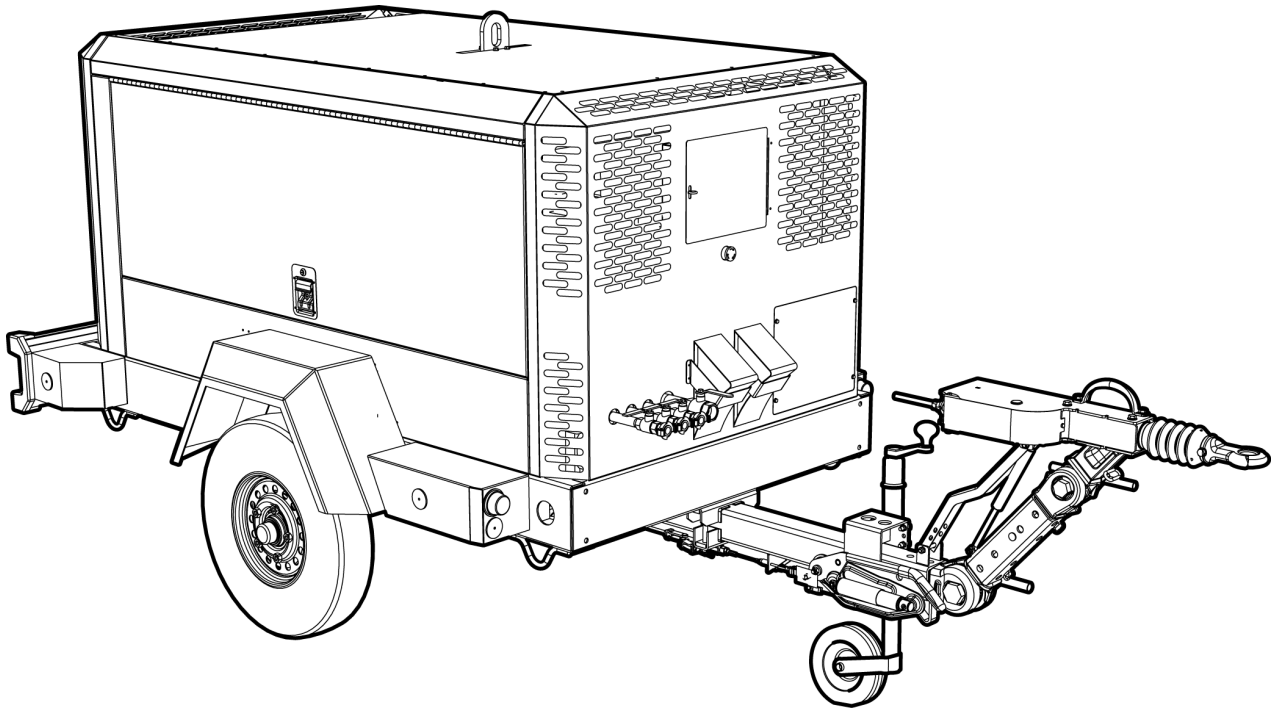
DOOSAN

Portable Power

7/125 - 9/115, 7/125 - 10/110, 14/90

OPERATION & MAINTENANCE MANUAL

Original Instruction



This manual contains important safety information and must be made available to personnel who operate and maintain this machine.

SERIAL No : 660000 ->

46641810_en_B_08/16

Machine models represented in this manual may be used in various locations world-wide. Machines sold and shipped into European Union Territories require that the machine display the CE Mark and conform to various directives. In such cases, the design specification of this machine has been certified as complying with EC directives. Any modification to any part is absolutely prohibited and would result in the CE Certification and marking being rendered invalid. A declaration of that conformity follows:

CE

DOOSAN

[1] **EC Declaration of Conformity**

[2] Original declaration

[3] **We:**
Doosan International USA, Inc
1293 Glenway Drive
Statesville
North Carolina 28625-9218
USA

[4] **Represented in EC by:**
Doosan Trading Limited
Block B, Swords Business Campus
Swords
Co. Dublin
Ireland

[5] **Hereby declare that, under our sole responsibility the product(s)**

[6] Machine description: Portable Screw Compressor

[7] Machine Model: 7/20; 7/26E; 7/31E; 7/41; 7/51; 7/53 ; 7/73-10/53; 7/125-9/115; 7/125-10/110; 14/90; 7/204; 10/174; 12/154; 14/144; 9/274; 9/304; 12/254; 17/244; 21/224

[8] Commercial name: 7/20; 7/26E; 7/31E; 7/41; 7/51; 7/53; 7/73-10/53; 7/125-9/115; 7/125-10/110; 14/90; 7/204; 10/174; 12/154; 14/144; 9/274; 9/304; 12/254; 17/244; 21/224

[9] VIN / Serial number: UN5

[10] **is (are) in conformity with the relevant provisions of the following EC Directive(s)**

[11] 2006/42/EC The Machinery Directive
[12] 2004/108/EC The Electromagnetic Compatibility Directive
[13] 2000/14/EC The Noise Emission Directive
[14] 97/23/EC The Pressure Equipment Directive
[15] 2009/105/EC The Simple Pressure Vessels Directive
[16] 97/68/EC The emission of engines for no-road mobile machinery
[31] 2006/95/EC The Low Voltage Equipment Directive
[17] and their amendments

[18] **Conformity with the Noise Emission Directive 2000/14/EC**

[19] Directive 2000/14/EC, Annex VI, Part I
[20] Notified body: AV Technology, Stockport, UK. Nr 1067

[21]Machine		[23]Measured sound power level	[24]Guaranteed sound power level	[21]Machine		[23]Measured sound power level	[24]Guaranteed sound power level
[22]Type	kW			[22]Type	kW		
7/20	17,5	**96L$_{WA}$**	**97L$_{WA}$**	**7/125-9/115; 7/125-10/110; 14/90**	97	**98L$_{WA}$**	**99L$_{WA}$**
7/26E	21,3	**97L$_{WA}$**	**98L$_{WA}$**				
7/31E	25,9	**97L$_{WA}$**	**98L$_{WA}$**				
7/41	35	**98L$_{WA}$**	**98L$_{WA}$**	**7/204; 10/174; 12/154; 14/144**	168	**98L$_{WA}$**	**99L$_{WA}$**
7/51	50,2	**98L$_{WA}$**	**98L$_{WA}$**				
7/53	36	**97L$_{WA}$**	**98L$_{WA}$**				
7/73-10/53	55	**96L$_{WA}$**	**98L$_{WA}$**	**9/274**	226	**99L$_{WA}$**	**100L$_{WA}$**
				9/304; 12/254; 17/244; 21/224	247	**99L$_{WA}$**	**100L$_{WA}$**

[25] **Conformity with the Pressure Equipment directive 97/23/EC**

[26] We declare that this product has been assessed according to the Pressure Equipment Directive 97/23/EC and, in accordance with the terms of this Directive, has been excluded from the scope of this Directive. It may carry "CE" marking in compliance with other applicable EC directives.

Jan Moravec
[27] Engineering Manager
[28] Issued at Dobris, Czech Republic

[29] Date

[30] **The technical documentation for the machinery is available from:**
Doosan Infracore Portable Power EMEA, Dreve Richelle 167, B-1410 Waterloo, Belgium

Portable Power

Portable Power

ABBREVIATIONS & SYMBOLS

####	Contact the company for serial number
->####	Up to Serial No.
####->	From Serial No.
*	Not illustrated
†	Option
WDG	Generator option
AR	As required
HA	High ambient machine
S.R.G.	Site running gear
H.R.G.	High speed running gear

bg	Bulgarian
cs	Czech
da	Danish
de	German
el	Greek
en	English
es	Spanish
et	Estonian
fi	Finnish
fr	French
hu	Hungarian
it	Italian
lt	Lithuanian
lv	Latvian, Lettish
mt	Maltese
nl	Dutch
no	Norwegian
pl	Polish
pt	Portuguese
ro	Romanian
ru	Russian
sk	Slovak
sl	Slovenian
sv	Swedish
zh	Chinese

2 FOREWORD

The contents of this manual are considered to be proprietary and confidential to and should not be reproduced without the prior written permission of the company.

Nothing contained in this document is intended to extend any promise, warranty or representation, expressed or implied, regarding the 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 authorised service department.

The design specification of this machine has been certified as complying with EC directives. As a result:

a) Any machine modifications are strictly prohibited, and will invalidate EC certification.
b) A unique specification for USA/Canada is adopted and tailored to the territory.

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 the company.
- clearly rated for a pressure at least equal to the machine maximum allowable working pressure.
- compatible with the compressor lubricant/coolant.
- accompanied with instructions for safe installation, operation and maintenance.

Details of approved equipment are available from the company Service departments.

The use of repair parts / lubricants / fluids other than those included within the approved parts list may create hazardous conditions over which the company has no control. Therefore the company cannot be held responsible for equipment in which non-approved repair parts are installed.

The company 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 machine are outlined below and examples of unapproved usage are also given, however the company cannot anticipate every application or work situation that may arise.

IF IN DOUBT CONSULT SUPERVISION.

This machine has been designed and supplied for use only in the following specified conditions and applications:

- Compression of normal ambient air containing no known or detectable additional gases, vapours. or particles
- Operation within the ambient temperature range specified in the *GENERAL INFORMATION* section of this manual.

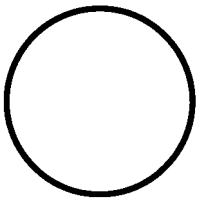
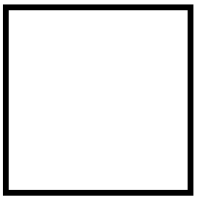
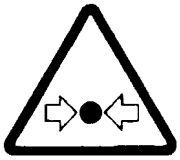
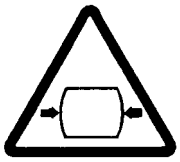
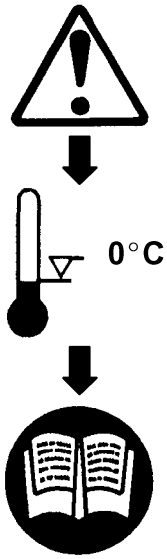
The use of the machine in any of the situation types listed in table 1:-

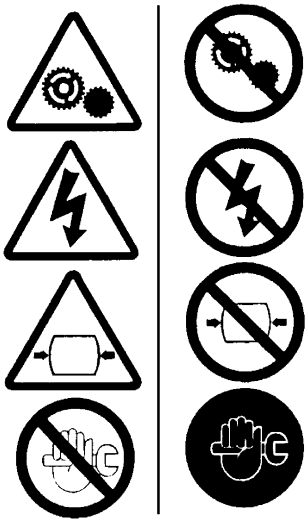
a) Is not approved,
b) May impair the safety of users and other persons, and
c) May prejudice any claims made against the company.

TABLE 1
Use of the machine to produce compressed air for: a) direct human consumption b) indirect human consumption, without suitable filtration and purity checks.
Use of the machine outside the ambient temperature range specified in the *GENERAL INFORMATION SECTION* of this manual.
This machine is not intended and must not be used in potentially explosive atmospheres, including situations where flammable gases or vapours may be present.
Use of the machine fitted with non approved components / lubricants / fluids.
Use of the machine with safety or control components missing or disabled.

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

GRAPHIC FORM AND MEANING OF ISO SYMBOLS

		
Prohibition / Mandatory	**Information / Instructions**	**Warning**
		
WARNING: Electrical shock risk	**WARNING - Pressurised component or system.**	**WARNING - Hot surface.**
		
WARNING - Pressure control.	**WARNING - Corrosion risk.**	**WARNING - Air/gas flow or Air discharge.**
		
WARNING - Pressurised vessel.	**WARNING - Hot and harmful exhaust gas.**	**WARNING - Flammable liquid.**
		
WARNING - Maintain correct tyre pressure. (Refer to the GENERAL INFORMATION section of this manual).	**WARNING - Before connecting the tow bar or commencing to tow consult the Operation & Maintenance manual.**	**WARNING - For operating temperature below 0°C (32°F), consult the Operation & 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 & Maintenance manual before commencing any maintenance.

Do not breathe the compressed air from this machine.

Do not remove the Operating 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 the doors or enclosure open.

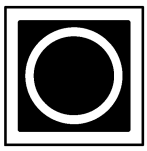
Do not use fork lift truck from this side.

Do not exceed the trailer speed limit.

No naked lights.

Do not open the service valve before the airhose is attached.

Use fork lift truck from this side only.



Emergency stop.

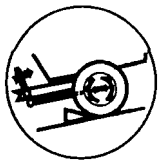
Tie down point

Lifting point.

On (power).

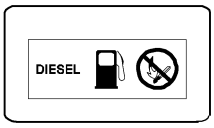
Off (power).

Read the Operation & Maintenance manual before operation or maintenance of this machine is undertaken.



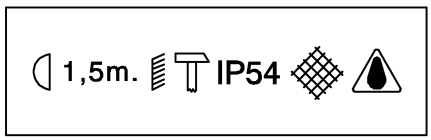
When parking use prop stand, handbrake and wheel chocks.

Compressor oil filling

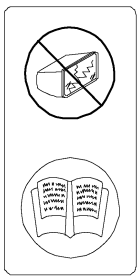


Diesel fuel
No open flame.

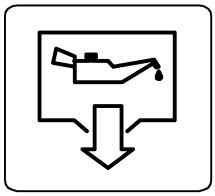
Parking brake.



Rough Service Designation.
Wet Location Operation.



Replace any cracked protective shield.



Oil drain.

Operational status of the engine emission filter.

Engine emissions system temperature may be high.

Disable active regeneration of the engine emission filter.

WARNINGS
Warnings call attention to instructions which must be followed precisely to avoid injury or death.

CAUTIONS
Cautions call attention to instructions which must be followed precisely to avoid damaging the product, process or its surroundings.

NOTES
Notes are used for supplementary information.

General Information

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

Ensure that the Operation & Maintenance manual, and the manual holder, are not removed permanently from the machine.

Ensure that maintenance personnel are adequately trained, competent and have read the Maintenance Manuals.

Make sure that all protective covers are in place and that the canopy/ doors are closed during operation.

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

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

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

Compressed air

Compressed air can be dangerous if incorrectly handled. Before doing any work on the unit, ensure that all pressure is vented from the system and that the machine cannot be started accidentally.

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

All air pressure equipment installed in or connected to the machine must have safe working pressure ratings of at least the machine rated pressure.

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, so that one machine cannot accidentally be pressurised / over pressurised by another.

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

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

If the 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.

Materials

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

- brake lining dust
- engine exhaust fumes

AVOID INHALATION

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 machine and *may* be hazardous to health if used incorrectly:

- anti-freeze
- compressor lubricant
- engine lubricant
- preservative grease
- rust preventative
- diesel fuel
- battery electrolyte

AVOID INGESTION, SKIN CONTACT AND INHALATION OF FUMES.

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

Should compressor lubricant come into contact with the skin, then wash off immediately.

Consult a doctor if large amounts of compressor lubricant are ingested.

Consult a doctor if compressor lubricant is inhaled.

Never give fluids or induce vomiting if the patient is unconscious or having convulsions.

Safety data sheets for compressor and engine lubricants should be obtained from the lubricant supplier.

Battery

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.

Batteries contain corrosive liquid and produce explosive gas. Do not expose to naked lights. Always wear personal protective clothing when handling. When starting the machine from a slave battery ensure that the correct polarity is observed and that connections are secure.

DO NOT ATTEMPT TO SLAVE START A FROZEN BATTERY SINCE THIS MAY CAUSE IT TO EXPLODE.

Radiator

Hot engine coolant and steam can cause injury. Ensure that the radiator filler cap is removed with due care and attention.

Transport

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

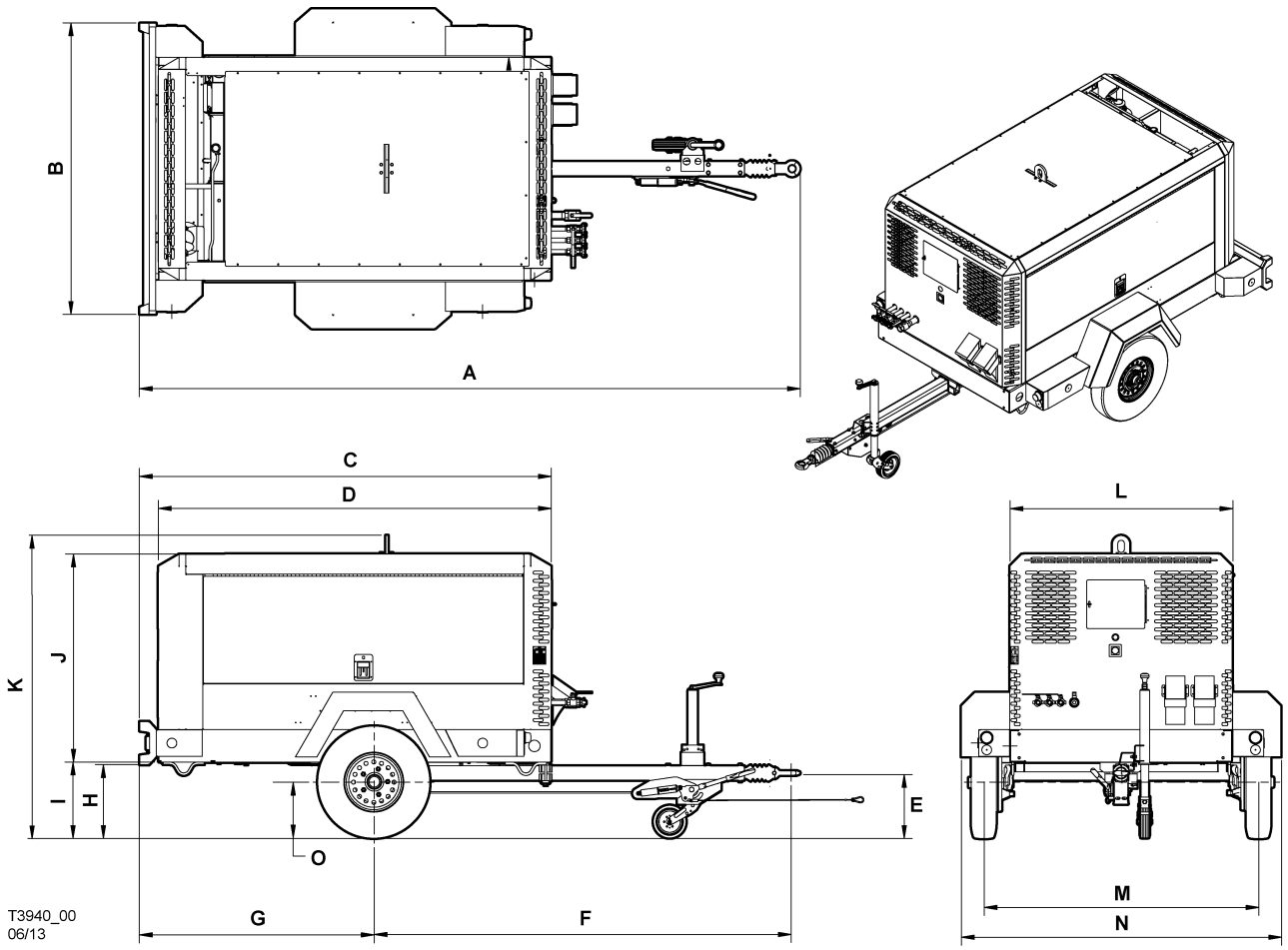
When loading or transporting machines ensure that the towing vehicle, its size, weight, towing hitch and electrical supply are all suitable to provide safe and stable towing at speeds either, up to the legal maximum for the country in which it is being towed or, as specified for the machine model if lower than the legal maximum.

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.

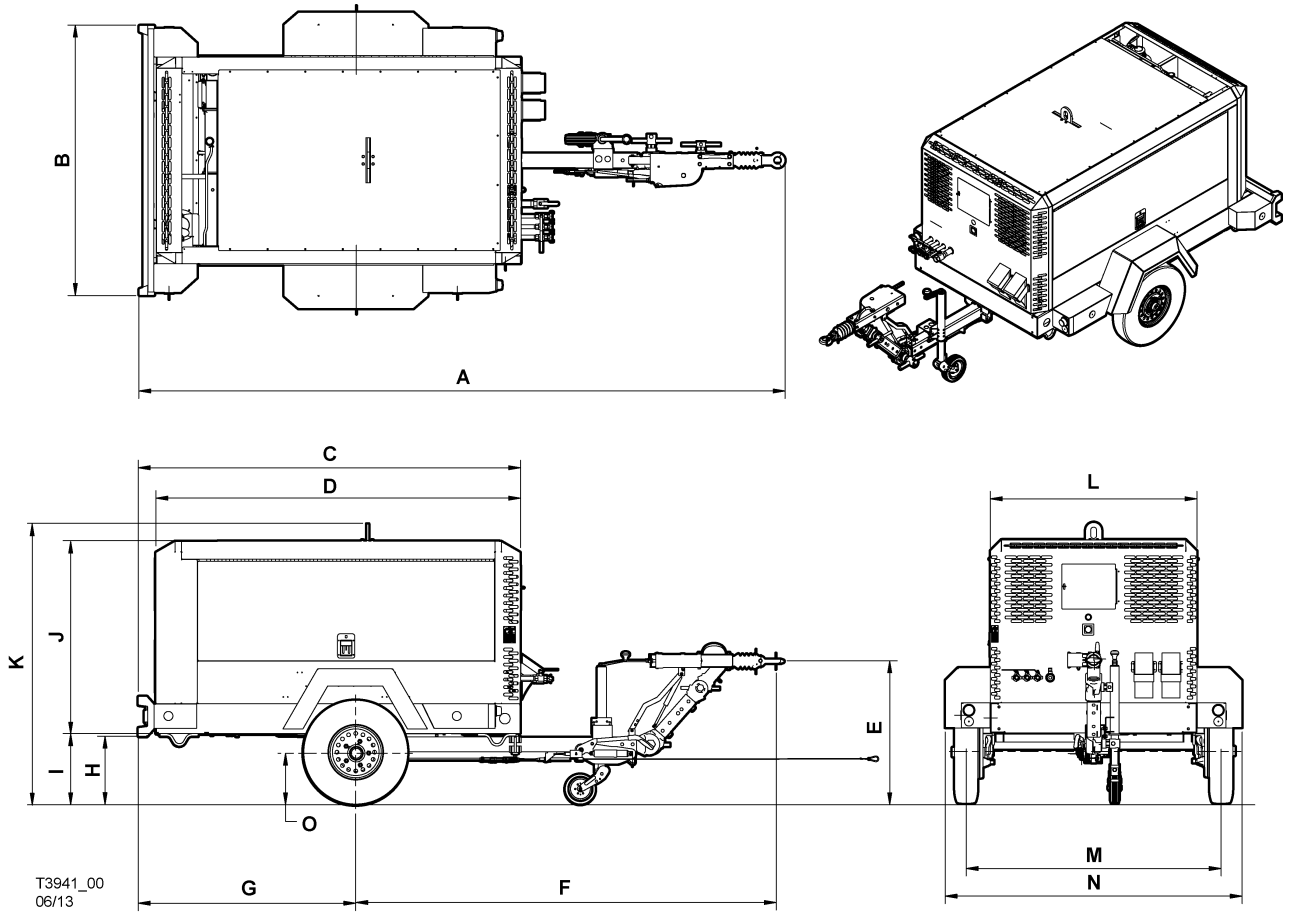
Before towing the machine, ensure that:-

1. Ensure wheels, tires, and drawbar connectors are in safe operating condition and drawbar is properly connected before towing.
2. ‘the canopy is secure.
3. all ancillary equipment is stored in a safe and secure manner.
4. When parking, always use the handbrake and, if necessary, suitable wheel chocks.

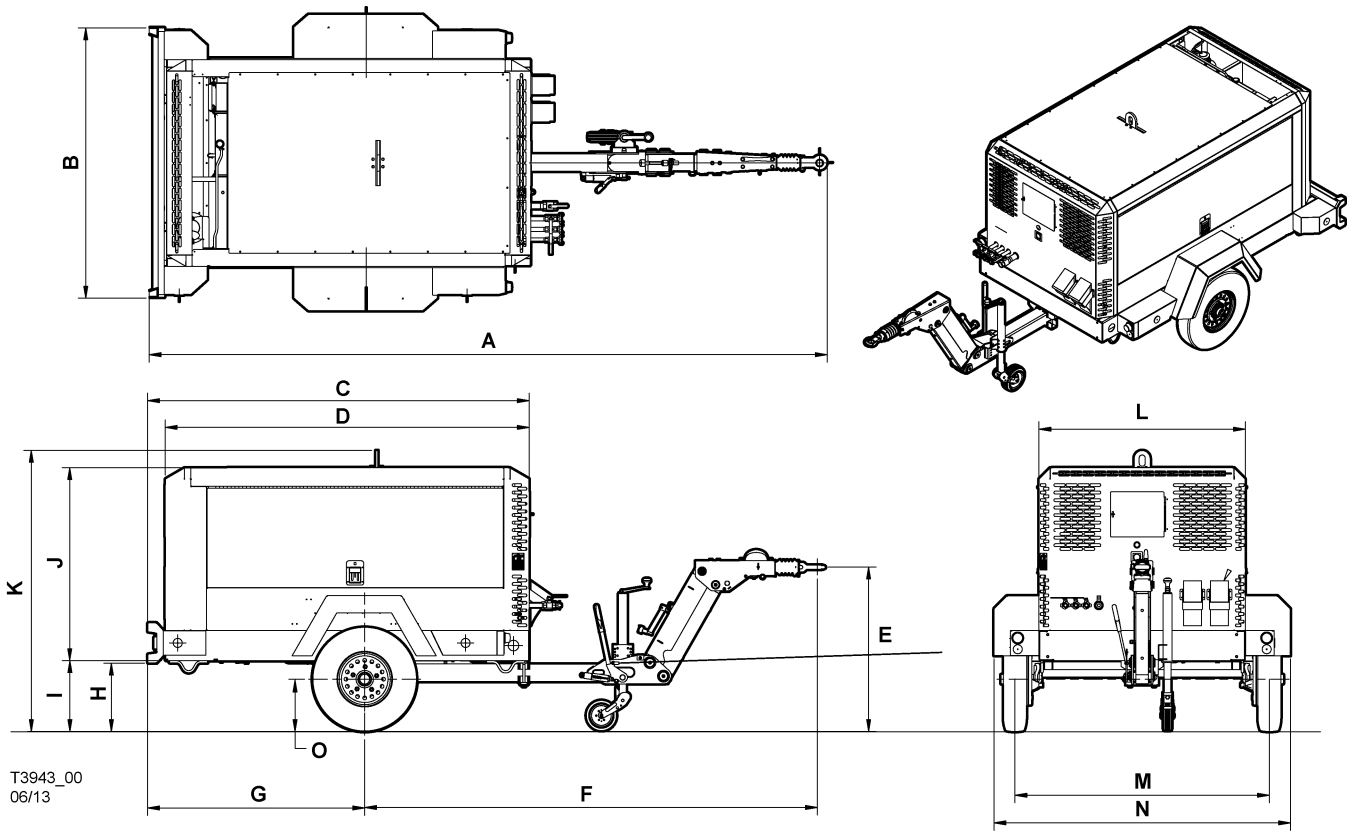
Fixed Height Braked



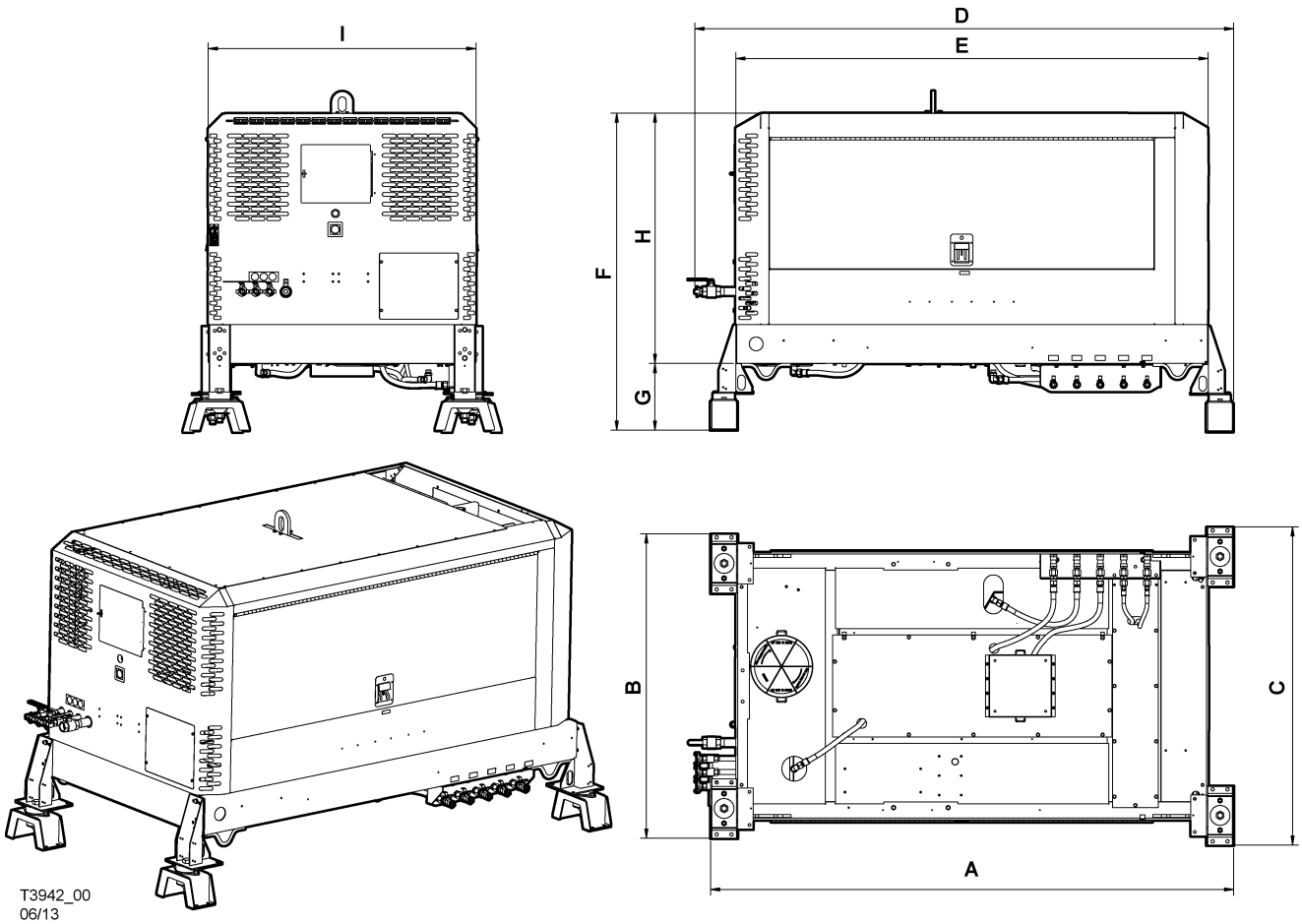
Variable Height Braked



KHD Variable Height



LRG (Less Running Gear)



DIMENSIONS															
MODEL	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**	**M**	**N**	**O**
Fixed Height Braked	4100 MIN 4158 MAX	1798	2541	2424	400	2629 MIN 2646 MAX	1435	410	440	1283	1840	1374	1695	1985	330
Variable Height Braked	4272 MIN 4515 MAX	1798	2541	2424	395 MIN 880 MAX	2801 MIN 3003 MAX	1435	410	440	1283	1840	1374	1695	1985	330
KHD Variable Height	4481 MIN 4914 MAX	1798	2541	2424	310 MIN 1050 MAX	3010 MIN 3402 MAX	1435	410	440	1283	1840	1374	1695	1985	330
LRG (Less Running Gear)	2685	1563	1634	2765	2424	1628	343	1285	1374	-	-	-	-	-	-
ALL DIMENSIONS IN MLLIMETRES															

MODEL		**7/125**	**9/115**	**10/110**	**14/90**
COMPRESSOR					
Actual free air delivery.	m^3/min/ cfm	12,0/ 425	10,7/ 377	10,6/ 374	8,3/ 294
Normal operating discharge pressure.	bar/ psi	6,9/ 100	8,6/ 125	10,3/ 150	13,8/ 200
Maximum allowable pressure	bar/ psi	8,6/ 125	10,3/ 150	12,1/ 175	15,5/ 225
Safety valve setting	bar/ psi	14/ 200	14/ 200	14/ 200	17/ 250
Maximum pressure ratio (absolute)		7,9:1	9,6:1	11,3:1	14,8:1
Operating ambient temperature range	°C/ °F	-10 to +46/ 14 to 115	-10 to +46/ 14 to 115	-10 to +46/ 14 to 115	-10 to +46/ 14 to 115
Maximum discharge temperature	°C/ °F	120/ 248	120/ 248	120/ 248	120/ 248
COMPRESSOR					
Cooling system.	Oil Injection				
Oil capacity.	Litre/ gallon	36/ 9.5	36/ 9.5	36/ 9.5	36/ 9.5
Maximum oil system temperature	°C/ °F	120/ 248	120/ 248	120/ 248	120/ 248
Maximum oil system pressure	bar/ psi	8,6/ 125	10,3/ 150	12,1/ 175	15,5/ 225
LUBRICATING OIL SPECIFICATION (for the specified ambient temperatures).	**SEE 'COMPRESSOR LUBRICATION' IN THE MAINTENANCE SECTION.**				

LUBRICATING OIL SPECIFICATION
(for the specified ambient temperatures).

ABOVE -23°C(-9°F)

Recommended: PRO-TEC

Approved: SAE 10W, API CF-4/CG-4

PRO-TEC compressor fluid is factory-fitted, for use at all ambient temperatures above -23°C (-9°F).

NOTE: Warranty may be extended only by continuous use of PRO-TEC and Doosan oil filters and separators.

No other oil/fluids are compatible with PRO-TEC.

No other oils/fluids should be mixed with PRO-TEC because the resulting mixture could cause damage to the airend.

In the event that PRO-TEC is not available and / or the end user needs to use an approved single grade engine oil, the complete system including separator / receiver, cooler and pipework must be flushed clear of the first fill fluid and new Doosan oil filters installed.
When this has been completed, the following oils are approved:

for ambient temperatures above -23°C (-9°F),
SAE 10W, API CF-4/CG-4

Safety data sheets can be obtained on request from your Doosan dealership.

For temperatures outside the specified ambient range, consult the company.

ENGINE

Type/model.	Cummins / QSB4.5 CM2250 EC
Number of cylinders.	4
Oil capacity.	12 litres (3.2 US GAL)
Speed at full load.	2200 revs min-1 (RPM)
Speed at idle.	1500 revs min-1 (RPM)
Electrical system.	24V negative earth
Power available at 2200 revs min-1	93 kW (125 HP)
Fuel tank capacity	219.5 litres (58 US GAL)
Oil specification	Refer to engine section
Coolant capacity	15 litres (4 US GAL)

INFORMATION ON AIRBORNE NOISE (CE regions)

- The A-weighted emission sound pressure level

- 83 dB (A), uncertainty 1 dB (A)

- The A-weighted emission sound power level

- 99 dB (A), uncertainty 1 dB (A)

The operating conditions of the machinery are in compliance with ISO 3744:1995 and EN ISO 2151:2004

FIXED HEIGHT RUNNING GEAR
Braked version

Shipping weight.	1935kg (4266Lbs)
Maximum weight.	2500kg (5511Lbs)
Maximum horizontal towing force.	2009kg (4429Lbs)
Maximum vertical coupling load (nose weight).	100 kgf (220 Lbs)

VARIABLE HEIGHT RUNNING GEAR
Braked version

Shipping weight.	1965kg (4331Lbs)
Maximum weight.	2500kg (5511Lbs)
Maximum horizontal towing force.	2009kg (4429Lbs)
Maximum vertical coupling load (nose weight).	100 kgf (220 Lbs)

KHD VARIABLE HEIGHT RUNNING GEAR
Braked version

Shipping weight.	1965kg (4331Lbs)
Maximum weight.	2500kg (5511Lbs)
Maximum horizontal towing force.	2009kg (4429Lbs)
Maximum vertical coupling load (nose weight).	100 kgf (220 Lbs)

WHEELS AND TYRES

Number of wheels.	2 x 5.5
Tyre size.	205/75 R16
Tyre pressure.	4.5 bar (65 psi)

TOWING SPEED

Maximum towing speed.	100 km/h (62 mph)

Further information may be obtained by request through the customer services department.

COMMISSIONING

Upon receipt of the unit, and prior to putting it into service, it is important to adhere strictly to the instructions given below in *PRIOR TO STARTING*.

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

Ensure that the position of the *emergency stop* device is known and recognised by its markings. Ensure that it is functioning correctly and that the method of operation is known.

Before towing the unit, ensure that the tyre pressures are correct (refer to the *GENERAL INFORMATION* section of this manual) and that the handbrake is functioning correctly (refer to the *MAINTENANCE* section of this manual). Before towing the unit during the hours of darkness, ensure that the lights are functioning correctly (where fitted).

Ensure that all transport and packing materials are discarded.

Ensure that the correct fork lift truck slots or marked lifting / tie down points are used whenever the machine is lifted or transported.

When selecting the working position of the machine ensure that there is sufficient clearance for ventilation and exhaust requirements, observing any specified minimum dimensions (to walls, floors etc.).

Adequate clearance needs to be allowed around and above the machine to permit safe access for specified maintenance tasks.

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

Attach the battery cables to the battery(s) ensuring that they are tightened securely. Attach the negative cable before attaching the positive cable.

WARNING: All air pressure equipment installed in or connected to the machine must have safe working pressure ratings of at least the machine rated pressure, and materials compatible with the compressor lubricant (refer to the *GENERAL INFORMATION* section).

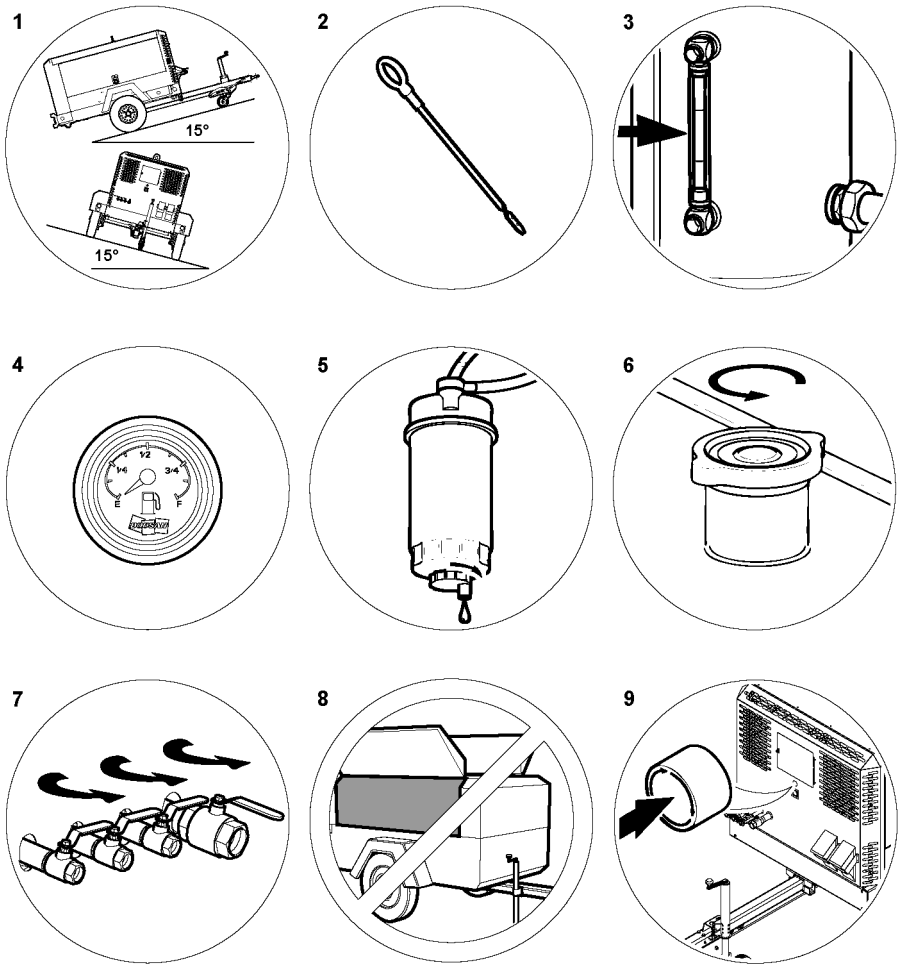
WARNING: If more than one compressor is connected to one common downstream plant, effective check valves and isolation valves must be fitted and controlled by work procedures, so that one machine cannot accidentally be pressurised / over pressurised by another.

WARNING: If flexible discharge hoses are to carry more than 7 bar pressure then it is recommended that safety retaining wires are used on the hoses.

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.



T3970_00
08/13

PRIOR TO STARTING

1. Place the unit in a position that is as level as possible. The design of the unit permits a 15 degree lengthways and sideways limit on out of level operation. It is the engine, not the compressor, that is the limiting factor.

When the unit has to be operated out of level, it is important to keep the engine oil level near the high level mark (with the unit level).

CAUTION: *Do not overfill either the engine or the compressor with oil.*

2. Check the engine lubrication oil in accordance with the operating instructions in the *Engine Operator's Manual.*
3. Check the compressor oil level in the sight glass located on the separator tank.
4. Check the diesel fuel level. A good rule is to top up at the end of each working day. This prevents condensation from occurring in the tank.

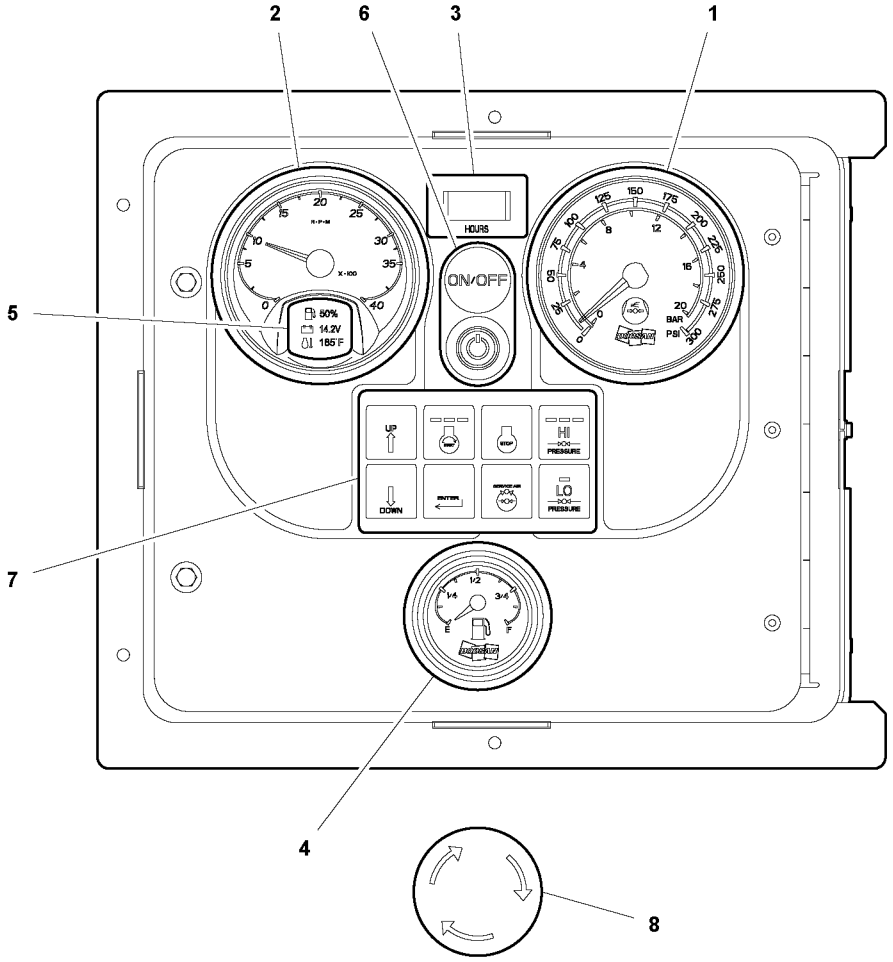
CAUTION: *When refuelling:-*
- *switch off the engine.*
- *do not smoke.*
- *extinguish all naked lights.*
- *do not allow the fuel to come into contact with hot surfaces.*
- *wear personal protective equipment.*

5. Drain the fuel filter water separator of water, ensuring that any released fuel is safely contained.
6. Check the radiator coolant level (with the unit level).
7. Open the service valve(s) to ensure that all pressure is relieved from the system. Close the service valve(s) when all pressure is relieved.

8. ***CAUTION:*** *Do not operate the machine with the canopy/doors in the open position as this may cause overheating and operators to be exposed to high noise levels.*

9. Check that the emergency stop switch is not engaged. Pull knob to release if necessary.
10. Close the manual relief valve inside the unit, on the top of the separator tank.

When starting or operating the machine in temperatures below or approaching 0°C (32°F), ensure that the operation of the regulation system, the unloader valve, the safety valve, and the engine are not impaired by ice or snow, and that all inlet and outlet pipes and ducts are clear of ice and snow.



T3805_01
08/13

CONTROLS AND GAUGES

The operating controls and instruments are arranged on or below the control panel as shown above. A description of each device is as follows:

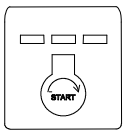
1. **Air Pressure Gauge:** Indicates pressure (BAR/PSI) in the separator tank
2. **Engine Tachometer:** Indicates engine speed (RPM).
3. **Hourmeter:** Indicates machine operating hours.
4. **Fuel Level Gauge:** Indicates level of fuel in tank.
5. **MidPort Display:** Indicates compressor and engine operating parameters including diagnostic fault codes.
6. **Main Power Button:** Used to start and shutdown the compressor control system and gauge panel.
7. **KeyPad:** Used to start, shutdown and operate the compressor.
8. **Emergency Stop Switch:** Used to stop the machine in the event of an emergency.

VIEWPORT

Navigation

The Navigation and Function selection buttons are situated on the keypad located below the display. This keypad provides the operator interface with compressor systems as described below.

STOP: Shutdown the compressor.

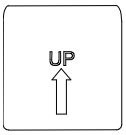


START: Initiates engine cranking.

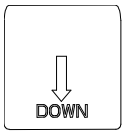
SERVICE AIR: Allows operator to load compressor after warm-up.

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.**

Displayed in case of a engine related fault:

SPN = Suspect Parameter Number = identifies the item for which a diagnostic code is being displayed.

FMI = Failure Mode Identifier = defines the type of failure detected in the subsystem identified by the SPN.

OC = occurrence = amount of times this failure has occurred.

Displayed in case of a compressor related fault:

CPR Code = one or two digit number identifying the component or system fault.

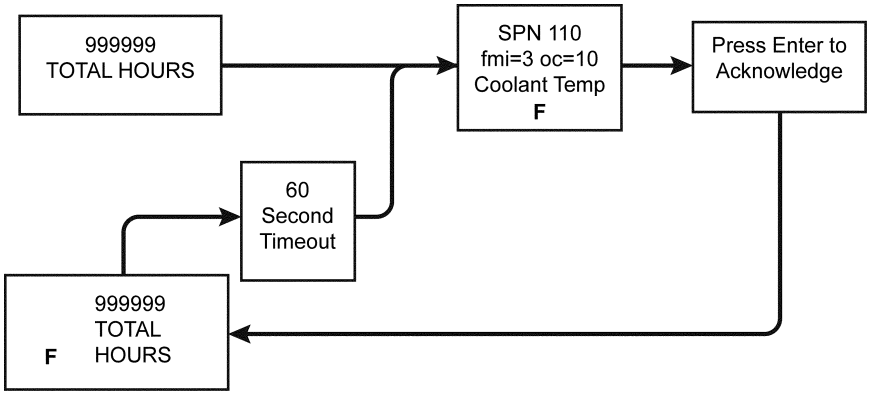


Figure 1

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**

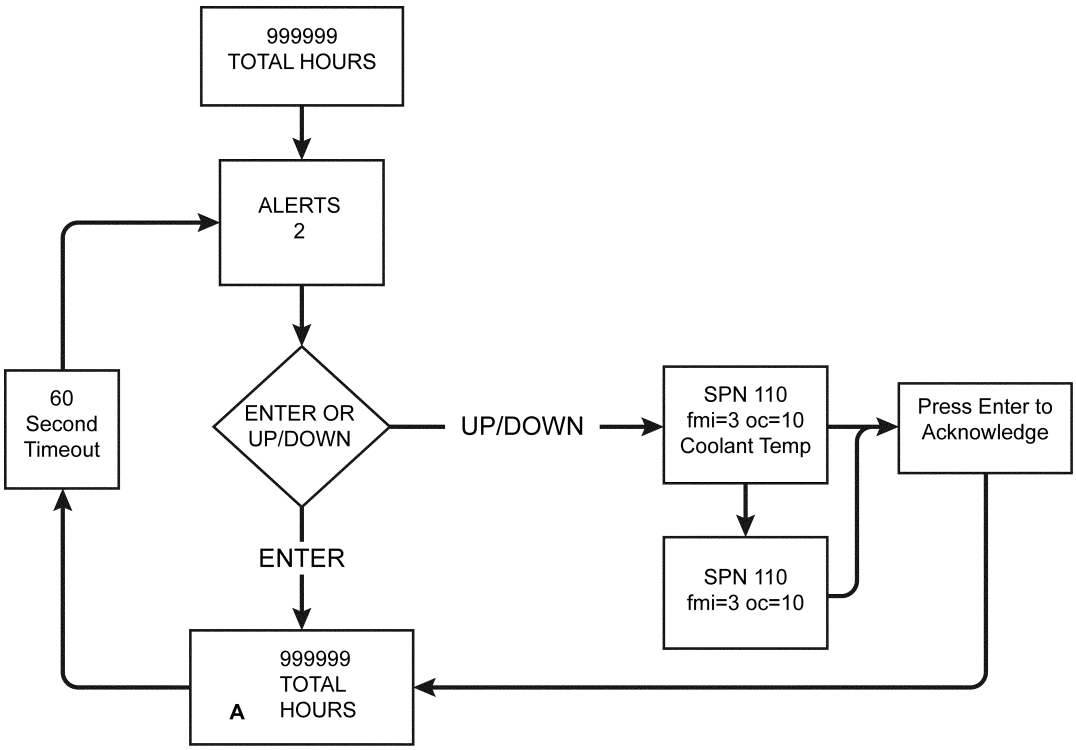


Figure 2

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**.

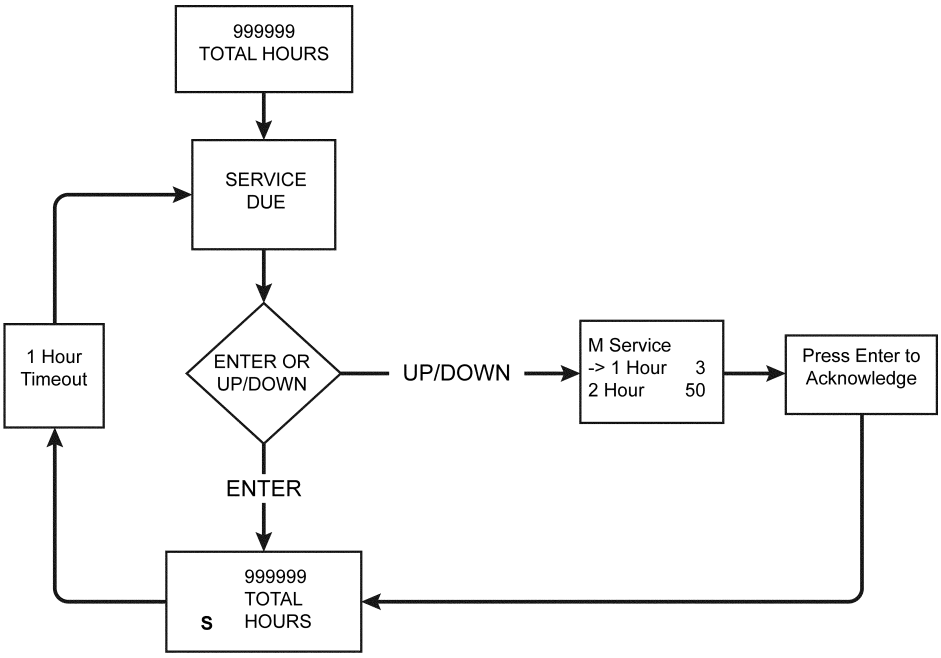


Figure 3

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.**

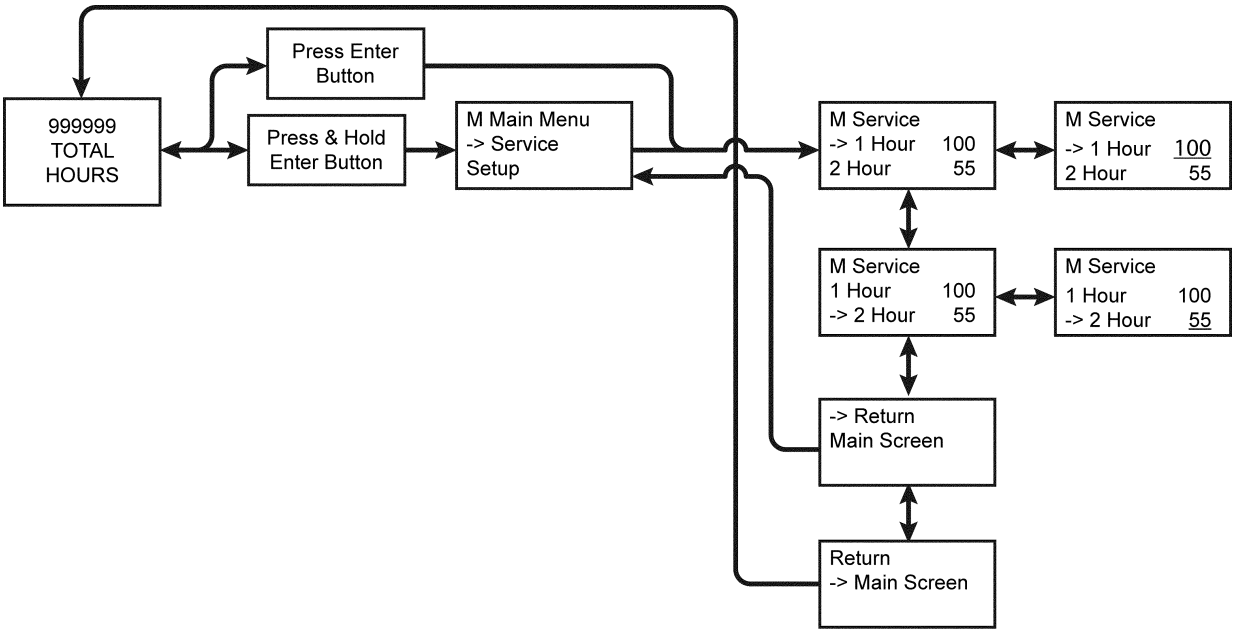


Figure 4

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.**

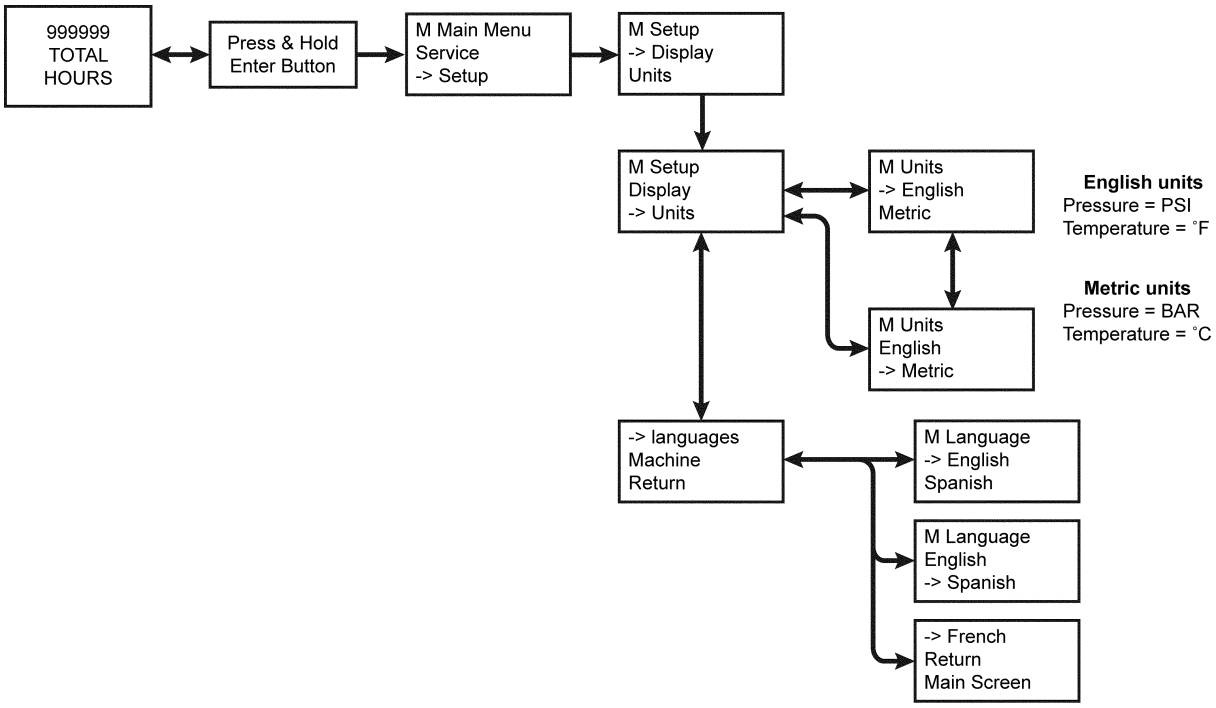


Figure 5

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).

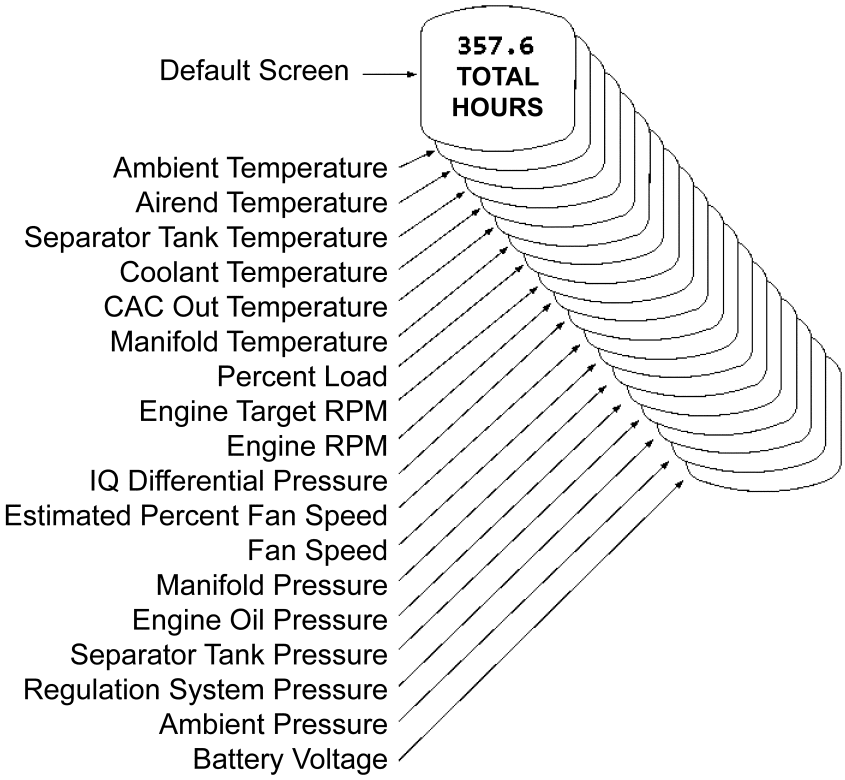


Figure 6

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.

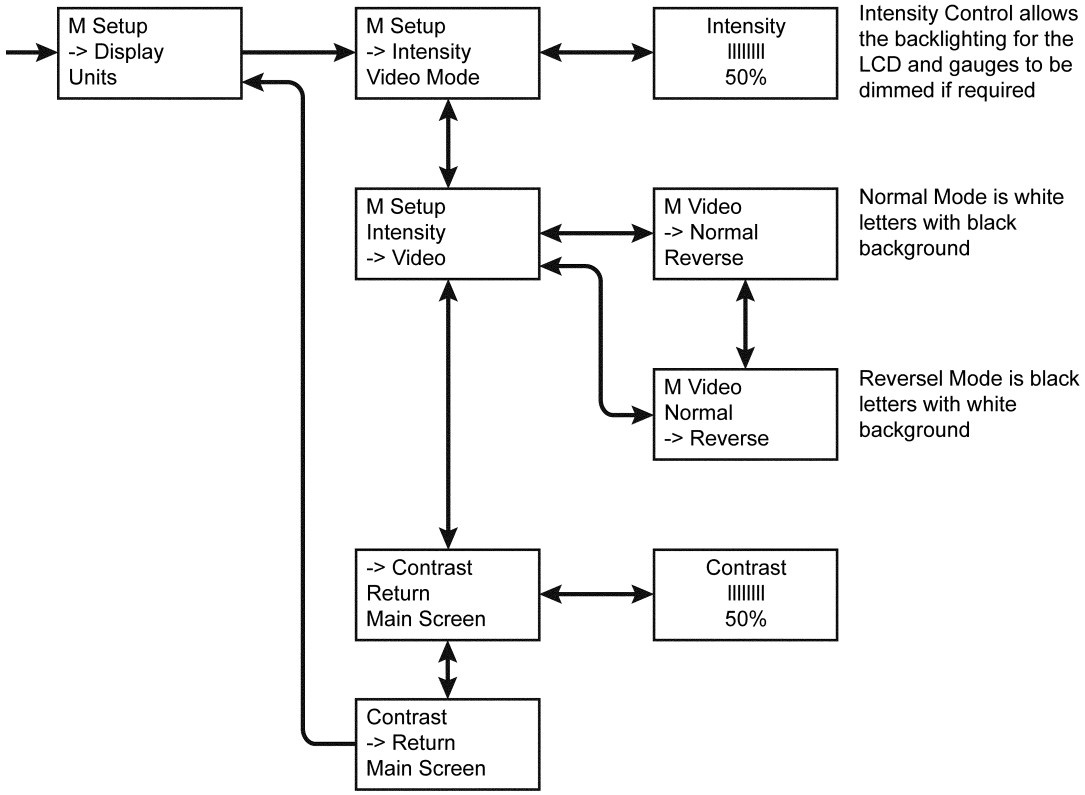


Figure 7

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.

CONDITION / DESCRIPTION	ALERT		SHUTDOWN		
	CODE	THRESHOLD	CODE	THRESHOLD	DELAY (sec)
High Engine Speed - Engine speed greater than 2100 RPM for 30 seconds.			2	2100 RPM	30
Engine Crank Timeout (starter protection) - Engine crank attempt longer than 15 seconds.	3	15 sec			
Low Fuel Level / Out Of Fuel - Fuel level in tank approaching empty OR Fuel level in tank below usable limit.	12		4		3
Engine Diagnostic Code - Engine diagnostic code present in ViewPort history log.	9				
Engine Speed Response - Engine target idle speed not met within 10 seconds after loading compressor.	10				
AutoStart Attempts Exceeded - Compressor not started after 3 crank attempts.			11	3	0
Engine Shutdown Unknown - Engine stopped without an engine diagnostic code.			29		0
High Airend Discharge Temperature - Airend discharge temperature greater than or equal to 248 °F.			30	120 °C (248 °F)	3
Low Airend Oil Pressure - Airend oil pressure below 10 psi.			31	0.7 bar (10 PSI)	3
Airend Discharge Temperature Sensor - Airend discharge temperature sensor reading out of range.			32		10
Separator Tank Pressure Sensor - Separator tank pressure sensor reading out of range.	33	<0.5V, >4.5V			
High Separator Tank Pressure At Start - Separator tank pressure greater than 20 psi at crank attempt.	34	1.4 bar (20 PSI)			
High Separator Tank Pressure - Air pressure in the separator tank exceeded limit.			35	12 bar (175 PSI) / 29.3 bar (425 PSI)	1
Safety Valve Open - Safety relief valve on separator tank opened.			36		
Low Airend Discharge Temperature - Airend discharge temperature 5°F below calculated setpoint for 20 minutes.			37		
Intake Air Filters Restricted - Intake filters restricting air flow.	38				
Low System Voltage - Electrical system voltage below 25.5 VDC.	39	25.5V			
Airend Oil Pressure Sensor - Airend oil pressure sensor reading out of range.			41	<0.5V, >4.5V	3

CONDITION / DESCRIPTION	ALERT		SHUTDOWN		
	CODE	THRESHOLD	CODE	THRESHOLD	DELAY (sec)
Fuel Level Sensor - Fuel level sensor reading out of range.	42	<0.5V, >4.5V			
Low Separator Tank Pressure - Separator tank pressure below 40 psi after compressor is loaded.			43	2.8 bar (40 PSI)	3
High IQ Filter Restriction - IQ filters restricting air flow OR IQ filters restricted past usable level.	44	0.7 bar (10 PSI)	52	1 bar (15 PSI)	3
High Separator Tank Temperature - Separator tank temperature greater than or equal to 248 °F.			50	120 °C (248 °F)	3
Compressor ID Invalid - The Titan controller and ViewPort do not have a valid compressor ID.			15		0
Separator Tank Temperature Sensor - Separator tank temperature sensor reading out of range.			53		10
Regulation System Pressure Sensor - Regulation system pressure sensor reading out of range.	54	<0.5V, >4.5V			
Emergency Stop Activated - Emergency Stop button has been activated.			55		3
Low Start Pressure - Separator tank pressure below 50 psi 20 seconds after start.	56	3.5 bar (50 PSI)			
Ambient Temperature Sensor - Ambient temperature sensor reading out of range.	58				
OTBV Solenoid Malfunction - Oil temperature bypass valve solenoid current out of range.	59				
IQ Filter Pressure Error - IQ filter outlet pressure reading higher than inlet pressure.	61	Transducer or Motor			
Engine ECM Communication - Communication between Titan controller and engine ECM not functional.			71		
AutoStart Controller Communication - Communication between Titan controller and AutoStart controller not functional.	73		73		0
OTC Controller Communication - Communication between Titan controller and OTC controller not functional.	74				
IQ TCU Controller Communication - Communication between Titan controller and IQ TCU controller not functional.	75				
CAN Keypad Communication Fault -	77				

ENGINE DIAGNOSTIC CODES - MODEL QSL9 CM2250					
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 HighSource	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
100	18	143	Engine Oil Pressure	Data Valid but Below Normal Operating Range - Moderately Severe Level	Oil Pressure Low - Data Valid but Below Normal Operational Range - Moderately Severe Level
101	0	556	Engine Crankcase Pressure	Data Valid but Above Normal Operational Range - Most Severe Level	Crankcase Pressure - Data Valid But Above Normal Operating Range - Moderately Severe Level
101	2	1942	Engine Crankcase Pressure	Data Erratic, Intermittent or Incorrect	Crankcase Pressure - Data Erratic, Intermittent or Incorrect

J1939 SPN	J1939 FMI	CUMMINS CODE	J1939 SPN DESCRIPTION	J1939 FMI DESCRIPTION	CUMMINS DESCRIPTION
101	3	1843	Engine Crankcase Pressure	Voltage Above Normal, or Shorted to HighSource	Crankcase Pressure Circuit - Voltage Above Normal, or Shorted to High Source
101	4	1844	Engine Crankcase Pressure	Voltage Below Normal, or Shorted to Low Source	Crankcase Pressure Circuit - Below Normal, or Shorted to Low Source
101	15	1974	Engine Crankcase Pressure	Data Valid but Above Normal Operating Range - Least Severe Level	Crankcase Pressure - Data Valid But Above Normal Operating Range - Least Severe Level
101	16	555	Engine Crankcase Pressure	Data Valid but Above Normal Operating Range - Moderately Severe Level	Crankcase Pressure - Data Valid But Above Normal Operating Range - Moderately Severe Level
102	2	2973	Engine Intake Manifold #1 Pressure	Data Erratic, Intermittent or Incorrect	Intake Manifold Pressure Sensor Circuit - Data Erratic, Intermittent, or Incorrect
102	3	122	Engine Intake Manifold #1 Pressure	Voltage Above Normal, or Shorted to High Source	Intake Manifold Pressure Sensor Circuit - Voltage Above Normal, or Shorted to High Source
102	4	123	Engine Intake Manifold #1 Pressure	Voltage Below Normal, or Shorted to Low Source	Intake Manifold Pressure Sensor Circuit - Voltage Below Normal, or Shorted to Low Source
102	18	125	Engine Intake Manifold #1 Pressure	Data Valid but Below Normal Operating Range - Moderately Severe Level	Intake Manifold 1 Pressure - Data Valid But Below Normal Operating Range - Moderately Severe Level
103	15	2288	Engine Turbocharger 1 Speed	Data Valid but Above Normal Operating Range Least Severe Level	Turbocharger 1 Speed - Data Valid But Above Normal Operating Range - Least Severe Level
103	16	595	Engine Turbocharger 1 Speed	Data Valid but Above Normal Operating Range - Moderately Severe Level	Turbocharger #1 Speed High - Data Valid but Above Normal Operational Range - Moderately Severe Level
103	18	687	Engine Turbocharger 1 Speed	Data Valid but Below Normal Operating Range - Moderately Severe Level	Turbocharger #1 Speed Low - Data Valid but Below Normal Operational Range - Moderately Severe Level
105	0	155	Engine Intake Manifold 1 Temperature	Data Valid but Above Normal Operational Range - Most Severe Level	Intake Manifold Air Temperature High - Data Valid but Above Normal Operational Range - Most Severe Level
105	3	153	Engine Intake Manifold 1 Temperature	Voltage Above Normal, or Shorted to High Source	Intake Manifold Air Temperature Sensor Circuit - Voltage Above Normal, or Shorted to High Source
105	4	154	Engine Intake Manifold 1 Temperature	Voltage Below Normal, or Shorted to Low Source	Intake Manifold Air Temperature Sensor Circuit - Voltage Below Normal, or Shorted to Low Source
105	16	488	Engine Intake Manifold 1 Temperature	Data Valid but Above Normal Operating Range - Moderately Severe Level	Intake Manifold 1 Temperature - Data Valid but Above Normal Operational Range - Moderately Severe Level
108	2	295	Barometric Pressure	Data Erratic, Intermittent or Incorrect	Barometric Pressure Sensor Circuit - Data Erratic, Intermittent, or Incorrect
108	3	221	Barometric Pressure	Voltage Above Normal, or Shorted to High Source	Barometric Pressure Sensor Circuit - Voltage Above Normal, or Shorted to High Source
108	4	222	Barometric Pressure	Voltage Below Normal, or Shorted to Low Source	Barometric Pressure Sensor Circuit - Voltage Below Normal, or Shorted to Low Source
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

J1939 SPN	J1939 FMI	CUMMINS CODE	J1939 SPN DESCRIPTION	J1939 FMI DESCRIPTION	CUMMINS DESCRIPTION
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
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

J1939 SPN	J1939 FMI	CUMMINS CODE	J1939 SPN DESCRIPTION	J1939 FMI DESCRIPTION	CUMMINS DESCRIPTION
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
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

J1939 SPN	J1939 FMI	CUMMINS CODE	J1939 SPN DESCRIPTION	J1939 FMI DESCRIPTION	CUMMINS DESCRIPTION
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
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

J1939 SPN	J1939 FMI	CUMMINS CODE	J1939 SPN DESCRIPTION	J1939 FMI DESCRIPTION	CUMMINS DESCRIPTION
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
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 Adjustment
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

J1939 SPN	J1939 FMI	CUMMINS CODE	J1939 SPN DESCRIPTION	J1939 FMI DESCRIPTION	CUMMINS DESCRIPTION
1209	2	2554	Engine Exhaust Gas Pressure	Data Erratic, Intermittent or Incorrect	Exhaust Gas Pressure - Data Erratic, Intermittent or Incorrect
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
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

J1939 SPN	J1939 FMI	CUMMINS CODE	J1939 SPN DESCRIPTION	J1939 FMI DESCRIPTION	CUMMINS DESCRIPTION
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
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

J1939 SPN	J1939 FMI	CUMMINS CODE	J1939 SPN DESCRIPTION	J1939 FMI DESCRIPTION	CUMMINS DESCRIPTION
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
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

J1939 SPN	J1939 FMI	CUMMINS CODE	J1939 SPN DESCRIPTION	J1939 FMI DESCRIPTION	CUMMINS DESCRIPTION
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
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

J1939 SPN	J1939 FMI	CUMMINS CODE	J1939 SPN DESCRIPTION	J1939 FMI DESCRIPTION	CUMMINS DESCRIPTION
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
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

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.

STARTING THE MACHINE

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.

NOTICE: 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. 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 104°F (40°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.

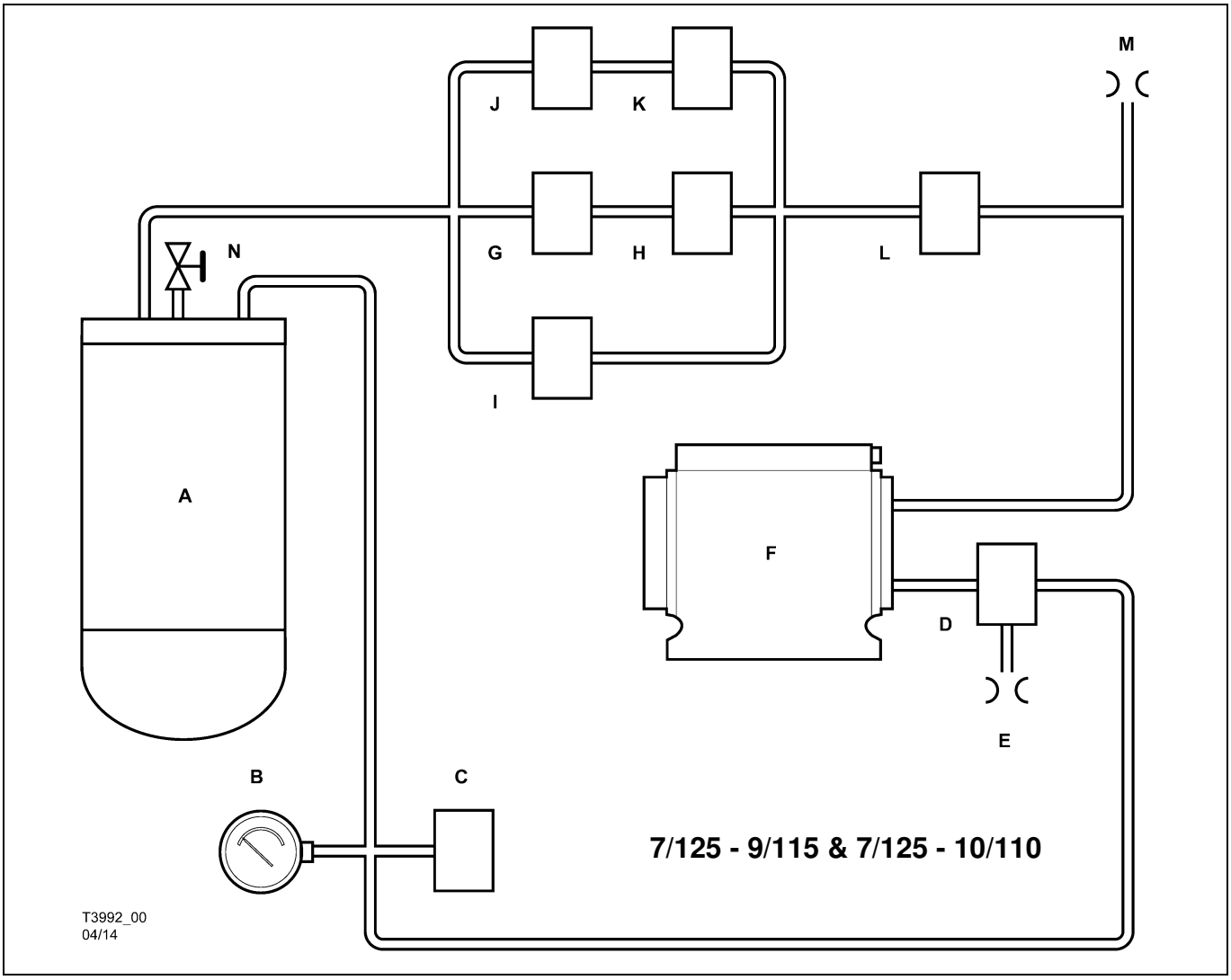
CAUTION: To ensure an adequate flow of oil to the airend, never allow the discharge pressure to fall below 3,4 bar.

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 (7/125 - 9/115 & 7/125 - 10/110)



Key

A Separator tank

B Panel pressure gauge

C Discharge pressure transducer

D Automatic blowdown valve

E Orifice

F Unloader

G Start / run solenoid valve

H Regulator pressure transducer

I Pressure regulator (Low pressure mode)

J Pressure regulator (High pressure mode)

K Modes solenoid valve

L Captive pressure solenoid valve

M Orifice

N Manual blowdown valve

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 12 m^3/min at 6,9 bar regulated set pressure. The regulated set pressure of this mode can be changed (see Pressure Regulating Adjusting Instructions) from 5,5-6,9 bar.

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 10,6 m^3/min at 10,3 bar regulated set pressure. The regulated set pressure of this mode can be changed (see Pressure Regulating Adjusting Instructions) from 5,5-10,3 bar.

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.

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

NOTE: 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.

NOTE: 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.

NOTE: 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.

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 machine is to be permanently decommissioned or dismantled, it is important to ensure that all hazard risks are either eliminated or notified to the recipient of the machine. 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 or drains.
- Do not dispose of a complete machine without documentation relating to instructions for its use.

LONG TERM STORAGE RECOMMENDATIONS (6 months or more)

Spare Airends

- Long-term storage of airends should include filling the airend with the standard compressor fluid, PRO-TEC, XHP605 or XHP405. Upon installation of the airend, drain the storage oil from the airend and proceed with the installation, assuring fresh oil is poured into the intake prior to start up.

Portable Compressors

- Airend – Remove the intake connection and pour the airend intake full with Doosan compressor fluid PRO-TEC, XHP605 or XHP405. Reconnect the intake connection.
- Engine cooling system – Treat with rust inhibitor and drain. Check with engine dealer for further recommendations.
- Compressor Oil Filter/s- fill with Doosan compressor fluid PRO-TEC, XHP605 or XHP405.
- Seal all opening with waterproof tape
- Place a desiccant in the exhaust pipes, engine and compressor air intake pipes.
- Loosen tension on belts, fan, airend, etc.
- Block axles so tyres are off ground and do not support any weight.
- Disconnect battery cables.
- Drain fuel system.

SHORT TERM STORAGE

Machines that stand idle for extended periods of time greater than 30 days:

- Start and operate the machine every 30 days. Operate long enough to allow the engine and compressor to reach operating temperature.
- Open and close the service valve to exercise machine from full load to idle RPM.
- Drain fuel tank to remove any water.
- Drain water from fuel water separator.

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.

NOTE: *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 such as but not limited to sandblasting, quarry drilling, well drilling, and oil and gas drilling, more frequent service intervals and/or the installment of a heavy duty air filtration system 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.

Should you require assistance in determining the effect your application may have on compressor performance, we suggest you contact your Doosan dealer.

MAINTENANCE

	Initial 850 km (500 miles)	Daily	Weekly	Monthly	3 Months (500 hrs)	6 Months (1000 hrs)	12 Months (2000 hrs)
Compressor Oil Level		C					
Engine Oil Level		C					
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.

MAINTENANCE

	Initial 500 miles /850 km	Daily	Weekly	Monthly	6 Months (500 hrs)	12 Months (1000 hrs)	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.

MAINTENANCE

	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

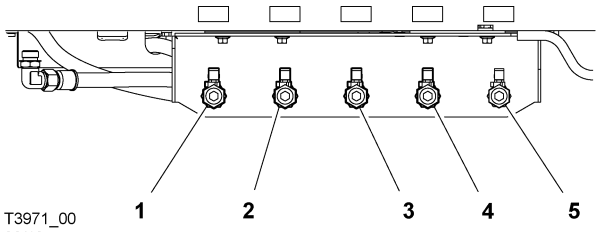
R = Replace

T = Test

W I = or when indicated if earlier.

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

DRAIN LOCATIONS



1. Separator tank drain.
2. Fuel tank drain.
3. Engine oil drain.
4. Oil cooler drain.
5. Water cooler drain.

Ensure the compressor is stopped and all pressure is relieved before draining fluids. Check and close all drain valves, remove the plug from the drain outlet. Place the empty container underneath the drain outlet and open the valve using the tool provided. Do not leave unattended as some fluids will drain very rapidly and could spill.

WARNING: Use caution when draining fluids as these can be hot and could cause injury.

ROUTINE MAINTENANCE

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

The *SERVICE/MAINTENANCE CHART* indicates the various components' descriptions and the intervals when maintenance is recommended. Oil capacities, etc., can be found in the *GENERAL INFORMATION* section of this manual.

For any specification or specific requirement on service or preventative maintenance for the engine, refer to the *Engine Manufacturer's Manual*.

Compressed air can be dangerous if incorrectly handled. Before doing any work on the unit, ensure that all pressure is vented from the system and that the machine cannot be started accidentally.

If the automatic blowdown fails to operate, then pressure must be gradually relieved by operating the manual blowdown valve. Suitable personal protective equipment should be worn.

Ensure that maintenance personnel are adequately trained, competent and have read the Maintenance Manuals.

Prior to attempting any maintenance work, ensure that:-

- all air pressure is fully discharged and isolated from the system. If the automatic blowdown valve is used for this purpose, then allow enough time for it to complete the operation.

NOTE: Pressure will always remain in the part of the system between the minimum pressure valve and the discharge valve after operation of the auto blowdown valve.

THIS PRESSURE MUST BE RELIEVED BY CAREFULLY:

(a) DISCONNECTING ANY DOWNSTREAM EQUIPMENT.

(b) OPENING THE DISCHARGE VALVE TO ATMOSPHERE.

(USE HEARING PROTECTION IF NECESSARY).

- the machine cannot be started accidentally or otherwise, by posting warning signs and/or fitting appropriate anti-start devices.
- all residual electrical power sources (mains and battery) are isolated.

Prior to opening or removing panels or covers to work inside a machine, ensure that:-

- anyone entering the machine is aware of the reduced level of protection and the additional hazards, including hot surfaces and intermittently moving parts.
- the machine cannot be started accidentally or otherwise, by posting warning signs and/or fitting appropriate anti-start devices.

Prior to attempting any maintenance work on a running machine, ensure that:-

- the work carried out is limited to only those tasks which require the machine to run.
- the work carried out with safety protection devices disabled or removed is limited to only those tasks which require the machine to be running with safety protection devices disabled or removed.
- all hazards present are known (e.g. pressurised components, electrically live components, removed panels, covers and guards, extreme temperatures, inflow and outflow of air, intermittently moving parts, safety valve discharge etc.).
- appropriate personal protective equipment is worn.
- loose clothing, jewellery, long hair etc. is made safe.
- warning signs indicating that Maintenance Work is in Progress are posted in a position that can be clearly seen.

Upon completion of maintenance tasks and prior to returning the machine into service, ensure that:-

- the machine is suitably tested.
- all guards and safety protection devices are refitted.
- all panels are replaced, canopy and doors closed.
- hazardous materials are effectively contained and disposed of.

PROTECTIVE SHUTDOWN SYSTEM

Refer to the Wedge diagnostic display codes table for a listing of shutdown conditions.

SCAVENGE LINE

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

Examine the orifice, check valve and hoses at every service or in the event of oil carryover into the discharge air.

It is good preventative maintenance to check that the scavenge line and tube are clear of any obstruction each time the compressor lubricant is changed as any blockage will result in oil carryover into the discharge air.

COMPRESSOR OIL FILTER

Refer to the MAINTENANCE CHART in this section for the recommended servicing intervals.

Removal

WARNING: Do not remove the filter(s) without first making sure that the machine is stopped and the system has been completely relieved of all air pressure. (Refer to *STOPPING THE UNIT* in the *OPERATING INSTRUCTIONS* section of this manual).

Clean the exterior of the filter housing and remove the spin-on element by turning it in a anticlockwise direction.

Inspection

Examine the filter element.

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 that it should be changed immediately. Refer to LUBRICATION later in this section.*

Reassembly

Clean the filter gasket contact area and install the new element by screwing in a clockwise direction until the gasket makes contact with the filter housing. Tighten a further $^{1}/_{2}$ to $^{3}/_{4}$ of a revolution.

CAUTION: *Start the machine (refer to PRIOR TO STARTING and STARTING THE UNIT in the OPERATING INSTRUCTIONS section of this manual) and check for leakage before the machine is put back into service.*

COMPRESSOR OIL SEPARATOR ELEMENT

Refer to the SERVICE / MAINTENANCE CHART in this section for service intervals.

Removal

WARNING: Do not remove the filter(s) without first making sure that the machine is stopped and the system has been completely relieved of all air pressure. (Refer to *STOPPING THE UNIT* 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 then remove the cover plate. Remove the separator element.

Inspection

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

Reassembly

Thoroughly clean the orifice/drop tube and install a new o-ring before reassembly. Install the new element.

Reposition the cover plate, taking care not to damage the o-ring, and replace the cover plate screws tightening in a criss-cross pattern to the recommended torque (refer to the TORQUE SETTING TABLE later in this section).

Replace the drop-tube and reconnect all hoses and tubes to the separator tank cover plate.

Replace the compressor oil (refer to LUBRICATION later in this section).

CAUTION: *Start the machine (refer to PRIOR TO STARTING and STARTING THE UNIT in the OPERATING INSTRUCTIONS section of this manual) and check for leakage before the machine is put back into service.*

COMPRESSOR OIL COOLER AND ENGINE RADIATOR AIR CHARGE COOLER

When grease, oil and dirt accumulate on the exterior surfaces of the oil cooler and radiator, the efficiency is impaired. It is recommended that each month the oil cooler and radiator be cleaned by directing a jet of compressed air, (carrying if possible a non-flammable cleaning solvent) over the exterior core of the cooler/radiator. This should remove any accumulation of oil, grease and dirt from the exterior core of the cooler so that the entire cooling area can radiate the heat of the lubricating and cooling oil/water into the air stream.

WARNING: Hot engine coolant and steam can cause injury. When adding coolant or antifreeze solution to the engine radiator, stop the engine at least one minute prior to releasing the radiator filler cap. Using a cloth to protect the hand, slowly release the filler cap, absorbing any released fluid with the cloth. Do not remove the filler cap until all excess fluid is released and the engine cooling system fully depressurised.

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.

AIR FILTER ELEMENT

The air filter should be inspected regularly (refer to the SERVICE/ MAINTENANCE CHART) and the element replaced when the restriction indicator lamp illuminates. The dust collector box(es) should be cleaned daily (more frequently in dusty operating conditions) and not allowed to become more than half full.

The safety element should be renewed every 2000 hours or every other main filter element change, whichever comes first.

Removal

CAUTION: *Never remove and replace element(s) when the machine is running.*

Clean the exterior of the filter housing and remove the filter element by releasing the nut.

If the safety element is to be renewed, 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 that the seal seats properly.

Secure the element in the housing by hand tightening the nut.

Assemble the dust collector box parts, ensuring that they are correctly positioned.

Before restarting the machine, check that all clamps are tight.

CAUTION: *Safety elements must not be cleaned or re-used.*

VENTILATION

Always check that the air inlets and outlets are clear of debris etc.

CAUTION: *NEVER clean by blowing air inwards.*

COOLING FAN DRIVE

Periodically check that the fan mounting bolt in the fan hub has not loosened. If, for any reason, it becomes necessary to remove the fan or re-tighten the fan mounting bolt, apply a good grade of commercially available thread locking compound to the bolt threads and tighten to the torque value shown in the TORQUE SETTING TABLE later in this section.

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

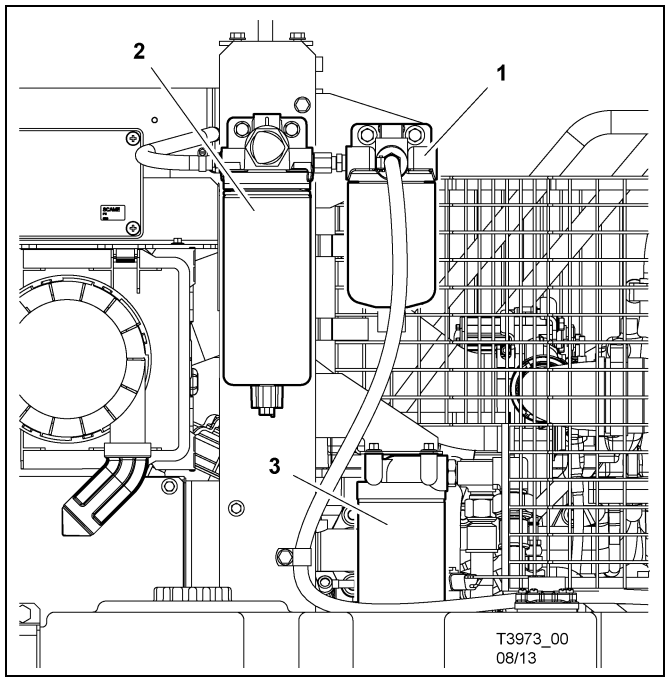
The fan belt(s) should be checked regularly for wear and correct tensioning.

FUEL SYSTEM

The fuel tank should be filled daily or every eight hours. To minimise condensation in the fuel tank(s), it is advisable to top up after the machine is shut down or at the end of each working day. At six month intervals drain any sediment or condensate that may have accumulated in the tank(s).

FUEL FILTER MAINTENANCE

This compressor is equipped with 3 fuel filters in series to be replaced at every 500 hr interval or sooner if required.



1. Primary Fuel Filter / Water Separator (30 microns).
2. Secondary Fuel Filter / Water Separator (10 microns).
3. Final Fuel Filter / Water Separator (3 microns).

Primary Fuel Filter / Water Separator

Mounted to the lifting structure on the separator tank side of the compressor , this filter is capable of separating water from fuel and will filter solid contaminants to 30 microns in size.

To be checked daily for the presence of water and drained if required.

Replace: Unscrew the fuel filter assembly from the head, remove the plastic bowl and install on the new filter while taking care all seals are in place.

Secondary Fuel Filter / Water Separator

Mounted to the lifting structure on the separator tank side of the compressor, this filter is capable of separating water from fuel and will filter solid contaminants to 10 microns in size.

Replace: Remove the Water In Fuel sensor connector from the bottom of the filter element, remove and discard the filter. Install a new element taking care all seals are in place, install the sensor connector.

Final Fuel Filter / Water Separator

The final fuel filter (3 micron) is mounted on the engine. For maintenance details, refer to the engine manual.

WARNING: The Primary as well as Secondary filter elements may be filled with the appropriate quality of fuel from a clean source. NEVER fill the Final fuel filter before installing.

The correct procedure would be to fill Primary and Secondary filters with clean fuel, leave the Final filter empty and prime the system using the hand prime pump on the Primary filter head.

FUEL FILTER WATER SEPARATOR

The fuel filter water separator contains a filter element which should be replaced at regular intervals (see the SERVICE/MAINTENANCE CHART).

CHARGE COOLER PIPEWORK

Inspect all hoses and clips on the charge cooler pipe work.

Engine damage will occur if the charge cooling system leaks.

HOSES

All components of the engine cooling air intake system should be checked periodically to keep the engine at peak efficiency.

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

Periodically inspect all pipework for cracks, leaks, etc. and replace immediately if damaged.

ELECTRICAL SYSTEM

WARNING: Always disconnect the battery switch before performing any maintenance or service.

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, then 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 safety shutdown system switches and the instrument panel relay contacts for evidence of arcing and pitting. Clean where necessary.

Check the mechanical action of the components.

Check the security of electrical terminals on the switches and relays i.e. nuts or screws loose, which may cause local hot spot oxidation.

Inspect the components and wiring for signs of overheating i.e. discolouration, 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 retaining clamp should be kept tight enough to prevent the battery from moving.

CAUTION: *Exercise extreme caution when using booster battery. To jump battery, connect ends of one booster cable to the positive (+) terminal of each battery. Connect one end of other cable to the negative (-) terminal of the booster battery and other end to a ground connection away from dead battery (to avoid a spark occurring near any explosive gases that may be present). After starting the compressor, always disconnect cables in reverse order.*

PRESSURE SYSTEM

At 3 month intervals it is necessary to inspect the external surfaces of the system (from the airend through to the discharge 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 machine is put back into service.

TYRES/TYRE PRESSURE

See the GENERAL INFORMATION section of this manual.

RUNNING GEAR/WHEELS

Check the wheel nut torque 30 kilometres (20 miles) after refitting the wheels. Refer to the TORQUE SETTING TABLE later in this section.

The bolts securing the running gear to the frame should be checked periodically for tightness (refer to the SERVICE/MAINTENANCE CHART for frequency) and re-tightened where necessary. Refer to the TORQUE SETTING TABLE later in this section.

LUBRICATION

The engine is initially supplied with engine oil sufficient for a nominal period of operation (for more information, consult The Engine Manufacturer's Manual).

CAUTION: *Always check the oil levels before a new machine is put into service.*

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

ENGINE LUBRICATING 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.

ENGINE LUBRICATING OIL SPECIFICATION

Refer to the Engine Manufacturer's Manual or Lubrication Specification list.

ENGINE OIL FILTER ELEMENT

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 LUBRICATING OIL

Refer to the SERVICE/MAINTENANCE CHART in this section for service intervals.

NOTE: If the machine has been operating under adverse conditions, or has suffered long shutdown periods, then 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 making sure that the machine is stopped and the system has been completely relieved of all air pressure (refer to STOPPING THE UNIT in the OPERATING INSTRUCTIONS section of this manual).

Completely drain the receiver/separator system including the 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 machine has been running, then most of the sediment will be in suspension and will therefore drain more readily.

CAUTION: *Some oil mixtures are incompatible and result in the formation of varnishes, shellacs or lacquers which may be insoluble.*

RUNNING GEAR WHEEL BEARINGS

Wheel bearings should be packed with heavy duty wheel bearing grease every 6 months.

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

RUNNING GEAR/WHEELS

Check the wheel nut torque 20 miles (30 kilometres) after refitting the wheels. Refer to the *TORQUE SETTING TABLE* later in this section.

Lifting jacks should only be used under the axle.

The bolts securing the running gear to the chassis should be checked periodically for tightness (refer to the *SERVICE/MAINTENANCE CHART* for frequency) and re-tightened where necessary. Refer to the *TORQUE SETTING TABLE* later in this section.

BRAKES

Check and adjust the brake linkage at 500 miles (850km) then every 3000 miles (5000km) or 3 months (whichever is the sooner) to compensate for any stretch of the adjustable cables. Check and adjust the wheel brakes to compensate for wear.

CAUTION: *Check the wheel nut torque 20 miles (30 kilometres) after refitting the wheels (Refer to the TORQUE SETTING TABLE later in this section).*

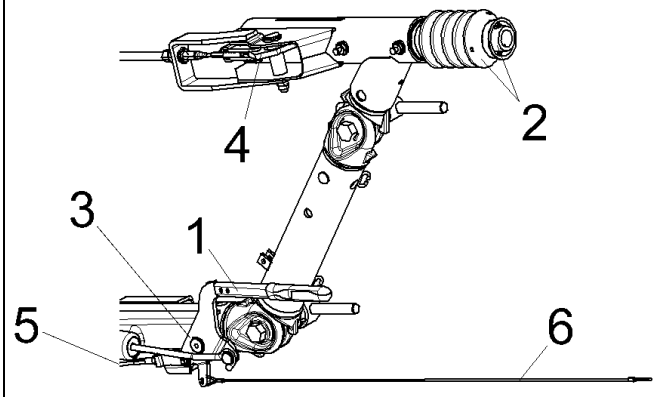
ADJUSTING THE OVERRUN BRAKING SYSTEM (KNOTT RUNNING GEAR)

1. Preparation

Jack up the machine

Disengage the handbrake lever [1].

Fully extend the draw bar [2] on the overrun braking system.



1. Handbrake lever
2. Draw bar and bellows
3. Handbrake lever pivot
4. Transmission lever
5. Brake cable
6. Breakaway Cable

Requirements:

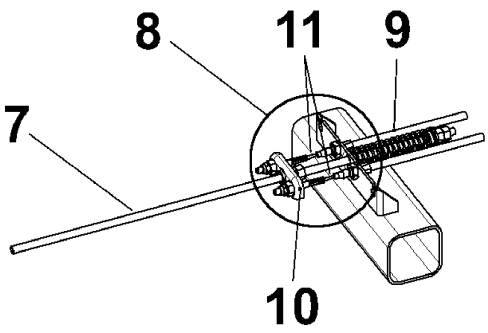
During the adjustment procedure always start with the wheel brakes.

Always rotate the wheel in the direction of forward movement.

Ensure that an M10 safety screw is fitted to the handbrake pivot.

The brake actuators must not be pre-tensioned - if necessary loosen the brake linkage [7] on the brake equalisation assembly [8].

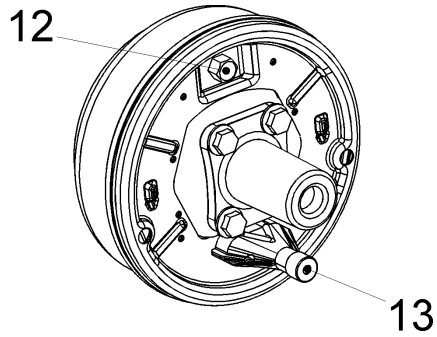
Check that brake actuators and cables [11] operate smoothly.



7. Brake linkage
8. Equalisation assembly
9. Compression spring
10. Equaliser plate
11. Cable

CAUTION: *The compression spring [9] must only be lightly pre-tensioned and when operating must never touch the axle tube.*
Never adjust the brakes at the brake linkage [7].

2. Brake Shoe Adjustment



12. Adjusting screw
13. Cable entry

Width across flats of adjusting screw [12]

Brake size	**Key width**
160x35 / 200x50	SW 17
250x40	SW 19
300x60	SW 22

Tighten adjusting screw [12] clockwise until the wheel locks.

Loosen adjusting screw [12] anti-clockwise (approx. ½ turn) until the wheel can be moved freely.

Slight dragging noises that do not impede the free movement of the wheel are permissible.

This adjustment procedure must be carried out as described on both wheel brakes.

When the brake has been adjusted accurately the actuating distance is approximately 5-8mm on the cable [11]

3. Compensator assembly adjustment

Variable Height models

Fit an M10 safety screw to the handbrake pivot.

Disconnect the handbrake cable [5] at one end.

Pre-adjust brake linkage [7] lengthways (a little play is permissible) and re-insert the cable [5], adjusting it to give a small amount of play.

Remove the M10 safety screw from the handbrake pivot.

All Models

Engage the handbrake lever [1] and check that the position of the equaliser plate [10] is at right angles to the pulling direction. If necessary correct the position of the equaliser plate [10] on the cables [11].

The compression spring [9] must only be slightly pre-tensioned and when engaged must not touch the axle tube.

4. Brake linkage adjustment

Adjust the brake linkage [7] lengthways without pre-tension and without play in the transmission lever [4].

Readjustment

Engage the handbrake lever [1] forcefully a number of times to set the brake.

Check the alignment of the equalisation assembly [8], this should be at right angles to the pulling direction

Check the play in the brake linkage [7]

If necessary adjust the brake linkage [7] again without play and without pre-tensioning

There must still be a little play in cable [5] (Variable Height Only)

Check the position of the hand brake lever [1]. The start of resistance should be approximately 10-15mm above the horizontal position.

Check that the wheels move freely when the handbrake is disengaged.

Final test

Check the fastenings on the transmission system (cables, brake equalisation system and linkage).

Check the handbrake cable [5] for a small amount of play and adjust if necessary (Variable height only)

Check the compression spring [9] for pre-tensioning.

Test run

If necessary carry out 2-3 test brake actions.

Test brake action

Check the play in brake linkage [7] and if necessary adjust the length of brake linkage [7] until there is no play.

Apply the handbrake while rolling the machine forward, travel of the handbrake lever up to $^2/_3$ of maximum is allowed.

RE-ADJUSTING THE OVERRUN BRAKING SYSTEM (KNOTT RUNNING GEAR)

Re-adjustment of the wheel brakes will compensate for brake lining wear. Follow the procedure described in *2: Brake Shoe Adjustment.*

Check the play in the brake linkage [7] and re-adjust if necessary.

Important

Check the brake actuators and cables [11]. The brake actuators must not be pre-tensioned.

Excessive operation of the handbrake lever, which may have been caused by worn brake linings, must not be corrected by re-adjusting (shortening) the brake linkage [7]

Re-adjustment

The handbrake lever [1] should be engaged forcefully several times to set the braking system.

Check the setting of the brake equalisation assembly [8], which should be at right angles to the pulling direction.

Check the play in the brake linkage [7] again, ensuring that there is no play in the brake linkage and that it is adjusted without pre-tension

Check the position of the hand brake lever [1], cable [5] (with little play) and the compression spring [9] (only slight pre-tension). The start of resistance of the handbrake lever should be approximately 10-15mm above the horizontal position.

Final test

Check the fastenings on the transmission system (cables, brake equalisation system and linkage)

Apply the handbrake while rolling the machine forward, travel of the handbrake lever up to $^2/_3$ of maximum is allowed.

Check the handbrake cable [5] for a small amount of play and adjust if necessary (Variable height only)

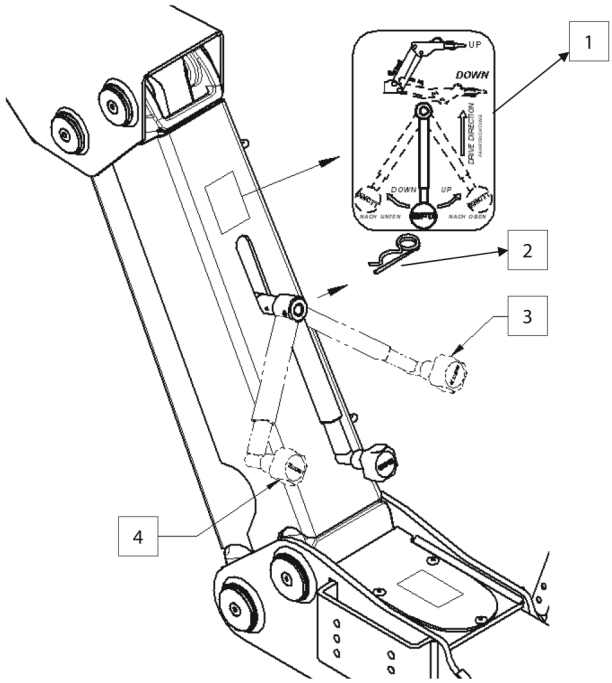
Check the compression spring [9] for slight pre-tensioning.

RUNNING GEAR HEIGHT ADJUSTMENT (KNOTT KHD)

Operating the height adjusting mechanism

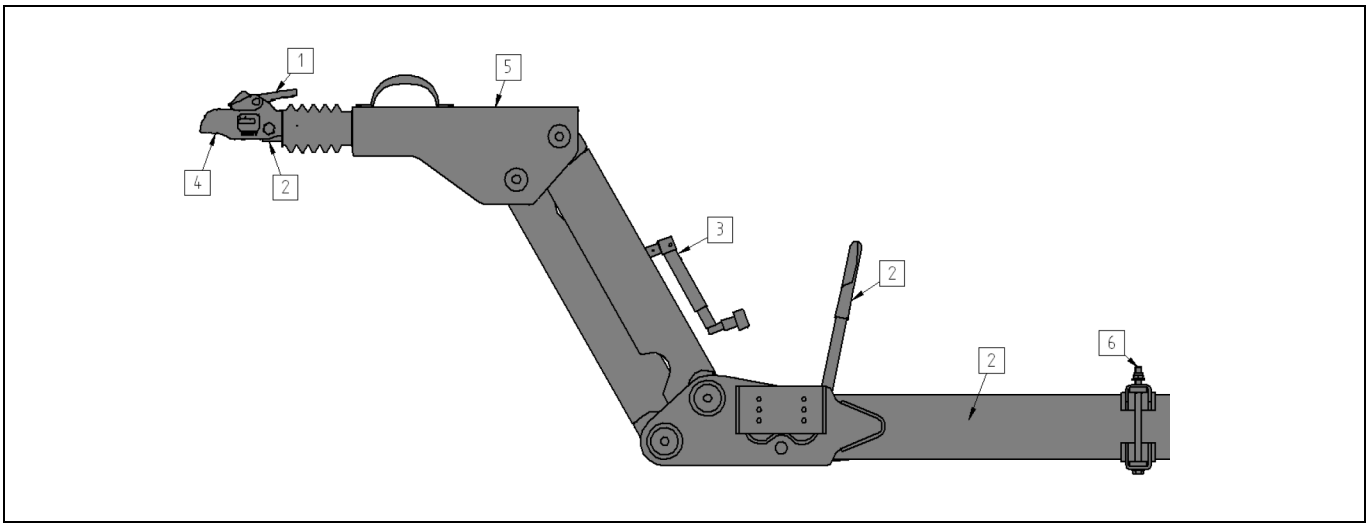
To adjust the coupling to the proper height, the lock spring must first be removed. Turning the handle clockwise will move the coupling down, turning it counterclockwise will move the coupling up. The direction of adjustment is visible on the warning label. After reaching the desired position, the coupling must be secured with the lock spring again.

WARNING:
During height adjustment, the drawbar may NOT be connected to the towing vehicle!
After connecting the coupling to the towing vehicle, turning the handle **IS FORBIDDEN!**
Lifting of the trailer by turning the handle **IS STRICTLY FORBIDDEN!**



1. Warning label
2. Lock spring
3. Upward adjustment
4. Downward adjustment

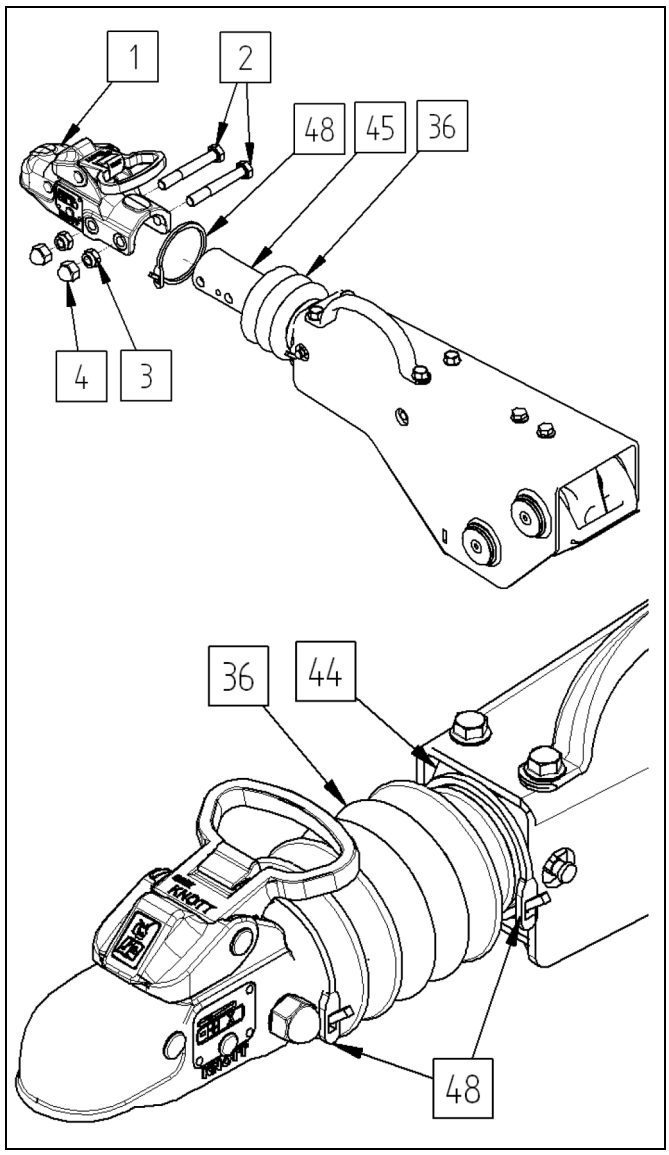
Maintenance: Lubrication and servicing



	Service interval Lubricate in accordance with regulation SK70003	Before the first journey	After the first loaded journey	After 500 km	Every 2000-3000 km
1	Function check of the coupling head or the towing eye	•			•
2	Mobility check of the drawtube, handbrake lever and rods	•		•	•
3	Mobility and ease of operation check of the height adjusting mechanism	•			•
4	Coupling head lubrication	•			•
5	Drawtube support lubrication – at the housing of the overrun coupling				•
6	Clamping jig bolts tightening		•		

Replacement of the coupling head or the towing eye

To be carried out ONLY by skilled service personnel.



Disassembly

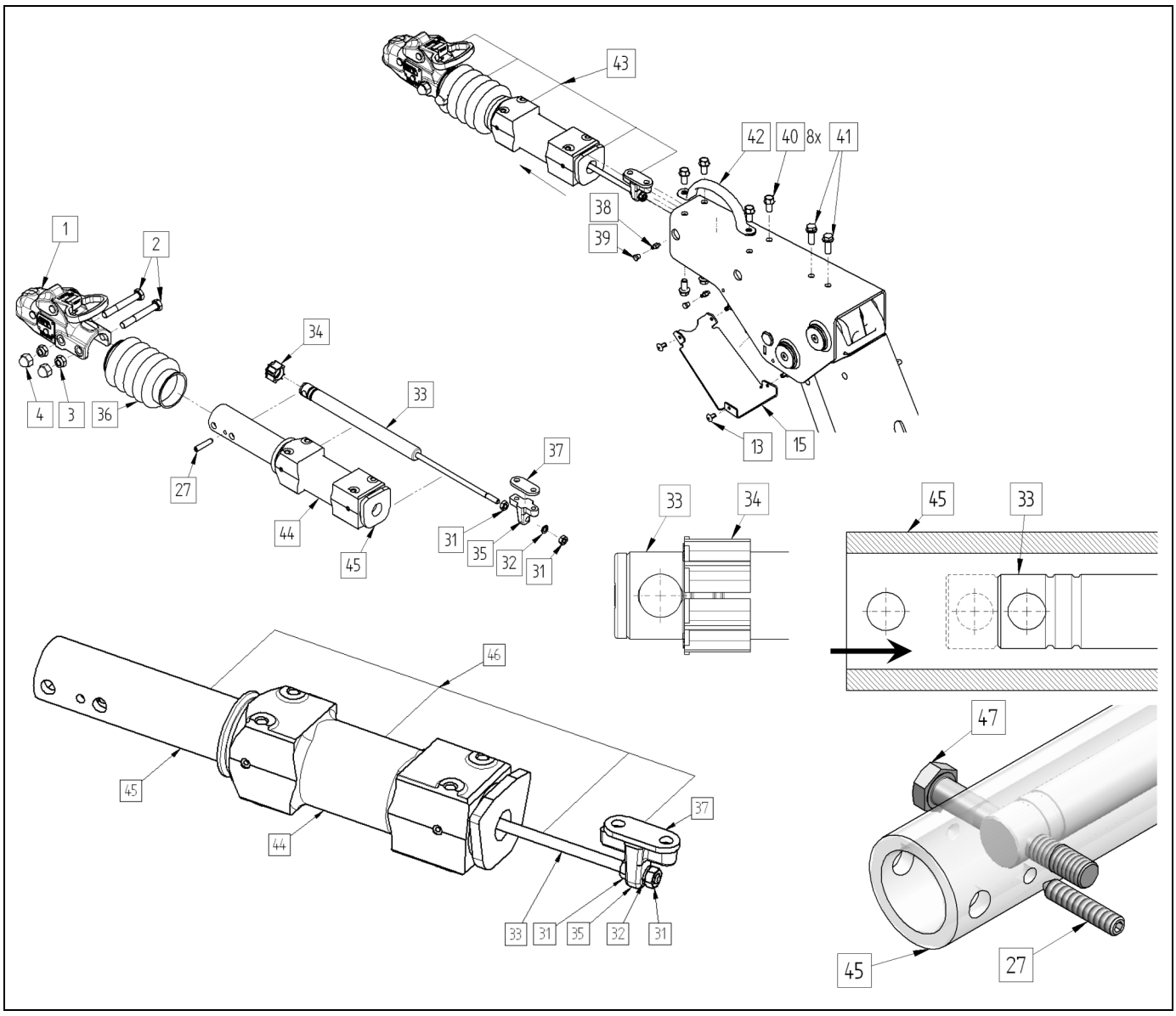
To remove the coupling (1), the cable tie (48) must be removed. Withdraw the bellows (36) from the coupling head (1) and remove the protection caps (4). Unscrew the fixing nuts (3) and remove the bolts (2). The coupling head (1) may now be removed. If the bellows (36) is damaged, it must be replaced.

Assembly

Before mounting, all the new and removed parts have to be lubricated in accordance with **regulation SK70003**. Attach the shaft of the coupling head (1) onto the drawtube (45) and adjust until the holes overlap. Insert both bolts (2). Screw on new fixing nuts (3) and fasten them with a torque wrench (Bolt M12 to 77 ± 5Nm, Bolt M14 to 125 ± 5Nm). Replace the protection caps (4). Slide the bellows (36) onto the coupling head (1). The rear bolt (2) must be covered by the bellows (36). Secure the bellows (36) with a new cable tie (48).

Replacement of the shock absorber

To be carried out ONLY by skilled service personnel.



Disassembly

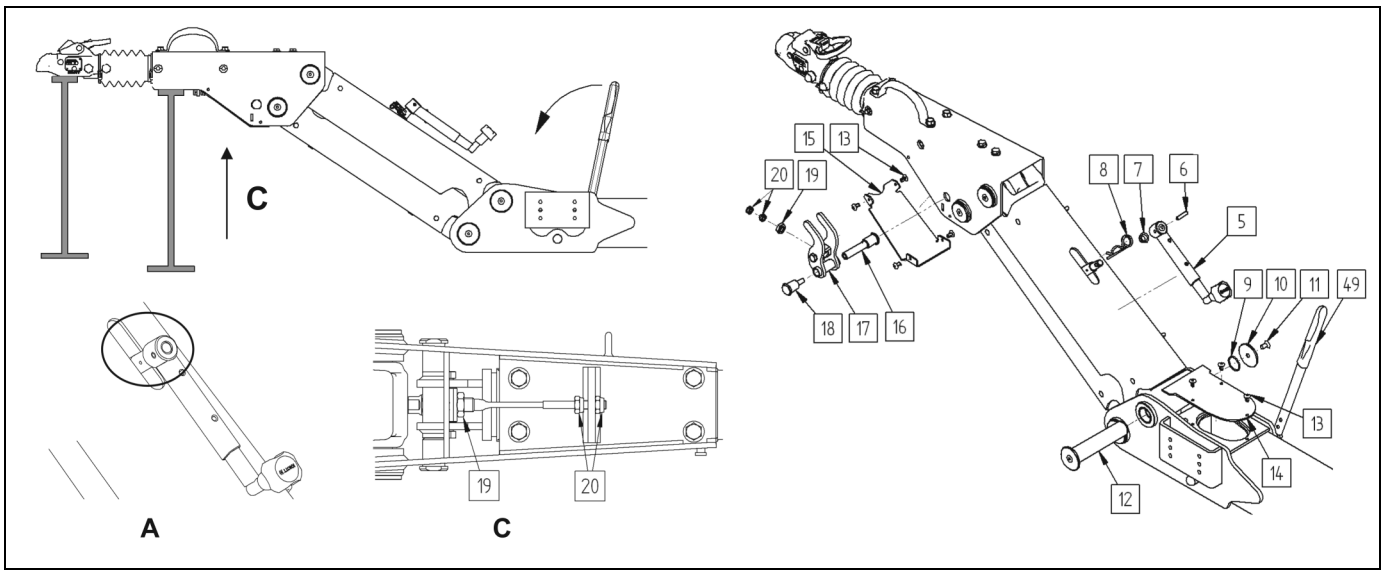
Drill out the blind rivets (13), remove the shield (15), grease the nipple caps (39) and the nipples (38) themselves. Unscrew all the bolts (41) and also all bolts (40) and then pull out the assembly (43). remover the coupling head (1), the bellows (36) and the pin (27) from the drawtube (45). Unscrew the hexagonal nut (31) from the shock absorber (33) and pull out the shock absorber (33) to the front. Dismount the centralizer tube (34) (if present) from the shock absorber (33) and replace the shock absorber (33).

Assembly

Before mounting, all the new and removed parts must be lubricated in accordance with regulation SK70003. Mount the centralizer tube (34) (if present) onto the shock absorber (33). Push the shock absorber (33) into the drawtube (45) from the front and bolt together with the shock absorber bracket (35). Fasten the hexagonal nut (31) with a tightening moment of 30±5Nm. Push the unit (46) from the front into the housing, place the disc (37) (if present) between the housing and the shock absorber bracket (35) and fasten with lock bolts (40), (41). At the same time mount the hand grip (42). Fasten the lock bolts with a tightening moment of 80+5Nm. Using a screw clamp, the shock absorber (33) has to be pressed together so far that the position of the hole in the shock absorber (33) coincides with the position of the rear hole in the drawtube (45). Secure in position using the bolt (47) and screw in (plug in) the pin (27) through the drawtube (45). Mount the bellows (36) and the coupling head (1) on the drawtube (45). Secure the bellows (36) on the coupling head (1) and the guide bearing (44) using cable ties (48). Replace the grease nipples (38), nipple caps (39) and the shield (15) for the overrun head.

Replacement of the cable

To be carried out ONLY by skilled service personnel.



Disassembly

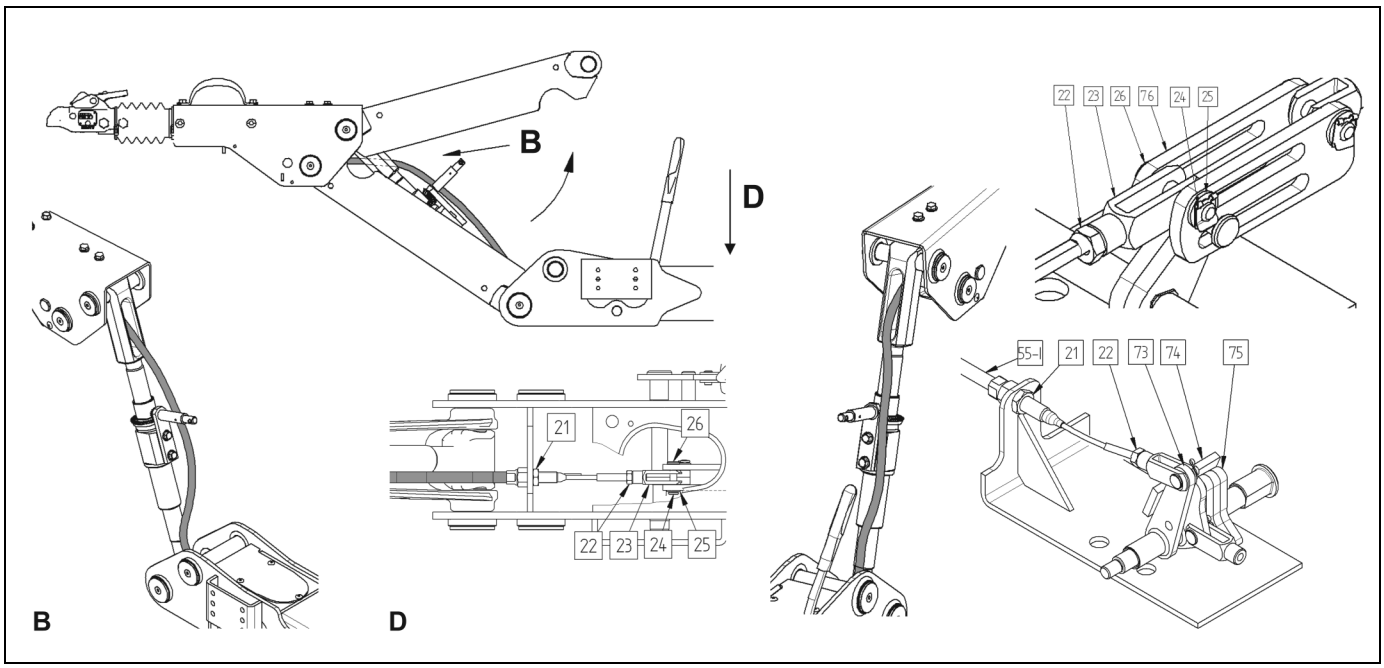
Remove the lock spring (8). Turn the handle (5) until halfway up the slot (See View A). Move the handbrake lever (49) to the front. Drill out the blind rivets (13) and shields (15) and (14). Unscrew the nut (20) from the cable (See View C), then pull the cable from the cable bracket. remove the hexagonal nut (19) and pins (16) and (18). Pull the cable out of the transmission lever (17). Knock out the pin (6) using a hammer and remove the winding handle (5). Pull out the adaptor (7). Unscrew the bolt (11) and remove the disc (10) with the seal ring (9).

Secure the overrun head against falling off – injury risk!!! Knock out the pin (12) with a hammer and bronze bar. Lift off the top middle part and **secure it against falling off – injury risk!!!**

Remove the SL-clip (24) and the disc (25) and pull out the pin (26). Unscrew the clevis (23) and hexagonal nuts (22) and (21). Pull out the cable and replace it.

Assembly

Before mounting, all the new and removed parts must be lubricated in accordance with regulation SK70003. Push the new cable through the cable bracket into the drawbar, screw in the hexagonal nut (21) and fasten it with a tightening moment of 30 ± 2Nm.

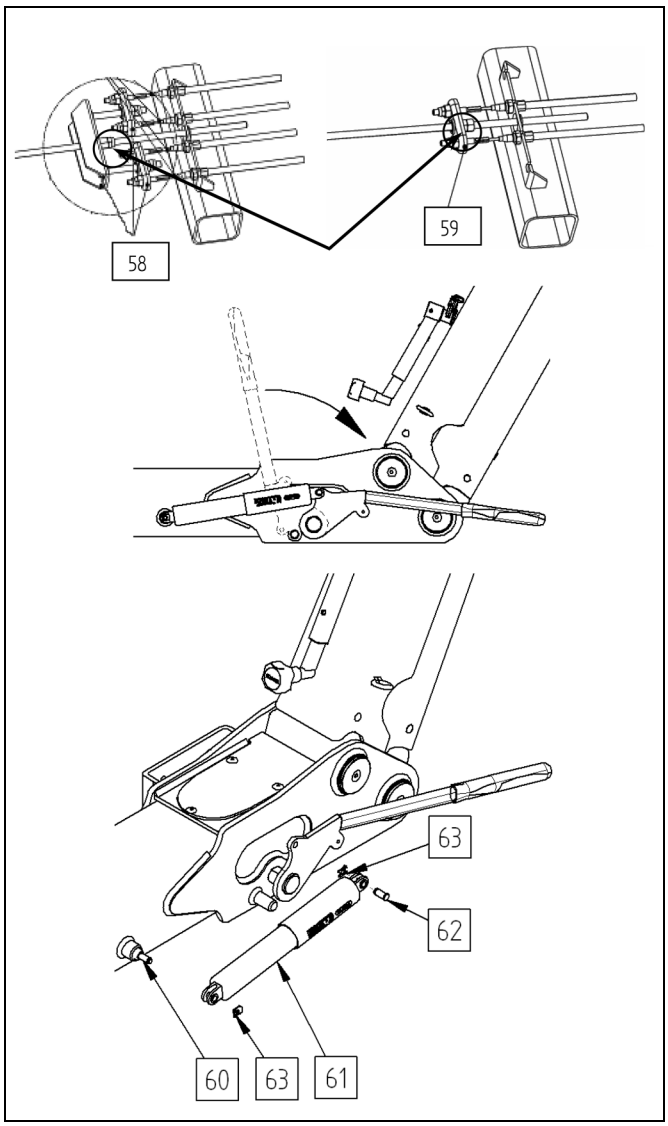


Screw the hexagonal nut (22) and the clevis (23) onto the cable and adjust it **in accordance with regulation SK70008**. Put the pin (26) through the balance lever (76) and the clevis (23) and lock it with the disc (25) and the SL-clip (24). Insert the cable into the slot in the spindle top part (See View B) and mount it with the transmission lever (17). Mount the transmisson lever (17) into the overrun head and secure it with pins (16) and (18). Spread the pin (18) with liquid high strength thread locker and fasten it with a tightening moment of 30 ± 2Nm.

Screw in the hexagonal nuts (19) and (20) and adjust them **in accordance with regulation SK70008**. Mount on the top middle part. Using gentle hammer impacts, put the pin (12) through the drawbar and the top middle part. Secure the pin (12) with the seal ring (9), disc (10) and the bolt (11). Spread the bolt (11) with liquid high strength thread locker and fasten it with a tightening moment of 20 ± 2Nm. Set the handbrake lever into its non-braking position and check the adjustment of the KHD braking system **in accordance with regulation SK70008** once more. Do additional adjustments if necessary. Put on shields (15) and (14) and secure them with blind rivets (13). Plug in the adaptor (7) and the winding handle (5). Secure the winding handle (5) with the pin (6). Put the coupling unit into the highest position and adjust the whole braking system (KHD + axles).

Replacement of the coupling head or the spring pack

To be carried out ONLY by skilled service personnel.



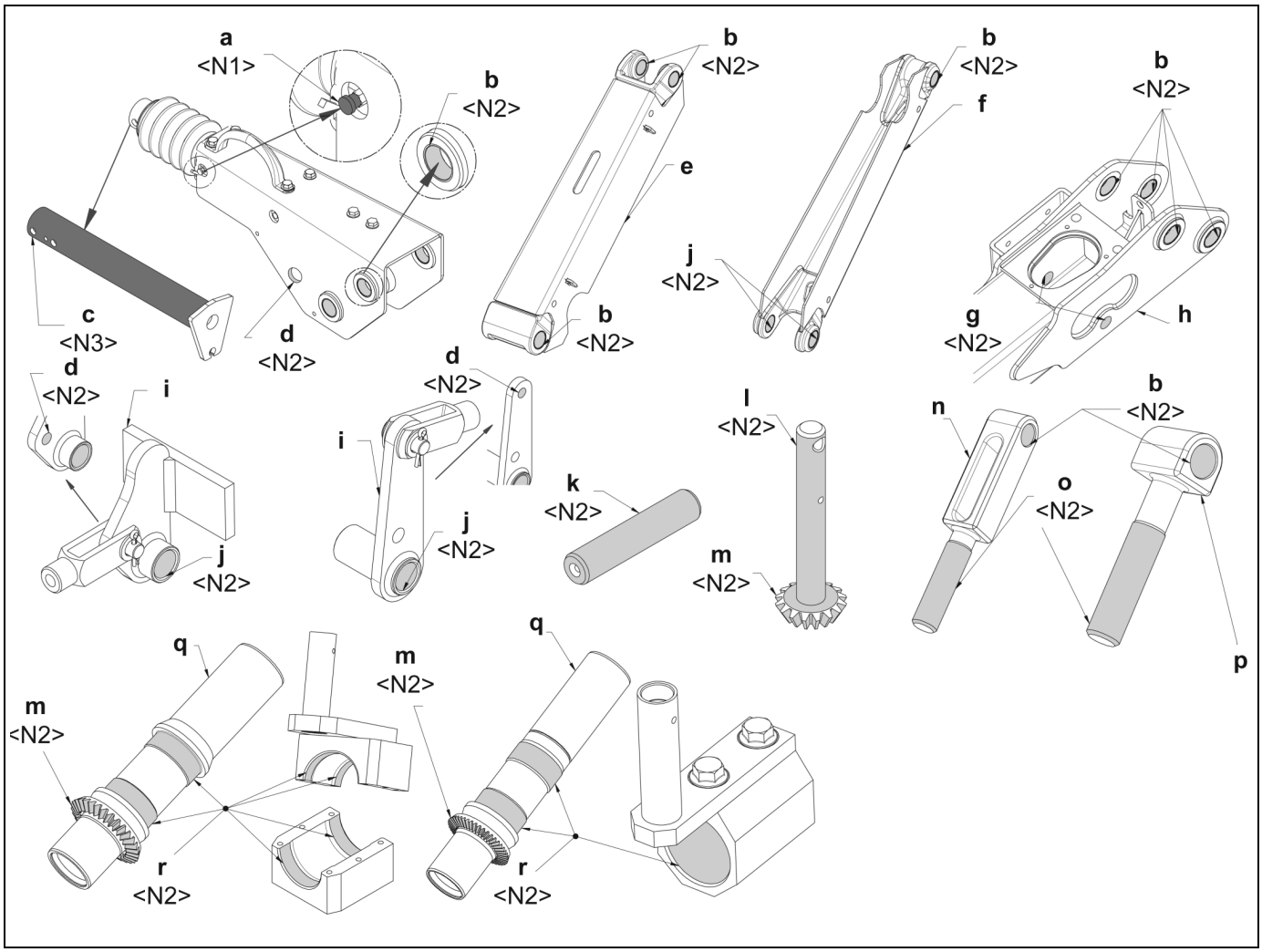
Disassembly

Loosen the balance bar (58, tandem) or (59, single axle) so that the handbrake lever can be moved down. Undo the SL-clips (63) and pull out the pin (62). Replace the damaged spring pack.

Assembly

Mount the new spring pack onto the spring pack bracket (60) and secure it with the SL-clip (63). Mount the spring pack (61) with the handbrake lever, insert the pin (62) and secure with the SL-clip (63). Set up the whole braking system according to general KNOTT regulation.

Lubrication points



	Part to be lubricated
a	Grease nipple
b	Bush
c	Piston rod
d	Hole
e	Top middle part
f	Bottom middle part
g	Holes for handbrake
h	Drawbar coupling
i	Conversion lever coupling
j	Tube
k	Pin
l	Adjustement bolt, welded
m	Gearing
n	Top spindle
o	Thread

p	Bottom spindle
q	Adjustment nut, welded
r	Area
s	Pin of handbrake
t	Seal ring
u	Contact area
v	Screw
w	Guiding slot

Lubricants

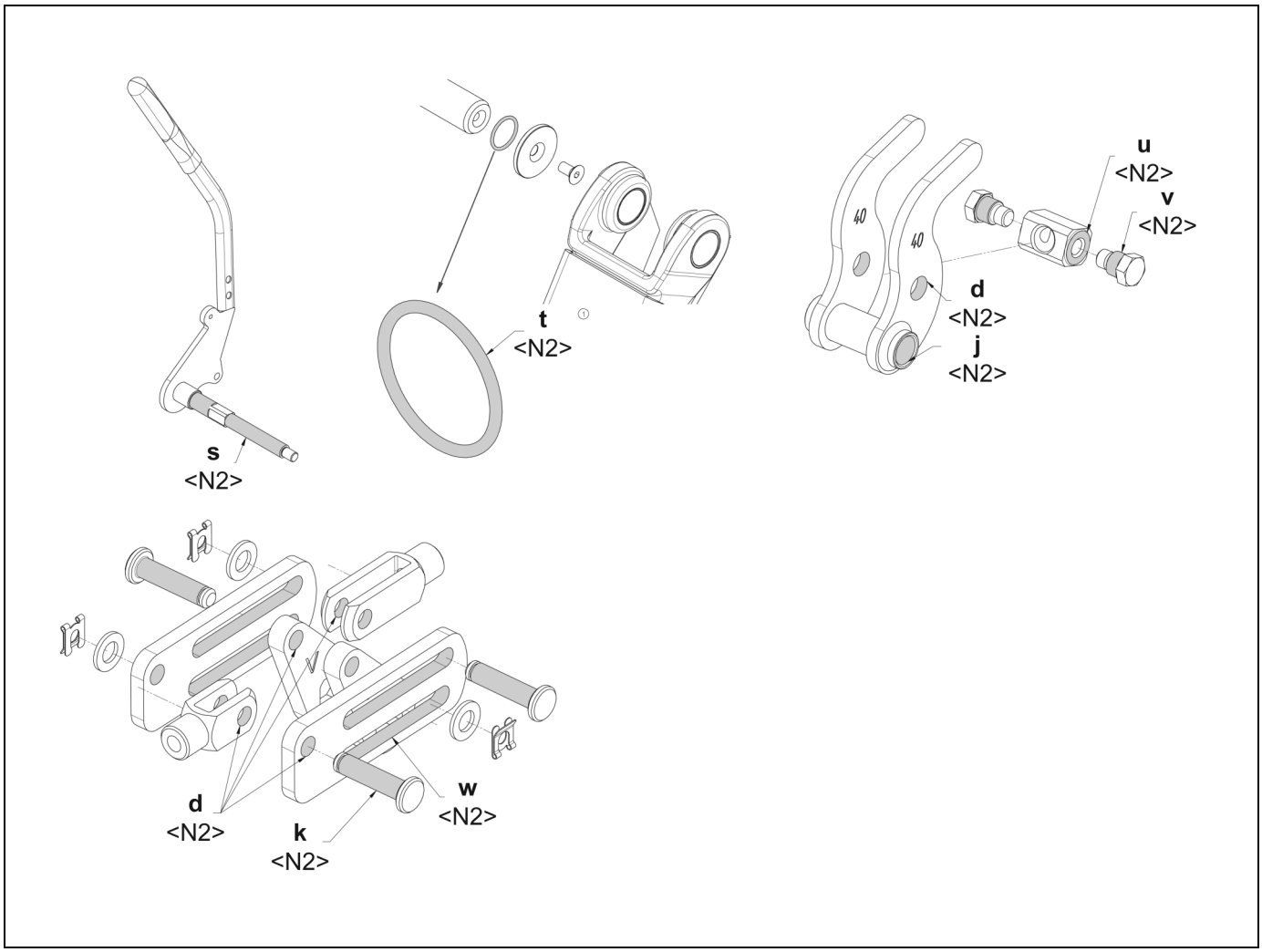
<N1> Lubricate with 5g SPHEEROL EPL2 lubricant or equivalent NLGI 2 Grade lubricant.

<N2> Using a brush, cloth or plastic sponge, apply a thin, even layer of OPTIMOL OLISTAMOLY 2 lubricant or equivalent MoS2 based high performance grease.

<N3> Using a brush, apply a thin, even layer of SPHEEROL EPL2 or equivalent NLGI 2 Grade lubricant.

.

Lubrication points (continued)



	Part to be lubricated
a	Grease nipple
b	Bush
c	Piston rod
d	Hole
e	Top middle part
f	Bottom middle part
g	Holes for handbrake
h	Drawbar coupling
i	Conversion lever coupling
j	Tube
k	Pin
l	Adjustement bolt, welded
m	Gearing
n	Top spindle
o	Thread
p	Bottom spindle
q	Adjustment nut, welded
r	Area
s	Pin of handbrake
t	Seal ring
u	Contact area
v	Screw
w	Guiding slot

Lubricants

<N1> Lubricate with 5g SPHEEROL EPL2 lubricant or equivalent NLGI 2 Grade lubricant.

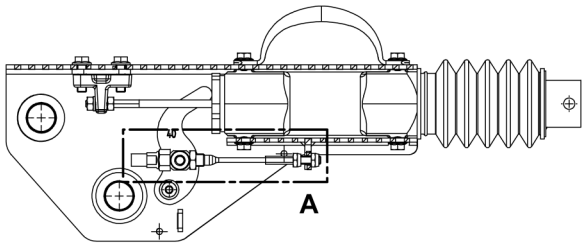
<N2> Using a brush, cloth or plastic sponge, apply a thin, even layer of OPTIMOL OLISTAMOLY 2 lubricant or equivalent MoS2 based high performance grease.

<N3> Using a brush, apply a thin, even layer of SPHEEROL EPL2 or equivalent NLGI 2 Grade lubricant.

Brake cable adjustment for KHD drawbar – SK70008

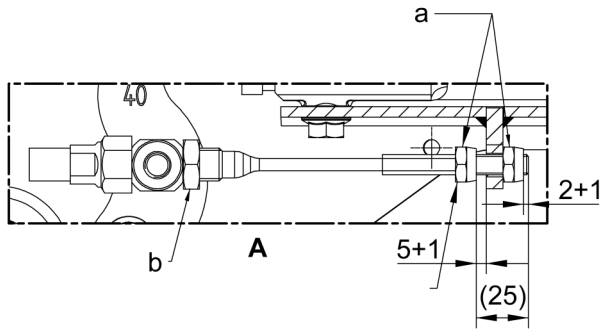
Instructions

1. Adjust drawbar in top position (60°).



Coupling cross-section showing position of detail 'A'

2. Adjust the brake system according to detail 'A'.

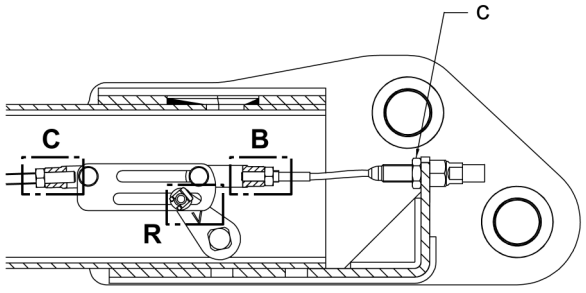


Detail 'A'

a. Fixing nut M10-8 DIN980
ATTENTION: Do NOT lock fixing nuts M10-8 DIN980!

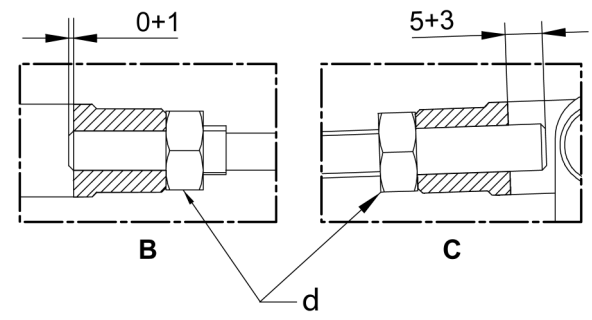
b. Hexagonal head nut M16x1,5 DIN936
Torque 30Nm ± 2Nm

3. Adjust the brake system according to details 'B' and 'C'.



Cross-section showing positions of details 'B', 'C' and 'R'

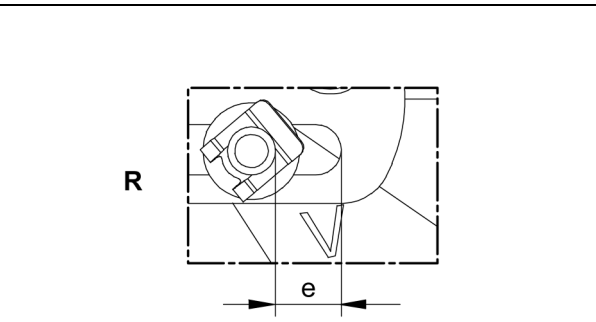
c. Hexagonal head nut M16x1,5 DIN936
Torque 30Nm ± 2Nm



Details 'B' and 'C'

d. Fixing nut M10-8 DIN980
ATTENTION: Do NOT lock fixing nuts M10-8 DIN980!

4. Check the gap in detail 'R'.

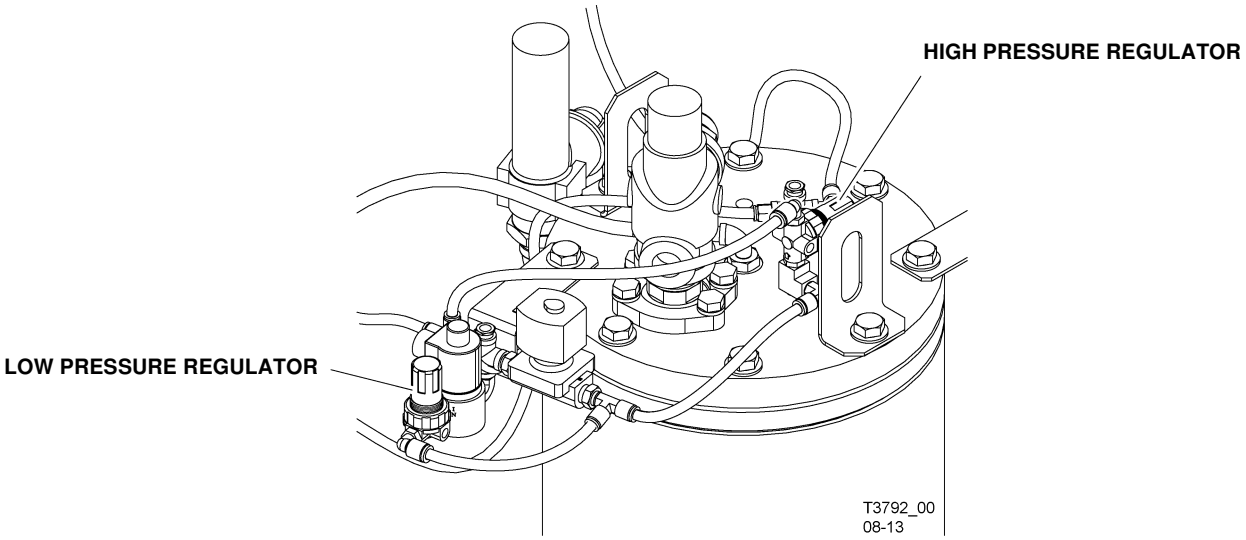


Detail 'R'

5. If gap 'e' is less than 10mm in detail 'R', then adjust the gap in detail 'B' to 0+5mm.

6. If gap 'e' is greater than 28mm in detail 'R', then adjust the gap in detail 'B' to 0-5mm.

Pressure Regulator Adjusting Instructions



Before Starting

1. Select Low Pressure Mode by pressing the LO Pressure Button.
2. At the Low Pressure Regulator, pull the plastic cap upwards to unlock and turn counter clockwise until tension is relieved. Proceed to turn the cap clockwise one full turn.
3. If high pressure regulation needs adjustment, repeat Step 2 at High Pressure Regulator.
4. Close Service Valves.

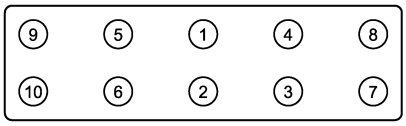
After Starting Unit

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 cap on the Low Pressure Regulator clockwise until the discharge pressure gauge indicates 8,6-9,0 bar. Push the plastic cap downwards to lock.
6. To adjust the high pressure regulation, repeat Step 5 on High Pressure Regulator except adjust pressure at idle to 12,1-12,4 bar while in High Pressure Mode.

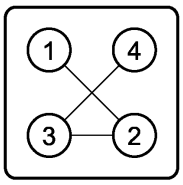
   Note: The High Pressure Regulator must be set at a higher pressure than the Low Pressure Regulator.

TORQUE VALUES

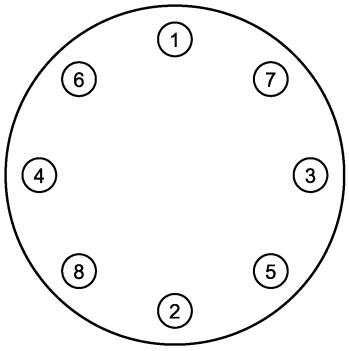
TABLE 1 INCH FASTENERS				
CAPSCREW OR NUT THREAD SIZE AND PITCH	NOMINAL DESIGN TORQUE			
	8AE J249 GRADE 5 (HEAD MARKING)		8AE J249 GRADE 8 (HEAD MARKING)	
	(Nm.)	(FT-LBF)	(Nm.)	(FT-LBF)
1/4 - 20	11	8	16	12
5/16 - 18	24	17	33	25
3/8 - 16	42	31	59	44
7/16 - 14	67	49	95	70
1/2 - 13	102	75	144	106
9/16 - 12	148	109	208	154
5/8 - 11	203	150	287	212
3/4 - 10	361	266	509	376



TYPICAL RECTANGULAR TORQUE PATTERN



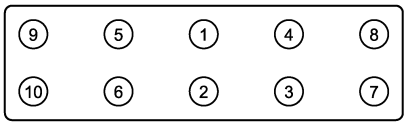
TYPICAL SQUARE TORQUE PATTERN



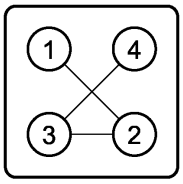
TYPICAL CIRCULAR TORQUE PATTERN

TABLE 2 METRIC FASTENERS

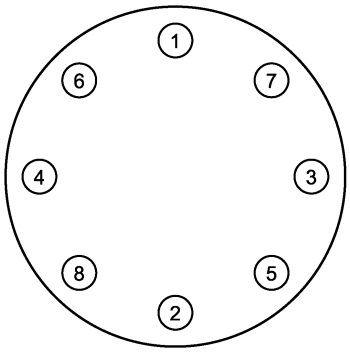
CAPSCREW OR NUT THREAD SIZE AND PITCH	NOMINAL DESIGN TORQUE					
	PROPERTY GRADE 8.8 (HEAD MARKING)		PROPERTY GRADE 10.9 (HEAD MARKING)		PROPERTY GRADE 12.9 (HEAD MARKING)	
	(Nm.)	(FT-LBF)	(Nm.)	(FT-LBF)	(Nm.)	(FT-LBF)
M6 X 1.0	11	8	15	11	18	13
M8 X 1.25	26	19	36	27	43	31
M10 X 1.5	52	38	72	53	84	62
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

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 assure the proper size and filtration for the compressor.

Compressor Oil Change

These compressors are normally 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 completely drained of all oil, it must be refilled with new oil before it is placed in operation. Refer to specifications in the Portable Compressor Fluid Chart.

NOTE: 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.

Where possible, 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 completely 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 such as 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. 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 completely 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.

NOTE: Portable Power provides compressor oil specifically formulated for Portable Compressors and requires the use of these fluids in order to obtain extended limited airend warranty.

COMPRESSOR LUBRICATION

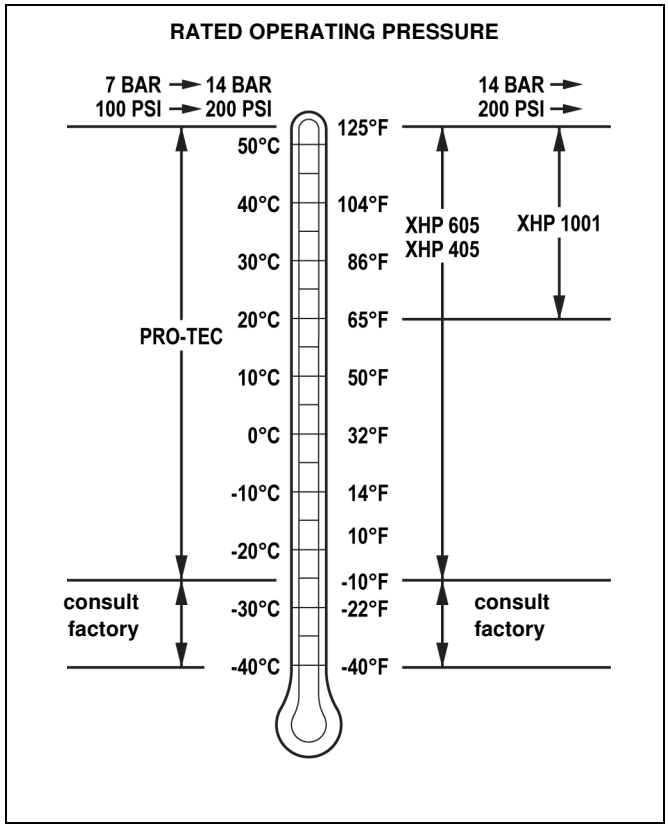
Portable Compressor Fluid Chart

Refer to these charts for correct compressor fluid required. Note that the selection of fluid is dependent on the design operating pressure of the machine and the ambient temperature expected to be encountered before the next oil change.

Note: Fluids listed as "preferred" are required for extended warranty.

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

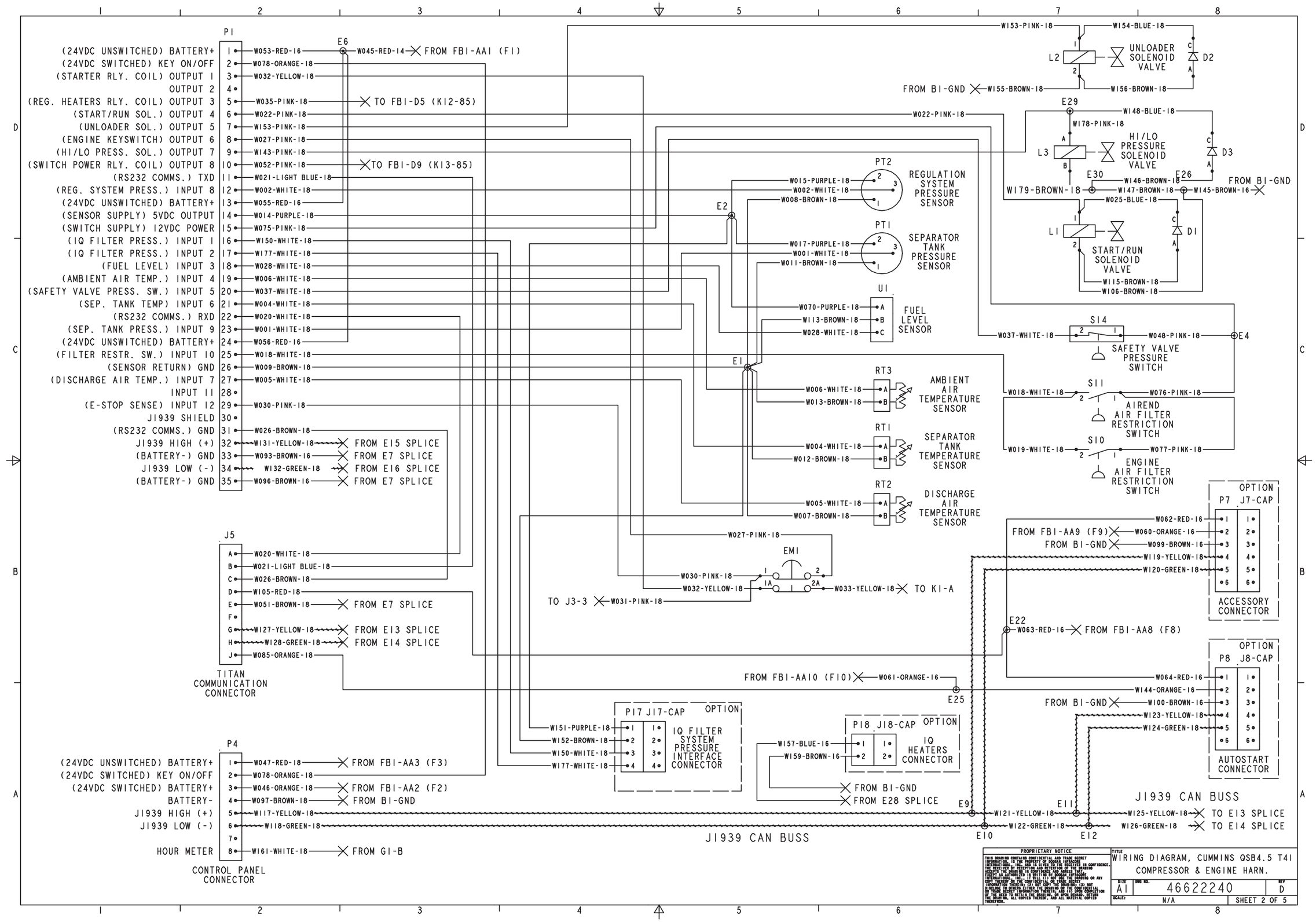
Design operating pressure	Ambient temperature	Compressor oil specification
7 bar to 14 bar (100 psi to 200 psi)	-23°C to 52°C (-10°F to 125°F)	Preferred: **PRO-TEC** Alternate: ISO Viscosity Grade 46 with rust and oxidisation inhibitors, designed for air compressor service.
14 bar and above (200 psi and above)	-23°C to 52°C (-10°F to 125°F)	Preferred: **XHP 605** Alternate: **XHP 405** ISO Viscosity Grade 68 Group 3 or 5 with rust and oxidisation inhibitors, designed for air compressor service.
	18°C to 52°C (65°F to 125°F)	Preferred: **XHP 605** **XHP 1001**



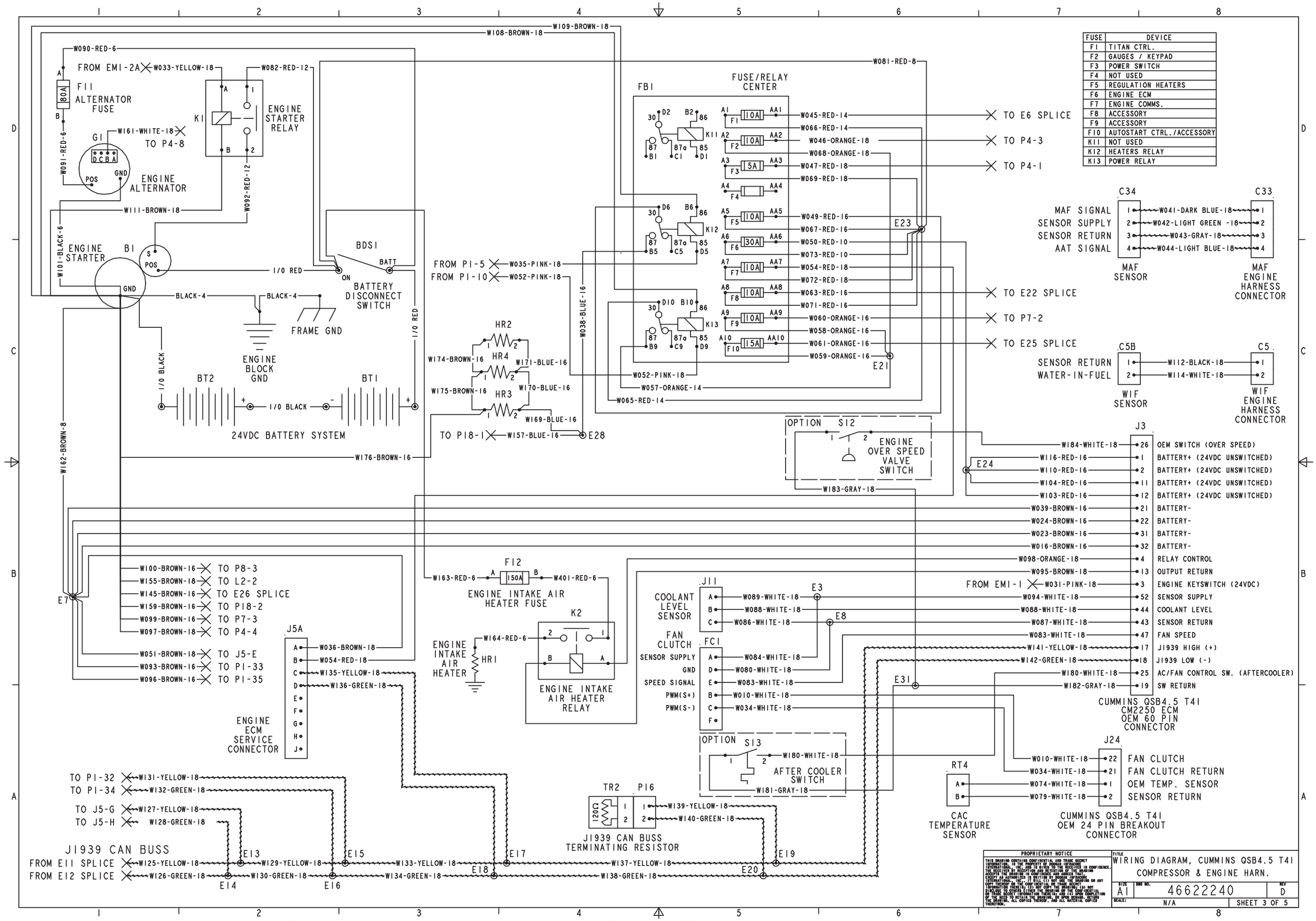
Doosan preferred fluids - the use of these fluids with original Doosan branded filters can extend airend warranty. Refer to operator's manual warranty section for details or contact your Portable Power representative.

Doosan preferred fluids		
PRO-TEC engine oil	46652105 (20.0 Litres)	46652106 (208.0 Litres)
Stage 3B and 4 engine oil	46551222 (20.0 Litres)	46551223 (208.0 Litres)
PRO-TEC compressor oil	89292973 (20.0 Litres)	89292981 (208.0 Litres)
XHP 605 compressor oil	22252076 (19.0 Litres)	22252050 (208.2 Litres)
XHP 1001 compressor oil	-	35300516 (208.2 Litres)
XHP 405 compressor oil	22252126 (19.0 Litres)	22252100 (208.2 Litres)

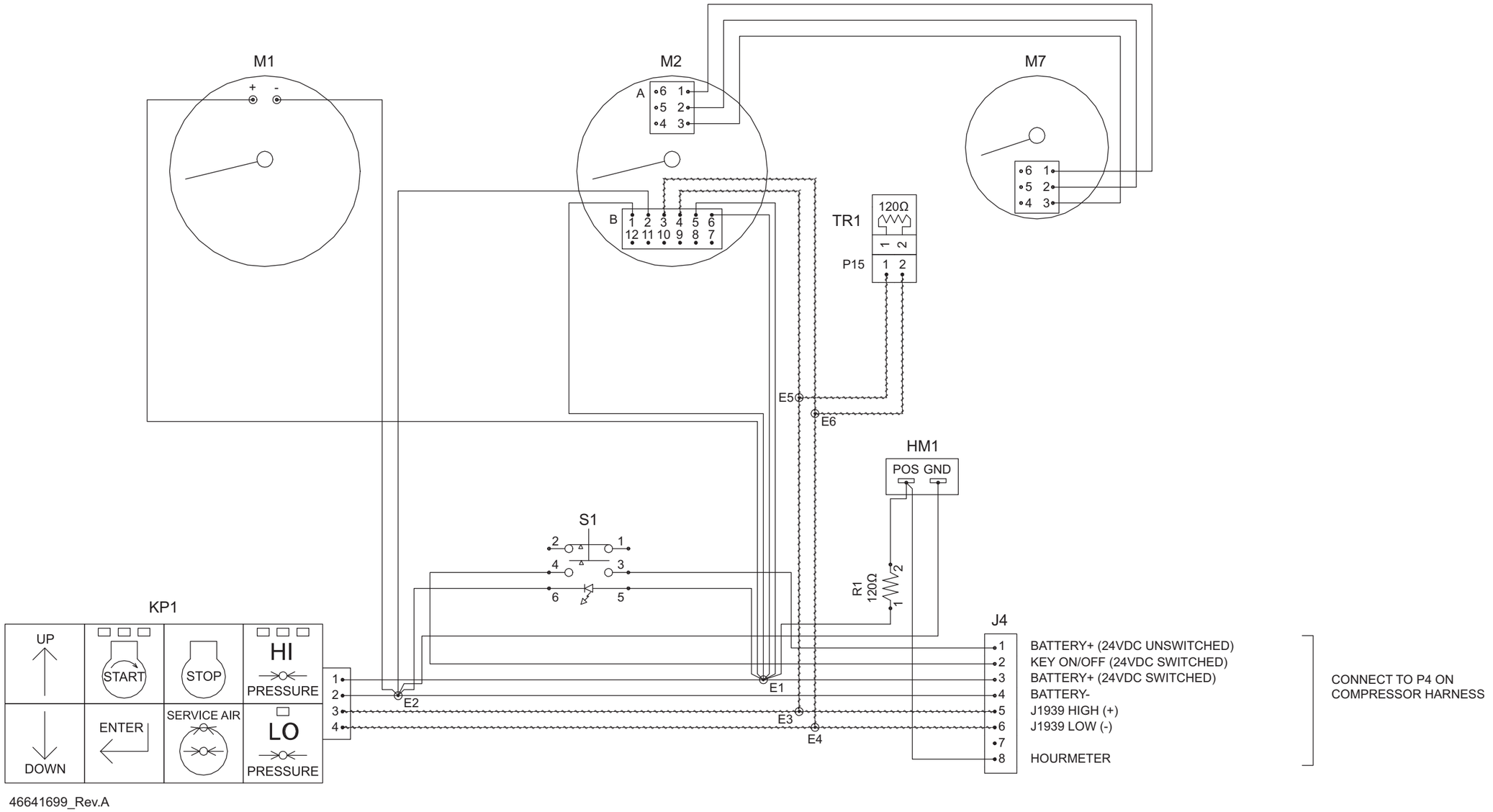
Note: Stage 3B & Stage 4 engines are required to use CJ-4/ACEA E9 engine oil only, failure to do so will result in engine after treatment damage. Please read the engine manual for more details.



Compressor and Engine Harness System Schematic 46622240 Rev. D (sheet 2)



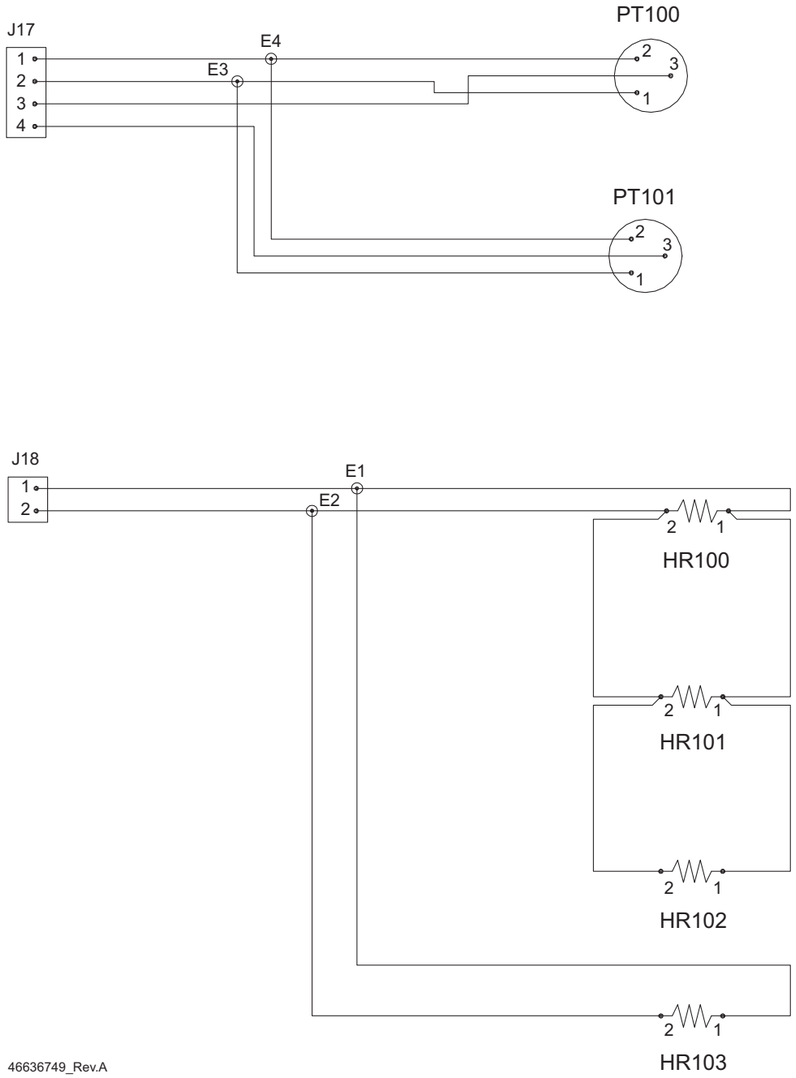
Compressor and Engine Harness System Schematic 46622240 Rev. D (sheet 3)



46641699_Rev.A

KEY	
HM1	Hourmeter
J4	Control panel connector
KP1	Keypad
M1	Air pressure gauge
M2	Engine tachometer
M7	Fuel level gauge
S1	Power switch
TR1	J1939 CAN bus terminating resistor

Control Panel Haness Schematic 46641699 Rev. A (sheet 1)



KEY	
HR100	Water separator drain heater
HR101	Primary filter drain heater
HR102	Secondary filter drain heater
HR103	Aftercooler drain heater
PT100	IQ Filter system primary filter inlet pressure sensor
PT101	IQ Filter system secondary filter outlet pressure sensor

IQ Option Harness Schematic 46636749 Rev. A (sheet 1)

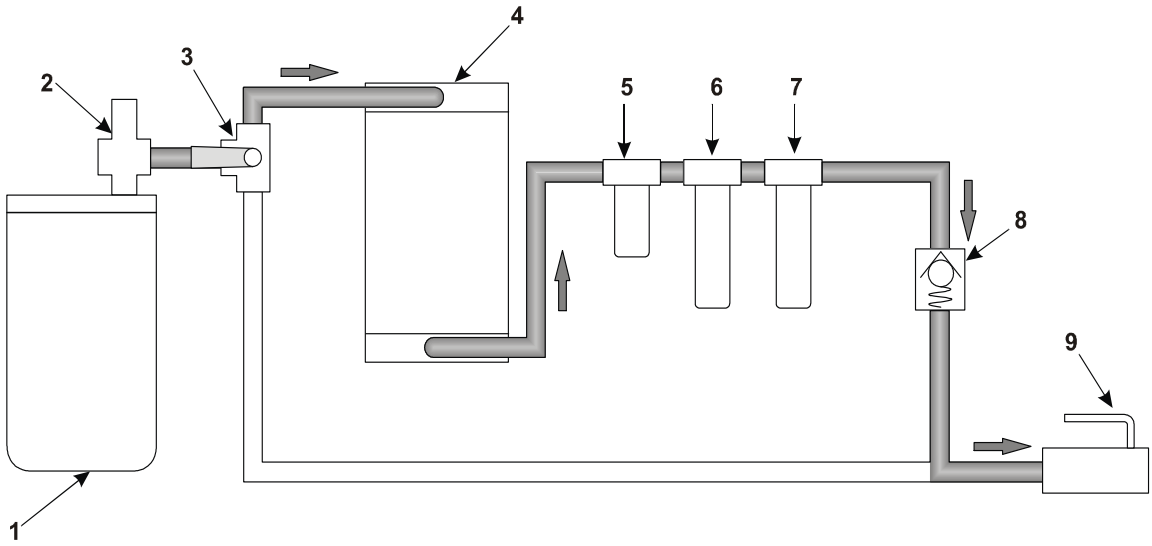
FAULT	CAUSE	REMEDY
1. Compressor has stopped unexpectedly	*Out of fuel.*	Add clean fuel.
	Compressor oil temperature too high.	See Fault #6.
	Engine coolant temperature too high.	Check coolant level. If low, add coolant. See Fault #3.
	Engine oil pressure too low.	See Fault #4.
	Loose or broken belts.	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 Fault #6.
2. Compressor won't start or run	*Battery disconnect switch off.*	Check switch position and operation. 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 Fault #6.
	Engine coolant temperature too high.	Check coolant level. If low, add coolant. See Fault #3.
	Engine oil pressure too low.	See Fault #4.
	Loose wire connection.	Check wires at switches and connectors to find loose connection. Make repairs. 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.
	Engine malfunctioning.	See troubleshooting in Engine manual.
	Airend malfunctioning.	See Fault #6.

FAULT	CAUSE	REMEDY
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.
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.
	Loose or broken belts.	Tighten or replace belt set.
	Malfunctioning oil cooler pressure relief valve.	Replace valve.
	Malfunctioning minimum pressure valve.	Repair or replace valve.
	Blocked or restricted oil lines.	Clean by flushing, or replace lines.
	Airend malfunctioning.	See Faults #11, #12.

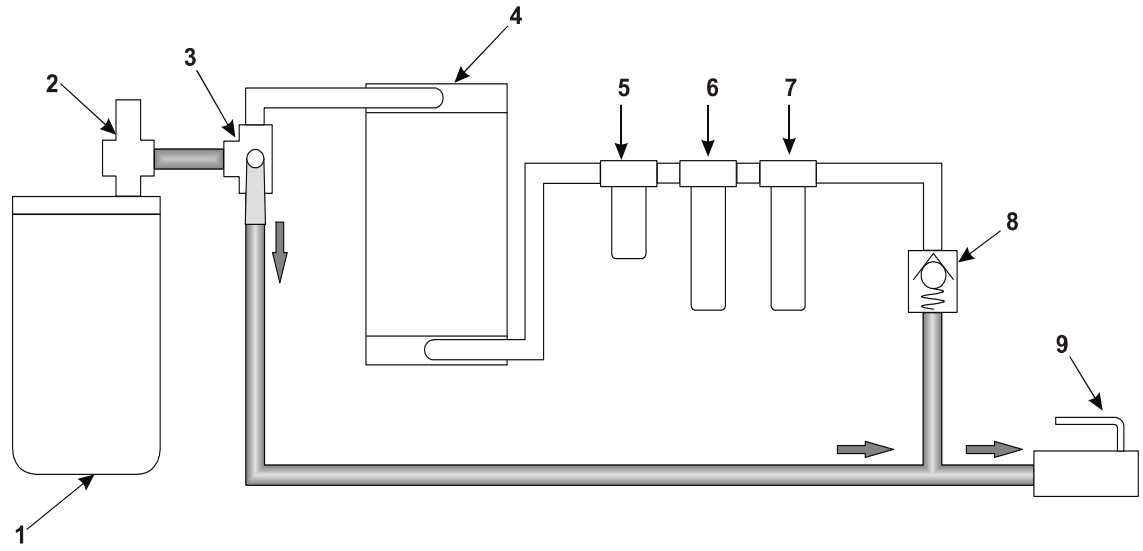
FAULT	CAUSE	REMEDY
7. Low engine speed	*Clogged fuel filters.*	Service fuel filters. See Engine manual. Drain and clean fuel tanks. Add clean fuel.
	Operating pressure too high.	Reduce pressure to rated operating pressure.
	Clogged air filter element(s).	Clean or replace air filter element(s).
	Wrong air filter element(s).	Install correct air filter element(s).
	Engine malfunctioning.	See troubleshooting in Engine manual.
	Airend malfunctioning.	See Faults #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 Faults #7, #11, #12.
	Engine idle speed too low.	See Fault #7. See Engine manual.
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 / butterfly valve.	Inspect valve. Make adjustments per this manual.
	Wrong air filter element(s).	Install correct air filter element(s).
	Low engine speed.	See Fault #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 / butterfly valve.*	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.
	Load solenoid leak or malfunction.	Replace load solenoid.
	Plugged vent leak.	Clean and/or replace.
12. Safety valve opens	*Operating pressure too high.*	Reduce pressure to rated operating pressure.
	Malfunctioning inlet unloader / butterfly valve.	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 eqqppuipped.
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.

IQ SYSTEM OPERATING INSTRUCTIONS

IQ System Active



Standard Operation (IQ System Bypassed)



KEY

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		

IQ SYSTEM

The IQ System is a complete, self-contained system which provides cooler, cleaner air than from a standard portable compressor. The system utilises 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 vaporised 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 regulations.

Ensure that the compressed air temperature always remains above freezing temperatures (typically 7°C (45°F)) at any ambient temperature down to -23°C (-20°F). This prevents the need for heat tracing systems, or any manual adjustment to prevent freezing of the compressed air system. All drain points for the condensate handling system are heated with 24VDC heaters, which are integral to the compressor heater system.

Standard Non-Louvred configuration not to be operated below freezing.

IQ SYSTEM OPERATING INSTRUCTIONS - 2

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 aftercooler is cooled by the incoming compressor package air. The compressed air and condensate (water with a small amount of compressor lubricant) exits the aftercooler and enters the moisture separator, where most of the condensate is removed. The aerosol oil is removed down to approximately 0.01 ppm and all particulates are removed down to 0.01 micron.

At the bottom of the moisture separator and both filters are strainers and constant-bleed orifices, which are sized to allow the maximum flow of condensate while minimising compressed air loss.

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 minimum pressure valve, and out through the service air valve. The air pressure gauge on the instrument panel indicates the pressure inside the separator tank. A service air pressure gauge is located inside the front door of the compressor on the filter support.

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.

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.

Weekly Maintenance:

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

Yearly Maintenance:

The normal maintenance interval on the primary and secondary IQ System filters is one year, or earlier if pressure drop becomes excessive. The compressor will shut down if restriction exceeds recommended values.

FILTER REPLACEMENT

- With engine stopped, ensure pressure is relieved from air system.
- Remove all wires and hoses connected to drains on 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 loosening, taking care to prevent the housing from falling to the floor panel.
- Lower the housing to floor panel and lean it against the airend. Remove and replace the filter element, being careful not to damage outer wrap.

Verify the part number of new element vs. old element, as the two IQ filters are of different media.

PRIMARY AND SECONDARY FILTER MAINTENANCE

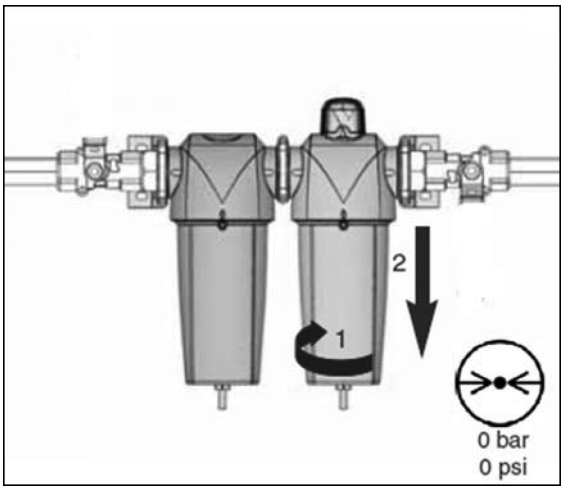


FIGURE 1.

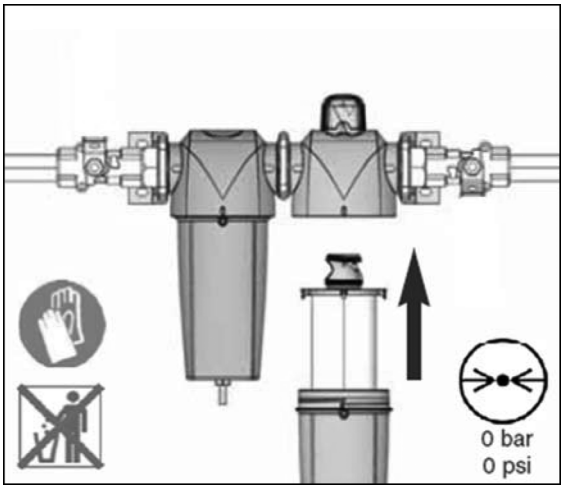


FIGURE 2.

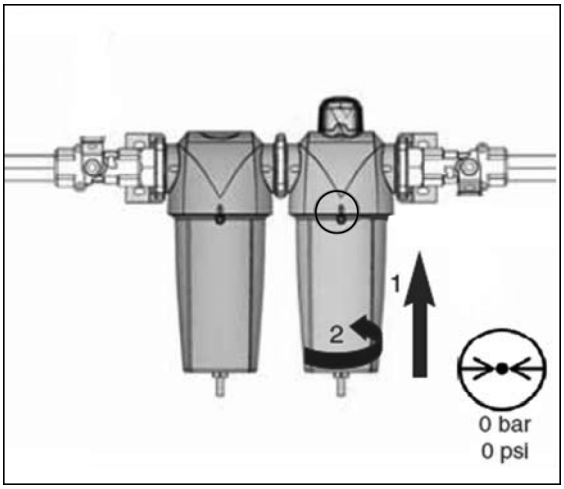


FIGURE 3.

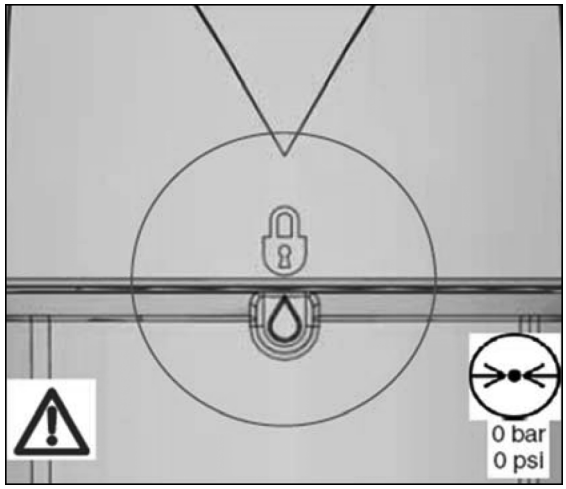


FIGURE 4.

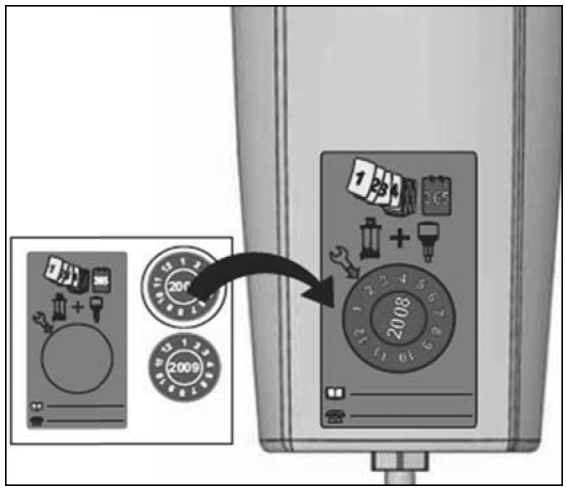


FIGURE 5.

WATER SEPARATOR MAINTENANCE

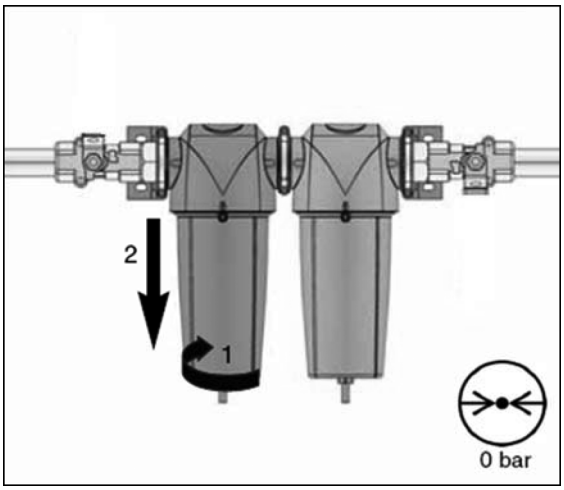


FIGURE 1.

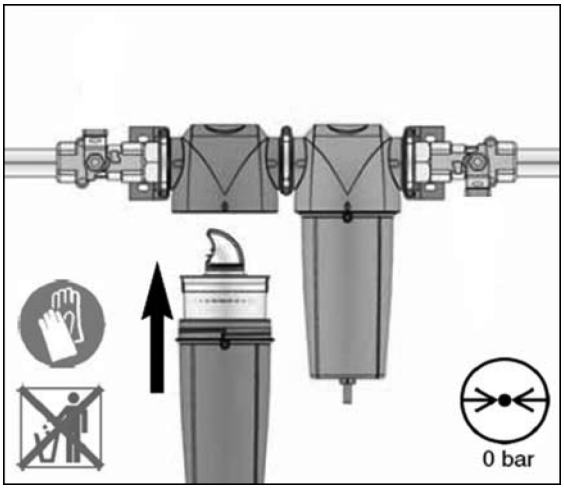


FIGURE 2.

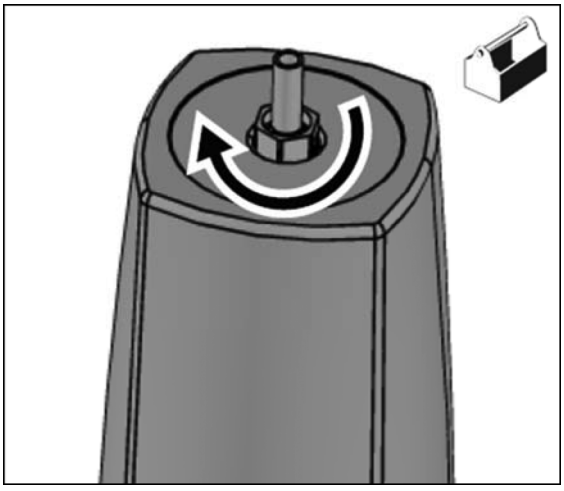


FIGURE 3.

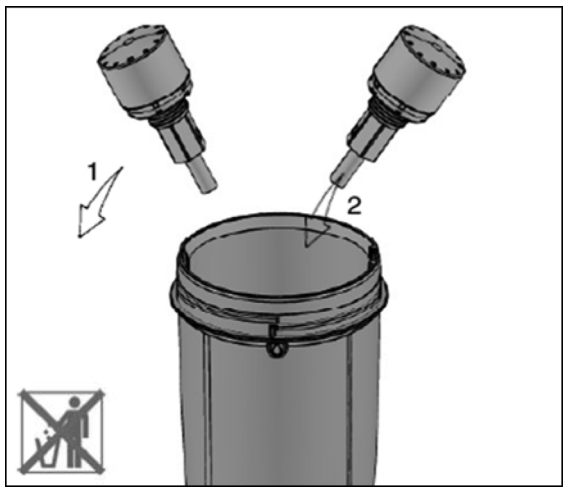


FIGURE 4.

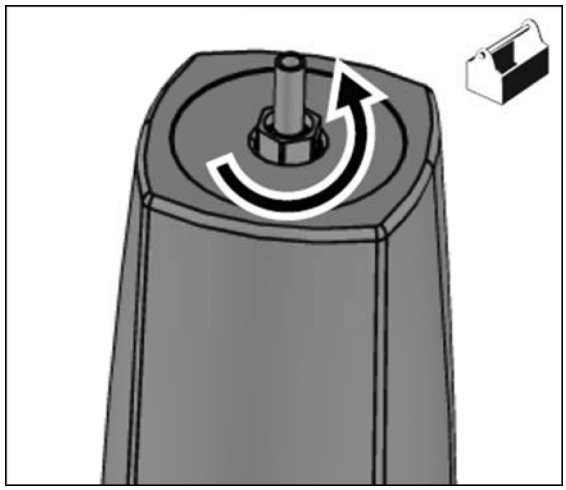


FIGURE 5.

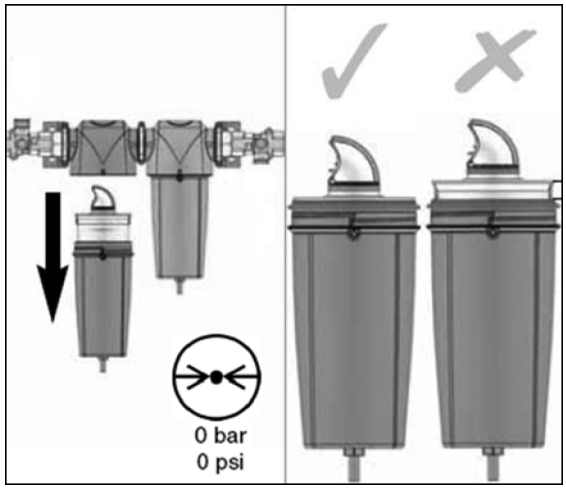


FIGURE 6.

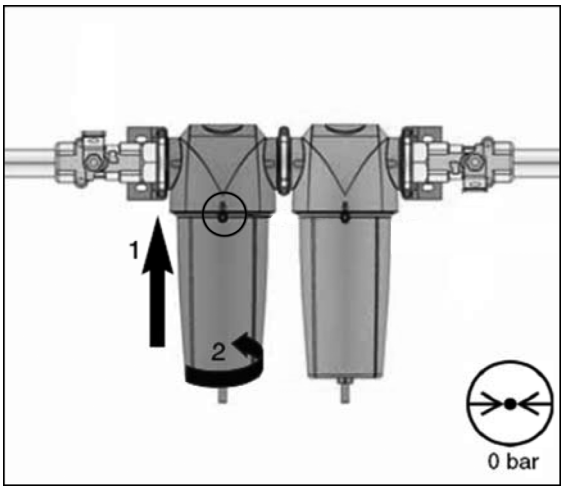


FIGURE 7.

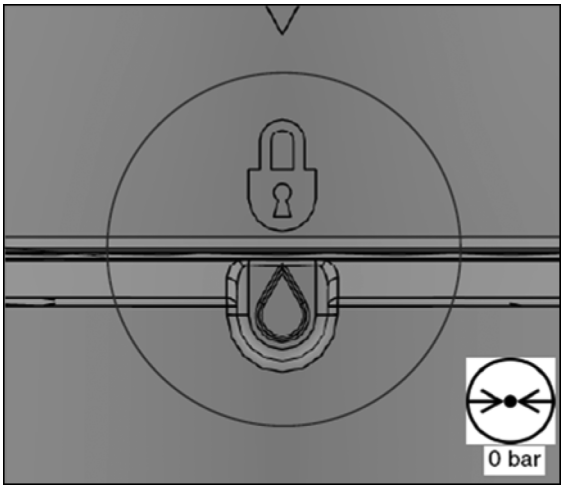


FIGURE 8.

SAFETY

CAUTION: *The compressor regulation system is adjusted to maintain regulated pressure at the separator tank. DO NOT adjust regulation to provide full regulation 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.*
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.*
CAUTION: *Blockage of the condensate will result in flooding of the vessels. If flooding occurs, excessive condensate may enter the air stream and could result in damage to downstream equipment.*

NOTE: Do not operate at temperatures less that 2°C (35°F).

GENERAL

This publication, which contains an illustrated parts breakdown, has been prepared as an aid in locating those parts which may be required in the maintenance of the unit. All of the compressor parts, listed in the parts breakdown, are manufactured with the same precision as the original equipment. For the greatest protection always insist on genuine Doosan parts for your compressor.

NOTICE

Doosan can bear no responsibility for injury or damages resulting directly from the use of non-approved repair parts.

Doosan Infracore service facilities and parts are available worldwide.

There are Authorised Distributors or Company Sales offices in principal cities of many countries.

Special order parts may not be included in the manual. Contact Doosan Parts Department with the unit serial number for assistance with these special parts.

DESCRIPTION

The illustrated parts breakdown illustrates and lists the various assemblies, subassemblies and detailed parts which make up this particular machine. This covers the standard models and the more popular options that are available.

A series of illustrations show each part distinctly and in location relative to the other parts in the assembly. The part number, the description of the part and the quantity of parts required are shown on each illustration or on adjacent page. The quantities specified are the number of parts used per one assembly and are not necessarily the total number of parts used in the machine. Where no quantity is specified the quantity is assumed to be one.

Each description of a part is based upon the "noun first" method, i.e., the identifying noun or item name is always the first part of the description. The noun name is generally followed by a single descriptive modifier. The descriptive modifier may be followed by words or abbreviations such as upper, lower, inner, outer, front, rear, RH, LH, etc. when they are essential.

In referring to the rear, the front or to either side of the unit, always consider the **drawbar end** of the unit as the **front**. Standing at the rear of the unit facing the drawbar (front) will determine the right and left sides.

FASTENERS

Both SAE/inch, ISO/metric hardware have been used in the design and assembly of these units. In the disassembly and reassembly of parts, extreme care must be taken to avoid damaging threads by the use of wrong fasteners. In order to clarify the proper usage and for exact replacement parts, all standard fasteners have been identified by part number, size and description. This will enable a customer to obtain fasteners locally rather than ordering from the factory. These parts are identified in tables that will be found at the rear of the parts illustrations. Any fastener that has not been identified by both part number and size is a specially engineered part that must be ordered by part number to obtain the exact replacement part.

MARKINGS AND DECALS

NOTICE

Do not paint over safety warnings or instructional decals. If safety warning decals become illegible, immediately order replacements from the factory.

Part numbers for original individual decals and their mounting locations are shown within Parts List Section. These are available as long as a particular model is in production.

HOW TO USE PARTS LIST

a. Turn to Parts List.

b. Locate the area or system of the compressor in which the desired part is used and find illustration page number.

c. Locate the desired part on the illustration by visual identification and make note of part number and description.

HOW TO ORDER

The satisfactory ordering of parts by a purchaser is greatly dependent upon the proper use of all available information. By supplying your nearest sales office, autonomous company or authorised distributor, with complete information, you will enable them to fill your order correctly and to avoid any unnecessary delays.

In order that all avoidable errors may be eliminated, the following instructions are offered as a guide to the purchaser when ordering replacement parts:

a. Always specify the model number of the unit as shown on the general data decal attached to the unit.

b. Always specify the serial number of the unit. THIS IS IMPORTANT. The serial number of the unit will be found stamped on a plate attached to the unit. (The serial number on the unit is also permanently stamped in the metal of the frame side rail.)

c. Always specify the number of the parts list publication.

d. Always specify the quantity of parts required.

e. Always specify the part number, as well as the description of the part, or parts, exactly as it is given on the parts list illustration.

In the event parts are being returned to your nearest sales office, autonomous company or authorised distributor, for inspection or repair, it is important to include the serial number of the unit from which the parts were removed.

TERMS AND CONDITIONS ON PARTS ORDERS

Acceptance: Acceptance of an offer is expressly limited to the exact terms contained herein. If purchaser's order form is used for acceptance of an offer, it is expressly understood and agreed that the terms and conditions of such order form shall not apply unless expressly agreed to by Doosan Company ("Company") in writing. No additional or contrary terms will be binding upon the Company unless expressly agreed to in writing.

Taxes: Any tax or other governmental charge now or hereafter levied upon the production, sale, use or shipment of material and equipment ordered or sold is not included in the Company's price and will be charged to and paid for by the Purchaser.

Shipping dates shall be extended for delays due to acts of God, acts of Purchaser, acts of Government, fires, floods, strikes, riot, war, embargo, transportation shortages, delay or default on the part of the Company's vendors, or any other cause beyond the Company's reasonable control.

Should Purchaser request special shipping instruction, such as exclusive use of shipping facilities, including air freight when common carrier has been quoted and before change order to purchase order can be received by the Company, the additional charges will be honoured by the Purchaser.

Warranty: The Company warrants that parts manufactured by it will be as specified and will be free from defects in materials and workmanship. The Company's liability under this warranty shall be limited to the repair or replacement of any part which was defective at the time of shipment provided Purchaser notifies the Company of any such defect promptly upon discovery, but in no event later than three (3) months from the date of shipment of such part by the Company. The only exception to the previous statement is the extended warranty as it applies to the special airend exchange program.

Repairs and replacements shall be made by the Company F.O.B. point of shipment. The Company shall not be responsible for costs of transportation, removal or installation.

Warranties applicable to material and equipment supplied by the Company but wholly manufactured by others shall be limited to the warranties extended to the Company by the manufacturer which are able to be conveyed to the Purchaser.

Delivery: Shipping dates are approximate. The Company will use best efforts to ship by the dates specified; however, the Company shall not be liable for any delay or failure in the estimated delivery or shipment of material and equipment or for any damages suffered by reason thereof.

The company makes no other warranty or representation of any kind whatsoever, expressed or implied, except that of title, and all implied warranties, including any warranty of merchantability and fitness for a particular purpose, are hereby disclaimed.

Limitation of Liability:

The remedies of the Purchaser set forth herein are exclusive, and the total liability of the Company with respect to this order whether based on contract, warranty, negligence, indemnity, strict liability or otherwise, shall not exceed the purchase price of the part upon which such liability is based.

The Company shall in no event be liable to the Purchaser, any successors in interest or any beneficiary of this order for any consequential, incidental, indirect, special or punitive damages arising out of this order or any breach thereof, or any defect in, or failure of, or malfunction of the parts hereunder, whether based upon loss of use, lost profits or revenue, interest, lost goodwill, work stoppage, impairment of other goods, loss by reason of shutdown or non-operation, increased expenses of operation or claims of customers of Purchaser for service interruption whether or not such loss or damage is based on contract, warranty, negligence, indemnity, strict liability or otherwise.

AIREND EXCHANGE PROGRAM

Doosan offers an airend exchange program to benefit portable compressor users.

Your nearest sales office, autonomous company or authorised distributor must first contact the Parts Service Department at the factory at which your portable air compressor was manufactured for further instructions.

For parts, service or information regarding your local distributor (Europe, Middle East, Africa) please contact:

Facility:	Telephone:	Fax:
Doosan Portable Power EMEA Aftermarket Drève Richelle 167 B-1410 Waterloo Belgium	+32 (2) 404 0811	+32 (2) 371 6915

For Service information contact: service_emea@dii.doosan.com
For Parts information contact: parts_emea@dii.doosan.com
Office hours: Monday to Friday 8:30 a.m. to 5:15 p.m. (GMT)

For parts, service or information regarding your local distributor (U.S, Latin America or Asia Pacific) please contact:

Facility:	Telephone:	Fax:
Doosan International USA, Inc	800-633-5206 (US & Canada)	336-751-1579 (US & Canada)
1293 Glenway Drive	305-222-0835 (Latin America)	336-751-4325 (Latin America)
Statesville	65-860-6863 (Asia Pacific)	336-751-4325 (Asia Pacific)
North Carolina 28625-9218		

Office hours: Monday to Friday 8:00 a.m. to 5:30 p.m. (EST)

or visit our website and dealer locator at www.doosanportablepower.com

Portable Power