

# **Portable Power**

# **12/154** 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 :



**Portable Power** 

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:



# <sup>18)</sup> Conformity with the Noise Emission Directive 2000/14/EC

Directive 2000/14	)irective 2000/14/EC, Annex VI, Part I								
Notified body: AV	Notified body: AV Technology, Stockport, UK. Nr 1067								
<sup>21)</sup> Machir	<sup>21)</sup> Machine		<sup>24)</sup> Guaranteed sound	<sup>21)</sup> Machine		<sup>23)</sup> Measured sound	<sup>24)</sup> Guaranteed		
<sup>22)</sup> Type	kW	power level	power level	<sup>22)</sup> Type	kW	power level	sound power level		
7/20	17,5	96L <sub>WA</sub>	97L <sub>WA</sub>	7/125-9/115;	97	98L <sub>WA</sub>	99L <sub>WA</sub>		
7/26E	21,3	97L <sub>WA</sub>	98L <sub>WA</sub> 98L <sub>WA</sub>	7/125-10/110; 14/90					
7/31E	25,9	97L <sub>WA</sub>							
7/41	35	98L <sub>WA</sub>	98L <sub>WA</sub>	7/170; 10/125;	120 5	081	001		
7/51	50,2	98L <sub>WA</sub>	98L <sub>WA</sub>	14/115	120,5	JOLWA	55L <sub>WA</sub>		
7/71; 12/56	59,2	97L <sub>WA</sub>	99L <sub>WA</sub>	12/154	168	98L <sub>WA</sub>	99L <sub>WA</sub>		
7/72	52,5	96L <sub>WA</sub>	98L <sub>WA</sub>	9/275	227	99L <sub>WA</sub>	100L <sub>WA</sub>		
7/120; 9/110; 10/105; 14/85	93	98L <sub>WA</sub>	99L <sub>WA</sub>	9/305; 12/250; 17/240; 21/220	254	99L <sub>WA</sub>	100L <sub>WA</sub>		

<sup>25)</sup> 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

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<sup>30)</sup> The technical documentation for the machinery is available from: Doosan Infracore Portable Power EMEA, Dreve Richelle 167, B-1410 Waterloo, Belgium



**Portable Power** 

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# **ABBREVIATIONS & SYMBOLS**

####	Contact the company for serial number				
->####	Up to Serial No.				
####->	From Serial No.				
*	Not illustrated				
†	Option				
AR	As required				
HA	High ambient machine				
F.H.R.G. Fixed height running gear					
V.H.R.G	. Variable height running gear				
<b>ba</b> Bi	ulgarian				
cs C	zech				
da D	da Danish				
de G	erman				
el G	reek				
en E	nglish				

- en English es Spanish
- et Estonian
- fi Finnish
- fr French
- hu Hungarian
- it Italian
- It Lithuanian
- Iv Latvian, Lettish
- mt Maltese
- nl Dutch
- no Norwegian
- pl Polish
- pt Portuguese
- ro Romanian
- ru Russian
- sk Slovak sl Slovenian
- sv Swedish
- zh Chinese

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) This machine may be used in USA/Canada when configured with components bearing the appropriate certification. (Where ASME certification is valid).

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.

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

12/154

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.
Km/h		
Do not exceed the trailer speed limit.	No naked lights.	Do not open the service valve before the airhose is attached.
		8
Use fork lift truck from this side only.	Emergency stop.	Tie down point



Start and stop device.	Mandatory action: Hearing protection must be worn.	Lashing point (Tie down).
Prohibition: Do not start.	WARNING - Maintenance work in progress.	Engine oil.
	$\overrightarrow{}$	?
Fuel level/point.	Pressure control.	Malfunction.
- +	→ <b>●</b> ← ▼	→●← 
Battery charging condition.	Low pressure.	High pressure.
?	R	(?)
Engine malfunction.	High compressor temperature.	Compressor malfunction.
	R	
Low engine oil pressure.	High engine temperature.	

### 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**

Never operate unit without first observing all safety warnings and carefully reading the operation and maintenance manual shipped from the factory with this machine.

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.

Ensure that ice and snow do not block the cooling air inlets.

Use hearing protectors when unit is running.

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.

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

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

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

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

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

The machine must not be used for transport or storage of explosive, flammable or other dangerous substances.

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

Ether is an extremely volatile, highly inflammable gas. When it is specified as a starting aid, use sparingly. DO NOT USE ETHER IF THE MACHINE HAS GLOW PLUGS OR INLET HEATER STARTING AIDS OR ENGINE DAMAGE WILL RESULT.

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

#### Compressed air

Compressed air can be dangerous if incorrectly handled. 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.

High Pressure Air can cause serious injury or death. Relieve pressure before removing filler plugs/caps, fittings or covers.

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

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.

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

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

Never allow the unit to sit stopped with pressure in the receiverseparator system.

## 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

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.

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

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

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 unit, always disconnect cables in reverse order.

#### Radiator

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

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

#### Transport

When loading or transporting machines ensure that the specified lifting and tie down points are used and cables or chains are in safe limits.

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.

Ensure that the maximum trailer weight does not exceed the maximum gross weight of the machine (by limiting the equipment load), limited by the capacity of the running gear.

### NOTE:

Gross mass (on data plate) is for the basic machine and fuel only, excluding any fitted options, tools, equipment and foreign materials.

Before towing the machine, ensure that:

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

The machine must be towed in a level attitude (the maximum permissible drawbar angle is between  $0^{\circ}$  and  $+5^{\circ}$  from horizontal) 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.

The machine must not be towed on public roads if it is fitted with the hose carrier option.

To ensure full braking efficiency, the front (towing eye) section must always be set level.

When adjusting variable height running gear:

- Ensure front (towing eye) section is set level.
- · When raising towing eye, set rear joint first, then front joint.
- · When lowering towing eye, set front joint first, then rear joint.
- After setting, fully tighten each joint by hand and then tighten further to the next pin. Refit the pin.
- When parking always use the handbrake and, if necessary, suitable wheel chocks.
- Make sure wheels, tyres and tow bar connectors are in safe operating condition and tow bar is properly connected before towing.

#### Safety chains / connections and adjustment

The legal requirements for the joint operation of the breakaway cable and safety chains are as yet unidentified by 71/320/EEC or UK regulations. Consequently we offer the following advice / instructions.

Where brakes only are fitted:

- Ensure that the breakaway cable is securely coupled to the handbrake lever and also to a substantial point on the towing vehicle.
- Ensure that the effective cable length is as short as possible, whilst still allowing enough slackness for the trailer to articulate without the handbrake being applied.

Where brakes and safety chains are fitted:

- Loop the chains onto the towing vehicle using the towing vehicle hitch as an anchorage point, or any other point of similar strength.
- Ensure that the effective chain length is as short as possible whilst still allowing normal articulation of the trailer and effective operation of the breakaway cable.

Where safety chains only are fitted:

- Loop the chains onto the towing vehicle using the towing vehicle hitch as an anchorage point, or any other point of similar strength.
- When adjusting the safety chains there should be sufficient free length in the chains to allow normal articulation, whilst also being short enough to prevent the towbar from touching the ground in the event of an accidental separation of the towing vehicle from the trailer.

# 12/154 Fixed Height Running Gear





- A. Instrument panel access door
- B. Package air inlet
- C. Access items: Separator element & fill Compressor oil filter Fuel filters Dipstick Engine oil fill Coolant bottle fill

- D. Access items: Fuel fill Engine oil filter Fuel filter Engine and compressor air filter
- E. Access items: Radiator fill
- F. Package air outlet
- G. Track width
- H. Fixed height drawbar

# 12/154 Variable Height Running Gear





- A. Instrument panel access door
- B. Package air inlet
- C. Access items: Separator element & fill Compressor oil filter Fuel filters Dipstick Engine oil fill Coolant bottle fill

- D. Access items: Fuel fill Engine oil filter Fuel filter Engine and compressor air filter
- E. Access items: Radiator fill
- F. Package air outlet
- G. Track width
- J. Variable height drawbar 438mm minimum / 968mm maximum

# 12/154 KHD Variable Height Running Gear





- A. Instrument panel access door
- B. Package air inlet
- C. Access items: Separator element & fill Compressor oil filter Fuel filters Dipstick Engine oil fill Coolant bottle fill

- D. Access items: Fuel fill Engine oil filter Fuel filter Engine and compressor air filter
- E. Access items: Radiator fill
- F. Package air outlet
- G. Track width
- J. Variable height drawbar 320mm minimum / 1090mm maximum

# 12/154 LRG (Less Running Gear)





T4793\_00 12/14

- A. Instrument panel access door
- B. Package air inlet
- C. Access items: Separator element & fill Compressor oil filter Fuel filters Dipstick Engine oil fill Coolant bottle fill

- D. Access items: Fuel fill Engine oil filter Fuel filter Engine and compressor air filter
- E. Access items: Radiator fill
- F. Package air outlet

COMPRESSOR		
Actual free air delivery.	m <sup>3</sup> /min/ cfm	14,9/ 526
Normal operating discharge pressure.	bar/ psi	12/ 174
Maximum allowable pressure.	bar/ psi	12,7/ 184
Safety valve setting.	bar/ psi	15/ 218
Maximum pressure ratio (absolute).		13:1
Operating ambient temperature range (CE regions).	°C/ °F	-10 to +46/ 14 to 115
Maximum discharge temperature.	°C/ °F	120/ 248
Cooling system.	Oil Inj	ection
Oil capacity.	Litre/ gallon	56/ 14,8
Maximum oil system temperature.	°C/ °F	120/ 248
Maximum oil system pressure.	bar/ psi	12,7/ 184

# LUBRICATING OIL SPECIFICATION (for the specified ambient temperatures).

Refer to lubrication data page in the MAINTENANCE SECTION of this manual.

### ENGINE

Type/model.	Cummins
Number of cylinders.	6
Oil capacity.	14 litres (3,7 US GAL)
Speed at full load.	2000 revs min-1 (RPM)
Speed at idle.	1500 revs min-1 (RPM)
Electrical system.	24V negative earth
Power available at 2000 revs min-1	168 kW (225 HP)
Fuel tank capacity	310 litres (82 US GAL)
Oil specification	Refer to engine section
Coolant capacity	38 litres (10 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

Mass in running order.	2950kg (6503Lbs)
Maximum mass.	3500kg (7716Lbs)
Maximum horizontal towing force.	3100kg (6834Lbs)
Maximum vertical coupling load (nose weight).	150 kgf (331Lbs)

# VARIABLE HEIGHT RUNNING GEAR Braked version

Mass in running order.	3020kg (6657Lbs)
Maximum mass.	3500kg (7716Lbs)
Maximum horizontal towing force.	3100kg (6834Lbs)
Maximum vertical coupling load (nose weight).	150 kgf (331Lbs)

# KHD VARIABLE HEIGHT RUNNING GEAR Braked version

Mass in running order.	3020kg (6657Lbs
Maximum mass.	3500kg (7716Lbs)
Maximum horizontal towing force.	3100kg (6835Lbs)
Maximum vertical coupling load (nose weight).	150 kgf (331Lbs)
<ul> <li>Mass in running order means the mass fuel and liquids, fitted with the standard equ</li> </ul>	of the vehicle including the upment.

· Actual mass with optional equipment may be different.

## WHEELS AND TYRES

Number of wheels.	2
Tyre size.	215/75 R17,5
Tyre pressure.	6,0 bar (87 psi)

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.

**Running gear drawbar** (European Area) - Machines are shipped to some areas with the drawbar removed. Fitting involves four nuts / bolts to secure the drawbar to the axle and two bolts to fit the drawbar to the front of the machine with the saddle and spacer block.

Support the front of the machine, fit the wheel chocks to stop the machine moving and attach the drawbar. Refer to the torque value table in the *MAINTENANCE* section of this manual for the correct torque values.

**CAUTION**: This is a safety critical procedure. Double check the torque settings after assembly.

Fit the propstand and coupling. Remove the supports and set the machine level.

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.



### **PRIOR TO STARTING**

 Place the unit in a position that is as level as possible. The design of the unit permits a 10 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.
- 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.
- 5. Check the DEF level and add fluid as necessary. Use API certified DEF which meets ISO22241. The DEF pump contains a filter that should be replaced at regular intervals. (See *Maintenance Schedule*.)

#### 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.
- 6. Drain the fuel filter water separator of water, ensuring that any released fuel is safely contained.
- 7. Check the radiator coolant level (with the unit level).
- 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.
- 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.
- 10.Check that the emergency stop switch is not engaged. Pull knob to release if necessary.
- 11.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  $0 \,^{\circ}\!C$  (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.



### 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.
- 9. DEF Tank Fluid Level Gauge
- 10. Aftertreatment System Warning Lights
- 11. Aftertreatment Regeneration Switch

# 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.
- 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.



#### 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	ALERT			SHUTDOWN			
	CODE	THRESHOLD	LIGHT BLINKS	CODE	THRESHOLD	DELAY (sec)	MACHINE
Low Engine Speed				1	Idle Speed -400RPM	30 sec	All
High Engine Speed				2	Full Speed +100RPM	30 sec	All
Crank Timeout (starter protection)				3	Note 1	0	All
Low Fuel	12		All	4		3 sec	All
Active Engine Alert	9		All				
Engine Not Reaching Speed	10		All				
Too Many Start Attempts (AutoStart)				11	3	0	All
Engine Shutdown, reason unknown				29		0	All
High Airend Discharge Temperature				30	251 ⁰F	3 sec	All
Airend Discharge Temperature Sensor Fault				32		10 sec	All
Separator Tank Pressure Sensor Fault				33	<.5V, >4.5V		Note 3
Pressure Too High To Start	34	20 PSI	All				
Safety Valve Open				36		2 sec	Note 4
Intake Air Filter Restricted	38		All				
Alternator Not Charging	39	Note 5	All				
Fuel Level Sensor Fail	42	<.5V, >4.5V	Note 4				
IQ Filter Restriction	44	10 PSI	IQ Option	52	15 PSI	3 sec	IQ Option
High Separator Tank Temperature				50	251 ⁰F	3 sec	All
Machine ID Not Valid				51		0	All
Separator Tank Temperature Sensor Fault				53		10 sec	All
Regulation System Pressure Sensor Fault				54	<.5V, >4.5V	Note 2	All
E-stop Activated				55		3 sec	All
Ambient Temperature Sensor Fault	58		All				
IQ Filter Pressure Rise	61	Drop<-1PSI	IQ Opt				
IQ Primary Pressure Sensor Failed	63	<.5V, >4.5V	IQ Opt				
IQ Secondary Pressure Sensor Failed	64	<.5V, >4.5V	IQ Opt				
Autostart Remote Pressure Sensor	68	<.5V, >4.5V	AS Opt				
Engine ECM Communication Failure				71		3 sec	All
Auto Start/Stop Module Communication Fault	73	If Alert is selected	AS Opt	73	If Fault is selected	0	AS Opt
TITAN Communication Failure				76		0	All
CAN Keypad Communication Fault				77		10 sec	Except Kubota 185

# NOTES

-		12V systems		24V systems	
1.	15 seconds above 50 DegF, 30 seconds below 32 DegF.	LowV =	11.5V	23.5V	(on)
2.	13 seconds on voltage too high if electronic dual pressure.		13.3V	25.3V	(running)
2. (	otherwise 3 seconds.	ResetV =	12V	24V	(on)
3.	12/154, 14/90, 7/175, 7/125, WW600.		14V	26V	(running)
4.	All except Kubota 185, Doosan P185, P250, C185.				

5. 30 seconds after LowV without exceeding ResetV.

Engine C	Engine Codes: Cummins Engine Model QSB6.7						
	ENGINE DIAGNOSTIC CODES						
J1939 SPN	J1939 FMI	CUMMINS CODE	J1939 SPN DESCRIPTION	J1939 FMI DESCRIPTION	CUMMINS DESCRIPTION		
27	2	1228	Engine Exhaust Gas Recirculation 1 Valve Position	Data Erratic, Intermittent or Incorrect	Data Erratic, Intermittent or Incorrect		
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 Diesel Particulate Filter Intake Pressure - Data Valid But Above Normal Operating Range - Moderately Severe Level		
84	2	241	Wheel-Based Vehicle Speed	Data Erratic, Intermittent or Incorrect	Wheel-Based Vehicle Speed - Data erratic, intermittent or incorrect		
84	9	3526	Wheel-Based Vehicle Speed	Abnormal Update Rate	Wheel-Based Vehicle Speed - Abnormal update rate		
84	10	242	Wheel-Based Vehicle Speed	Abnormal Rate of Change	Wheel-Based Vehicle Speed Sensor Circuit tampering has been detected - Abnormal rate of change		
84	19	3525	Wheel-Based Vehicle Speed	Received Network Data in Error	Wheel-Based Vehicle Speed - Received Network Data In Error		
91	0	148	Accelerator Pedal Position 1	Data Valid but Above Normal Operational Range - Most Severe Level	Accelerator Pedal or Lever Position Sensor 1 - Data valid but above normal operational range - Most Severe Level		
91	1	147	Accelerator Pedal Position 1	Data Valid but Below Normal Operational Range - Most Severe Level	Accelerator Pedal or Lever Position 1 Sensor Circuit Frequency - Data valid but below normal operating Range		
91	2	1242	Accelerator Pedal Position 1	Data Erratic, Intermittent or Incorrect	Accelerator Pedal or Lever Position Sensor 1 - 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 1 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 1 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	1515	Accelerator Pedal Position 1	Received Network Data in Error	SAE J1939 Multiplexed Accelerator Pedal or Lever Sensor System - Received Network Data In Error		
93	2	528	Engine Net Brake Torque	Data Erratic, Intermittent or Incorrect	Auxiliary Alternate Torque Validation Switch - Data erratic, intermittent or incorrect		
94	0	4615	Engine Fuel Delivery Pressure	Data Valid but Above Normal Operational Range - Most Severe Level	Engine Fuel Delivery Pressure - Data Valid but Above Normal Operational Range - Most Severe Level		
94	3	546	Engine Fuel Delivery Pressure	Voltage Above Normal or Shorted to High Source	Fuel Delivery Pressure Sensor Circuit - Voltage above normal, or shorted to high source		
94	4	547	Engine Fuel Delivery Pressure	Voltage Below Normal or Shorted to Low Source	Fuel Delivery Pressure Sensor Circuit - Voltage below normal, or shorted to low source		
94	15	2261	Engine Fuel Delivery Pressure	Data Valid but Above Normal Operating Range - Least Severe Level	Fuel Pump Delivery Pressure - Data Valid But Above Normal Operating Range - Least Severe Level		
94	17	2262	Engine Fuel Delivery Pressure	Data Valid but Below Normal Operating Range - Least Severe Level	Fuel Pump Delivery Pressure - Data Valid But Below Normal Operating Range - Least Severe Level		
94	18	2215	Engine Fuel Delivery Pressure	Data Valid but Below Normal Operating Range - Moderately Severe Level	Fuel Pump Delivery Pressure - Data Valid But Below Normal Operating Range - Moderately Severe Level		
95	16	2372	Engine Fuel Filter Differential 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		

J1939 SPN	J1939 FMI	CUMMINS CODE	J1939 SPN DESCRIPTION	J1939 FMI DESCRIPTION	CUMMINS DESCRIPTION
97	3	428	Water in Fuel Indicator	Voltage Above Normal, or Shorted to HighSource	Water in Fuel Indicator 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 Indicator 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 - Data Valid But Above Normal Operating 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 Operating Range - Moderately Severe Level
98	0	688	Engine Oil Level	Data Valid but Above Normal Operational Range - Most Severe Level	Engine Oil Level - Data valid but above normal operational range - Most Severe Level
98	1	253	Engine Oil Level	Data Valid but Below Normal Operational Range - Most Severe Level	Engine Oil Level - Data valid but below normal operational range - Most Severe Level
98	17	471	Engine Oil Level	Data Valid but Below Normal Operating Range - Least Severe Level	Engine Oil Level - Data Valid But Below Normal Operating Range - Least Severe Level
100	1	415	Engine Oil Pressure	Data Valid but Below Normal Operational Range - Most Severe Level	Engine Oil Rifle Pressure - Data valid but below normal operational range - Most Severe Level
100	2	435	Engine Oil Pressure	Data Erratic, Intermittent or Incorrect	Engine Oil Rifle Pressure - Data erratic, intermittent or incorrect
100	3	135	Engine Oil Pressure	Voltage Above Normal, or Shorted to High Source	Engine Oil Rifle Pressure 1 Sensor Circuit - Voltage above normal, or shorted to high source
100	4	141	Engine Oil Pressure	Voltage Below Normal, or Shorted to Low Source	Engine Oil Rifle Pressure 1 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	Engine Oil Rifle Pressure - Data Valid But Below Normal Operating 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 operational range - Most Severe Level
101	2	1942	Engine Crankcase Pressure	Data Erratic, Intermittent or Incorrect	Crankcase Pressure - Data erratic, intermittent or incorrect
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 - Voltage 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 1 Pressure - Data erratic, intermittent or incorrect
102	3	122	Engine Intake Manifold #1 Pressure	Voltage Above Normal, or Shorted to High Source	Intake Manifold 1 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 1 Pressure Sensor Circuit - Voltage below normal, or shorted to low source
102	10	3361	Engine Intake Manifold #1 Pressure	Abnormal Rate of Change	Intake Manifold 1 Pressure - Abnormal rate of change
102	16	124	Engine Intake Manifold #1 Pressure	Data Valid but Above Normal Operating Range - Moderately Severe Level	Intake Manifold 1 Pressure - Data Valid But Above Normal Operating Range - Moderately Severe Level
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

J1939 SPN	J1939 FMI	CUMMINS CODE	J1939 SPN DESCRIPTION	J1939 FMI DESCRIPTION	CUMMINS DESCRIPTION
103	2	686	Engine Turbocharger 1 Speed	Data Erratic, Intermittent or Incorrect	Turbocharger 1 Speed - Data erratic, intermittent or incorrect
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 - Data Valid But Above Normal Operating Range - Moderately Severe Level
103	18	687	Engine Turbocharger 1 Speed	Data Valid but Below Normal Operating Range - Moderately Severe Level	Turbocharger 1 Speed - Data Valid But Below Normal Operating Range - Moderately Severe Level
104	18	3917	Engine Turbocharger Lube Oil Pressure 1	Data Valid but Below Normal Operating Range - Moderately Severe Level	Engine Turbocharger Lube Oil Pressure - Data Valid But Below Normal Operating Range - Moderately Severe Level
105	0	155	Engine Intake Manifold 1 Temperature	Data Valid but Above Normal Operational Range - Most Severe Level	Intake Manifold 1 Temperature - Data valid but above normal operational range - Most Severe Level
105	2	436	Engine Intake Manifold 1 Temperature	Data Erratic, Intermittent or Incorrect	Intake Manifold 1 Temperature - Data erratic, intermittent or incorrect
105	3	153	Engine Intake Manifold 1 Temperature	Voltage Above Normal, or Shorted to High Source	Intake Manifold 1 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 1 Temperature Sensor Circuit - Voltage below normal, or shorted to low source
105	15	2964	Engine Intake Manifold 1 Temperature	Data Valid but Above Normal Operating Range - Least Severe Level	Intake Manifold 1 Temperature - Data Valid But Above Normal Operating Range - Least Severe Level
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 Operating Range - Moderately Severe Level
105	18	3385	Engine Intake Manifold 1 Temperature	Data Valid but Below Normal Operating Range - Moderately Severe Level	Intake Manifold 1 Temperature - Data Valid But Below Normal Operating Range - Moderately Severe Level
107	15	5576	Engine Air Filter 1 Differential Pressure	Data Valid but Above Normal Operating Range - Least Severe Level	Engine Air Filter Differential Pressure - Data Valid But Above Normal Operating Range - Least Severe Level
107	16	3341	Engine Air Filter 1 Differential Pressure	Data Valid but Above Normal Operating Range - Moderately Severe Level	Engine Air Filter Differential Pressure - Data Valid But Above Normal Operating Range - Moderately Severe Level
108	2	295	Barometric Pressure	Data Erratic, Intermittent or Incorrect	Barometric Pressure - 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 above normal, or shorted to low source
109	3	231	Engine Coolant Pressure	Voltage Above Normal or Shorted to High Source	Coolant Pressure Sensor Circuit - Voltage above normal, or shorted to high source
109	4	232	Engine Coolant Pressure	Voltage Below Normal or Shorted to Low Source	Coolant Pressure Sensor Circuit - Voltage below normal, or shorted to low source
109	18	233	Engine Coolant Pressure	Data Valid but Below Normal Operating Range - Moderately Severe Level	Coolant Pressure - Data Valid But Below Normal Operating Range - Moderately Severe Level
110	0	151	Engine Coolant Temperature	Data Valid but Above Normal Operational Range - Most Severe Level	Engine Coolant Temperature - Data valid but above normal operational range - Most Severe Level
110	2	334	Engine Coolant Temperature	Data Erratic, Intermittent or Incorrect	Engine Coolant Temperature - Data erratic, intermittent or incorrect

J1939 SPN	J1939 FMI	CUMMINS CODE	J1939 SPN DESCRIPTION	J1939 FMI DESCRIPTION	CUMMINS DESCRIPTION
110	3	144	Engine Coolant Temperature	Voltage Above Normal, or Shorted to High Source	Engine Coolant Temperature 1 Sensor Circuit - Voltage above normal, or shorted to high source
110	4	145	Engine Coolant Temperature	Voltage Below Normal, or Shorted to Low Source	Engine Coolant Temperature 1 Sensor Circuit - Voltage below normal, or shorted to low source
110	14	1847	Engine Coolant Temperature	Special Instructions	Engine Coolant Temperature - Special Instructions
110	15	2963	Engine Coolant Temperature	Data Valid but Above Normal Operating Range - Least Severe Level	Engine Coolant Temperature - Data Valid But Above Normal Operating Range - Least Severe Level
110	16	146	Engine Coolant Temperature	Data Valid but Above Normal Operating Range - Moderately Severe Level	Engine Coolant Temperature - Data Valid But Above Normal Operating 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 - 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 1 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 1 Circuit - Voltage below normal, or shorted to low source
111	9	3613	SAE J1939 Multiplexing PGN Timeout	Abnormal Update Rate	SAE J1939 Multiplexing PGN Timeout Error - Abnormal update rate
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	17	5167	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 Operating Range - Moderately Severe Level
111	18	3366	Engine Coolant Level	Data Valid but Below Normal Operating Range - Moderately Severe Level	Coolant Level - Data Valid But Below Normal Operating Range - Moderately Severe Level
111	19	3614	SAE J1939 Multiplexing PGN Timeout	Received Network Data in Error	Coolant Level Sensor - Received Network Data in Error
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	2	554	Engine Injector Metering Rail 1 Pressure	Data Erratic, Intermittent or Incorrect	Injector Metering Rail 1 Pressure - Data erratic, intermittent or incorrect
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	7	755	Engine Injector Metering Rail 1 Pressure	Mechanical System not Responding or Out of Adjustment	Injector Metering Rail 1 Pressure - Mechanical system not responding or out of adjustment

J1939 SPN	J1939 FMI	CUMMINS CODE	J1939 SPN DESCRIPTION	J1939 FMI DESCRIPTION	CUMMINS DESCRIPTION
157	15	4727	Engine Injector Metering Rail 1 Pressure	Data Valid but Above Normal Operating Range - Least Severe Level	Injector Metering Rail 1 Pressure - Data Valid But Above Normal Operating Range - Least Severe Level
157	16	553	Engine Injector Metering Rail 1 Pressure	Data Valid but Above Normal Operating Range - Moderately Severe Level	Injector Metering Rail 1 Pressure - Data Valid But Above Normal Operating 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 - Data Valid But Below Normal Operating Range - Moderately Severe Level
168	16	442	Battery Potential / Power Input 1	Data Valid but Above Normal Operating Range - Moderately Severe Level	Battery 1 Voltage - Data Valid But Above Normal Operating Range - Moderately Severe Level
168	17	3724	Battery Potential / Power Input 1	Data Valid but Below Normal Operating Range - Least Severe Level	Battery 1 Voltage - Data Valid But Below Normal Operating Range - Least Severe Level
168	18	441	Battery Potential / Power Input 1	Data Valid but Below Normal Operating Range - Moderately Severe Level	Battery 1 Voltage - Data Valid But Below Normal Operating Range - Moderately Severe Level
171	2	2398	Ambient Air Temperature	Data Erratic, Intermittent or Incorrect	Ambient Air Temperature - Data erratic, intermittent or incorrect
171	3	249	Ambient Air Temperature	Voltage Above Normal or Shorted to High Source	Ambient Air Temperature Sensor 1 Circuit - Voltage above normal, or shorted to high source
171	4	256	Ambient Air Temperature	Voltage Below Normal or Shorted to Low Source	Ambient Air Temperature Sensor 1 Circuit - Voltage below normal, or shorted to low source
171	9	3531	Ambient Air Temperature	Abnormal Update Rate	Ambient Air Temperature - Abnormal update rate
171	19	3532	Ambient Air Temperature	Received Network Data in Error	Ambient Air Temperature - Received Network Data In Error
174	0	266	Engine Fuel Temperature 1	Data Valid but Above Normal Operational Range - Most Severe Level	Engine Fuel Temperature - Data valid but above normal operational range - Most Severe Level
174	2	535	Engine Fuel Temperature 1	Data Erratic, Intermittent or Incorrect	Engine Fuel Temperature - Data erratic, intermittent or incorrect
174	3	263	Engine Fuel Temperature 1	Voltage Above Normal or Shorted to High Source	Engine Fuel Temperature Sensor 1 Circuit - Voltage above normal, or shorted to high source
174	4	265	Engine Fuel Temperature 1	Voltage Below Normal or Shorted to Low Source	Engine Fuel Temperature Sensor 1 Circuit - Voltage below normal, or shorted to low source
174	16	261	Engine Fuel Temperature 1	Data Valid but Above Normal Operating Range - Moderately Severe Level	Engine Fuel Temperature - Data Valid But Above Normal Operating Range - Moderately Severe Level
175	0	214	Engine Oil Temperature 1	Data Valid but Above Normal Operational Range - Most Severe Level	Engine Oil Temperature - Data valid but above normal operational range - Most Severe Level
175	2	425	Engine Oil Temperature 1	Data Erratic, Intermittent or Incorrect	Engine Oil Temperature - Data erratic, intermittent or incorrect
175	3	212	Engine Oil Temperature 1	Voltage Above Normal or Shorted to High Source	Engine Oil Temperature Sensor 1 Circuit - Voltage above normal, or shorted to high source
175	4	213	Engine Oil Temperature 1	Voltage Below Normal or Shorted to Low Source	Engine Oil Temperature Sensor 1 Circuit - Voltage below normal, or shorted to low source
175	16	421	Engine Oil Temperature 1	Data Valid but Above Normal Operating Range - Moderately Severe Level	Engine Oil Temperature - Data Valid But Above Normal Operating Range - Moderately Severe Level

J1939 SPN	J1939 FMI	CUMMINS CODE	J1939 SPN DESCRIPTION	J1939 FMI DESCRIPTION	CUMMINS DESCRIPTION
188	16	3715	Engine Speed At Idle, Point 1 (Engine Configuration)	Data Valid but Above Normal Operating Range - Moderately Severe Level	Engine Speed At Idle - Data Valid But Above Normal Operating Range - Moderately Severe Level
188	18	3716	Engine Speed At Idle, Point 1 (Engine Configuration)	Data Valid but Below Normal Operating Range - Moderately Severe Level	Engine Speed At Idle - Data Valid But Below Normal Operating Range - Moderately Severe Level
190	0	234	Engine Speed	Data Valid but Above Normal Operational Range - Most Severe Level	Engine Crankshaft Speed/Position - Data valid but above normal operational range - Most Severe Level
190	2	689	Engine Speed	Data Erratic, Intermittent or Incorrect	Engine Crankshaft Speed/Position - Data erratic, intermittent or incorrect
190	2	2321	Engine Speed	Data Erratic, Intermittent or Incorrect	Engine Crankshaft Speed/Position - Data erratic, intermittent or incorrect
190	16	1992	Engine Speed	Data Valid but Above Normal Operating Range - Moderately Severe Level	Engine Crankshaft Speed/Position - Data Valid But Above Normal Operating Range - Moderately Severe Level
190	16	2468	Engine Speed	Data Valid but Above Normal Operating Range - Moderately Severe Level	Engine Crankshaft Speed/Position - Data Valid But Above Normal Operating Range - Moderately Severe Level
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 Operating 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 Operating Range - Moderately Severe Level
191	19	3418	Transmission Output Shaft Speed	Received Network Data in Error	Transmission Output Shaft Speed - Received Network Data In Error
237	2	4722	Vehicle Identification Number	Data Erratic, Intermittent or Incorrect	Vehicle Identification Number - Data erratic, intermittent or incorrect
237	13	4517	Vehicle Identification Number	Out of Calibration	Vehicle Identification Number - Out of Calibration
237	31	4721	Vehicle Identification Number	Not Available or Condition Exists	Vehicle Identification Number - Condition Exists
251	2	319	Real Time Clock	Data Erratic, Intermittent or Incorrect	Real Time Clock - Data erratic, intermittent or incorrect
411	2	1866	Engine Exhaust Gas Recirculation 1 Differential Pressure	Data Erratic, Intermittent or Incorrect	Exhaust Gas Recirculation Differential 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 Differential 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 Differential Pressure Sensor Circuit - Voltage below normal, or shorted to low source
412	2	1867	Engine Exhaust Gas Recirculation 1 Temperature	Data Erratic, Intermittent or Incorrect	Exhaust Gas Recirculation Temperature - Data erratic, intermittent or incorrect
412	3	2375	Engine Exhaust Gas Recirculation 1 Temperature	Voltage Above Normal, or Shorted to High Source	Exhaust Gas Recirculation 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 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 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 Temperature - Data Valid But Above Normal Operating Range - Moderately Severe Level

J1939 SPN	J1939 FMI	CUMMINS CODE	J1939 SPN DESCRIPTION	J1939 FMI DESCRIPTION	CUMMINS DESCRIPTION
441	3	293	Auxiliary Temperature 1	Voltage Above Normal, or Shorted to High Source	Auxiliary Temperature Sensor Input 1 Circuit - Voltage above normal, or shorted to high source
441	4	294	Auxiliary Temperature 1	Voltage Below Normal, or Shorted to Low Source	Auxiliary Temperature Sensor Input 1 Circuit - Voltage below normal, or shorted to low source
441	14	292	Auxiliary Temperature 1	Special Instructions	Auxiliary Temperature Sensor Input 1 - Special Instructions
442	3	3765	Auxiliary Temperature 2	Voltage Above Normal or Shorted to High Source	Auxiliary Temperature Sensor Input 2 Circuit - Voltage above normal, or shorted to high source
442	4	3766	Auxiliary Temperature 2	Voltage Below Normal or Shorted to Low Source	Auxiliary Temperature Sensor Input 2 Circuit - Voltage below normal, or shorted to low source
521	2	4526	Brake Pedal Position	Data Erratic, Intermittent or Incorrect	Brake Pedal Position - Data erratic, intermittent or incorrect
558	2	431	Accelerator Pedal 1 Low Idle Switch	Data Erratic, Intermittent or Incorrect	Accelerator Pedal or Lever Idle Validation Switch - Data erratic, intermittent or incorrect
558	9	3528	Accelerator Pedal 1 Low Idle Switch	Abnormal Update Rate	Accelerator Pedal or Lever Idle Validation Switch - Abnormal update rate
558	13	432	Accelerator Pedal 1 Low Idle Switch	Out of Calibration	Accelerator Pedal or Lever Idle Validation Switch Circuit - Out of Calibration
558	19	3527	Accelerator Pedal 1 Low Idle Switch	Received Network Data in Error	Accelerator Pedal or Lever Idle Validation Switch - Received Network Data In Error
563	9	3488	Anti-Lock Braking (ABS) Active	Abnormal Update Rate	Anti-Lock Braking (ABS) Controller - Abnormal update rate
563	31	4215	Anti-Lock Braking (ABS) Active	Not Available or Condition Exists	Anti-Lock Braking (ABS) Active - Condition Exists
596	2	3841	Cruise Control Enable Switch	Data Erratic, Intermittent or Incorrect	Cruise Control Enable Switch - Data erratic, intermittent or incorrect
596	7	3839	Cruise Control Enable Switch	Mechanical System not Responding or Out of Adjustment	Cruise Control Enable Switch - Mechanical system not responding or out of adjustment
596	13	3842	Cruise Control Enable Switch	Out of Calibration	Cruise Control Enable Switch - 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
599	2	2721	Cruise Control Set Switch	Data Erratic, Intermittent or Incorrect	Cruise Control Set Switch - Data erratic, intermittent or incorrect
611	2	523	System Diagnostic Code #1	Data Erratic, Intermittent or Incorrect	Auxiliary Intermediate (PTO) Speed Switch Validation - Data erratic, intermittent or incorrect
612	2	115	System Diagnostic Code #2	Data Erratic, Intermittent or Incorrect	Engine Magnetic Speed/Position Lost Both of Two Signals - Data erratic, intermittent or incorrect
625	9	291	Proprietary Datalink	Abnormal Update Rate	Proprietary Datalink Error (OEM/Vehicle Datalink) - Abnormal update rate
626	3	2738	Engine Start Enable Device 1	Voltage Above Normal or Shorted to High Source	Start Enable Device 1 Circuit (Ether Injection) - Voltage above normal, or shorted to high source
626	4	2738	Engine Start Enable Device 1	Voltage Below Normal or Shorted to Low Source	Start Enable Device 1Circuit (Ether Injection) - Voltage below normal, or shorted to low source
626	18	487	Engine Start Enable Device 1	Data Valid but Below Normal Operating Range - Moderately Severe Level	Start Enable Device 1 Canister Empty (Ether Injection) - Data Valid But Below Normal Operating Range

J1939 SPN	J1939 FMI	CUMMINS CODE	J1939 SPN DESCRIPTION	J1939 FMI DESCRIPTION	CUMMINS DESCRIPTION
629	12	111	Controller #1	Bad Intelligent Device or Component	Engine Control Module Critical Internal Failure - 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
629	31	2661	Controller #1	Not Available or Condition Exists	At Least One Unacknowledged Most Severe Fault - Condition Exists
629	31	2662	Controller #1	Not Available or Condition Exists	At Least One Unacknowledged Moderately Severe Fault - Condition Exists
630	12	3697	Engine Control Module Calibration Memory	Bad Intelligent Device or Component	Engine Control Module Calibration Memory - Bad intelligent device or component
633	31	2311	Engine Fuel Actuator 1 Control Command	Not Available or Condition Exists	Electronic Fuel Injection Control Valve Circuit - Condition Exists
639	2	426	J1939 Network #1, Primary Vehicle Network (previously SAE J1939 Data Link)	Data Erratic, Intermittent or Incorrect	J1939 Network #1 - Data erratic, intermittent or incorrect
639	9	285	J1939 Network #1, Primary Vehicle Network (previously SAE J1939 Data Link)	Abnormal Update Rate	SAE J1939 Multiplexing PGN Timeout Error - Abnormal update rate
639	9	427	J1939 Network #1, Primary Vehicle Network (previously SAE J1939 Data Link)	Abnormal Update Rate	SAE J1939 Datalink - Abnormal update rate
639	13	286	J1939 Network #1, Primary Vehicle Network (previously SAE J1939 Data Link)	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	11	2198	Engine Variable Geometry Turbocharger Actuator #1	Root Cause Not Known	VGT Actuator Driver Circuit - Root Cause Not Known
641	12	2634	Engine Variable Geometry Turbocharger Actuator #1	Bad Intelligent Device or Component	VGT Actuator Controller - Bad intelligent device or component
641	13	1898	Engine Variable Geometry Turbocharger Actuator #1	Out of Calibration	VGT Actuator Controller - Out of Calibration
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 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 Command 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

J1939 SPN	J1939 FMI	CUMMINS CODE	J1939 SPN DESCRIPTION	J1939 FMI DESCRIPTION	CUMMINS DESCRIPTION
649	3	5271	Engine Exhaust Back Pressure Regulator Control Circuit	Voltage Above Normal or Shorted to High Source	Engine Exhaust Back Pressure Regulator Control Circuit - Voltage Above Normal, or Shorted to High Source
649	4	5272	Engine Exhaust Back Pressure Regulator Control Circuit	Voltage Below Normal or Shorted to Low Source	Engine Exhaust Back Pressure Regulator Control Circuit - Voltage Below Normal, or Shorted to Low Source
649	5	5273	Engine Exhaust Back Pressure Regulator Control Circuit	Current Below Normal or Open Circuit	Engine Exhaust Back Pressure Regulator Control Circuit - Current Below Normal or Open Circuit
651	5	322	Engine Injector Cylinder #01	Current Below Normal or Open Circuit	Injector Solenoid Driver Cylinder 1 Circuit - Current below normal or open circuit
651	7	1139	Engine Injector Cylinder #01	Mechanical System not Responding or Out of Adjustment	Injector Solenoid Driver Cylinder 1 - Mechanical system not responding or out of adjustment
652	5	331	Engine Injector Cylinder #02	Current Below Normal or Open Circuit	Injector Solenoid Driver Cylinder 2 Circuit - Current below normal or open circuit
652	7	1141	Engine Injector Cylinder #02	Mechanical System not Responding or Out of Adjustment	Injector Solenoid Driver Cylinder 2 - Mechanical system not responding or out of adjustment
653	5	324	Engine Injector Cylinder #03	Current Below Normal or Open Circuit	Injector Solenoid Driver Cylinder 3 Circuit - Current below normal or open circuit
653	7	1142	Engine Injector Cylinder #03	Mechanical System not Responding or Out of Adjustment	Injector Solenoid Driver Cylinder 3 - Mechanical system not responding or out of adjustment
654	5	332	Engine Injector Cylinder #04	Current Below Normal or Open Circuit	Injector Solenoid Driver Cylinder 4 Circuit - Current below normal or open circuit
654	7	1143	Engine Injector Cylinder #04	Mechanical System not Responding or Out of Adjustment	Injector Solenoid Driver Cylinder 4 - Mechanical system not responding or out of adjustment
655	5	323	Engine Injector Cylinder #05	Current Below Normal or Open Circuit	Injector Solenoid Driver Cylinder 5 Circuit - Current below normal or open circuit
655	7	1144	Engine Injector Cylinder #05	Mechanical System not Responding or Out of Adjustment	Injector Solenoid Driver Cylinder 5 - Mechanical system not responding or out of adjustment
656	5	325	Engine Injector Cylinder #06	Current Below Normal or Open Circuit	Injector Solenoid Driver Cylinder 6 Circuit - Current below normal or open circuit
656	7	1145	Engine Injector Cylinder #06	Mechanical System not Responding or Out of Adjustment	Injector Solenoid Driver Cylinder 6 - Mechanical system not responding or out of adjustment
657	5	1548	Engine Injector Cylinder #7	Current Below Normal or Open Circuit	Injector Solenoid Driver Cylinder 7 Circuit - Current below normal or open circuit
658	5	1549	Engine Injector Cylinder #8	Current Below Normal or Open Circuit	Injector Solenoid Driver Cylinder 8 Circuit - Current below normal or open circuit
659	5	1622	Engine Injector Cylinder #9	Current Below Normal or Open Circuit	Injector Solenoid Driver Cylinder 9 Circuit - Current below normal or open circuit
660	5	1551	Engine Injector Cylinder #10	Current Below Normal or Open Circuit	Injector Solenoid Driver Cylinder 10 Circuit - Current below normal or open circuit
661	5	1552	Engine Injector Cylinder #11	Current Below Normal or Open Circuit	Injector Solenoid Driver Cylinder 11 Circuit - Current below normal or open circuit
662	5	1553	Engine Injector Cylinder #12	Current Below Normal or Open Circuit	Injector Solenoid Driver Cylinder 12 Circuit - Current below normal or open circuit
663	5	1554	Engine Injector Cylinder #13	Current Below Normal or Open Circuit	Injector Solenoid Driver Cylinder 13 Circuit - Current below normal or open circuit
664	5	1555	Engine Injector Cylinder #14	Current Below Normal or Open Circuit	Injector Solenoid Driver Cylinder 14 Circuit - Current below normal or open circuit
665	5	1556	Engine Injector Cylinder #15	Current Below Normal or Open Circuit	Injector Solenoid Driver Cylinder 15 Circuit - Current below normal or open circuit
666	5	1557	Engine Injector Cylinder #16	Current Below Normal or Open Circuit	Injector Solenoid Driver Cylinder 16 Circuit - Current below normal or open circuit

J1939 SPN	J1939 FMI	CUMMINS CODE	J1939 SPN DESCRIPTION	J1939 FMI DESCRIPTION	CUMMINS DESCRIPTION
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
677	4	585	Engine Starter Motor Relay	Voltage Below Normal or Shorted to Low Source	Starter Relay Driver Circuit - Voltage below normal, or shorted to low source
697	3	2557	Auxiliary PWM Driver #1	Voltage Above Normal or Shorted to High Source	Auxiliary PWM Driver 1 Circuit - 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 Circuit - Voltage below normal, or shorted to low source
701	14	4734	Auxiliary I/O #01	Special Instructions	Auxiliary Input/Output 1 - Special Instructions
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
702	5	4724	Auxiliary I/O #02	Current Below Normal or Open Circuit	Auxiliary Input/Output 2 Circuit - Current below normal or open circuit
702	6	4725	Auxiliary I/O #02	Current Above Normal or Grounded Circuit	Auxiliary Input/Output 2 Circuit - Current above normal or grounded circuit
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
723	2	778	Engine Speed 2	Data Erratic, Intermittent or Incorrect	Engine Camshaft Speed / Position Sensor - Data erratic, intermittent or incorrect
723	2	2322	Engine Speed 2	Data Erratic, Intermittent or Incorrect	Engine Camshaft Speed / Position Sensor - Data erratic, intermittent or incorrect
723	7	731	Engine Speed 2	Mechanical System not Responding or Out of Adjustment	Engine Speed / Position Camshaft and Crankshaft Misalignment - Mechanical system not responding or out of adjustment
729	3	2555	Engine Intake Air Heater Driver #1	Voltage Above Normal, or Shorted to High Source	Engine 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	Engine Intake Air Heater 1 Circuit - Voltage below normal, or shorted to low source
748	9	3641	Transmission Output Retarder	Abnormal Update Rate	Transmission Output Retarder - Abnormal update rate
862	3	3733	Crankcase breather Heater Ciruit	Voltage Above Normal or Shorted to High Source	Crankcase Breather Filter Heater Circuit - Voltage above normal, or shorted to high source
862	4	3734	Crankcase breather Heater Ciruit	Voltage Below Normal or Shorted to Low Source	Crankcase Breather Filter Heater 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 1 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 1 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 Position Sensor System - Received Network Data In Error
1072	3	2182	Engine (Compression) Brake Output #1	Voltage Above Normal or Shorted to High Source	Engine Brake Actuator Driver 1 Circuit - Voltage above normal, or shorted to high source
1072	4	2183	Engine (Compression) Brake Output #1	Voltage Below Normal or Shorted to Low Source	Engine Brake Actuator Driver 1 Circuit - Voltage below normal, or shorted to low source
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	Electric Lift Pump for Engine Fuel Supply 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	Electric Lift Pump for Engine Fuel Supply Circuit - Voltage below normal, or shorted to low source
J1939 SPN	J1939 FMI	CUMMINS CODE	J1939 SPN DESCRIPTION	J1939 FMI DESCRIPTION	CUMMINS DESCRIPTION
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1081	7	3494	Engine Wait to Start Lamp	Mechanical System not Responding or Out of Adjustment	Engine Wait to Start Lamp - Mechanical system not responding or out of adjustment
1081	9	3555	Engine Wait to Start Lamp	Abnormal Update Rate	Engine Wait to Start Lamp - Abnormal update rate
1081	19	3556	Engine Wait to Start Lamp	Received Network Data in Error	Engine Wait to Start Lamp - Received Network Data In Error
1081	31	4252	Engine Wait to Start Lamp	Not Available or Condition Exists	Engine Wait to Start Lamp - Condition Exists
1109	0	3931	Engine Protection System Approaching Shutdown	Data Valid but Above Normal Operational Range - Most Severe Level	Engine Protection System Approaching Shutdown - Data valid but above normal operational range - Most
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 - Volt- age below normal, or shorted to low source
1127	7	3683	Engine Turbocharger 1 Boost Pressure	Mechanical System not Responding or Out of Adjustment	Engine Turbocharger 1 Boost Pressure - Mechanical system not responding or out of adjustment
1136	2	699	Engine ECU Temperature	Data Erratic, Intermittent or Incorrect	Engine ECU Temperature - Data erratic, intermittent or incorrect
1136	3	697	Engine ECU Temperature	Voltage Above Normal, or Shorted to High Source	Engine ECU 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	Engine ECU Temperature Sensor Circuit - Voltage below normal, or shorted to low source
1172	2	693	Engine Turbocharger 1 Compressor Intake Temperature	Data Erratic, Intermittent or Incorrect	Turbocharger 1 Compressor Intake Temperature - Data erratic, intermittent or incorrect
1172	3	691	Engine Turbocharger 1 Compressor Intake Temperature	Voltage Above Normal, or Shorted to High Source	Turbocharger 1 Compressor Intake Temperature Circuit - Voltage above normal, or shorted to high source
1172	4	692	Engine Turbocharger 1 Compressor Intake Temperature	Voltage Below Normal or Shorted to Low Source	Turbocharger 1 Compressor Intake Temperature Circuit - Voltage below normal, or shorted to low source
1172	9	3369	Engine Turbocharger 1 Compressor Intake Temperature	Abnormal Update Rate	Turbocharger 1 Compressor Intake Temperature Sensor - Abnormal update rate
1172	19	3371	Engine Turbocharger 1 Compressor Intake Temperature	Received Network Data in Error	Turbocharger 1 Compressor Intake Temperature Sensor - Received Network Data In Error
1176	1	3348	Engine Turbocharger 1 Compressor Intake Pressure	Data Valid but Below Normal Operational Range - Most Severe Level	Turbocharger 1 Compressor Intake Pressure - Data valid but below normal operational range - Most Severe Level
1176	2	743	Engine Turbocharger 1 Compressor Intake Pressure	Data Erratic, Intermittent or Incorrect	Turbocharger 1 Compressor Intake Pressure - Data erratic, intermittent or incorrect
1176	3	741	Engine Turbocharger 1 Compressor Intake Pressure	Voltage Above Normal or Shorted to High Source	Turbocharger 1 Co mpressor Intake Pressure Circuit - Voltage above normal, or shorted to high source
1176	4	742	Engine Turbocharger 1 Compressor Intake Pressure	Voltage Below Normal or Shorted to Low Source	Turbocharger 1 Compressor Intake Pressure Circuit - Voltage below normal, or shorted to low source
1176	9	3372	Engine Turbocharger 1 Compressor Intake Pressure	Abnormal Update Rate	Turbocharger 1 Compressor Intake Pressure - Abnormal update rate
1176	18	629	Engine Turbocharger 1 Compressor Intake Pressure	Data Valid but Below Normal Operating Range - Moderately Severe Level	Turbocharger 1 Compressor Intake Pressure - Data Valid But Below Normal Operating Range - Moderately
1176	19	3373	Engine Turbocharger 1 Compressor Intake Pressure	Received Network Data in Error	Turbocharger 1 Compressor Intake Pressure - Received Network Data In Error
1194	13	3298	Anti-theft Encryption Seed Present Indicator	Out of Calibration	Anti-theft Encryption Seed - Out of Calibration

J1939 SPN	J1939 FMI	CUMMINS CODE	J1939 SPN DESCRIPTION	J1939 FMI DESCRIPTION	CUMMINS DESCRIPTION
1195	2	269	Anti-theft Password Valid Indicator	Data Erratic, Intermittent or Incorrect	Antitheft Password Valid Indicator - Data erratic, intermittent or incorrect
1209	2	2554	Engine Exhaust Gas Pressure 1	Data Erratic, Intermittent or Incorrect	Exhaust Gas Pressure 1 - Data erratic, intermittent or incorrect
1209	3	2373	Engine Exhaust Gas Pressure 1	Voltage Above Normal, or Shorted to High Source	Exhaust Gas Pressure Sensor 1 Circuit - Voltage above normal, or shorted to high source
1209	4	2374	Engine Exhaust Gas Pressure 1	Voltage Below Normal, or Shorted to Low Source	Exhaust Gas Pressure Sensor 1 Circuit - Voltage below normal, or shorted to low source
1209	16	2764	Engine Exhaust Gas Pressure 1	Data Valid but Above Normal Operating Range - Moderately Severe Level	Exhaust Gas Pressure 1 - Data Valid But Above Normal Operating Range - Moderately Severe Level
1213	9	3535	Malfunction Indicator Lamp	Abnormal Update Rate	Malfunction Indicator Lamp - Abnormal update rate
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
1239	16	4726	Engine Fuel Leakage 1	Data Valid but Above Normal Operating Range - Moderately Severe Level	Engine Fuel Leakage - Data Valid But Above Normal Operating Range - Moderately Severe Level
1347	3	272	Engine Fuel Pump Pressurizing Assembly #1	Voltage Above Normal, or Shorted to High Source	Idle Shutdown Vehicle Accessories Relay Driver Circuit - Voltage above normal, or shorted to high source
1267	3	338	Idle Shutdown Vehicle Accessories Relay Driver Circuit	Voltage Above Normal or Shorted to High Source	Idle Shutdown Vehicle Accessories Relay Driver Circuit - Voltage below normal, or shorted to low source
1322	31	1718	Engine Misfire for Multiple Cylinders	Not Available or Condition Exists	Engine Misfire for Multiple Cylinders - Condition Exists
1323	31	1654	Engine Misfire Cylinder #1	Not Available or Condition Exists	Engine Misfire Cylinder 1 - Condition Exists
1324	31	1655	Engine Misfire Cylinder #2	Not Available or Condition Exists	Engine Misfire Cylinder 2 - Condition Exists
1325	31	1656	Engine Misfire Cylinder #3	Not Available or Condition Exists	Engine Misfire Cylinder 3 - Condition Exists
1326	31	1657	Engine Misfire Cylinder #4	Not Available or Condition Exists	Engine Misfire Cylinder 4 - Condition Exists
1327	31	1658	Engine Misfire Cylinder #5	Not Available or Condition Exists	Engine Misfire Cylinder 5 - Condition Exists
1328	31	1659	Engine Misfire Cylinder #6	Not Available or Condition Exists	Engine Misfire Cylinder 6 - Condition Exists
1347	3	272	Engine Fuel Pump Pressurizing Assembly #2	Voltage Above Normal or Shorted to High Source	Engine Fuel Pump Pressurizing Assembly 1 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	Engine Fuel Pump Pressurizing Assembly 1 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	Engine Fuel Pump Pressurizing Assembly 1 - Mechanical system not responding or out of adjustment
1349	3	483	Engine Injector Metering Rail 2 Pressure	Voltage Above Normal or Shorted to High Source	Injector Metering Rail 2 Pressure Sensor Circuit - Voltage above normal, or shorted to high source
1349	4	484	Engine Injector Metering Rail 2 Pressure	Voltage Below Normal or Shorted to Low Source	Injector Metering Rail 2 Pressure Sensor Circuit - Voltage below normal, or shorted to low source
1377	2	497	Engine Synchronization Switch	Data Erratic, Intermittent or Incorrect	Multiple Unit Synchronization Switch - Data erratic, intermittent or incorrect
1378	31	649	Engine Oil Change Interval	Not Available or Condition Exists	Engine Oil Change Interval - Condition Exists

J1939 SPN	J1939 FMI	CUMMINS CODE	J1939 SPN DESCRIPTION	J1939 FMI DESCRIPTION	CUMMINS DESCRIPTION
1383	31	611	Engine was Shut Down Hot	Not Available or Condition Exists	Engine Shut Down Hot - Condition Exists
1387	3	1539	Auxiliary Pressure #1	Voltage Above Normal or Shorted to High Source	Auxiliary Pressure Sensor Input 1 Circuit - Voltage above normal, or shorted to high source
1387	4	1621	Auxiliary Pressure #1	Voltage Below Normal or Shorted to Low Source	Auxiliary Pressure Sensor Input 1 Circuit - Voltage below normal, or shorted to low source
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 2 - Special Instructions
1563	2	1256	Incompatible Monitor/ Controller	Data Erratic, Intermittent or Incorrect	Control Module Identification Input State Error - Data erratic, intermittent or incorrect
1563	2	1257	Incompatible Monitor/ Controller	Data Erratic, Intermittent or Incorrect	Control Module Identification Input State Error - Data erratic, intermittent or incorrect
1569	31	3714	Engine Protection Torque Derate	Not Available or Condition Exists	Engine Protection Torque Derate - Condition Exists
1590	2	784	Adaptive Cruise Control Mode	Data Erratic, Intermittent or Incorrect	Adaptive Cruise Control Mode - Data erratic, intermittent or incorrect
1623	9	3186	Tachograph Output Shaft Speed	Abnormal Update Rate	Tachograph Output Shaft Speed - Abnormal update rate
1623	13	5248	Tachograph Output Shaft Speed	Out of Calibration	Tachograph Output Shaft Speed - Out of Calibration
1623	19	3213	Tachograph Output Shaft Speed	Received Network Data in Error	Tachograph Output Shaft Speed - Received Network Data In Error
1632	14	2998	Engine Torque Limit Feature	Special Instructions	Engine Torque Limit Feature - Special Instructions
1632	31	5193	Engine Torque Limit Feature	Not Available or Condition Exists	Engine Torque Limit Feature - Condition Exists
1639	0	4789	Fan Speed	Data Valid but Above Normal Operational Range - Most Severe Level	Fan Speed - Data Valid but Above Normal Operational Range - Most Severe Level
1639	1	4791	Fan Speed	Data Valid but Below Normal Operational Range - Most Severe Level	Fan Speed - Data Valid but Below Normal Operational Range - Most Severe Level
1668	2	4437	J1939 Network #4 - Data erratic	Data Erratic, Intermittent or Incorrect	J1939 Network #4 - Data erratic, intermittent or incorrect
1675	31	3737	Engine Starter Mode	Not Available or Condition Exists	Engine Starter Mode Overcrank Protection - Condition Exists
1761	1	1673	Aftertreatment 1 Diesel Exhaust Fluid Tank Level	Data Valid but Below Normal Operational Range - Most Severe Level	Aftertreatment 1 Diesel Exhaust Fluid Tank Level - Data valid but below normal operational range -Most Severe Level
1761	2	1699	Aftertreatment 1 Diesel Exhaust Fluid Tank Level	Data Erratic, Intermittent or Incorrect	Aftertreatment 1 Diesel Exhaust Fluid Tank Level Sensor - Data erratic, intermittent or incorrect
1761	3	1669	Aftertreatment 1 Diesel Exhaust Fluid Tank Level	Voltage Above Normal or Shorted to High Source	Aftertreatment 1 Diesel Exhaust Fluid Tank Level Sensor Circuit - Voltage above normal, or shorted to high source
1761	4	1668	Aftertreatment 1 Diesel Exhaust Fluid Tank Level	Voltage Below Normal or Shorted to Low Source	Aftertreatment 1 Diesel Exhaust Fluid Tank Level Sensor Circuit - Voltage below normal, or shorted to low source
1761	5	4679	Aftertreatment 1 Diesel Exhaust Fluid Tank Level	Current Below Normal or Open Circuit	Aftertreatment 1 Diesel Exhaust Fluid Tank Level Sensor Circuit - Current below normal or open circuit
1761	6	4738	Aftertreatment 1 Diesel Exhaust Fluid Tank Level	Current Above Normal or Grounded Circuit	Aftertreatment 1 Diesel Exhaust Fluid Tank Level Sensor Circuit - Current above normal or grounded circuit

J1939 SPN	J1939 FMI	CUMMINS CODE	J1939 SPN DESCRIPTION	J1939 FMI DESCRIPTION	CUMMINS DESCRIPTION
1761	10	4769	Aftertreatment 1 Diesel Exhaust Fluid Tank Level	Abnormal Rate of Change	Aftertreatment 1 Diesel Exhaust Fluid Tank Level Sensor - Abnormal Rate of Change
1761	11	4739	Aftertreatment 1 Diesel Exhaust Fluid Tank Level	Root Cause Not Known	Aftertreatment 1 Diesel Exhaust Fluid Tank Level Sensor - Root Cause Not Known
1761	13	4732	Aftertreatment 1 Diesel Exhaust Fluid Tank Temperature	Out of Calibration	Aftertreatment 1 Diesel Exhaust Fluid Tank Level Sensor - Out of Calibration
1761	17	3497	Aftertreatment 1 Diesel Exhaust Fluid Tank Level	Data Valid but Below Normal Operating Range - Least Severe Level	Aftertreatment 1 Diesel Exhaust Fluid Tank Level - Data Valid But Below Normal Operating Range - Least Severe Level
1761	18	3498	Aftertreatment 1 Diesel Exhaust Fluid Tank Level	Data Valid but Below Normal Operating Range - Moderately Severe Level	Aftertreatment 1 Diesel Exhaust Fluid Tank Level - Data Valid But Below Normal Operating Range - Moderately Severe Level
1800	16	2263	Battery 1 Temperature	Data Valid but Above Normal Operating Range - Moderately Severe Level	Battery Temperature - Data Valid But Above Normal Operating Range - Moderately Severe Level
1800	18	2264	Battery 1 Temperature	Data Valid but Below Normal Operating Range - Moderately Severe Level	Battery Temperature - Data Va lid But Below Normal Operating Range - Moderately Severe Level
1818	31	3374	ROP Brake Control active	Not Available or Condition Exists	Roll Over Protection Brake Control Active - Condition Exists
2006	9	5133	Source Address 6	Abnormal Update Rate	Source Address 6 - Abnormal Update Rate
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
2629	15	2347	Engine Turbocharger 1 Compressor Outlet Temperature	Data Valid but Above Normal Operating Range - Least Severe Level	Turbocharger Compressor Outlet Temperature (Calculated) - Data Valid But Above Normal Operating Range
2630	2	3478	Engine Charge Air Cooler 1 Outlet Temperature	Data Erratic, Intermittent or Incorrect	Engine Charge Air Cooler Outlet Temperature - Data erratic, intermittent or incorrect
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
2633	7	3616	Engine Variable Geometry Turbocharger (VGT) 1 Nozzle Position	Mechanical System not Responding or Out of Adjustment	Engine VGT Nozzle Position - Mechanical system not responding or out of adjustment
2634	3	1776	Power Relay	Voltage Above Normal or Shorted to High Source	Power Relay Driver Circuit - Voltage above normal, or shorted to high source
2634	4	1777	Power Relay	Voltage Below Normal or Shorted to Low Source	Power Relay Driver Circuit - 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 Intake Temperature - Data Valid But Above Normal Operating Range - Least Severe

J1939 SPN	J1939 FMI	CUMMINS CODE	J1939 SPN DESCRIPTION	J1939 FMI DESCRIPTION	CUMMINS DESCRIPTION
2789	16	2451	Engine Turbocharger 1 Calculated Turbine Intake Temperature	Data Valid but Above Normal Operating Range - Moderately Severe Level	Turbocharger Turbine Intake Temperature - Data Valid But Above Normal Operating Range - Moderately Severe Level
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	9	1893	Engine Exhaust Gas Recirculation 1 (EGR1) Valve Control	Abnormal Update Rate	EGR Valve Control Circuit - Abnormal update rate
2791	13	1896	Engine Exhaust Gas Recirculation 1 (EGR1) Valve Control	Out of Calibration	EGR Valve Controller - Out of Calibration
2791	15	1961	Engine Exhaust Gas Recirculation 1 (EGR1) Valve Control	Data Valid but Above Normal Operating Range - Least Severe Level	EGR Valve Control Circuit Over Temperature - Data Valid But Above Normal Operating Range - Least Severe Level
2797	13	2765	Engine Injector Group 1	Out of Calibration	Engine Injector Bank 1 Barcodes - Out of Calibration
2884	9	3735	Engine Auxillary Governor Switch	Abnormal Update Rate	Engine Auxiliary Governor Switch - Abnormal update rate
2978	9	3838	Estimated Engine Parasitic Losses - Percent Torque	Abnormal Update Rate	Estimated Engine Parasitic Losses - Percent Torque - Abnormal update rate
3031	2	1679	Aftertreatment 1 Diesel Exhaust Fluid Tank Temperature	Data Erratic, Intermittent or Incorrect	Aftertreatment 1 Diesel Exhaust Fluid Tank Temperature - Data erratic, intermittent or incorrect
3031	3	1678	Aftertreatment 1 Diesel Exhaust Fluid Tank Temperature	Voltage Above Normal or Shorted to High Source	Aftertreatment 1 Diesel Exhaust Fluid Tank Temperature Sensor - Voltage above normal, or shorted to high source
3031	4	1677	Aftertreatment 1 Diesel Exhaust Fluid Tank Temperature	Voltage Below Normal or Shorted to Low Source	Aftertreatment 1 Diesel Exhaust Fluid Tank Temperature Sensor - Voltage below normal, or shorted to low source
3031	5	4682	Aftertreatment 1 Diesel Exhaust Fluid Tank Temperature	Current Below Normal or Open Circuit	Aftertreatment 1 Diesel Exhaust Fluid Tank Temperature Sensor Circuit - Current below normal or open circuit
3031	6	4736	Aftertreatment 1 Diesel Exhaust Fluid Tank Temperature	Current Above Normal or Grounded Circuit	Aftertreatment 1 Diesel Exhaust Fluid Tank Temperature Sensor Circuit - Current above normal or grounded circuit
3031	9	4572	Aftertreatment 1 Diesel Exhaust Fluid Tank Temperature	Abnormal Update Rate	Aftertreatment 1 Diesel Exhaust Fluid Tank Temperature - Abnormal Update Rate
3031	11	4737	Aftertreatment 1 Diesel Exhaust Fluid Tank Temperature	Root Cause Not Known	Aftertreatment 1 Diesel Exhaust Fluid Tank Temperature - Root Cause Not Known
3031	13	4731	Aftertreatment 1 Diesel Exhaust Fluid Tank Temperature	Out of Calibration	Aftertreatment 1 Diesel Exhaust Fluid Tank Temperature Sensor - Out of Calibration
3060	18	3243	Engine Cooling System Monitor	Data Valid but Below Normal Operating Range - Moderately Severe Level	Engine Cooling System Monitor - Data Valid But Below Normal Operating Range - Moderately Severe Level
3216	2	3228	Aftertreatment 1 Intake NOx	Data Erratic, Intermittent or Incorrect	Aftertreatment 1 Intake NOx Sensor - Data erratic, intermittent or incorrect
3216	4	1885	Aftertreatment 1 Intake NOx	Voltage Below Normal or Shorted to Low Source	Aftertreatment 1 Intake NOx Sensor Circuit - Voltage below normal, or shorted to low source
3216	9	3232	Aftertreatment 1 Intake NOx	Abnormal Update Rate	Aftertreatment 1 Intake NOx Sensor - Abnormal update rate

J1939 SPN	J1939 FMI	CUMMINS CODE	J1939 SPN DESCRIPTION	J1939 FMI DESCRIPTION	CUMMINS DESCRIPTION
3216	10	3725	Aftertreatment 1 Intake NOx	Abnormal Rate of Change	Aftertreatment 1 Intake NOx Sensor - Abnormal rate of change
3216	13	3718	Aftertreatment 1 Intake NOx	Out of Calibration	Aftertreatment 1 Intake NOx - Out of Calibration
3216	16	3726	Aftertreatment 1 Intake NOx	Data Valid but Above Normal Operating Range - Moderately Severe Level	Aftertreatment 1 Intake NOx - Data Valid But Above Normal Operating Range - Moderately Severe Level
3216	20	3748	Aftertreatment 1 Intake NOx	Data not Rational - Drifted High	Aftertreatment 1 Intake NOx Sensor - Data not Rational - Drifted High
3217	2	1861	Aftertreatment 1 Intake O2	Data Erratic, Intermittent or Incorrect	Aftertreatment Intake Oxygen S ensor - Data erratic, intermittent or incorrect
3218	2	3682	Aftertreatment 1 Intake Gas Sensor Power Status	Data Erratic, Intermittent or Incorrect	Aftertreatment 1 Intake NOx Sensor Power Supply - Data erratic, intermittent or incorrect
3226	2	1694	Aftertreatment 1 Outlet NOx	Data Erratic, Intermittent or Incorrect	Aftertreatment 1 Outlet NOx Sensor - Data erratic, intermittent or incorrect
3226	4	1887	Aftertreatment 1 Outlet NOx	Voltage Below Normal or Shorted to Low Source	Aftertreatment 1 Outlet NOx Sensor Circuit - Voltage below normal, or shorted to low source
3226	9	2771	Aftertreatment 1 Outlet NOx	Abnormal Update Rate	Aftertreatment 1 Outlet NOx Sensor - Abnormal update rate
3226	10	3545	Aftertreatment 1 Outlet NOx	Abnormal Rate of Change	Aftertreatment 1 Outlet NOx Sensor - Abnormal rate of change
3226	13	3717	Aftertreatment 1 Outlet NOx	Out of Calibration	Aftertreatment 1 Outlet NOx Sensor - Out of Calibration
3226	20	3749	Aftertreatment 1 Outlet NOx	Data not Rational - Drifted High	Aftertreatment 1 Outlet NOx Sensor - Data not Rational - Drifted High
3227	9	2683	Aftertreatment 1 Outlet O2	Abnormal Update Rate	Aftertreatment Outlet Oxygen Sensor Circuit - Abnormal update rate
3228	2	3681	Aftertreatment 1 Outlet Gas Sensor Power Status	Data Erratic, Intermittent or Incorrect	Aftertreatment 1 Outlet NOx Sensor Power Supply - Data erratic, intermittent or incorrect
3242	0	3311	Aftertreatment 1 Diesel Particulate Filter Intake Gas Temperature	Data Valid but Above Normal Operational Range - Most Severe Level	Aftertreatment 1 Diesel Particulate Filter Intake Temperature - Data valid but above normal operation
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
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
3246	0	3312	Aftertreatment 1 Diesel Particulate Filter Outlet Gas Temperature	Data Valid but Above Normal Operational Range - Most Severe Level	Aftertreatment 1 Diesel Particulate Filter Outlet Temperature - Data valid but above normal operation
3246	2	3322	Aftertreatment 1 Diesel Particulate Filter Outlet Gas Temperature	Data Erratic, Intermittent or Incorrect	Aftertreatment 1 Diesel Particulate Filter Outlet Temperature - Data erratic, intermittent or incorrect
3246	3	3319	Aftertreatment 1 Diesel Particulate Filter Outlet Gas Temperature	Voltage Above Normal or Shorted to High Source	Aftertreatment 1 Diesel Particulate Filter Outlet Temperature Sensor Circuit - Voltage above normal, or shorted to high source
3246	4	3321	Aftertreatment 1 Diesel Particulate Filter Outlet Gas Temperature	Voltage Below Normal or Shorted to Low Source	Aftertreatment 1 Diesel Particulate Filter Outlet Temperature Sensor Circuit - Voltage below normal, or shorted to low source

J1939 SPN	J1939 FMI	CUMMINS CODE	J1939 SPN DESCRIPTION	J1939 FMI DESCRIPTION	CUMMINS DESCRIPTION
3246	15	3256	Aftertreatment 1 Diesel Particulate Filter Outlet Gas Temperature	Data Valid but Above Normal Operating Range - Least Severe Level	Aftertreatment 1 Diesel Particulate Filter Outlet Temperature - Data Valid But Above Normal Operating Range
3246	16	3255	Aftertreatment 1 Diesel Particulate Filter Outlet Gas Temperature	Data Valid but Above Normal Operating Range - Moderately Severe Level	Aftertreatment 1 Diesel Particulate Filter Outlet Temperature - Data Valid But Above Normal Operating Range
3249	17	2742	Aftertreatment 1 Exhaust Gas	Data Valid but Below Normal	Aftertreatment Exhaust Gas Temperature 2 - Data
				Operating Range - Least Severe	Valid But Below Normal Operating Range - Least
0040	10	0740			Severe Level
3249	18	2743	Temperature 2	Operating Range - Moderately Severe Level	Atterfreatment 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 Diesel Particulate Filter Differential Pressure - Data valid but above normal Operating Range
3251	2	1883	Aftertreatment 1 Diesel Particulate Filter Differential Pressure	Data Erratic, Intermittent or Incorrect	Aftertreatment Diesel 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 Diesel Particulate Filter Differential Pressure Sensor Circuit - Voltage above normal
3251	4	1881	Aftertreatment 1 Diesel Particulate Filter Differential Pressure	Voltage Below Normal or Shorted to Low Source	Aftertreatment Diesel Particulate Filter Differential Pressure Sensor Circuit - Voltage below normal
3251	15	2639	Aftertreatment 1 Diesel Particulate Filter Differential Pressure	Data Valid but Above Normal Operating Range - Least Severe Level	Aftertreatment Diesel Particulate Filter Differential Pressure - Data valid but above normal Operating Range
3251	16	1921	Aftertreatment 1 Diesel Particulate Filter Differential Pressure	Data Valid but Above Normal Operating Range - Moderately Severe Level	Aftertreatment Diesel Particulate Filter Differential Pressure - Data Valid But Above Normal Operating Range
3255	9	4145	Aftertreatment 2 Intake NOx	Abnormal Update Rate	Aftertreatment 2 Intake Nox Sensor - Abnormal update rate
3265	9	3988	Aftertreatment 2 Intake NOx	Abnormal Update Rate	Aftertreatment 2 Outlet NOx - Abnormal Update Rate
3353	3	4953	Alternator 1 Status	Voltage Above Normal or Shorted to High Source	Alternator 1 Status - Voltage Above Normal, or Shorted to High Source
3353	4	4954	Alternator 1 Status	Voltage Below Normal or Shorted to Low Source	Alternator 1 Status - Voltage Below Normal, or Shorted to Low Source
3361	2	2976	Aftertreatment 1 Diesel Exhaust Fluid Dosing Unit	Data Erratic, Intermittent or Incorrect	Aftertreatment 1 Diesel Exhaust Fluid Dosing Unit Temperature - Data erratic, intermittent or incorrect
3361	3	3558	Aftertreatment 1 Diesel Exhaust Fluid Dosing Unit	Voltage Above Normal or Shorted to High Source	Aftertreatment 1 Diesel Exhaust Fluid Dosing Unit - Voltage above normal, or shorted to high source
3361	4	3559	Aftertreatment 1 Diesel Exhaust Fluid Dosing Unit	Voltage Below Normal or Shorted to Low Source	Aftertreatment 1 Diesel Exhaust Fluid Dosing Unit - Voltage below normal, or shorted to low source
3362	31	1682	Aftertreatment 1 Diesel Exhaust Fluid Dosing Unit Input Lines	Not Available or Condition Exists	Aftertreatment 1 Diesel Exhaust Fluid Dosing Unit Input Lines - Condition Exists
3363	3	1683	Aftertreatment 1 Diesel Exhaust Fluid Tank 1 Heater	Voltage Above Normal or Shorted to High Source	Aftertreatment 1 Diesel Exhaust Fluid Tank Heater - Voltage above normal, or shorted to high source
3363	4	1684	Aftertreatment 1 Diesel Exhaust Fluid Tank 1 Heater	Voltage Below Normal or Shorted to Low Source	Aftertreatment 1 Diesel Exhaust Fluid Tank Heater - Voltage below normal, or shorted to low source
3363	7	3242	Aftertreatment 1 Diesel Exhaust Fluid Tank 1 Heater	Mechanical System not Responding or Out of Adjustment	Aftertreatment 1 Diesel Exhaust Fluid Tank Heater - Mechanical system not responding or out of adjustment

J1939 SPN	J1939 FMI	CUMMINS CODE	J1939 SPN DESCRIPTION	J1939 FMI DESCRIPTION	CUMMINS DESCRIPTION
3363	16	1713	Aftertreatment 1 Diesel Exhaust Fluid Tank 1 Heater	Data Valid but Above Normal Operating Range - Moderately Severe Level	Aftertreatment 1 Diesel Exhaust Fluid Tank Heater - Data Valid But Above Normal Operating Range - Moderately Severe Level
3363	18	1712	Aftertreatment 1 Diesel Exhaust Fluid Tank 1 Heater	Data Valid but Below Normal Operating Range - Moderately Severe Level	Aftertreatment 1 Diesel Exhaust Fluid Tank Heater - Data Valid But Below Normal Operating Range - Moderately Severe Level
3364	1	3866	Aftertreatment 1 Diesel Exhaust Fluid Tank 1 Quality	Data Valid but Below Normal Operational Range - Most Severe Level	Aftertreatment Diesel Exhaust Fluid Quality - Data valid but below normal operational range - Most Severe Level
3364	2	3878	Aftertreatment 1 Diesel Exhaust Fluid Tank 1 Quality	Data Erratic, Intermittent or Incorrect	Aftertreatment Diesel Exhaust Fluid Quality - Data erratic, intermittent or incorrect
3364	3	1686	Aftertreatment 1 Diesel Exhaust Fluid Tank 1 Quality	Voltage Above Normal or Shorted to High Source	Aftertreatment Diesel Exhaust Fluid Quality Sensor Circuit - Voltage above normal, or shorted to high source
3364	4	1685	Aftertreatment 1 Diesel Exhaust Fluid Tank 1 Quality	Voltage Below Normal or Shorted to Low Source	Aftertreatment Diesel Exhaust Fluid Quality Sensor Circuit - Voltage below normal, or shorted to low source
3364	5	4741	Aftertreatment 1 Diesel Exhaust Fluid Tank 1 Quality	Current Below Normal or Open Circuit	Aftertreatment Diesel Exhaust Fluid Quality Sensor Circuit - Current below normal or open circuit
3364	6	4742	Aftertreatment 1 Diesel Exhaust Fluid Tank 1 Quality	Current Above Normal or Grounded Circuit	Aftertreatment Diesel Exhaust Fluid Quality Sensor Circuit - Current above normal or grounded circuit
3364	7	3876	Aftertreatment 1 Diesel Exhaust Fluid Tank 1 Quality	Mechanical System not Responding or Out of Adjustment	Aftertreatment Diesel Exhaust Fluid Quality Sensor - Mechanical system not responding or out of adjustment
3364	9	3868	Aftertreatment 1 Diesel Exhaust Fluid Tank 1 Quality	Abnormal Update Rate	Aftertreatment Diesel Exhaust Fluid Quality - Abnormal update rate
3364	10	4277	Aftertreatment 1 Diesel Exhaust Fluid Tank 1 Quality	Abnormal Rate of Change	Aftertreatment Diesel Exhaust Fluid Quality - Abnormal Rate of Change
3364	11	1715	Aftertreatment 1 Diesel Exhaust Fluid Tank 1 Quality	Root Cause Not Known	Aftertreatment Diesel Exhaust Fluid Quality - Root Cause Not Known
3364	12	3877	Aftertreatment 1 Diesel Exhaust Fluid Tank 1 Quality	Bad Intelligent Device or Component	Aftertreatment Diesel Exhaust Fluid Quality Sensor - Bad intelligent device or component
3364	13	1714	Aftertreatment 1 Diesel Exhaust Fluid Tank 1 Quality	Out of Calibration	Aftertreatment Diesel Exhaust Fluid Quality - Out of Calibration
3364	15	4842	Aftertreatment Diesel Exhaust Fluid Quality	Data Valid but Above Normal Operating Range - Least Severe Level	Aftertreatment Diesel Exhaust Fluid Quality - Data Valid But Above Normal Operating Range - Least Severe Level
3364	18	3867	Aftertreatment 1 Diesel Exhaust Fluid Tank 1 Quality	Data Valid but Below Normal Operating Range - Moderately Severe Level	Aftertreatment Diesel Exhaust Fluid Quality - Data Valid But Below Normal Operating Range - Moderate Severe Level
3364	19	4241	Aftertreatment 1 Diesel Exhaust Fluid Tank 1 Quality	Received Network Data in Error	Aftertreatment Diesel Exhaust Fluid Quality - Received Network Data In Error
3480	2	1926	Aftertreatment Fuel Pressure	Data Erratic, Intermittent or Incorrect	Aftertreatment Fuel Pressure Sensor - Data erratic, intermittent or incorrect
3480	3	1927	Aftertreatment Fuel Pressure	Voltage Above Normal or Shorted to High Source	Aftertreatment Fuel Pressure Sensor Circuit - Voltage above normal, or shorted to high source
3480	4	1928	Aftertreatment Fuel Pressure	Voltage Below Normal or Shorted to Low Source	Aftertreatment Fuel Pressure Sensor Circuit - Voltage below normal, or shorted to low source
3480	17	2881	Aftertreatment Fuel Pressure	Data Valid but Below Normal Operating Range - Least Severe Level	Aftertreatment Fuel Pressure Sensor - Data Valid But Below Normal Operating Range - Least 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

J1939 SPN	J1939 FMI	CUMMINS CODE	J1939 SPN DESCRIPTION	J1939 FMI DESCRIPTION	CUMMINS DESCRIPTION
3482	2	1925	Aftertreatment 1 Fuel Enable Actuator	Data Erratic, Intermittent or Incorrect	Aftertreatment Fuel Shutoff Valve - Data erratic, intermittent or incorrect
3482	3	1923	Aftertreatment 1 Fuel Enable Actuator	Voltage Above Normal or Shorted to High Source	Aftertreatment Fuel Shutoff Valve Circuit - Voltage above normal, or shorted to high source
3482	4	1924	Aftertreatment 1 Fuel Enable Actuator	Voltage Below Normal or Shorted to Low Source	Aftertreatment Fuel Shutoff Valve Circuit - Voltage below normal, or shorted to low source
3482	7	1963	Aftertreatment 1 Fuel Enable Actuator	Mechanical System not Responding or Out of Adjustment	Aftertreatment Fuel Shutoff Valve - Mechanical system not responding or out of adjustment
3482	13	2741	Aftertreatment 1 Fuel Enable Actuator	Out of Calibration	Aftertreatment Fuel Shutoff Valve Swapped - Out of Calibration
3482	16	4568	Aftertreatment 1 Fuel Enable Actuator	Data Valid but Above Normal Operating Range - Moderately Severe Level	Aftertreatment Fuel Shutoff Valve - Data Valid But Above Normal Operating Range - Moderately Severe
3490	3	3224	Aftertreatment 1 Purge Air Actuator	Voltage Above Normal or Shorted to High Source	Aftertreatment Purge Air Actuator Circuit - Voltage above normal, or shorted to high source
3490	4	3223	Aftertreatment 1 Purge Air Actuator	Voltage Below Normal or Shorted to Low Source	Aftertreatment Purge Air Actuator Circuit - Voltage below normal, or shorted to low source
3490	7	3225	Aftertreatment 1 Purge Air Actuator	Mechanical System not Responding or Out of Adjustment	Aftertreatment Purge Air Actuator - Mechanical system not responding or out of adjustment
3509	3	386	Sensor supply voltage 1	Voltage Above Normal or Shorted to High Source	Sensor Supply 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 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 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 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 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 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
3512	4	2186	Sensor supply voltage 4	Voltage Below Normal or Shorted to Low Source	Sensor Supply 4 Circuit - Voltage below normal, or shorted to low source
3513	3	1695	Sensor supply voltage 5	Voltage Above Normal or Shorted to High Source	Sensor Supply 5 - Voltage above normal, or shorted to high source
3513	4	1696	Sensor supply voltage 5	Voltage Below Normal or Shorted to Low Source	Sensor Supply 5 - Voltage below normal, or shorted to low source
3514	3	515	Sensor supply voltage 6	Voltage Above Normal, or Shorted to High Source	Sensor Supply 6 Circuit - Voltage above normal, or shorted to high source
3514	4	516	Sensor supply voltage 6	Voltage Below Normal, or Shorted to Low Source	Sensor Supply 6 Circuit - Voltage below normal, or shorted to low source
3515	2	4242	Aftertreatment 1 Diesel Exhaust Fluid Temperature 2	Data Erratic, Intermittent or Incorrect	Aftertreatment 1 Diesel Exhaust Fluid Temperature 2 - Data erratic, intermittent or incorrect
3515	3	4233	Aftertreatment 1 Diesel Exhaust Fluid Temperature 2	Voltage Above Normal or Shorted to High Source	Aftertreatment 1 Diesel Exhaust Fluid Temperature 2 Sensor Circuit - Voltage above normal, or shorted to high source
3515	4	4234	Aftertreatment 1 Diesel Exhaust Fluid Temperature 2	Voltage Below Normal or Shorted to Low Source	Aftertreatment 1 Diesel Exhaust Fluid Temperature 2 Sensor Circuit - Voltage below normal, or shorted to low source
3515	5	4743	Aftertreatment 1 Diesel Exhaust Fluid Temperature 2	Current Below Normal or Open Circuit	Aftertreatment 1 Diesel Exhaust Fluid Temperature 2 Sensor Circuit - Current below normal or open circuit

J1939 SPN	J1939 FMI	CUMMINS CODE	J1939 SPN DESCRIPTION	J1939 FMI DESCRIPTION	CUMMINS DESCRIPTION
3515	6	4744	Aftertreatment 1 Diesel Exhaust Fluid Temperature 2	Current Above Normal or Grounded Circuit	Aftertreatment 1 Diesel Exhaust Fluid Temperature 2 Sensor Circuit - Current above normal or grounded
3515	10	4243	Aftertreatment 1 Diesel Exhaust Fluid Temperature 2	Abnormal Rate of Change	Aftertreatment 1 Diesel Exhaust Fluid Temperature 2 - Abnormal Rate of Change
3515	11	4745	Aftertreatment 1 Diesel Exhaust Fluid Temperature 2	Root Cause Not Known	Aftertreatment 1 Diesel Exhaust Fluid Temperature 2 - Root Cause Not Known
3521	11	4768	Aftertreatment 1 Diesel Exhaust Fluid Property	Root Cause Not Known	Aftertreatment 1 Diesel Exhaust Fluid Property - Root Cause Not Known
3521	31	4235	Aftertreatment 1 Diesel Exhaust Fluid Property	Not Available or Condition Exists	Aftertreatment 1 Diesel Exhaust Fluid Property - Condition Exists
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	2	1932	Aftertreatment Hydrocarbon Doser	Data Erratic, Intermittent or Incorrect	Aftertreatment Doser - Data erratic, intermittent or incorrect
3556	5	1977	Aftertreatment Hydrocarbon Doser	Current Below Normal or Open Circuit	Aftertreatment Doser Circuit - Current below normal or open circuit
3556	7	1964	Aftertreatment Hydrocarbon Doser	Mechanical System not Responding or Out of Adjustment	Aftertreatment Doser - Mechanical system not responding or out of adjustment
3556	18	3167	Aftertreatment Hydrocarbon Doser	Data Valid but Below Normal Operating Range - Moderately Severe Level	Aftertreatment Doser - Data Valid But Below Normal Operating Range - Moderately Severe Level
3597	2	1117	ECU Power Output Supply Voltage #1	Data Erratic, Intermittent or Incorrect	Power Supply Lost With Ignition On - Data erratic, intermittent or incorrect
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	12	351	ECU Power Output Supply Voltage #1	Bad Intelligent Device or Component	Injector Power Supply - Bad intelligent device or component
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	Aftertreatment Diesel Particulate Filter Outlet Pressure	Data Erratic, Intermittent or Incorrect	Aftertreatment 1 Diesel Particulate Filter Outlet Pressure - Data erratic, intermittent or incorrect
3610	3	3133	Aftertreatment Diesel Particulate Filter Outlet Pressure	Voltage Above Normal, or Shorted to High Source	Aftertreatment 1 Diesel Particulate Filter Outlet Pressure Sensor Circuit - Voltage above normal, or shorted to high source
3610	4	3134	Aftertreatment Diesel Particulate Filter Outlet Pressure	Voltage Below Normal, or Shorted to Low Source	Aftertreatment 1 Diesel Particulate Filter Outlet Pressure Sensor Circuit - Voltage below normal, or shorted to low source
3667	2	31395221	Engine Air Shutoff Status	Data Erratic, Intermittent or Incorrect	Engine Air Shutoff Status - Data erratic, intermittent or incorrect
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
3667	7	4484	Engine Air Shutoff	Mechanical System not Responding or Out of Adjustment	Engine Air Shutoff - Mechanical System Not Responding or Out of Adjustment
3695	2	4213	Diesel Particulate Filter Regeneration Inhibit Switch	Data Erratic, Intermittent or Incorrect	Aftertreatment Diesel Particulate Filter Regeneration Inhibit Switch - Data erratic, intermittent or incorrect

J1939 SPN	J1939 FMI	CUMMINS CODE	J1939 SPN DESCRIPTION	J1939 FMI DESCRIPTION	CUMMINS DESCRIPTION
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
3713	31	3753	Diesel Particulate Filter Active Regeneration Inhibited Due to System Timeout	Not Available or Condition Exists	Diesel Particulate Filter Active Regeneration Inhibited Due to System Timeout - Condition Exists
3750	31	3396	Diesel Particulate Filter 1 Conditions Not Met for Active Regeneration	Not Available or Condition Exists	Diesel Particulate Filter 1 Conditions Not Met for Active Regeneration - Condition Exists
3926	18	4573	Aftertreatment 1 Diesel Exhaust Fluid Average Consumption	Data Valid but Below Normal Operating Range - Moderately Severe Level	Aftertreatment 1 Diesel Exhaust Fluid Average Consumption - Data Valid But Below Normal Operating Range
3936	7	3245	Aftertreatment 1 Diesel Particulate Filter System	Mechanical System not Responding or Out of Adjustment	Aftertreatment 1 Diesel Particulate Filter System - Mechanical system not responding or out of adjustment
3936	14	4584	Aftertreatment Diesel Particulate Filter System	Special Instructions	Aftertreatment Diesel Particulate Filter System - Special Instructions
3936	15	1981	Aftertreatment Diesel Particulate Filter System	Data Valid but Above Normal Operating Range - Least Severe Level	Aftertreatment 1 Diesel Particulate Filter System - Data Valid But Above Normal Operating Range - Level
4094	31	3543	NOx limits exceeded due to Insufficient Diesel Exhaust Fluid Quality	Not Available or Condition Exists	NOx limits exceeded due to Insufficient Reagent Quality - Condition Exists
4096	31	3547	NOx limits exceeded due to Empty Diesel Exhaust Fluid Tank	Not Available or Condition Exists	Aftertreatment Diesel Exhaust Fluid Tank Empty - Condition Exists
4097	3	2732	Aftertreatment 1 Fuel Drain Actuator	Voltage Above Normal or Shorted to High Source	Aftertreatment Fuel Drain Valve Circuit - Voltage above normal, or shorted to high source
4097	4	2733	Aftertreatment 1 Fuel Drain Actuator	Voltage Below Normal or Shorted to Low Source	Aftertreatment Fuel Drain Valve Circuit - Voltage below normal, or shorted to low source
4097	7	2878	Aftertreatment 1 Fuel Drain Actuator	Mechanical System not Responding or Out of Adjustment	Aftertreatment Fuel Drain Valve - Mechanical system not responding or out of adjustment
4182	4	3695	Generator Output Frequency Adjust Potentiometer Circuit	Voltage Below Normal or Shorted to Low Source	Generator Output Frequency Adjust Potentiometer Circuit - Voltage below normal, or shorted to low source
4183	4	3696	Droop Adjust Potentiometer Circuit	Voltage Below Normal or Shorted to Low Source	Droop Adjust Potentiometer Circuit - Voltage below normal, or shorted to low source
4184	4	3694	Gain Adjust Potentiometer Circuit	Voltage Below Normal or Shorted to Low Source	Gain Adjust Potentiometer Circuit - Voltage below normal, or shorted to low source
4185	31	1427	Overspeed Shutdown Relay Driver	Not Available or Condition Exists	Overspeed Shutdown Relay Driver Diagnostic has detected an error - Condition Exists
4186	31	1428	Low Oil Pressure Shutdown Relay Driver	Not Available or Condition Exists	Low Oil Pressure (LOP) Shutdown Relay Driver Diagnostic has detected an error - Condition Exists
4187	31	1429	High Engine Temperature Shutdown Relay Driver	Not Available or Condition Exists	High Engine Temperature (HET) Shutdown Relay Driver Diagnostic has detected an error - Condition Exists
4188	31	1431	Pre-Low Oil Pressure Indicator Relay Driver	Not Available or Condition Exists	Pre-Low Oil Pressure Warning Relay Driver Diagnostic has detected an error - Condition Exists
4223	31	1432	Pre-High Engine Temperature Warning Relay Driver	Not Available or Condition Exists	Pre-High Engine Temperature Warning Relay Driver Diagnostic has detected an error - Condition Exists
4331	18	4658	Aftertreatment 1 Diesel Exhaust Fluid Actual Dosing Quantity	Data Valid but Below Normal Operating Range - Moderately Severe Level	Aftertreatment SCR Actual Dosing Reagent Quantity - Data Valid But Below Normal Operating Range - Mo

J1939 SPN	J1939 FMI	CUMMINS CODE	J1939 SPN DESCRIPTION	J1939 FMI DESCRIPTION	CUMMINS DESCRIPTION
4334	2	3596	Aftertreatment 1 Diesel Exhaust Fluid Doser Absolute Pressure	Data Erratic, Intermittent or Incorrect	Aftertreatment 1 Diesel Exhaust Fluid Pressure Sensor - Data erratic, intermittent or incorrect
4334	3	3571	Aftertreatment 1 Diesel Exhaust Fluid Doser Absolute Pressure	Voltage Above Normal or Shorted to High Source	Aftertreatment 1 Diesel Exhaust Fluid Pressure Sensor - Voltage above normal, or shorted to high source
4334	4	3572	Aftertreatment 1 Diesel Exhaust Fluid Doser Absolute Pressure	Voltage Below Normal or Shorted to Low Source	Aftertreatment 1 Diesel Exhaust Fluid Pressure Sensor - Voltage below normal, or shorted to low source
4334	16	3575	Aftertreatment 1 Diesel Exhaust Fluid Doser Absolute Pressure	Data Valid but Above Normal Operating Range - Moderately Severe Level	Aftertreatment 1 Diesel Exhaust Fluid Pressure Sensor - Data Valid But Above Normal Operating Range
4334	18	3574	Aftertreatment 1 Diesel Exhaust Fluid Doser Absolute Pressure	Data Valid but Below Normal Operating Range - Moderately Severe Level	Aftertreatment 1 Diesel Exhaust Fluid Pressure Sensor - Data Valid But Below Normal Operating Range
4337	2	4244	Aftertreatment 1 Diesel Exhaust Fluid Dosing Temperature	Data Erratic, Intermittent or Incorrect	Aftertreatment 1 Diesel Exhaust Fluid Dosing Temperature - Data erratic, intermittent or incorrect
4337	3	4174	Aftertreatment 1 Diesel Exhaust Fluid Dosing Temperature Sensor	Voltage Above Normal or Shorted to High Source	Aftertreatment 1 Diesel Exhaust Fluid Dosing Temperature Sensor - Voltage Above Normal, or Shorted to High Source
4337	4	4175	Aftertreatment 1 Diesel Exhaust Fluid Dosing Temperature Sensor	Voltage Below Normal or Shorted to Low Source	Aftertreatment 1 Diesel Exhaust Fluid Dosing Temperature Sensor - Voltage below normal, or shorted to low source
4337	10	4249	Aftertreatment 1 Diesel Exhaust Fluid Dosing Temperature	Abnormal Rate of Change	Aftertreatment 1 Diesel Exhaust Fluid Dosing Temperature - Abnormal Rate of Change
4339	31	4586	Aftertreatment 1 SCR Feedback Control Status	Not Available or Condition Exists	Aftertreatment 1 SCR Feedback Control Status - Condition Exists
4340	3	3237	Aftertreatment 1 Diesel Exhaust Fluid Line Heater 1 State	Voltage Above Normal or Shorted to High Source	Aftertreatment 1 Diesel Exhaust Fluid Line Heater 1 Circuit - Voltage above normal, or shorted to high source
4340	4	3238	Aftertreatment 1 Diesel Exhaust Fluid Line Heater 1 State	Voltage Below Normal or Shorted to Low Source	Aftertreatment 1 Diesel Exhaust Fluid Line Heater 1 Circuit - Voltage below normal, or shorted to low source
4340	5	3258	Aftertreatment 1 Diesel Exhaust Fluid Line Heater 1 State	Current Below Normal or Open Circuit	Aftertreatment 1 Diesel Exhaust Fluid Line Heater 1 Circuit - Current below normal or open circuit
4342	3	3239	Aftertreatment 1 Diesel Exhaust Fluid Line Heater 2 State	Voltage Above Normal or Shorted to High Source	Aftertreatment 1 Diesel Exhaust Fluid Line Heater 2 Circuit - Voltage above normal, or shorted to high source
4342	4	3241	Aftertreatment 1 Diesel Exhaust Fluid Line Heater 2 State	Voltage Below Normal or Shorted to Low Source	Aftertreatment 1 Diesel Exhaust Fluid Line Heater 2 Circuit - Voltage below normal, or shorted to low source
4342	5	3261	Aftertreatment 1 Diesel Exhaust Fluid Line Heater 2 State	Current Below Normal or Open Circuit	Aftertreatment 1 Diesel Exhaust Fluid Line Heater 2 Circuit - Current below normal or open circuit
4344	3	3422	Aftertreatment 1 Diesel Exhaust Fluid Line Heater 3 State	Voltage Above Normal or Shorted to High Source	Aftertreatment Diesel Exhaust Fluid Line Heater 3 Circuit - Voltage above normal, or shorted to high source
4344	4	3423	Aftertreatment 1 Diesel Exhaust Fluid Line Heater 3 State	Voltage Below Normal or Shorted to Low Source	Aftertreatment Diesel Exhaust Fluid Line Heater 3 Circuit - Voltage below normal, or shorted to low source
4344	5	3425	Aftertreatment 1 Diesel Exhaust Fluid Line Heater 3 State	Current Below Normal or Open Circuit	Aftertreatment Diesel Exhaust Fluid Line Heater 3 Circuit - Current below normal or open circuit
4360	0	3229	Aftertreatment 1 SCR Catalyst Intake Gas Temperature	Data Valid but Above Normal Operational Range - Most Severe Level	Aftertreatment 1 SCR Intake Temperature - Data valid but above normal operational range - Most Severe Level
4360	2	3144	Aftertreatment 1 SCR Catalyst Intake Gas Temperature	Data Erratic, Intermittent or Incorrect	Aftertreatment 1 SCR Intake Temperature Sensor - Data erratic, intermittent or incorrect
4360	3	3142	Aftertreatment 1 SCR Catalyst Intake Gas Temperature	Voltage Above Normal or Shorted to High Source	Aftertreatment 1 SCR Intake Temperature Sensor Circuit - Voltage above normal, or shorted to high source

J1939 SPN	J1939 FMI	CUMMINS CODE	J1939 SPN DESCRIPTION	J1939 FMI DESCRIPTION CUMMINS DESCRIPTION		
4360	4	3143	Aftertreatment 1 SCR Catalyst Intake Gas Temperature	Voltage Below Normal or Shorted to Low Source	Aftertreatment 1 SCR Intake Temperature Sensor Circuit - Voltage below normal, or shorted to low source	
4360	15	3164	Aftertreatment 1 SCR Catalyst Intake Gas Temperature	Data Valid but Above Normal Operating Range - Least Severe Level	Aftertreatment 1 SCR Intake Temperature - Data Valid But Above Normal Operating Range - Least Severe	
4360	16	3231	Aftertreatment 1 SCR Catalyst Intake Gas Temperature	Data Valid but Above Normal Operating Range - Moderately Severe Level	Aftertreatment 1 SCR Intake Temperature - Data Valid But Above Normal Operating Range - Moderately Severe Level	
4360	16	5247	Aftertreatment 1 SCR Intake Temperature	Data Valid but Above Normal Operating Range - Moderately Severe Level	Aftertreatment 1 SCR Intake Temperature - Data Valid But Above Normal Operating Range - Moderately Severe Level	
4363	0	3165	Aftertreatment 1 SCR Catalyst Outlet Gas Temperature	Data Valid but Above Normal Operational Range - Most Severe Level	Aftertreatment 1 SCR Outlet Temperature - Data valid but above normal operational range - Most Severe	
4363	2	3148	Aftertreatment 1 SCR Catalyst Outlet Gas Temperature	Data Erratic, Intermittent or Incorrect	Aftertreatment 1 SCR Outlet Temperature Sensor - Data erratic, intermittent or incorrect	
4363	3	3146	Aftertreatment 1 SCR Catalyst Outlet Gas Temperature	Voltage Above Normal or Shorted to High Source	Aftertreatment 1 SCR Outlet Temperature Sensor Circuit - Voltage above normal, or shorted to high source	
4363	4	3147	Aftertreatment 1 SCR Catalyst Outlet Gas Temperature	Voltage Below Normal or Shorted to Low Source	Aftertreatment 1 SCR Outlet Temperature Sensor Circuit - Voltage below normal, or shorted to low source	
4363	16	3235	Aftertreatment 1 SCR Catalyst Outlet Gas Temperature	Data Valid but Above Normal Operating Range - Moderately Severe Level	Aftertreatment 1 SCR Outlet Temperature - Data Valid But Above Normal Operating Range - Moderately Severe Level	
4364	18	3582	Aftertreatment 1 SCR Conversion Efficiency	Data Valid but Below Normal Operating Range - Moderately Severe Level	Aftertreatment SCR Catalyst Conversion Efficiency - Data Valid But Below Normal Operating Range - Moderately Severe Leve	
4376	3	3577	Aftertreatment 1 Diesel Exhaust Fluid Return Valve	Voltage Above Normal or Shorted to High Source	Aftertreatment Diesel Exhaust Fluid Return Valve - Voltage above normal, or shorted to high source	
4376	4	3578	Aftertreatment 1 Diesel Exhaust Fluid Return Valve	Voltage Below Normal or Shorted to Low Source	Aftertreatment Diesel Exhaust Fluid Return Valve - Voltage below normal, or shorted to low source	
4376	7	4157	Aftertreatment 1 Diesel Exhaust Fluid Return Valve	Mechanical System not Responding or Out of Adjustment	Aftertreatment Diesel Exhaust Fluid Return Valve - Mechanical system not responding or out of adjust	
4490	9	3367	Specific Humidity	Abnormal Update Rate	Specific Humidity Sensor - Abnormal update rate	
4490	90	3368	Specific Humidity	Received Network Data in Error	Specific Humidity Sensor - Received Network Data In Error	
4765	2	3315	Aftertreatment Diesel Oxidation Catalyst Intake Temperature	Data Erratic, Intermittent or Incorrect	Aftertreatment 1 Diesel Oxidation Catalyst Intake Temperature - Data erratic, intermittent or incorrect	
4765	3	3314	Aftertreatment Diesel Oxidation Catalyst Intake 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 Diesel Oxidation Catalyst Intake 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 Diesel Oxidation Catalyst Intake Temperature	Out of Calibration	Aftertreatment 1 Diesel Oxidation Catalyst Intake Temperature Swapped - Out of Calibration	
4765	16	3251	Aftertreatment Diesel Oxidation Catalyst Intake Temperature	Data Valid but Above Normal Operating Range - Moderately Severe Level	Aftertreatment 1 Diesel Oxidation Catalyst Intake Temperature - Data Valid But Above Normal Operating Range	
4766	0	5387	Aftertreatment 1 Diesel Oxidation Catalyst Outlet Gas Temperature	Data Valid but Above Normal Operational Range - Most Severe Level	Aftertreatment 1 Diesel Oxidation Catalyst Outlet Gas Temperature - Data Valid But Above Normal Operating Range - Most Severe Level	
4766	2	5386	Aftertreatment 1 Diesel Oxidation Catalyst Outlet Gas Temperature	Data Erratic, Intermittent or Incorrect	Aftertreatment 1 Diesel Oxidation Catalyst Outlet Gas Temperature - Data Erratic, Intermittent, or Incorrect	

J1939 SPN	J1939 FMI	CUMMINS CODE	J1939 SPN DESCRIPTION	N J1939 FMI DESCRIPTION CUMMINS DESCRIPTION	
4766	3	4533	Aftertreatment 1 Diesel Particulate Filter Intake Temperature Sensor Circuit	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
4766	3	4534	Aftertreatment 1 Diesel Particulate Filter Intake Temperature Sensor Circuit	Voltage Above Normal or Shorted to High Source	Aftertreatment 1 Diesel Particulate Filter Intake Temperature Sensor Circuit - Voltage below normal, or shorted to low source
4766	15	5389	Aftertreatment 1 Diesel Oxidation Catalyst Outlet Gas Temperature	Data Valid but Above Normal Operating Range - Least Severe Level	Aftertreatment 1 Diesel Oxidation Catalyst Outlet Gas Temperature - Data Valid But Above Normal Operating Range - Least Severe Level
4766	16	5388	Aftertreatment 1 Diesel Oxidation Catalyst Outlet Gas Temperature	Data Valid but Above Normal Operating Range - Moderately Severe Level	Aftertreatment 1 Diesel Oxidation Catalyst Outlet Gas Temperature - Data Valid But Above Normal Operating Range - Moderately Severe Level
4792	7	3751	Aftertreatment SCR Catalyst System	Mechanical System not Responding or Out of Adjustment	Aftertreatment SCR Catalyst System - Mechanical system not responding or out of adjustment
4792	14	4585	Aftertreatment 1 SCR Catalyst System	Special Instructions	Aftertreatment 1 SCR Catalyst System - Special Instructions
4793	31	3158	Aftertreatment Warm Up Diesel Oxidation Catalyst	Not Available or Condition Exists	Aftertreatment Warm Up Diesel Oxidation Catalyst Missing - Condition Exists
4794	31	3151	Aftertreatment 1 SCR Catalyst System	Not Available or Condition Exists	Aftertreatment 1 SCR Catalyst System Missing - Condition Exists
4795	31	1993	Aftertreatment 1 Diesel Particulate Filter Missing	Not Available or Condition Exists	Aftertreatment 1 Diesel Particulate Filter Missing - Condition Exists
4796	31	1664	Aftertreatment 1 Diesel Oxidation Catalyst Missing	Not Available or Condition Exists	Aftertreatment 1 Diesel Oxidation Catalyst Missing - Condition Exists
4809	2	3154	Aftertreatment Warm Up Diesel Oxidation Catalyst Intake Temperature	Data Erratic, Intermittent or Incorrect	Aftertreatment Warm Up Diesel Oxidation Catalyst Intake Temperature - Data erratic, intermittent or incorrect
4809	3	3152	Aftertreatment Warm Up Diesel Oxidation Catalyst Intake Temperature	Voltage Above Normal or Shorted to High Source	Aftertreatment Warm Up Diesel Oxidation Catalyst Intake Temperature Sensor Circuit - Voltage above normal
4809	4	3153	Aftertreatment Warm Up Diesel Oxidation Catalyst Intake Temperature	Voltage Below Normal or Shorted to Low Source	Aftertreatment Warm Up Diesel Oxidation Catalyst Intake Temperature Sensor Circuit - Voltage below normal
4809	13	3166	Aftertreatment Warm Up Diesel Oxidation Catalyst Intake Temperature	Out of Calibration	Aftertreatment Warm Up Diesel Oxidation Catalyst Intake Temperature Sensor Swapped - Out of Calibration
4809	16	3247	Aftertreatment Warm Up Diesel Oxidation Catalyst Intake Temperature	Data Valid but Above Normal Operating Range - Moderately Severe Level	Aftertreatment Warm Up Diesel Oxidation Catalyst Intake Temperature - Data Valid But Above Normal Operating Range
4810	0	3162	Aftertreatment Warm Up Diesel Oxidation Catalyst Outlet Temperature	Data Valid but Above Normal Operational Range - Most Severe Level	Aftertreatment Warm Up Diesel Oxidation Catalyst Outlet Temperature - Data valid but above normal operating Range –Most Severe level
4810	2	3157	Aftertreatment Warm Up Diesel Oxidation Catalyst Outlet Temperature	Data Erratic, Intermittent or Incorrect	Aftertreatment Warm Up Diesel Oxidation Catalyst Outlet Temperature - Data erratic, intermittent or incorrect
4810	3	3155	Aftertreatment Warm Up Diesel Oxidation Catalyst Outlet Temperature	Voltage Above Normal or Shorted to High Source	Aftertreatment Warm Up Diesel Oxidation Catalyst Outlet Temperature Sensor Circuit - Voltage above normal
4810	4	3156	Aftertreatment Warm Up Diesel Oxidation Catalyst Outlet Temperature	Voltage Below Normal or Shorted to Low Source	Aftertreatment Warm Up Diesel Oxidation Catalyst Outlet Temperature Sensor Circuit - Voltage below normal
4810	15	3249	Aftertreatment Warm Up Diesel Oxidation Catalyst Outlet Temperature	Data Valid but Above Normal Operating Range - Least Severe Level	Aftertreatment Warm Up Diesel Oxidation Catalyst Outlet Temperature - Data Valid But Above Normal Operating Range
4810	16	3169	Aftertreatment Warm Up Diesel Oxidation Catalyst Outlet Temperature	Data Valid but Above Normal Operating Range - Moderately Severe Level	Aftertreatment Warm Up Diesel Oxidation Catalyst Outlet Temperature - Data Valid But Above Normal Operating Range
5018	11	2637	Aftertreatment Diesel Oxidation Catalyst	Root Cause Not Known	Aftertreatment 1 Diesel Oxidation Catalyst Face Plugged - Root Cause Not Known

J1939 SPN	J1939 FMI	CUMMINS CODE	J1939 SPN DESCRIPTION	J1939 FMI DESCRIPTION	CUMMINS DESCRIPTION	
5019	2	3138	Engine Exhaust Gas Recirculation 1 Outlet Pressure	Data Erratic, Intermittent or Incorrect	Engine Exhaust Gas Recirculation Outlet Pressure - Data erratic, intermittent or incorrect	
5019	3	3136	Engine Exhaust Gas Recirculation 1 Outlet Pressure	Voltage Above Normal or Shorted to High Source	Engine Exhaust Gas Recirculation Outlet Pressure Sensor Circuit - Voltage above normal, or shorted to high source	
5019	4	3137	Engine Exhaust Gas Recirculation 1 Outlet Pressure	Voltage Below Normal or Shorted to Low Source	Engine Exhaust Gas Recirculation Outlet Pressure Sensor Circuit - Voltage below normal, or shorted to low source	
5024	10	3649	Aftertreatment 1 Intake Gas NOx Sensor Heater Ratio	Abnormal Rate of Change	Aftertreatment 1 Intake NOx Sensor Heater - Abnormal rate of change	
5031	10	3583	Aftertreatment 1 Outlet Gas NOx Sensor Heater Ratio	Abnormal Rate of Change	Aftertreatment 1 Outlet NOx Sensor Heater - Abnormal rate of change	
5097	3	4293	Engine Brake Active Lamp Data	Voltage Above Normal or Shorted to High Source	Engine Brake Active Lamp - Voltage Above Normal, or Shorted to High Source	
5097	4	4294	Engine Brake Active Lamp Data	Voltage Below Normal or Shorted to Low Source	Engine Brake Active Lamp - Voltage below normal, or shorted to low source	
5125	3	3419	Sensor supply voltage 7	Voltage Above Normal or Shorted to High Source	Sensor Supply 7 Circuit - Voltage above normal, or shorted to high source	
5125	4	3421	Sensor supply voltage 7	Voltage Below Normal or Shorted to Low Source	Sensor Supply 7 Circuit - Voltage below normal, or shorted to low source	
5245	31	4863	Aftertreatment Selective Catalytic Reduction Operator Inducement Active	Not Available or Condition Exists	Aftertreatment SCR Operator Inducement Active - 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	
5298	18	1691	Aftertreatment 1 Diesel Oxidation Catalyst Conversion Efficiency	Data Valid but Below Normal Operating Range - Moderately Severe Level	Aftertreatment 1 Diesel Oxidation Catalyst Conversion Efficiency - Data Valid But Below Normal Operating Range - Moderately Severe Level	
5319	31	3376	Aftertreatment 1 Diesel Particulate Filter Incomplete Regeneration	Not Available or Condition Exists	Aftertreatment Diesel Particulate Filter Incomplete Regeneration - Condition Exists	
5357	31	4713	Engine Fuel Injection Quantity Error for Multiple Cylinders	Not Available or Condition Exists	Engine Fuel Injection Quantity Error for Multiple Cylinders - Condition Exists	
5380	11	4936	Engine Fuel Valve 1	Root Cause Not Known	Engine Fuel Valve 1 - Root Cause Not Known	
5380	13	4937	Engine Fuel Valve 1	Out of Calibration	Engine Fuel Valve 1 - Out of Calibration	
5394	2	3755	Aftertreatment Diesel Exhaust Fluid Dosing Valve	Data Erratic, Intermittent or Incorrect	Aftertreatment Diesel Exhaust Fluid Dosing Valve - Data erratic, intermittent or incorrect	
5394	5	3567	Aftertreatment Diesel Exhaust Fluid Dosing Valve	Current Below Normal or Open Circuit	Aftertreatment Diesel Exhaust Fluid Dosing Valve - Current below normal or open circuit	
5394	7	3568	Aftertreatment Diesel Exhaust Fluid Dosing Valve	Mechanical System not Responding or Out of Adjustment	Aftertreatment Diesel Exhaust Fluid Dosing Valve - Mechanical system not responding or out of adjustment	
5395	16	3337	Engine Idle Fuel Quantity	Data Valid but Above Normal Operating Range - Moderately Severe Level	Engine Idle Fuel Quantity - Data Valid But Above Normal Operating Range - Moderately Severe Level	
5395	18	3338	Engine Idle Fuel Quantity	Data Valid but Below Normal Operating Range - Moderately Severe Level	Engine Idle Fuel Quantity - Data Valid But Below Normal Operating Range - Moderately Severe Level	
5396	31	3377	Engine Crankcase Ventilation Hose Disconnected	Not Available or Condition Exists	Engine Crankcase Ventilation Hose Disconnected - Condition Exists	
5397	31	3375	Aftertreatment 1 Diesel Particulate Filter Regeneration too Frequent	Not Available or Condition Exists	Aftertreatment Diesel Particulate Filter Regeneration too Frequent - Condition Exists	
5484	3	3633	Engine Fan Clutch 2 Output Device Driver	Voltage Above Normal or Shorted to High Source	Engine Fan Clutch 2 Control Circuit - Voltage above normal, or shorted to high source	
5484	4	3634	Engine Fan Clutch 2 Output Device Driver	Voltage Below Normal or Shorted to Low Source         Engine Fan Clutch 2 Control Circuit - below normal, or shorted to low source		

J1939 SPN	J1939 FMI	CUMMINS CODE	J1939 SPN DESCRIPTION	J1939 FMI DESCRIPTION	CUMMINS DESCRIPTION
5491	3	3562	Aftertreatment 1 Diesel Exhaust Fluid Line Heater Relay	Voltage Above Normal or Shorted to High Source	Aftertreatment Diesel Exhaust Fluid Line Heater Relay - Voltage above normal, or shorted to high source
5491	4	3563	Aftertreatment 1 Diesel Exhaust Fluid Line Heater Relay	Voltage Below Normal or Shorted to Low Source	Aftertreatment Diesel Exhaust Fluid Line Heater Relay - Voltage below normal, or shorted to low source
5491	7	3713	Aftertreatment 1 Diesel Exhaust Fluid Line Heater Relay	Mechanical System not Responding or Out of Adjustment	Aftertreatment 1 Diesel Exhaust Fluid Line Heater Relay - Mechanical system not responding or out of adjustment
5571	0	3741	High Pressure Common Rail Fuel Pressure Relief Valve	Data Valid but Above Normal Operational Range - Most Severe Level	High Pressure Common Rail Fuel Pressure Relief Valve - Data valid but above normal operational range
5571	3	4262	High Pressure Common Rail Fuel Pressure Relief Valve	Voltage Above Normal or Shorted to High Source	High Pressure Common Rail Fuel Pressure Relief Valve - Voltage Above Normal, or Shorted to High Source
5571	4	4263	High Pressure Common Rail Fuel Pressure Relief Valve	Voltage Below Normal or Shorted to Low Source	High Pressure Common Rail Fuel Pressure Relief Valve - Voltage below normal, or shorted to low source
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
5571	11	4265	High Pressure Common Rail Fuel Pressure Relief Valve	Root Cause Not Known	High Pressure Common Rail Fuel Pressure Relief Valve - Root Cause Not Known
5571	15	5585	High Pressure Common Rail Fuel Pressure Relief Valve	Data Valid but Above Normal Operating Range - Least Severe Level	High Pressure Common Rail Fuel Pressure Relief Valve - Data Valid But Above Normal Operating Range - Least Severe Level
5571	31	4867	High Pressure Common Rail Fuel Pressure Relief Valve	Not Available or Condition Exists	High Pressure Common Rail Fuel Pressure Relief Valve - Condition Exists
5585	18	4691	Engine Injector Metering Rail 1 Cranking Pressure	Data Valid but Below Normal Operating Range - Moderately Severe Level	Engine Injector Metering Rail 1 Cranking Pressure - Data Valid But Below Normal Operating Range - Mo
5603	9	3843	Cruise Control Disable Command	Abnormal Update Rate	Cruise Control Disable Command - Abnormal update rate
5603	31	3845	Cruise Control Disable Command	Not Available or Condition Exists	Cruise Control Disable Command - Condition Exists
5605	31	3844	Cruise Control Pause Command	Not Available or Condition Exists	Cruise Control Pause Command - Condition Exists
5625	2	5274	Engine Exhaust Back Pressure Regulator Position	Data Erratic, Intermittent or Incorrect	Engine Exhaust Back Pressure Regulator Position - Data Erratic, Intermittent or Incorrect
5625	3	5275	Engine Exhaust Back Pressure Regulator Position Sensor Circuit	Voltage Above Normal or Shorted to High Source	Engine Exhaust Back Pressure Regulator Position Sensor Circuit - Voltage Above Normal, or Shorted to High Source
5625	4	5276	Engine Exhaust Back Pressure Regulator Position Sensor Circuit	Voltage Below Normal or Shorted to Low Source	Engine Exhaust Back Pressure Regulator Position Sensor Circuit - Voltage Below Normal, or Shorted to Low Source
5626	13	5277	Engine Exhaust Back Pressure Regulator	Out of Calibration	Engine Exhaust Back Pressure Regulator - Out of Calibration
5741	2	4451	Aftertreatment 1 Outlet Soot Sensor	Data Erratic, Intermittent or Incorrect	Aftertreatment 1 Outlet Soot - Data erratic, intermittent or incorrect
5741	3	4143	Aftertreatment 1 Outlet Soot Sensor	Voltage Above Normal or Shorted to High Source	Aftertreatment 1 Outlet Soot Sensor - Voltage Above Normal, or Shorted to High Source
5741	4	4144	Aftertreatment 1 Outlet Soot Sensor	Voltage Below Normal or Shorted to Low Source	Aftertreatment 1 Outlet Soot Sensor - Voltage below normal, or shorted to low source
5742	3	4161	Aftertreatment Diesel Particulate Filter Temperature Sensor Module	Voltage Above Normal or Shorted to High Source	Aftertreatment Diesel Particulate Filter Temperature Sensor Module - Voltage Above Normal, or Shorted to high source
5742	4	4162	Aftertreatment Diesel Particulate Filter Temperature Sensor Module	Voltage Below Normal or Shorted to Low Source	Aftertreatment Diesel Particulate Filter Temperature Sensor Module - Voltage below normal, or shorted to low source

J1939 SPN	J1939 FMI	CUMMINS CODE	J1939 SPN DESCRIPTION	J1939 FMI DESCRIPTION CUMMINS DESCRIPTION	
5742	9	4151	Aftertreatment Diesel Particulate Filter Temperature Sensor Module	Abnormal Update Rate	Aftertreatment Diesel Particulate Filter Temperature Sensor Module - Abnormal update rate
5742	11	4259	Aftertreatment Diesel Particulate Filter Temperature Sensor Module	Root Cause Not Known	Aftertreatment Diesel Particulate Filter Temperature Sensor Module - Root Cause Not Known
5742	12	4158	Aftertreatment Diesel Particulate Filter Temperature Sensor Module	Bad Intelligent Device or Component	Aftertreatment Diesel Particulate Filter Temperature Sensor Module - Bad intelligent device or component
5742	16	4163	Aftertreatment Diesel Particulate Filter Temperature Sensor Module	Data Valid but Above Normal Operating Range - Moderately Severe Level	Aftertreatment Diesel Particulate Filter Temperature Sensor Module- Data Valid But Above Normal Operating Range
5743	3	4164	Aftertreatment Selective Catalytic Reduction Temperature Sensor Module	Voltage Above Normal or Shorted to High Source	Aftertreatment Selective Catalytic Reduction Temperature Sensor Module - Voltage Above Normal, or Shorted to high source
5743	4	4165	Aftertreatment Selective Catalytic Reduction Temperature Sensor Module	Voltage Below Normal or Shorted to Low Source	Aftertreatment Selective Catalytic Reduction Temperature Sensor Module - Voltage below normal, or Shorted to low source
5743	9	4152	Aftertreatment Selective Catalytic Reduction Temperature Sensor Module	Abnormal Update Rate	Aftertreatment Selective Catalytic Reduction Temperature Sensor Module - Abnormal update rate
5743	11	4261	Aftertreatment Selective Catalytic Reduction Temperature Sensor Module	Root Cause Not Known	Aftertreatment Selective Catalytic Reduction Temperature Sensor Module - Root Cause Not Known
5743	12	4159	Aftertreatment Selective Catalytic Reduction Temperature Sensor Module	Bad Intelligent Device or Component	Aftertreatment Selective Catalytic Reduction Temperature Sensor Module - Bad intelligent device or component
5743	16	4166	Aftertreatment Selective Catalytic Reduction Temperature Sensor Module	Data Valid but Above Normal Operating Range - Moderately Severe Level	Aftertreatment Selective Catalytic Reduction Temperature Sensor Module - Data Valid But Above Normal
5745	3	4168	Aftertreatment 1 Diesel Exhaust	Voltage Above Normal or Shorted	Aftertreatment 1 Diesel Exhaust Fluid Dosing Unit
			Fluid Dosing Unit Heater	to High Source	Heater - Voltage Above Normal, or Shorted to High
5745	4	4169	Aftertreatment 1 Diesel Exhaust Fluid Dosing Unit Heater	Voltage Below Normal or Shorted to Low Source	Aftertreatment 1 Diesel Exhaust Fluid Dosing Unit Heater - Voltage below normal, or shorted to low
					source
5745	18	4171	Aftertreatment 1 Diesel Exhaust Fluid Dosing Unit Heater	Data Valid but Below Normal Operating Range - Moderately Severe Level	Aftertreatment 1 Diesel Exhaust Fluid Dosing Unit Heater - Data Valid But Below Normal Operating Range
5746	3	4155	Aftertreatment 1 Diesel Exhaust Fluid Dosing Unit Heater Relay	Voltage Above Normal or Shorted to High Source	Aftertreatment 1 Diesel Exhaust Fluid Dosing Unit Heater Relay - Voltage Above Normal, or Shorted to high source
5746	4	4156	Aftertreatment 1 Diesel Exhaust Fluid Dosing Unit Heater Relay	Voltage Below Normal or Shorted to Low Source	Aftertreatment 1 Diesel Exhaust Fluid Dosing Unit Heater Relay - Voltage below normal, or shorted to low source
5747	3	4153	Aftertreatment 1 Outlet Soot Sensor Heater	Voltage Above Normal or Shorted to High Source	Aftertreatment 1 Outlet Soot Sensor Heater - Voltage Above Normal, or Shorted to High Source
5747	4	4154	Aftertreatment 1 Outlet Soot Sensor Heater	Voltage Below Normal or Shorted to Low Source	Aftertreatment 1 Outlet Soot Sensor Heater - Voltage below normal, or shorted to low source
5747	10	4449	Aftertreatment 1 Outlet Soot Sensor Heater	Abnormal Rate of Change	Aftertreatment 1 Outlet Soot Sensor Heater - Abnormal rate of change
5793	9	4284	Desired Engine Fueling State	Abnormal Update Rate	Desired Engine Fueling State - Abnormal Update Rate
5797	3	4254	Aftertreatment Warm Up Diesel Oxidation Catalyst Temperature Sensor Module	Voltage Above Normal or Shorted to High Source	Aftertreatment Warm Up Diesel Oxidation Catalyst Temperature Sensor Module - Voltage Above Normal, or shorted to high source
5797	4	4255	Aftertreatment Warm Up Diesel Oxidation Catalyst Temperature Sensor Module	Voltage Below Normal or Shorted to Low Source	Aftertreatment Warm Up Diesel Oxidation Catalyst Temperature Sensor Module - Voltage below normal, or shorted to low source

J1939 SPN	J1939 FMI	CUMMINS CODE	J1939 SPN DESCRIPTION	J1939 FMI DESCRIPTION	CUMMINS DESCRIPTION
5797	11	4258	Aftertreatment Warm Up Diesel Oxidation Catalyst Temperature Sensor Module	Root Cause Not Known Aftertreatment Warm Up Diesel Oxid Catalyst Temperature Sensor Module Cause Not Known	
5797	12	4253	Aftertreatment Warm Up Diesel Oxidation Catalyst Temperature Sensor Module	Bad Intelligent Device or Component	Aftertreatment Warm Up Diesel Oxidation Catalyst Temperature Sensor Module - Bad intelligent device
5797	16	4256	Aftertreatment Warm Up Diesel Oxidation Catalyst Temperature Sensor Module	Data Valid but Above Normal Operating Range - Moderately Severe Level	Aftertreatment Warm Up Diesel Oxidation Catalyst Temperature Sensor Module - Data Valid But Above Normal Operating Range – Moderately Severe Level
5798	2	4245	Aftertreatment 1 Diesel Exhaust Fluid Dosing Unit Heater Temperature	Data Erratic, Intermittent or Incorrect	Aftertreatment 1 Diesel Exhaust Fluid Dosing Unit Heater Temperature - Data erratic, intermittent or incorrect
5798	10	4251	Aftertreatment 1 Diesel Exhaust Fluid Dosing Unit Heater Temperature	Abnormal Rate of Change	Aftertreatment 1 Diesel Exhaust Fluid Dosing Unit Heater Temperature - Abnormal Rate of Change
5838	31	4485	EGR Valve Malfunction	Not Available or Condition Exists	EGR Valve Malfunction - Condition Exists
5839	31	4486	Diesel Exhaust Fluid Consumption Malfunction	Not Available or Condition Exists	Diesel Exhaust Fluid Consumption Malfunction - Condition Exists
5840	31	4487	Diesel Exhaust Fluid Dosing Malfunction	Not Available or Condition Exists	Diesel Exhaust Fluid Dosing Malfunction - Condition Exists
5841	31	4488	Diesel Exhaust Fluid Quality Malfunction	Not Available or Condition Exists	Diesel Exhaust Fluid Quality Malfunction - Condition Exists
5842	31	4489	SCR Monitoring System Malfunction	Not Available or Condition Exists	SCR Monitoring System Malfunction - Condition Exists
6301	3	4688	Water in Fuel Indicator 2 Sensor Circuit	Voltage Above Normal or Shorted to High Source	Water in Fuel Indicator 2 Sensor Circuit - Voltage above normal, or shorted to high source
6301	4	4689	Water in Fuel Indicator 2 Sensor Circuit	Voltage Below Normal or Shorted to Low Source	Water in Fuel Indicator 2 Sensor Circuit - Voltage below normal, or shorted to low source
6653	16	4841	Cold Start Injector Metering Rail 1 Pressure	Data Valid but Above Normal Operating Range - Moderately Severe Level	Cold Start Injector Metering Rail 1 Pressure - Data Valid But Above Normal Operating Range - Moderate Severe Level
6655	3	4951	ECU Power Lamp	Voltage Above Normal or Shorted to High Source	Maintain ECU Power Lamp - Voltage Above Normal, or Shorted to High Source
6655	4	4952	ECU Power Lamp	Voltage Below Normal or Shorted to Low Source	Maintain ECU Power Lamp - Voltage Below Normal, or Shorted to Low Source
6713	9	5177	VGT Actuator Driver Circuit	Abnormal Update Rate	VGT Actuator Driver Circuit - Abnormal update rate
6713	13	4956	Variable Geometry Turbocharger Actuator	Out of Calibration	Variable Geometry Turbocharger Actuator Software - Out of Calibration
6713	31	4957	Variable Geometry Turbocharger Actuator	Not Available or Condition Exists	Variable Geometry Turbocharger Actuator Software - Condition Exists
6881	9	5653	SCR Operator Inducement Override Switch	Abnormal Update Rate	SCR Operator Inducement Override Switch - Abnormal Update Rate
6881	13	5654	SCR Operator Inducement Override Switch	Out of Calibration	SCR Operator Inducement Override Switch - Out of Calibration
520199	3	193	Cruise Control	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	Voltage Below Normal, or Shorted to Low Source	Cruise Control (Resistive) Signal Circuit - Voltage below normal, or shorted to low source
520286	4	5394	Aftertreatment Diesel Oxidation Catalyst Temperature Sensor Module	Voltage Below Normal or Shorted to Low Source         Aftertreatment Diesel Oxidation Ca           Voltage Below Normal or Shorted to Low Source         Aftertreatment Diesel Oxidation Ca	
520286	11	5395	Aftertreatment Diesel Oxidation Catalyst Temperature Sensor Module	Root Cause Not Known	Aftertreatment Diesel Oxidation Catalyst Temperature Sensor Module - Root Cause Not Known

J1939 SPN	J1939 FMI	CUMMINS CODE	J1939 SPN DESCRIPTION	J1939 FMI DESCRIPTION	CUMMINS DESCRIPTION
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
520332	3	2755	Cruise Control	Voltage Above Normal or Shorted to High Source	Cruise Control (Resistive) #2 Signal Circuit - Voltage above normal, or shorted to high source
520332	4	2756	Cruise Control	Voltage Below Normal or Shorted to Low Source	Cruise Control (Resistive) #2 Signal Circuit - Voltage below normal, or shorted to low source
520435	12	3222	Glow Plug Module	Bad Intelligent Device or Component	Glow Plug Module - Bad intelligent device or component
520595	2	4288	Closed Crankcase Ventilation System Pressure	Data Erratic, Intermittent or Incorrect	Closed Crankcase Ventilation System Pressure - Data erratic, intermittent or incorrect
520595	3	4286	Closed Crankcase Ventilation System Pressure	Voltage Above Normal or Shorted to High Source	Closed Crankcase Ventilation System Pressure Sensor - Voltage Above Normal, or Shorted to High Source
520595	4	4287	Closed Crankcase Ventilation System Pressure	Voltage Below Normal or Shorted to Low Source	Closed Crankcase Ventilation System Pressure Sensor - Voltage below normal, or shorted to low source
520668	31	4452	Aftertreatment 1 Outlet NOx Sensor Closed Loop Operation	Not Available or Condition Exists	Aftertreatment 1 Outlet NOx Sensor Closed Loop Operation - Condition Exists
520716	3	4452	Aftertreatment 1 Diesel Exhaust Fluid Dosing Valve 1 Heater	Voltage Above Normal or Shorted to High Source	Aftertreatment 1 Diesel Exhaust Fluid Dosing Valve 1 Heater - Voltage Above Normal, or Shorted to High Source
520716	4	4453	Aftertreatment 1 Diesel Exhaust Fluid Dosing Valve 1 Heater	Voltage Below Normal or Shorted to Low Source	Aftertreatment 1 Diesel Exhaust Fluid Dosing Valve 1 Heater - Voltage Below Normal, or Shorted to Low Source
520784	3	5183	Fan Blade Pitch Position Sensor Circuit	Voltage Above Normal or Shorted to High Source	Fan Blade Pitch Position Sensor Circuit - Voltage Above Normal, or Shorted to High Source
520784	4	5184	Fan Blade Pitch Position Sensor Circuit	Voltage Below Normal or Shorted to Low Source	Fan Blade Pitch Position Sensor Circuit - Voltage Below Normal, or Shorted to Low Source
520784	5	5185	Fan Blade Pitch	Current Below Normal or Open Circuit	Fan Blade Pitch - Mechanical system not responding or out of adjustment
520791	2	5215	Engine Boost Curve Selection	Data Erratic, Intermittent or Incorrect	Engine Boost Curve Selection - Data erratic, intermittent or incorrect
520808	31	5291	Engine Emergency Shutdown Switch Actived	Not Available or Condition Exists	Engine Emergency Shutdown Switch Actived - Condition Exists
520809	31	5292	Excessive Time Since Last Engine Air Shutoff Maintenance Test	Not Available or Condition Exists	Excessive Time Since Last Engine Air Shutoff Maintenance Test - Condition Exists
520826	3	5393	Aftertreatment Diesel Oxidation Catalyst Temperature Sensor Module	Voltage Above Normal or Shorted to High Source	Aftertreatment Diesel Oxidation Catalyst Temperature Sensor Module - Voltage Above Normal or Shorted to High Source
520826	9	5391	Aftertreatment Diesel Oxidation Catalyst Temperature Sensor Module	Abnormal Update Rate	Aftertreatment Diesel Oxidation Catalyst Temperature Sensor Module - Abnormal Update Rate
520826	12	5392	Aftertreatment Diesel Oxidation Catalyst Temperature Sensor Module	Bad Intelligent Device or Component	Aftertreatment Diesel Oxidation Catalyst Temperature Sensor Module - Bad Intelligent Device or Component
520826	16	5396	Aftertreatment Diesel Oxidation Catalyst Temperature Sensor Module	Data Valid but Above Normal Operating Range - Moderately Severe Level	Aftertreatment Diesel Oxidation Catalyst Temperature Sensor Module - Data Valid But Above Normal Operating Range - Moderately Severe Level
520826	31	5617	Aftertreatment Diesel Oxidation Catalyst Temperature Sensor Module	Not Available or Condition Exists	Aftertreatment 1 Diesel Oxidation Catalyst System- Special Instruction
524286	31	9491		Not Available or Condition Exists	Reserved for temporary use - Condition Exists
524286	31	9999		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 power from engine. Repeat steps 1-3.

to remove

- 5. When engine starts, the first two lights on the Start Button will illuminate.
- Wait for Engine Temperature to reach 104 °F (40 °C). Press Service Air Button.
   The third light on the Start 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 gauge(s). 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 automatically be stopped with the cause of the shutdown shown on the MidPort.

Delivered air volume at load point pressure is accomplished by two methods, which work together:

- 1. The compressor is loaded (inlet valve fully open or modulated partially open) or unloaded (inlet valve fully closed).
- 2. Engine speed varies between idle speed and full load speed while compressor is loaded to match the required volume flow.

#### **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.

### STOPPING THE MACHINE

- 1. Close the service valve(s).
- 2. Allow the compressor to run at idle speed for 3 to 5 minutes to allow cool-down.
- Turn the main control switch to the run position (second position). This will stop the engine. The MidPort will remain active. Operating parameters and any active diagnostic codes may be viewed, if desired.
- 4. Turn the main control switch to the off position (first position). This turns off the MidPort and compressor control system.

**NOTE:** As soon as the engine stops, the automatic blowdown valve will relieve all pressure from the system, except for the discharge pipe / manifold area. This area should be depressurised by opening the discharge valve, keeping clear of any airflow from it.

If the automatic blowdown valve fails to operate, then pressure must be relieved from the system by means of the service valve(s).

WARNING: When relieving system pressure by means of the service valve(s), a small amount of pressure will remain in the system. No maintenance work should be carried out whilst this situation exists. This pressure may be relieved by slowly operating the manual blowdown valve.

**CAUTION:** Never allow the machine to stand idle with pressure in the system.

#### **EMERGENCY STOPPING**

In the event that the unit has to be stopped in an emergency, PRESS THE EMERGENCY STOP SWITCH ON THE FRONT OF THE MACHINE AND ENSURE THAT IT ENGAGES IN DEPRESSED POSITION.

If the unit is not fitted with an emergency stop switch, rotate the start switch to the (0) off position.

### **RE-STARTING AFTER AN EMERGENCY**

Disengage emergency stop control from engaged (depressed) position.

If the machine has been switched off because of a machine malfunction, then identify and correct the fault before attempting to restart.

If the machine has been switched off for reasons of safety, then ensure that the machine can be operated safely before re-starting.

Refer to the *PRIOR TO STARTING* and *STARTING THE UNIT* instructions earlier in this section before re-starting the machine.

#### MONITORING DURING OPERATION

Should any of the safety shut-down conditions occur, the unit will stop.

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

**CAUTION:** To ensure an adequate flow of oil to the compressor at low temperature, never allow the discharge pressure to fall below 3,5 bar.

### AFTERTREATMENT DEVICES

The Aftertreatment Architecture for the QSB6.7 T4F engine used in this compressor is based on three key subsystems:

- 1. Diesel Oxidation Catalyst (DOC)
- 2. Selective Catalytic Reduction (SCR)
- 3. Diesel Exhaust Fluid (DEF) Dosing System

#### **Diesel Oxidation Catalyst (DOC)**

Modern catalytic converters consist of a monolith honeycomb substrate coated with platinum group metal catalyst, packaged in a stainless steel container. The honeycomb structure with many small parallel channels presents a high catalytic contact area to exhaust gasses. As the hot gases contact the catalyst, several exhaust pollutants are converted into harmless substances: carbon dioxide and water.

The diesel oxidation catalyst is designed to oxidize carbon monoxide, gas phase hydrocarbons, and the SOF fraction of diesel particulate matter to  $CO_2$  and  $H_2O$ .

### Selective Catalytic Reduction (SCR)

The purpose of the SCR system is to reduce levels of NOx (oxides of nitrogen emitted from engines) that are harmful to our health and the environment. SCR is the aftertreatment technology that treats exhaust gas downstream of the engine. Small quantities of diesel exhaust fluid (DEF) are injected into the exhaust upstream of a catalyst, where it vaporizes and decomposes to form ammonia and carbon dioxide. The ammonia (NH<sub>3</sub>) is the desired product which in conjunction to the SCR catalyst, converts the NOx to harmless nitrogen (N<sub>2</sub>) and water (H<sub>2</sub>O).

#### **Diesel Exhaust Fluid (DEF)**

DEF is the reactant necessary for the functionality of the SCR system. It is a carefully blended aqueous urea solution of 32.5% high purity urea and 67.5% deionized water.

A 32.5% solution of DEF will begin to crystallize and freeze at 12 deg F (-11 deg C). At 32.5%, both the urea and water will freeze at the same rate, ensuring that as it thaws, the fluid does not become diluted, or over concentrated. The freezing and unthawing of DEF will not cause degradation of the product.

During cold weather engine operation the engine coolant will be used to heat up and thaw the DEF fluid, there is a delay built in to the engine software to ensure engine operation even with frozen DEF fluid during warmup.

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# **OPERATION OF THE AFTERTREATMENT DEVICES**



- 1. DEF tank fluid level gauge
- 2. Aftertreatment system warning lights
- 3. Aftertreatment regeneration switch

#### Aftertreatment System Lights



- DEF System Status
- 1. High Exhaust Temperature
- 2. Regeneration in process
- 3. DEF fluid level warning
- 4. Regeneration Inhibited

### **Diesel After treatment Device specific lights**

1. HEST Lamp

High Exhaust System Temperature



· Lights when the engine is in an active regeneration phase.

• Higher-than-normal exhaust temperatures may exist due to active DPF regeneration.

• Operator should make sure the exhaust pipe outlet is not directed at any surface or material that may become hazardous.

### 2. DPF Lamp

Regeneration required



· Lights when the DPF is approaching the need for regeneration.

• Operator should check to make sure the Regeneration Control Switch is in Normal Position.

· Operator can continue to use the compressor.

### 3. Diesel Exhaust Fluid (DEF) Lamp

• The Diesel Exhaust Fluid Lamp alerts the operator that the DEF is low and SHOULD be replenished.

• When DEF level comes below 10%, DEF LED goes ON (LED on DEF gauge), the operator should now add DEF fluid.

• When DEF level comes below 5%, DEF LED starts flashing, engine de-rate power for 25% and unit probably shut of due to engine over load.

• When DEF level comes to 0%, DEF LED keeps flashing, engine will stop.

### 4. Regeneration Inhibit



• Lights when the DPF is prevented from starting active regeneration. Prolonged running with this switch in Regeneration Disable Position will cause the DPF filter to plug and could potentially require the DPF to be removed for cleaning.

• This position should only be used when the compressor is to be utilized in hazardous environments (Petrochemical, chemical, others).

### **Regeneration Control Switch**



The regeneration inhibit switch controls the regeneration of the diesel particulate filter. When the switch is turned to the NORMAL position (0), the engine ECM will automatically perform the regeneration of the diesel particulate filter when the soot reaches a high level.

When the switch is turned to the INITIATE position (Right), a request is sent to the engine ECM for a manual regeneration of the diesel particulate filter. This manual regeneration will only happen when the machine is in a non-mission condition and DPF soot levels are high enough to allow regeneration.

**NOTE:** Switch returns from INITIATE position to NORMAL position automatically.

When the switch is turned to the DISABLE position (Left), the engine ECM disallows any automatic or manual (non-mission) regeneration of the diesel particulate filter.

#### Normal Operation - Passive regeneration:



Passive regeneration occurs during most of equipment operating time to remove PM soot from the Diesel Particulate Filter. Exhaust temperatures remain normal and no lamps will be illuminated. There is no impact on equipment performance or operation.

Active regeneration is automatically pre-set to initiate at **96-hour engine run time intervals** by the engine ECM to remove PM soot build-up. When active regen is underway, this may be indicated by the **HEST lamp.** 

#### Normal Operation - Active regeneration:



HEST Lamp Turns ON (temperature dependent activation).

Indicates an active regen in progress and higher than normal exhaust temperatures may occur for typically **15 minutes**. The HEST lamp will activate according to temperature level set by the OEM.

### No operator intervention or action is required.

Equipment works as normal. There maybe a slight increase in engine noise with a change to the sound of the turbocharger. Surface temperature of the DPF will elevate.

Normal Operation - Manual regeneration required:



DPF lamp indicates to the operator that the filter requires a manual active regeneration to clear a build-up of excessive PM soot.

Active regeneration is enabled - but duty cycle conditions prevent regeneration from occurring due to low exhaust temperatures. This will be a very infrequent occurrence. However, at the next convenient opportunity (such as end of shift) the operator should park the equipment and initiate a manual regeneration when it is safe to do so.

Normal Operation - Regeneration Inhibit:



Regeneration DISABLE position should only be selected if the compressor is to be used in a location that could be considered hazardous if the engine ECM initiates active regeneration (increased exhaust temperatures).

# **REGENERATION CHART**

1. Passive Regeneration	2. Mobile Active Regeneration	3. Stationary Active Regeneration
Continuous	Automatic	Manual
Passive regeneration occurs during most of the equipment operating time.	1. <b>Timed:</b> mobile active regen is pre-set to automatically occur <b>at 96 hour intervals</b> while the equipment is working. Takes <b>15 minutes</b> to fully regenerate.	A stationary (or parked) active regen is <b>manually initiated</b> by the operator using the Regen Start switch. Takes <b>30 to 45 minutes</b> to fully regenerate.
	2. <b>Duty Cycle:</b> active regen may occur sooner than 96 hours if passive regen is insufficient to	This is required when PM soot loading reaches 50% in the filter, shown by the DPF lamp.
	prevent PM soot loading approaching 50% in the filter. Takes <b>30 to 45 minutes</b> to fully regenerate.	Manual regen is required due to the active regen function disabled by the Inhibit 'ON' switch - or because the system cannot reach the necessary exhaust temperature or flow for duty cycle initiated active regen to occur.
Continually removes PM soot from the Diesel Particulate Filter when exhaust temperature is above 220 °C.	Removes any excessive build-up of PM soot from the filter by raising the exhaust temperature above 500 °C with late injection fuel.	Removes any excessive build-up of PM soot from the filter by raising the exhaust temperature above 500 °C with late injection fuel.
DPF exhaust and surface temperatures are normal.	DPF exhaust and surface temperatures are higher than normal due to regen.	DPF exhaust and surface temperatures <b>are</b> higher than normal.
No indicator lamp will illuminate.	The <b>HEST</b> (High Exhaust Temperature) lamp may illuminate.	The <b>HEST</b> (High Exhaust Temperature) lamp may illuminate.
		Equipment must be stationary and parked in a safe location.

WARNING: Continued use of the Regeneration Inhibit position will at first lead to warning messages being displayed on the MidPort due to increased soot loading of the DPF core. Failure to respond with a return to the Normal switch position will eventually create a severe engine power derate and shutdown, running in this condition until shutdown could also damage the DPF core requiring replacement instead of cleaning.

### Important Notes:

The DOC is a maintenance free device and will under normal conditions remain operational for as long as the engine.

The DEF system requires maintenance of the filter situated in the Bosch dosing pump at the required intervals (see scheduled maintenance).



Using any fluid other then the proper DEF fluid will contaminate and render the dosing system inoperable causing the engine to stop.

Should any contamination occur , then the tank needs to be removed and cleaned before filling with the correct DEF fluid.

DEF fluid should only be used from clean receptacles or filtered pumping systems.

Never use additives to change the DEF fluid properties.

### 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.

### BUNDED BASE

#### Description

This machine is fitted with bund equipment to contain leakages and spillages, which occur within the machine enclosure.

The bund will contain all fluids normally installed in the machine, plus an additional 10%, when operated within 3 degrees of level.

Drains for engine water & oil and compressor oil are located at the front corner of the machine

The rear air intake is covered to prevent rainwater ingress. Ensure that the cover is not prevented from moving.

## Draining of contaminated fluids

Contaminated fluid must be removed by authorized personnel only.

Captured fluids can be drained from the bund by uncoupling the flexible pipe secured at the rear / side. This pipe must be re-secured after draining.

#### Drainage of machine fluids

During maintenance operations drain machine fluids using the drain ports indicated.

When cleaning of the fuel tank is needed, tank should be removed from compressor.

Captured fluids can be drained from the bund by uncoupling the flexible pipe secured at the rear / side. This pipe must be re-secured after draining.

WARNING: Major leakages or spillages must be drained before the machine is towed.

# 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 fill the airend intake 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 the fuel system.

#### SHORT TERM STORAGE

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

• Be started and operated 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.
- Remove batteries and connect to trickle charger.

#### **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								
	Daily	Weekly	Monthly	6 months or 500 hrs	1 year or 1000 hrs	2000 hrs	4500 hrs	5000 hrs
Compressor Oil Level	С							
Engine Oil Level	С							
Coolant Level	С							
Gauges / Lamps	С							
Air Cleaner Service Indicators	С							
Air Cleaner Dust Ejector Valve	С							
Aftertreatment Exhaust Piping	С							
Fuel Tank	C/Refill							
Fuel / Water Separator	D							
Fluid Leaks	С							
Radiator Filler Cap	С							
Diesel Exhaust Fluid (DEF) Level	C/Refill							
Air Cleaner Precleaner Dump		С						
Fan / Alternator Belts		С						
Battery Connections / Electrolyte		С						
Tire Pressure & Surface		С						
Wheel Lug Nuts			С					
Hoses (Oil, Air, Intake, etc.)			С					
Automatic Shutdown System			С					
Air Cleaner System			С					
Coolers & Radiator			С					
Fastener & Guards			С					
Primary Air Cleaner Elements					R/WI			
Secondary Air Cleaner Elements						R/WI		
Fuel/Water Separator Element				R				
Final Fuel Filter				R				
Engine Oil Filter				R				
Engine Oil				R				
Engine Breather Filter						R		
Engine Coolant Conditioner Filter				R				
Engine Valve Lash								C/A
Aftertreatment DEF Unit Filter							R	
Compressor Oil Filter				R				
Compressor Oil				1	R			
Oil Separator Element						R		
Engine Coolant				С		R		

C = Check and act if required.

- T = Test.
- D = Drain.
- R = Replace.

R/WI = Replace or when indicated earlier.

C/R = Check and replace if required.

G/C = Grease and check.

C/A = Check and adjust if required.

**NOTE:** 500 and 1000 hour intervals are meant to be repeated at every 500 or 1000 hours. Other intervals only to be performed at hours indicated.

**NOTE:** All fluid and filter intervals are valid for near perfect conditions only. High ambient temperatures - high dust concentration - high humidity as well

Contact your Doosan Infracore Portable Power dealer for more information or assistance in determining the optimum intervals for your application.

	Daily	Weekly	Monthly	6 months or 500 hrs	1 year or 1000 hrs	2000 hrs	4500 hrs	5000 hrs
Wheels (Bearings, Seals, etc.)				С				
Shutdown Switch Settings					Т			
Scavenger Orifice & Related					С			
Lights (Brake, Running & Turn)	CBT							
Pintle Eye Bolts	CBT							
Brakes	С			С				
Brake Linkage	С							
Emergency Stop	Т							
Fasteners	С							
Running Gear Linkage & Bolts			G/C					
Safety Valve				С				
Minimum Pressure Valve				С				
Pressure System					С			
Pressure Gauge					С			
Pressure Regulator					С			
Separator Tank Exterior					С			
Lubricator (Fill)	С							
Engine Air Inlet Shutdown Valve			Ī		С			
Engine Vibration Damper			T	1		C/R		

C = Check and act if required.

T = Test.

D = Drain.

R = Replace.

R/WI = Replace or when indicated earlier.

C/R = Check and replace if required.

G/C = Grease and check.

C/A = Check and adjust if required.

**NOTE:** 500 and 1000 hour intervals are meant to be repeated at every 500 or 1000 hours. Other intervals only to be performed at hours indicated.

**NOTE:** All fluid and filter intervals are valid for near perfect conditions only. High ambient temperatures - high dust concentration - high humidity as well

Contact your Doosan Infracore Portable Power dealer for more information or assistance in determining the optimum intervals for your application.

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MAINTENANCE									
	Initial 500 miles /850 km	Daily	Weekly	Monthly	3 Months 500 hrs.	6 Months 1000 hrs	12 Months 2000 hrs		
*Brake linkage	С				С				
*Brakes	С				С				
*Lights (running, brake, & turn)		CBT							
*Pintle Eye Bolts		CBT							
*Tire Pressure and Condition			С						
*Wheel Lug Nuts				С					
*Running gear linkage				G					
*Running gear bolts(1)					С				
*Wheels (Bearings, Seals, etc.)						С	G		

	2 Yrs	4 Yrs	6 Yrs
Safety valve	С		
Hoses		R	
Separator tank (2) interior			С

# **DRAIN LOCATIONS**



- 1. Separator tank drain.
- 2. Engine coolant drain.
- 3. Engine oil drain.
- 4. Compressor coolant drain.
- 5. Fuel tank 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 using the tool provided. Place the empty container underneath the drain outlet and open the valve. 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).

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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 slide the cover plate towards the airend. 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 elem	ent <b>must</b> be l	replaceo	Ι.					

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 2 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. 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.

#### Final Fuel Filter / Water Separator

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

WARNING: The Primary 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 filters with clean fuel, leave the Final filter empty and prime the system using the hand prime pump on the Primary filter head.

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# 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**

Tyre Pressure: 600kPa.

#### **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.



- 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.



- 9. Compression spring
- 10.Equaliser plate
- 11.Cable

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

### 2. Brake Shoe Adjustment



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

Loosen adjusting screw [12] anti-clockwise (approx.  $^{1\!\!/_2}$  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!



# 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		٠		

# 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  $\pm$  5Nm, Bolt M14 to 125  $\pm$  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  $30 \pm 2$ Nm.



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  $30 \pm 2$ Nm.

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  $20 \pm 2$ Nm. 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
а	Grease nipple
b	Bush
С	Piston rod
d	Hole
е	Top middle part
f	Bottom middle part
g	Holes for handbrake
h	Drawbar coupling
i	Conversion lever coupling
j	Tube
k	Pin
I	Adjustement bolt, welded
m	Gearing
n	Top spindle
0	Thread

р	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
а	Grease nipple
b	Bush
С	Piston rod
d	Hole
е	Top middle part
f	Bottom middle part
g	Holes for handbrake
h	Drawbar coupling
i	Conversion lever coupling
j	Tube
k	Pin
I	Adjustement bolt, welded
m	Gearing
n	Top spindle
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### Brake cable adjustment for KHD drawbar – SK70008

### Instructions

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



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



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





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'.



- 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.

#### 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.

#### PRESSURE REGULATOR ADJUSTING INSTRUCTIONS



Normally, regulation requires no adjusting, but if correct adjustment is lost, proceed as follows:

- Refer to the diagram above.
- A Adjusting screw

- Start the machine (Refer to *STARTING INSTRUCTIONS* in the *OPERATING INSTRUCTIONS* section of this manual).
- Adjust the service valve on the outside of the machine to maintain rated pressure at full speed. If full speed is not maintained at rated pressure, then turn the adjusting screw clockwise to increase the pressure. Optimum adjustment is achieved when full speed is achieved at rated pressure.
- · Close the service valve. The engine will slow to idle speed.

#### TORQUE VALUES

TABLE 1		INCH FA	STENERS		
	Ν	NOMINAL DES		E	9 5 1 4 8
	8AE GRA (HEAD M	J249 DE 5 ARKING)	8AE GRA (HEAD M	J249 DE 8 ARKING)	10 6 2 3 7 TYPICAL RECTANGULAR TORQUE PATTERN
CAPSCREW OR NUT THREAD SIZE AND PITCH				$\bigcirc$	1 4   3 2   TYPICAL SQUARE TORQUE PATTERN   6 7
4/4	(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	TYPICAL CIRCULAR TORQUE PATTERN
5/8 - 11	203	150	287	212	
3/4 - 10	361	266	509	376	

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#### 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	Specification
6,9 bar to 20,6 bar 100 psi to 300 psi	-23°C to 52°C (-10°F to 125°F)	Preferred: <b>PRO-TEC</b> Alternate: ISO Viscosity Grade 46 with rust and oxidisation inhibitors, designed for air compressor service.
24,1 bar 350 psi	-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



Preferred Doosan Fluids - 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	19.0 Litre	208.2 Litre	836 Litre
PRO-TEC	89292973	89292981	22082598
XHP 605	22252076	22252050	22252068
XHP 1001	35612738	35300516	-
XHP 405	22252126	22252100	22252118



EM1	Button, emergency stop	<b>P</b> 1
EM2	Button, emergency stop	<b>P</b> 4
J4A	Connector, control panel	PT1
J5	Connector, Titan communication	PT2
J7	Connector, accessory (option)	RT1
J8	Connector, autostart (option)	RT2
J17	Connector, pressure sensor interface (IQ option)	RT3
J32	Connector, low fuel beacon (option)	S10
L1	Valve, start/run solenoid	S11
L2	Valve, unloader solenoid	S14
L3	Valve, dual pressure solenoid (option)	U1

KEY

P1	Titan controller
P4	Connector, control panel
PT1	Sensor, separator tank pressure
PT2	Sensor, regulation system pressure
RT1	Sensor, separator tank temperature
RT2	Sensor, discharge air temperature
RT3	Sensor, ambient air temperature
S10	Switch, engine air filter restriction
S11	Switch, airend air filter restriction
S14	Switch, safety valve pressure
U1	Sensor, fuel level

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B1	Starter, engine	G1	Alternator, engine
BDS1	Switch, battery disconnect	HR1	Heater, engine intake air
BT1	Battery 1 (24VDC)	HR2	Heater
BT2	Battery 2 (24VDC)	HR3	Heater
C33	Connector, MAF engine harness	HR4	Heater
C34	Sensor, MAF	HR5	Heater
F11	Fuse, alternator (100A)	J12	Connector, regulation heaters (option)
F <b>12</b>	Fuse, engine intake air heater (150A)	K1	Relay, engine starter
FB1	Fuse / Relay centre	K2	Relay, engine intake air heater



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C5B	Sensor, water-in-fuel	J26E	Module, DEF supply
FC1	Clutch, fan	J27E	Valve, DEF tank heating
J3	ECM	J31E	Module, DEF dosing
J5A	Connector, engine ECM service	P6	Connector, harness
J6	Connector, engine interface	P6A	Interface, engine
J6A	Connector, harness	RT4	Sensor, CAC out temperature
J11	Sensor, coolant level	S12	Switch, engine overspeed valve (option)
J20	Connector, air shutoff valve (option)	S13	Switch, aftercooler (option)
J24	Connector, 24 pin breakout	TR2	Resistor, terminating



J6E	Sensor, DEF quality	J28E	Heated hose, DEF pressure line
J7AE	Sensor, upstream NOx	J29E	Heated hose, DEF backflow line
J10E	Controllers SCR thermistor	J30E	Heated hose, DEF suction line
J17E	Controllers DOC / DPF thermocouple	J78E	Sensor, downstream NOx
J19	Controllers WiFi (option)	TR3	Resistor, terminating



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#### HM1 Hourmeter M8 Gauge, DEF level J4 Connector, control panel М9 Gauge, DEF status KP1 Keypad P4A Connector, control panel M1 Gauge, air pressure **S**1 Switch, power M2 Tachometer, engine S2 Switch TR1 М7 Gauge, fuel level Resistor, terminating



#### KEY

J17 Connector

- J18 Connector
- PT100 Sensor, primary filter inlet
- PT101 Sensor, secondary filter outlet

HR100 Heater, water separator drain

HR101 Heater, primary filter drain

HR102 Heater, secondary filter drain

#### ELECTRONIC SYSTEMS

The following special tools are recommended to perform service procedures in this manual.

The tools can be purchased from Doosan or equivalent substitutes can be used.

ΤοοΙ	Tool Description
22216691	Digital Multimeter Used to Measure electrical circuits: volts, ohms amps
54729660	Weather-Pack Terminal Removal Tool Used to repair Packard Electric Weather-Pack Connectors
54729678	Deutsch Terminal Removal Tool (Blue) Used to repair Deutsch connectors
54729686	Deutsch Terminal Removal Tool (Red) Used to repair Deutsch connectors
54729694	Deutsch Terminal Removal Tool (Yellow) Used to repair Deutsch connectors
22216667	Deutsch Terminal Crimp Tool Used to crimp Deutsch connector terminals
54729710	Electrical Contact Cleaner Used to clean electrical contacts and connectors
22073886	Packard Crimp Tool Used to crimp Packard connector terminals
22073878	Thermistor Simulator Plug Used to test thermister circuits
54699616	Deutsch Terminal Removal Tool Used to repair Deutsch connectors
54699657	Deutsch Terminal Removal Tool Used to repair Deutsch connectors
54749643	Packard Metri-Pack Terminal Removal Tool Used to repair Metri-Pack connectors
54749635	Connector Repair Kit Used to make connector repairs

FAULT	CAUSE	REMEDY		
No reaction from	Batteries not connected.	Connect batteries.		
instrument panel when key turned to (I) position.	Fuse at starter motor 'blown'.	Replace fuse.		
Engine fails to start.	Low battery charge.	Check the fan belt tension, battery and cable connections.		
	Bad earth connection.	Check the earth cables, clean as required.		
	Loose connection.	Locate and make the connection good.		
	Fuel starvation.	Check the fuel level and fuel system components. Replace the fuel filter if necessary.		
	Relay failed.	Replace the relay.		
	Faulty stop solenoid.	Check the stop solenoid.		
Engine stops while in service or is reluctant	Low fuel level.	Fill fuel tank and bleed air from fuel system if necessary. (Refer MAINTENANCE SECTION).		
to start.	Safety shut-down system in operation.	Check the safety shut-down switches.		
Engine starts but stalls	Electrical fault.	Test the electrical circuits.		
returns to position I.	Low engine oil pressure.	Check the oil level and the oil filter(s).		
	Faulty relay.	Check the relays.		
	Faulty key-switch.	Check the key-switch.		
Engine starts but will	Electrical fault.	Test the electrical circuits.		
down prematurely.	Low engine oil pressure.	Check the oil level and oil filter(s).		
	Safety shut-down system in operation.	Check the safety shut-down switches.		
	Fuel starvation.	Check the fuel level and fuel system components. Replace the fuel filter if necessary.		
	Switch failure.	Test the switches.		
	High compressor oil temperature.	Check the compressor oil level and oil cooler. Check the fan drive.		
	Water present in fuel system.	Check the water separator and clean if required.		
	Faulty relay.	Check the relays and replace if necessary.		
Engine Overheats.	Low water level.	Check the level and replenish if necessary.		
	Blocked radiator.	Stop the machine and clean the cooling fins with compressed air or steam. Use reduced pressure for cleaning the fins.		
	Reduced cooling air from fan.	Check the fan and the drive belts. Check for any obstruction inside the cowl.		
	Faulty thermostat.	Check the thermostat and replace if necessary.		
Engine speed too high.	Incorrect throttle arm setting.	Check the engine speed setting.		
Engine speed too low.	Incorrect throttle arm setting.	Check the throttle setting.		
	Blocked fuel filter.	Check and replace if necessary.		
	Blocked air filter.	Check and replace the element if necessary.		
	Incorrectly set regulation system.	Reset the regulation system. Refer to SPEED AND PRESSURE REGULATION ADJUSTMENT in the MAINTENANCE section of this manual.		
	Premature unloading.	Check the regulation system.		
Excessive vibration.	Engine speed too low.	See "Engine speed too low".		
Leaking oil seal.	Improperly fitted oil seal.	Replace the oil seal.		
Refer also to the Engine Manufacturer's Manual.				

### 94 FAULT FINDING

FAULT	CAUSE	REMEDY		
Air discharge capacity	Engine speed too low.	See "Engine speed too low".		
too low.	Blocked air cleaner.	Check the restriction indicators and replace the element(s) if necessary.		
	High pressure air escaping.	Check for leaks.		
	Incorrectly set regulation system.	Reset the regulation system. Refer to SPEED AND PRESSURE REGULATION ADJUSTMENT in the MAINTENANCE section of this manual.		
Compressor overheats.	Low oil level.	Top up the oil level and check for leaks.		
	Dirty or blocked oil cooler.	Clean the oil cooler fins.		
	Incorrect grade of oil.	Use Doosan recommended oil.		
	Defective by-pass valve.	Check the operation of the element and replace if necessary.		
	Recirculation of cooling air.	Move the machine to avoid recirculation.		
	Reduced cooling air from fan.	Check the fan and the drive belts. Check for any obstruction inside the fan cowl.		
Excessive oil present in	Blocked scavenge line.	Check the scavenge line, drop tube and orifice. Clean and replace.		
the discharge air.	Perforated separator element.	Replace the separator element.		
	Pressure in the system is too low.	Check the minimum pressure valve.		
Safety valve operates.	Operating pressure too high.	Refer to SPEED AND PRESSURE REGULATION ADJUSTMENT in the MAINTENANCE section of this manual.		
	Incorrect setting of the regulator.	Adjust the regulator.		
	Faulty regulator.	Replace the regulator.		
	Inlet valve set incorrectly.	Refer to SPEED AND PRESSURE REGULATION ADJUSTMENT in the MAINTENANCE section of this manual.		
	Loose pipe/hose connections.	Check all pipe/hose connections.		
	Faulty safety valve.	Check the relieving pressure. Replace the safety valve if faulty. DO NOT ATTEMPT A REPAIR.		
Oil is forced back into the air filter.	Incorrect stopping procedure used.	Always employ the correct stopping procedure. Close the discharge valve and allow the machine to run on idle before stopping.		
	Faulty inlet valve.	Check for free operation of the inlet valve(s).		
Machine goes to full pressure when started.	Faulty load valve.	Replace the valve.		
Machine fails to load	Faulty load valve.	Replace the valve.		
when the load switch is pressed.	Faulty switch.	Test switch.		
	Loose pipe/hose connections.	Check all pipe/hose connections.		

#### **OPTIONS - IQ SYSTEM**

#### **IQ System Active**



### Standard Operation (IQ System Bypassed)



#### KEY

1	Separator Tank	6	Primary IQ Filter
2	Minimum Pressure Valve	7	Secondary IQ FIIter
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  $7 \,^{\circ}C$  (45 $^{\circ}F$ )) at any ambient temperature down to -23 $^{\circ}C$  (-20 $^{\circ}F$ ). 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).

#### **OPTIONS - DUAL PRESSURE**

#### MAINTENANCE

**Daily:** Examine the spark arrestor for any sign of gas leakage, cracks or significant areas of damage, i.e. dents of more than a few millimetres in depth.

**Three Monthly:** Remove spark arrestor. Tap with a soft mallet to loosen any internal deposits and shake out. Also by shaking check for any loose internal baffles.

**Six Monthly (or 1500 hours operation, whichever is sooner):** Examine the exhaust discharge in darkness whilst repeatedly loading and accelerating the engine. If any sparks are observed, the spark arrestor is not suitable for further use.

**NOTE:** Ensure adequate ventilation if this check is carried out in an enclosed area.

**NOTE:** The engine must not be put back into service until any problems identified by the above checks are rectified.

#### **OPTIONS - OVERSPEED (CHALWYN) VALVE**

#### MAINTENANCE

#### **Three Monthly:**

- 1. Disconnect the intake pipework and release the valve from any support brackets etc., to allow it to be removed.
- Inspect the valve internally for cleanliness. If necessary, clean in paraffin or white spirit, taking normal precautions. Dry the valve thoroughly.
- Check that there is no excessive wear and that the valve moves smoothly over its complete operating stroke. DO NOT LUBRICATE.
- 4. Refit the valve. Check valve setting.

**NOTE:** The recommended routine maintenance period is three months. This period is dependent on the operating conditions of the engine and, by experience, may need to be varied.

#### Adjustment

Once the Chalwyn valve is installed, adjustment of the overspeed trip setting is carried out using the adjuster and locknut. Basically rotating the adjuster clockwise will increase the engine speed at which automatic shutdown occurs.

- 1. Start engine. Slowly accelerate. Note speed at which shutdown occurs.
- Remove hose at air inlet to Chalwyn valve to expose the adjuster and locknut.
- 3. Release locknut. Turn adjuster clockwise one turn. Tighten locknut.
- 4. Refit inlet hose to Chalwyn valve.
- 5. Start engine. Slowly accelerate. Note speed at which shutdown occurs.
- 6. Repeat the above steps "2" to "5" until the first setting at which the engine does not shut down at high idle speed.

#### Then either:

A. Use the results of shutdown speed versus adjuster setting as a calibration check to make a final adjustment to give the required setting (typically 10% to 15% over high idle),

#### or

- B. If a very precise setting is not required, turn the adjuster a further one turn clockwise to take the shutdown above high idle speed by a suitable margin. When using this setting procedure it may be found that the engine occasionally shuts down during the normal operation. If so, turn the adjuster clockwise by a further one half turn.
- 7. Ensure the adjuster locknut is fully tightened.

**NOTE:** <u>Turbocharged engines</u> - when setting up a valve on a turbocharged engine using the preceding method, it may be found that at high power outputs, the engine will shut down at lower speed than required. If this occurs, further small adjustments in steps of one half turn clockwise should be made until the problem is eliminated.

<u>Insufficient Adjustment</u> - should there be insufficient adjustment available to set the required overspeed trip-point, the outlet locknut should be released and the outlet adjuster rotated anticlockwise by four turns. The outlet locknut should then be treated with a thread lock adhesive and security tightened. Further adjustment to the inlet adjuster as per above instructions is then continued.

#### 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.

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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 After	market +32 (2) 404 0811	+32 (2) 371 6915
Drève Richelle 167		
B-1410 Waterloo		
Belgium		
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. (E	ST)

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



**Portable Power**