Doosan Infracore
Portable Power

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Portable Power

Portable Compressors

Service Training

2010

Ingersoll Rand
Construction Technologies

Machine Serial Number Identification

1. Hindley Green Serial Number Identification.

It is important to obtain the complete serial number, before looking up CPN numbers in the parts manual. On current machines the serial number is located on the canopy, on the right or front side, depending on the model.

Should the data plate be missing, the serial number is also stamped into the truck frame and also on the tow bar of each unit.

From 1970 machine serial numbers have incorporated a system of a three digit product code after the serial number, which represents a model of compressor built by the Portable Division.

A complete tabulation of machine product codes are as illustrated on pages 48 to 50, of the Product Support Manual 2002.

Example of complete serial number:

412405 E 95 341

412405	Machine Serial Number
E, U	Manufacturing Location - E = Hindley Green, U = Mocksville
95	Year of Manufacture
341	Product Code

2. Czech Republic Serial Number Identification.

VIN (Vehicle Identification Number) coding

The VIN number consists of the following numbers of digits :

XXX XXXXXX X X XXXXXX
a) b) c) d) e)

a) SCZ = WMI code for IR (3 digits)

b) 731EFX = model, type (6 digits)

c) 5 = year (2004 = 4, 2005 = 5, 2006 = 6, etc) (1 digit)

d) Y = assembled in Europe (1 digit)

e) 123456 = machine serial number (6 digit)

VIN example for compressor, assembled in year 2005, serial number 123456

SCZ731EFX5Y123456

3. USA Serial Number Identification.

a) Model Notations for Portable Compressors.

Below are listed the notations that you will come across on the Portable Compressors.

Prefixes: P — 100PSI NXP — 125PSI (Non Lube)
NHP — 151 thru 249 PSI (Non Lube)
XP — 125PSI VHP — 151 thru 249PSI
HP — 150PSI XHP — 250PSI or up

Suffixes:

1) "A", "B", "C", "D", "E", "F" – Designates that unit is a redesigned model. In other words XP600AWGM is **not** the same unit as XP600WGM, or XP750WGM is **not** the same unit as XP750AWGM.

2) "W" or "S" – Designates whisperized or standard.

3) "F", "W", "D", "GM", "CU", "CAT" or "JD" – These notations after the "Whisperized" or "Standard" notations refer to the driver.
W — White CAT — Caterpillar
D — Deutz JD — John Deere
GM — General Motors F — Ford
CU — Cummins IR — Ingersoll Rand

4) “U” – Designates utility version
Example – P100AWWU –This means:
P — 100PSI W — Whisperized
100 — 100CFM W — White engine
A — Redesigned unit U — Utility version

5) The other suffixes you may encounter after the CFM rating:
O.F. — Oil Field Rig
D.D. — Direct Drive
A.T. — Automatic Transmission

b) Model Notations for Light Towers.

Prefixes: L — Light Tower

Suffixes: 4MH – Number and type of Lamp (ex. 4 metal halide lamps)

c) Model Notations for Compressor Modules.

Prefixes: Same as listing in “a)” above.

Suffixes: CM - Compressor Module (Shaft mounted fan cooling)
CMH - Compressor Module (hydraulic mounted fan cooling)

Serial Number of the unit.

From the early 1950’s to 1970, serial numbers were in the following sequence types:

1) 600AR18719 ---------- R600 serial #18719
2) 125SRA19209 ---------- RA125 serial #19209
3) A85RR61253 ---------- RR85 serial #61253
4) 50621L900M ---------- L900 serial #50621

These serial numbers gave the style of unit and the unique serial number. They were stamped on the air end and on the Portable Machine identification plate.
Beginning in 1970 Portable Power went to a product code system for serial numbers. The basic concept was simple in that, a three digit product code would represent each style of compressor built by the Portable Division. The same concept was carried on until 1991.

Example of “Product Code” type serial number:

98716U77500

1) 98716 Serial number.
2) U Unit was manufactured in Mocksville.
3) 77 Unit was manufactured in 1977.
4) 500 Product code for DR600.

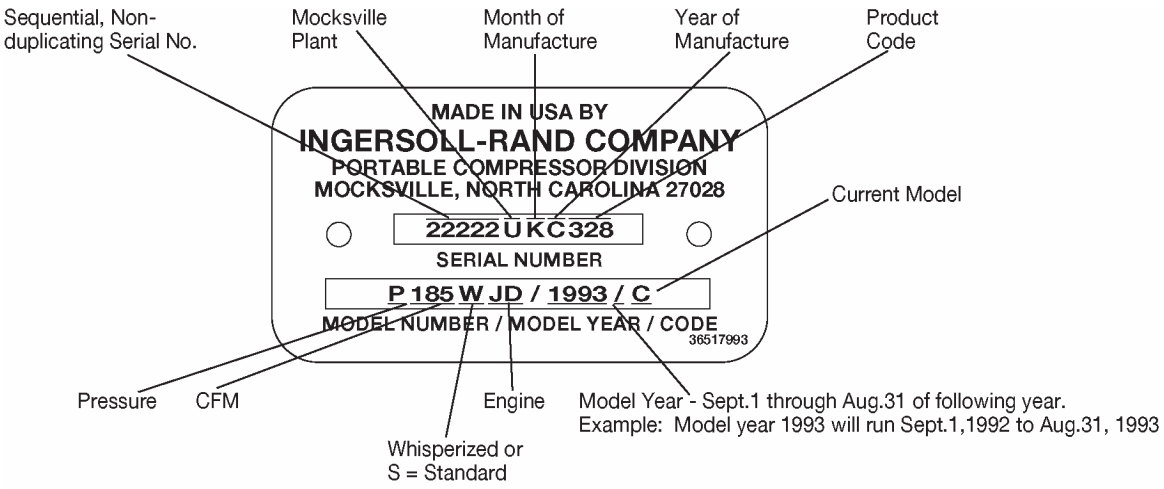
Also at this point in time, the compressor serial number was removed from the air end. In its place was stamped a unique air end serial number which was totally different from the compressor serial number. The compressor serial number was now stamped on the frame on the right hand side of the unit, when facing the drawbar looking toward the unit. Note: This may vary from unit to unit.

Beginning in 1991 with unit serial number 194276, the year of manufacture was removed from the serial number. A typical serial number looked as follows: 195200U578. Also in 1991, at unit serial number 199888, the serial number was no longer stamped on the frame of the unit.

Effective in August 1992, with unit serial number 214473, the numeric year of manufacture was reinstated by using two letters that give you the actual month and year of manufacture. The month and year of manufacture is encoded into the serial number according to the coding system that follows.

The new serial number plate will now show the model number for easier identification. This model number will be the nomenclature such as P185WJD. The letter immediately following the Model Year is a code that indicates the current model configuration of the unit. This is just one more feature that will make ordering service parts and referencing maintenance manuals easier.

The new metal serial number plate will look as follows:



MONTH of Manufacture	**CODE**	**YEAR of Manufacture**	**CODE**
January	A	1992	B, C
February	B	1993	D
March	C	1994	E
April	D	1995	F
May	E	1996	G
June	F	1997	H
July	G	1998	I
August	H	1999	J
September	I	2000	K
October	J	2001	L
November	K	2002	M
December	L	2003	N
		2004	O
		2005	P
		2006	Q
		2007	R
		2008	S
		2009	T
		2010	U
		2011	V
		2012	W
		2013	X
		2014	Y
		2015	Z

Location of Serial Number Plates (effective with S/N 214473)

Platinum Series (P100 thru P185):
Inside front panel near radiator (street side), or curb side fan shroud.

P250 thru P375 Cummins and John Deere:
Fan shroud (curb side).

Prestige Series (100 thru 250 cfm), P250WD, VHP300WD/P375WD, HP375WD, XP400WD, P425WD, XHP600/750SCAT:
Left hand side (street side) of fan shroud, or above instrument panel on horizontal part of box.

Fast Tracks (New style with fenders):
Fan shroud (curb side), or above instrument panel on horizontal part of box.

Fast Tracks, Large EPA, HP300WCU, P375WCU, HP450WCU, XP525WCU, P600WCU and other intermediate size compressors:
Above instrument panel on horizontal part of box.

AF-1600:
On outside of the discharge pipe support, midway between sub-base and top.

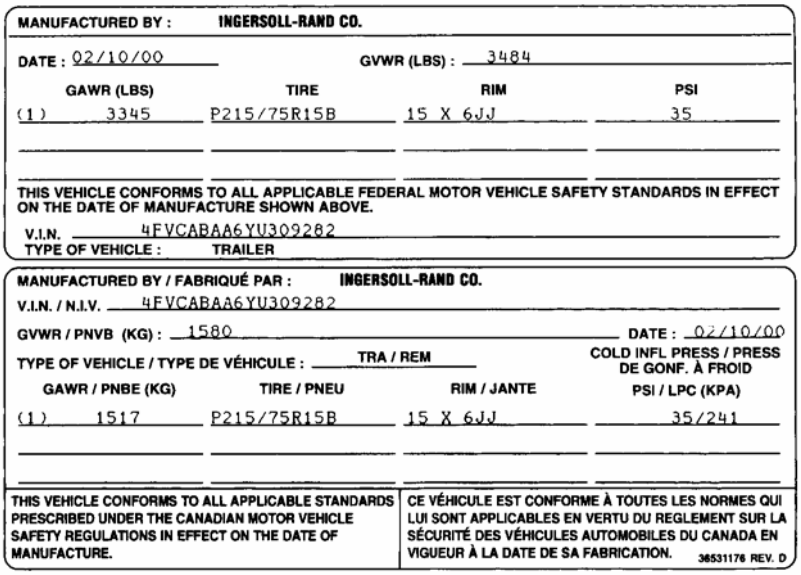
L6/L8 Light Towers:
On the backside of the instrument/control panel rear cover in top right hand corner. L6A and L8A: on left hand side (street side) of rear tower support above fan shroud. L6B and L8B: Right hand side (inside of unit) of rear panel near radiator. L6C and L8C: radiator side support on curb side.

Light Source:
Top of instrument panel box.

Compressor Module:
On top of inside bottom frame rail.

VEHICLE IDENTIFICATION NUMBERS (VIN)

Beginning in January of 2000, Portable Power began assigning vehicle identification numbers (VIN) to all highway tow able products. The VIN decal is attached to the exterior of the unit and looks as follows:



MANUFACTURED BY : INGERSOLL-RAND CO.

DATE : 02/10/00 GVWR (LBS) : 3484

	GAWR (LBS)	TIRE	RIM	PSI
(1)	3345	P215/75R15B	15 X 6JJ	35

THIS VEHICLE CONFORMS TO ALL APPLICABLE FEDERAL MOTOR VEHICLE SAFETY STANDARDS IN EFFECT ON THE DATE OF MANUFACTURE SHOWN ABOVE.

V.I.N. 4FVCABAA6YU309282

TYPE OF VEHICLE : TRAILER

MANUFACTURED BY / FABRIQUÉ PAR : INGERSOLL-RAND CO.

V.I.N. / N.I.V. 4FVCABAA6YU309282

GVWR / PNVB (KG) : 1580 DATE : 02/10/00

TYPE OF VEHICLE / TYPE DE VÉHICULE : TRA / REM

	GAWR / PNBE (KG)	TIRE / PNEU	RIM / JANTE	COLD INFL PRESS / PRESS DE GONF. À FROID PSI / LPC (KPA)
(1)	1517	P215/75R15B	15 X 6JJ	35/241

THIS VEHICLE CONFORMS TO ALL APPLICABLE STANDARDS PRESCRIBED UNDER THE CANADIAN MOTOR VEHICLE SAFETY REGULATIONS IN EFFECT ON THE DATE OF MANUFACTURE.

CE VÉHICULE EST CONFORME À TOUTES LES NORMES QUI LUI SONT APPLICABLES EN VERTU DU REGLEMENT SUR LA SÉCURITÉ DES VÉHICULES AUTOMOBILES DU CANADA EN VIGUEUR À LA DATE DE SA FABRICATION. 36531176 REV. D

17 Digit VIN Number Logic.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
manufacturers ID			TYPE	SERIES	CONFIGURATION	LENGTH	AXLE	CHECK DIGIT	MODEL YEAR	PLANT	First 6 digits from unit serial #					
			C=Compressor G=Genset L=Light Tower	COMPRESSORS A=100psi B=125psi C=150psi D=170psi E=200psi F=250psi G=300psi H=350psi LIGHT TOWERS R=5KW S=6KW T=8KW U=Lightsource	A=Standard B=Whisperized	A = 12ft B =13ft C =14ft D =15ft E =16ft F =17ft G =18ft H =19ft J =20ft K =21ft L =22ft	A=Single B=Tandum	*SUM/11	see table V=1997 W=1998 X=1999 Y=2000 Z=2001	U=Mocksville						

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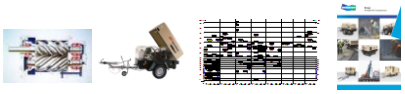
Portable Compressors EMEA



Date: December 2009
Department: Marketing
Alex Persyn

Product Range

Model	Capacity m³/min	Pressure bar
7/20	2.0	7.0

or

Kubota D1005 Engine

Product Range

Models	Capacity m³/min (cfm)	Pressure bar (psig)
7/26E	2.5 (90)	7.0 (100)
7/31E	3.0 (105)	7.0 (100)

or

or

Product Range

Models	Capacity m³/min (cfm)	Pressure bar (psig)
7/41	4.0 (140)	7.0 (100)

or

Product Range

Model	Capacity m³/min (cfm)	Pressure bar (psig)
7/51	5.0 (175)	7.0 (100)

or

Product Range

Models	Capacity m³/min (cfm)	Pressure bar (psig)
7/71	7.1 (250)	7.0 (100)
12/56	5.6 (200)	12.0 (175)

Product Range

7/120 Platform

Models	Capacity m³/min (cfm)	Pressure bar (psig)
7/120	12.0 (425)	7.0 (100)
9/110	10.6 (375)	8.6 (125)
10/105	10.3 (365)	10.3 (150)
14/85	8.5 (300)	13.8 (200)

Product Range

Models	Capacity m³/min (cfm)	Pressure bar (psig)
7/170	17.0 (600)	7.0 (100)
10/125	12.7 (450)	10.3 (150)
14/115	1.3 (400)	14.0 (200)

7/170 Platform

Product Range

Model	Capacity m³/min (cfm)	Pressure bar (psig)
9/235HA	23.4 (825)	8.6 (125)

Product Range: NEW 12/150

- Pressure: 12bar (175psi)
- Volume: 14.6 m³/min (515cfm)
- Engine: Cummins QSB 6.7 (157kW)
- Weight: Max 3000kg (incl.options)
- Running gear: Single axle
- Applications: Soil investigation
  Abrasive shot blasting
  Rock drilling
  Fibre optic cabling,…

Bunded base & Central drains standard!

Product Range

Models	Capacity m³/min (cfm)	Pressure bar (psig)
9/270	27.0 (950)	8.6 (125)
9/300	29.2 (1060)	8.6 (125)
12/235	23.1 (825)	12.1 (175)
17/235	23.1 (825)	17.2 (250)
21/215	20.9 (760)	20.7 (300)

Product range

Models	Capacity m³/min (cfm)	Pressure bar (psig)
10/370	36.8 (1300)	10.3 (150)
10/455	45.3 (1600)	10.3 (150)
25/300	30.3 (1070)	25 (365)
25/330	33.1 (1170)	25 (365)

Factory Fitted Option


Variable height running gear, and lights

Feature
Comprehensive running gear configuration with EC lighting requirements on all road tow running gear 7/20 through to 7/170.

Benefit
Gives towing height flexibility.

Factory Fitted Option




Less Running Gear - Shipping support / Permanent mount

Feature
Metal support replacing the running gear.

Benefit
Typically ordered when the machine is to be truck or concrete base mounted.

Factory Fitted Option


Less Running Gear - Shipping support / Permanent mount

Feature
Metal support or “feet” replacing the running gear.

Benefit
Typically ordered when the machine is to be truck or concrete base mounted.

Factory Fitted Option

Single colour paint and Laser Etching option for canopy

Feature
- Upper enclosure to customer colour (RAL code required)
- Laser etching of the rear panel (white or black backgroud)

Benefit
Allows customer specific livery and reduces the risk of theft.

Factory Fitted Option

Jockey wheel

Feature
All units have a jockey wheel as standard. (Except 7/20, not required on 9/270 through to 21/215).

Benefit
Helps on-site maneuverability.

Factory Fitted Option

Lubricator

Feature
An in built lubricator option helps to oil downstream pneumatic tools.

Benefit
Increases tool reliability and life.

Factory Fitted Option

Wheel nut checkpoints

Feature
The Checkpoints are fixed to the wheel nuts by gripping the six corners of the hexagon of the wheel nut.When the wheel is being fitted out the Checkpoint pointers should be aligned and set in a recognisable pattern.

Benefit
Safety precaution. Should a wheel nut loosen off, the Checkpoint has no option but to move with the nut and so break the recognizable pattern that was set, thus indicating the wheel nut has begun to rotate and therefore to loosen.

Factory Fitted Option

Spark arrestor and Overspeed valve ("Refinery Kit")

Feature
All spark arrestors meet BS6680 and are factory approved.
Overspeed valve throttles the air intake to the engine should it begin to over-speed due to volatile vapours being present in the atmosphere.

Benefit
Helps reduce the risk of exhaust sparks.
Increased engine reliability.

Factory Fitted Option

Light weight compressor mounted hose reel

Feature
Allows the safe and compact storage of 20/25m of 3/4" hose.
Available on certain models only.

Benefit
Longer hose life and reliability and increases operator convenience.

Factory Fitted Option

Aftercooler and water separator

Air Quality from compressor in standard condition
Pressurised air at approx. ambient temp plus 40 degrees C.
Intake filtered to 30 micron particle size.
Output has oil content to max of 10 parts per million by weight.

Air Quality from compressor with Aftercooler and water separator fitted.
Pressurised air at approx. ambient temp plus 15 degrees C.
Water extraction provided by the aftercooler reduces the relative humidity by approx. 50%

This reduces corrosion and the risk of freezing in downstream equipment. Improves tool life and reliability.

Factory Fitted Option

Aftercooler, water separator and filters (or IQ system)

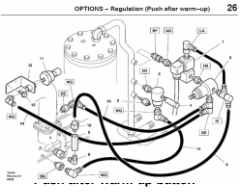
Feature
Pressurised air at approx. ambient temp plus 15 degrees C.
Water extraction provided by the aftercooler reduces the relative humidity by approx. 50%

Filter grade AO provides air to ISO 8573 Class 2 Dirt, 3 Oil.
(Removes particulates greater than 1 micron and reduces oil content to 0.05 ppm @ 21°C)

Filter grade AA provides air to ISO 8573 Class 1 Dirt, 2 Oil.
(Removes particulates greater than 0.01 micron and reduces oil content to 0.01 ppm @ 21°C)

Benefit
High quality on-board air from a portable package.

Factory Fitted Option



Feature
NA on 7/20. Standard on 7/26E. Optional on 7/31E, 7/41, and 7/51. Standard on the larger units. Can be added to help starting in very low ambient conditions as an alternative to open tap starting.

Benefit
Allows for quieter starting of the machine in cold weather and reduces engine starter motor wear.

Factory Fitted Option

Security lifting bail

Feature
This feature replaces the standard lifting bail with a hinged design, which allows the lifting bail to fold below the enclosure when not in use, helping security. NOW STANDARD

Benefit
Reduces the risk of theft.

Factory Fitted Option

6kVA Generator

Feature
50Hz 110V (UK) or 230V/400V 6kVA/4.8kW

Benefit
Compressed Air and Electricity available on site

UK specification - sockets
1 x 32 amp, 110V single phase
2 x 16 amp, 110V single phase

European specification- sockets
1 x 32 amp, 400V, 3 phase
2 x 16 amp, 230V single phase

Factory Fitted Option

Wheel chocks

Feature
2 Wheel chocks with attachments to lower enclosure.

Benefit
A legal requirement in Germany, these chocks can help prevent machine movement on a slope.

Factory Fitted Option

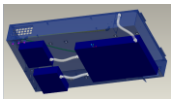
Enhanced control panel on 7/26E & 7/31E

Additional Diagnostic lamps:

1. Engine coolant temperature
2. Engine lubrification oil pressure
3. Engine alternator charging
4. AirEnd discharge temp

5. Low fuel

Factory Fitted Option



Bunded base

Feature
Containment base catching all fluids in case of leakage
Available on 7/20, 7/26^{E} , 7/31^{E} (and on 7/41 in UK only)

Benefit
Ecological measure.

Factory Fitted Option

Toolbox option

Feature
On board Tool storage space
7/20 not available 7/26E twin boxes 7/31E twin boxes
7/41 twin boxes 7/51 twin boxes 7/71 twin boxes

Benefit
Reduced risk of theft and damage during transport.

Factory Fitted Option

Road Lights for fixed height running gear

Feature
This option fits road lights to the fixed height running gear version
(Remark: Roadlights are standard with an adjustable height running gear).

Benefit
Convenience for the safe road tow of the air compressor.

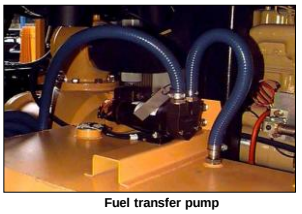
Factory Fitted Option

Dual pressure switch

Feature
This option is available on all machines whose operating pressure is >7bar. This feature allows the operator to move from the rated operating pressure to a lower pre-set pressure. Usually factory set at 7bar, except on all high pressure machines (17, 21 or 25bar) where the minimum pressure is set at15bar.

Benefit
Higher flexibility. Ideal for drilling applications and cable laying applications where a lower pressure is needed at the beginning of a job.

Factory Fitted Option



Fuel transfer pump

Feature
Optional available on the Large units (9/270 through to 21/215)
A 24V DC fuel transfer pump capable of 50 litres / minute flow rate.

Benefit
Ease of on site filling and considerable operator time saving. Practical and simple.

Factory Fitted Option

Hose rack

Feature
These 4 brackets are mounted to the corner of the Large units (9/270 - 21/215). They are designed to help hold the bull hose off the ground in order to reduce the risk of damage from surrounding equipment.

Benefit
Longer hose life.

Factory Fitted Option

Low fuel warning beacon

Feature
Gives 10 minutes advanced warning of low fuel shut down.

Benefit
Better safety and smoother operation.

External spotlights

Feature
Two roof mounted spotlights boost visibility in low light conditions. Particularly useful at the beginning and end of shifts in the winter months.

Benefit
Increased operator productivity.

Internal service lights

Feature
Three 30W fluorescent tubes provide internal lighting. Ideal for maintenance in low light conditions or applications where machines work at night.

Benefit
Increased operator productivity.

Applications

Use includes:

- Powering hand tools
- Mineral and rock drilling
- Oil and gas exploration
- Water well drilling
- Abrasive blasting
- Shotcreting
- Paint spraying
- Maintenance work
- Fibre optics and cable laying
- Pipeline cleaning and testing
- Industrial standby / temporary duties

Applications

Asphalt work, 7/51 powering a medium duty Paving Breaker

Applications

Abrasive blasting, 12/56 (out of shot)

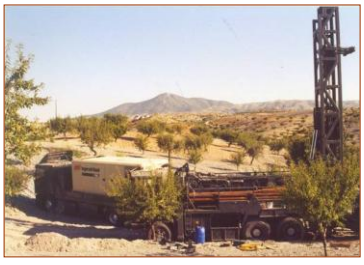
Applications

Construction, two 7/71's used in foundation work

Applications

7/41 powering breaker in pavement renewal work

Applications



This unit is a 25/300 based in Murcia, Southern Spain.

("El Virtudes" – water well drilling company)

Applications

- Quarries and DHD drilling where they use pneumatic drills
- Geo technical drilling (soil investigation, anchoring, piling,…)
- Aggressive blasting (grit, dry ice,…)
- Blasthole drilling
- Horizontal drilling (water pipes, fibre optics,…)

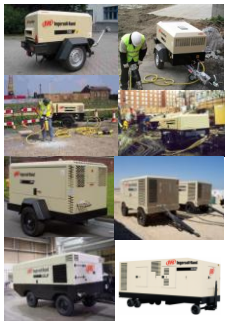
Applications

10/425 unit ‘oil free’

Used as standby should system air supply fail or fall below set parameters

Ingersoll Rand - Portable Power Product Range

- Twelve different platforms, twenty six different models
  - 7/20
  - 7/26E – 7/31E
  - 7/41
  - 7/51
  - 7/71 - 12/56
  - 7/120 - 10/105 - 9/110 - 14/85
  - 7/170 - 10/125 - 14/115
  - 12/150
  - 9/235 (only in High Ambient version – Not CE)
  - 9/270 - 9/300 - 12/235 - 17/235 - 21/215
  - 10/370 - 10/455 - 25/300 - 25/330
  - 10/425 (Oil-free)



SMALL COMPRESSORS

Doosan Infracore

COMPRESSOR TRAINING

Small compressors

Doosan Infracore Portable Power

SMALL COMPRESSORS RANGE

- 7/20 - P65 - 7 bar (100 PSI), 1.9 m3/min (70 cfm)
- 7/26E - P90 - 7 bar (100 PSI), 2.5 m3/min (90 cfm)
- 7/31E - P110 - 7 bar (100 PSI), 3.0 m3/min (105 cfm)
- 7/41 - P135 -7 bar (100 PSI), 4.0 m3/min (140 cfm)
- 7/51 - XP185 -7 bar (100 PSI), 5.0 m3/min (175 cfm)
- 7/71 - P260 -7 bar (100 PSI), 7.1 m3/min (250 cfm)
- 12/56 -12 bar (170 PSI), 5.6 m3/min (200 cfm)

Doosan Infracore Portable Power

SUMMARY

- The compressor can be divided in the following subsystems
  - ENGINE & AIREND
  - LUBRICATION & COOLING SYSTEM
  - AIR FLOW REGULATION SYSTEM
  - SEPARATION SYSTEM
  - BLOWDOWN SYSTEM
  - INSTRUMENT/CONTROL PANEL
  - ELECTRICAL WIRING
- Troubleshooting

Doosan Infracore Portable Power

ENGINE (7/20)

Compressor	7/20
IR Designation	3IRJ5N
Model	D 1005
Cylinders	3
Displacement	1 L
Rated Output (kW@RPM)	17.5@3000
Aspiration	Naturally aspirated
Fuel Pump	Mechanical inline pump
Emissions	Tier II certified
Electrics	12 Volts

ENGINE Tier 2 (7/26E – 7/51)

Compressor	7/26E	7/31E	7/41	7/51
IR Designation	3IRH2NS	3IRH8N	4IRH8N	4IRI8N
Model	3TNV82A	3TNV88	4TNV88	4TNV98
Cylinders	3	3	4	4
Displacement	1,3	1,6	2,2	3,3
Rated Output (kW@RPM)	21,1@2800	25,8@2800	34,8@2800	49,7@2400
Aspiration	Naturally aspirated			
Fuel Pump	Mono plunger mechanical pump			
Emissions	Tier II certified			
Electrics	12 Volts			

ENGINE Tier 3(7/51) from September 2008

Compressor	7/51
IR Designation	4IRI8NE-2
Model	4TNV98
Cylinders	4
Displacement	3,3
Rated Output (kW@RPM)	50.2@2400
Aspiration	Naturally aspirated
Fuel Pump	Mono plunger mechanical pump
Emissions	Tier III certified
Electrics	12 Volts

ENGINE Tier 2 (7/71 – 12/56)

Compressor	7/71 – 12/56
IR Designation	4IRD5N
Model	JD 4045DF270
Cylinders	4
Displacement	4.5 liter
Rated Output (kW@RPM)	60@2500
Aspiration	Naturally Aspirated
Fuel Pump	Rotary fuel pump
Emissions	Tier II certified
Electrics	12 Volts

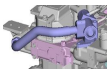
ENGINE Tier 3 (7/71 – 12/56) from October 2008

Compressor	7/71
IR Designation	4IRI8TE
Model	4TNV98T
Cylinders	4
Displacement	3,3
Rated Output (kW@RPM)	59.2@2300
Aspiration	Turbocharged
Fuel Pump	Mono plunger mechanical pump
Emissions	Tier III certified
Electrics	12 Volts

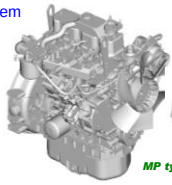
ENGINE Tier 3 Improvements – YANMAR ECO

Eco-Governor is Yanmar unique electronics control governor system which has been used for over 10 years mainly for agricultural machine. Yanmar has renewed this system to apply all equipment and named "2G Eco-Governor" which means second generation Eco-Governor. In addition, EGR valve for NV3 engine is controlled by this system.

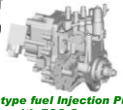
EGR Control system



EGR Valve



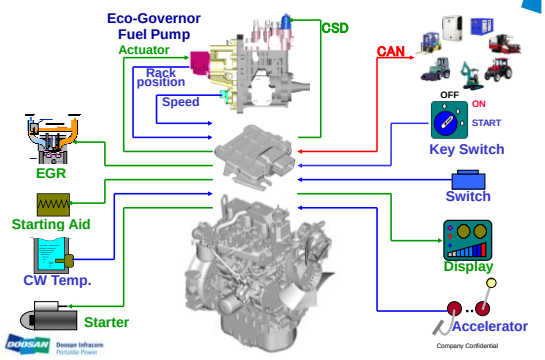
ECO-Governor system



MP type fuel Injection Pump with ECO Governor

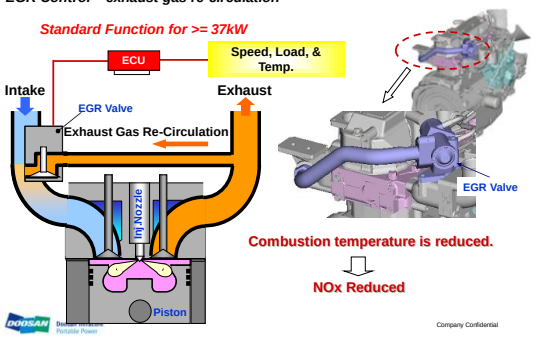
ECU

ENGINE Tier 3 Improvements – YANMAR ECO

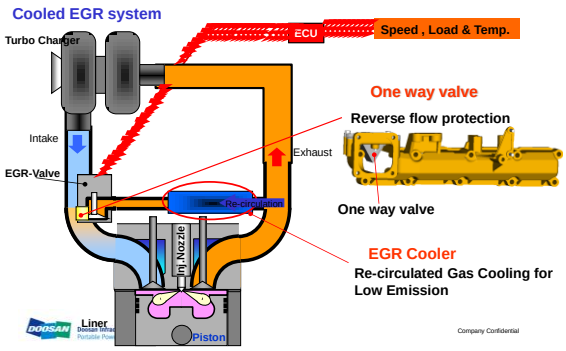


ENGINE Tier 3 Improvements – YANMAR ECO

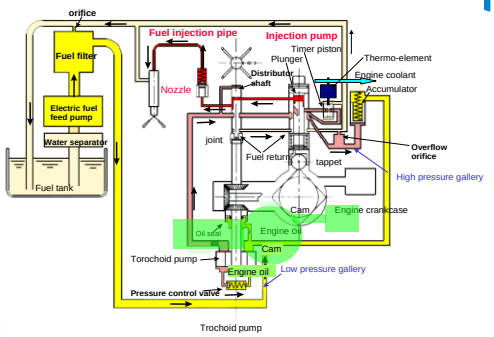
EGR Control – exhaust gas re-circulation



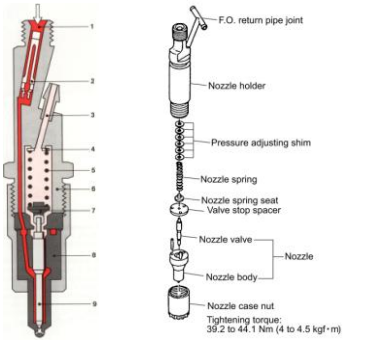
ENGINE Tier 3 Improvements – YANMAR ECO



ENGINE Tier 3 Improvements – YANMAR ECO



ENGINE Tier 3 Improvements – YANMAR ECO



AIREND

- Casing houses two screw-type rotors mounted on ball and roller bearings.
- Diesel engine drives the male rotor through heavy-duty coupling.
- Mechanical seal used to seal the shaft.
- Gear sets allow to change rotor speed and therefore air output.

AIREND (7/20)

- Now used on 7/20 only, formerly used on 7/21 and 7/26.
- Cast iron body.

AIREND (7/20)

- Now used on 7/20 only.
- Formerly used on 7/21 and 7/26.

AIREND (7/26E - 7/51)

- 85 mm Airend.
- Different gear sets permit to adjust air delivery.
- Cast aluminium body.
- Repair not advised.

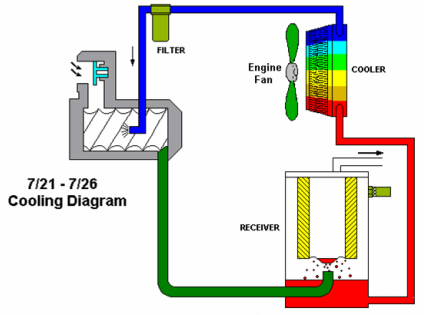
AIREND CF 90 (7/71 - 12/56)

- Different gear sets permit the use of this airend as 7/71 or 12/56.

COMPRESSOR OIL SYSTEM

- Functions of the oil system:
  - Lubricating the rotors, airend bearings and mechanical seals
  - Sealing the clearances between the airend rotors
  - Cooling of the airend. Heat is generated during air compression.
- The oil flows due to the air pressure. No oil pump is required.

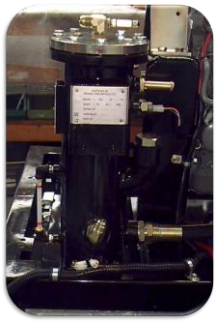
LUBRICATION & COOLING (7/20)



7/21 - 7/26
Cooling Diagram

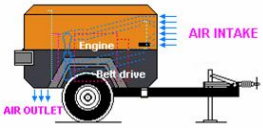
LUBRICATION & COOLING

- The Separator tank is also the reservoir of compressor oil.
- Pressure in the tank is forcing the oil through the system.

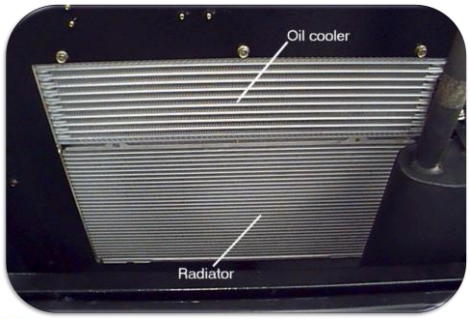


LUBRICATION & COOLING

- Cool box design with pusher type fan.



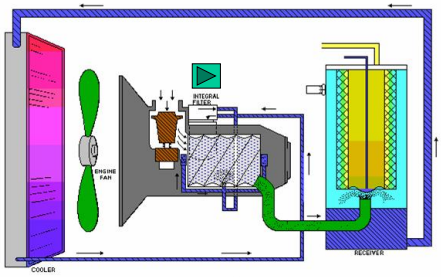
LUBRICATION & COOLING



LUBRICATION & COOLING

- Compressor oil filter, 10 micron rating.

LUBRICATION & COOLING (7/26E - 7/51)

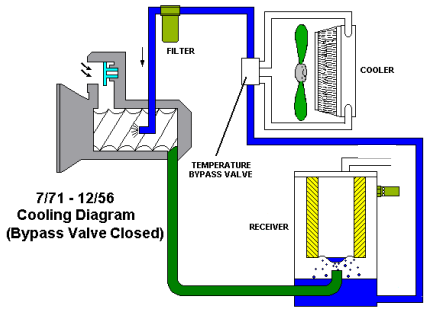


7/31 - 7/51
COOLING & LUBRICATION

LUBRICATION & COOLING (7/26E - 7/51)

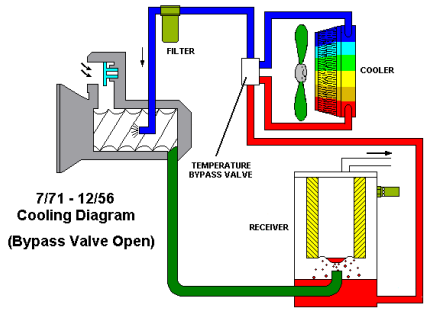
- Oil filter head integrated to airend.

LUBRICATION & COOLING (7/71 – 12/56)



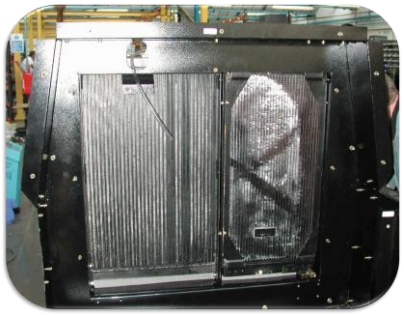
7/71 - 12/56
Cooling Diagram
(Bypass Valve Closed)

LUBRICATION & COOLING (7/71 – 12/56)



7/71 - 12/56
Cooling Diagram
(Bypass Valve Open)

LUBRICATION & COOLING (7/71 – 12/56)



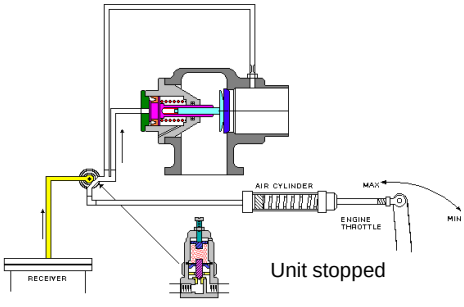
LUBRICATION & COOLING (7/71 – 12/56)

- Allows to regulate the oil temperature around 85°C.
- Keeping the oil hot enough allows to reduce the water condensation in the compressor.
- Never remove the thermostat as this would by-pass the oil cooler!

AIR REGULATION SYSTEM

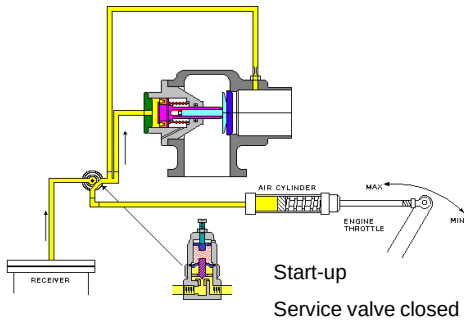
- The air regulation system continuously adjusts the production of compressed air to the consumption by controlling the engine speed and unloader valve.
- The unloader and fuel pump throttle are pneumatically (on mechanical engines) controlled through the pressure regulator.
- On the new electronic Yanmar engines the regulation pressure signal is converted to a speed signal to the engine ECU.

AIR FLOW & REGULATION (7/20)



Unit stopped

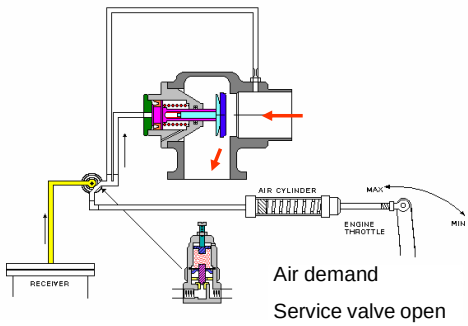
AIR FLOW & REGULATION (7/20)



Start-up

Service valve closed

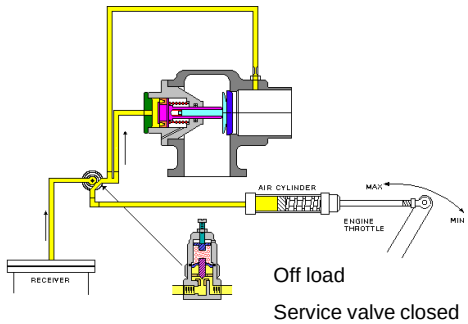
AIR FLOW & REGULATION (7/20)



Air demand

Service valve open

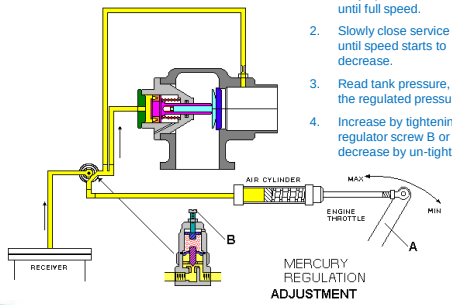
AIR FLOW & REGULATION (7/20)



Off load

Service valve closed

AIR FLOW & REGULATION (7/20)



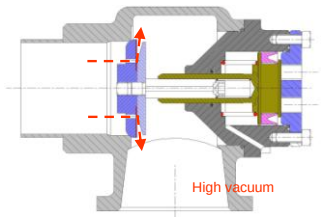
1. Fully open the service valve until full speed.
2. Slowly close service valve until speed starts to decrease.
3. Read tank pressure, this is the regulated pressure.
4. Increase by tightening regulator screw B or decrease by un-tightening.

AIR FLOW & REGULATION (7/20)

- Orifice continuously bleeds air from the regulation circuit.
- Size of orifice greatly affects regulation and can not be adjusted.

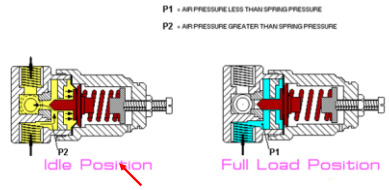
AIR FLOW & REGULATION (7/20)

- Anti-rumble valve.
- Membrane opens and allows some air to enter to limit vacuum at inlet.



REGULATOR VALVE - OPERATION

- Needle valve actuated by diaphragm and held closed by a spring.
- Controlled pressure preset in factory, can be adjusted by means of adjusting screw.
- Pin hole allows to determine diaphragm condition.

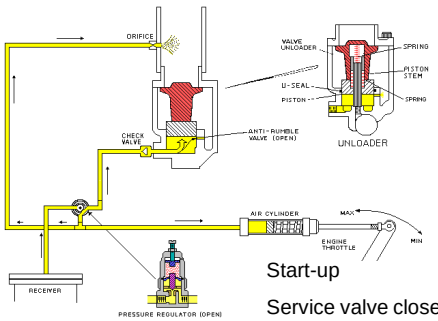


AIR FLOW & REGULATION (7/20)

- Mechanical engine - Spring loaded piston - Air pressure increase reduces speed.

- Electronic engine – Regulating pressure sensor sends signal to SECU which translates this to engine speed request to ECU.

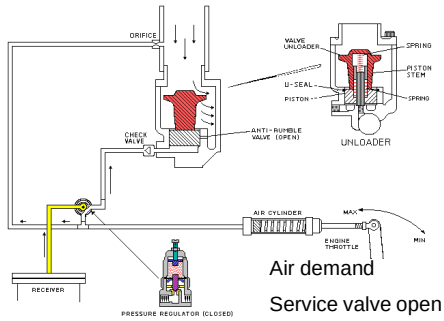
AIR FLOW & REGULATION (7/26E – 7/51)



Start-up

Service valve closed

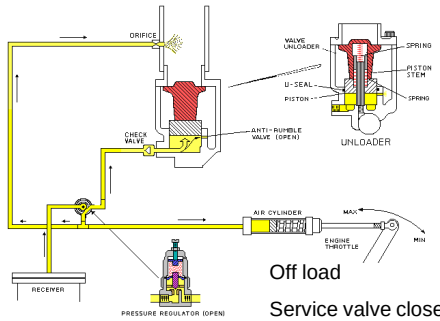
AIR FLOW & REGULATION (7/26E – 7/51)



Air demand

Service valve open

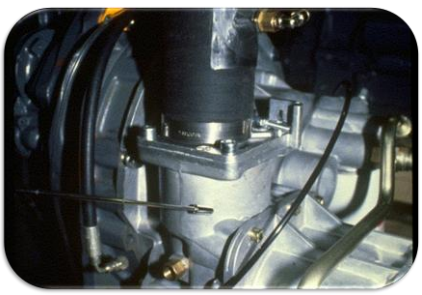
AIR FLOW & REGULATION (7/26E – 7/51)



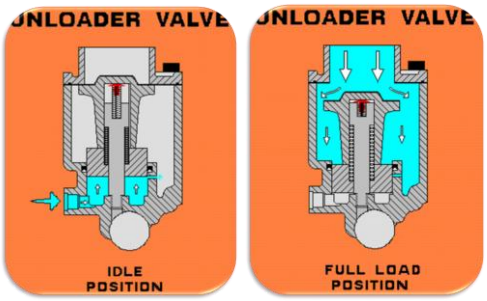
Off load

Service valve closed

AIR FLOW & REGULATION (7/26E – 7/51)

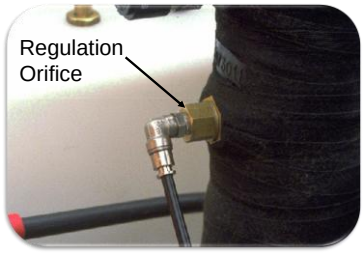


AIR FLOW & REGULATION (7/26E – 7/51)

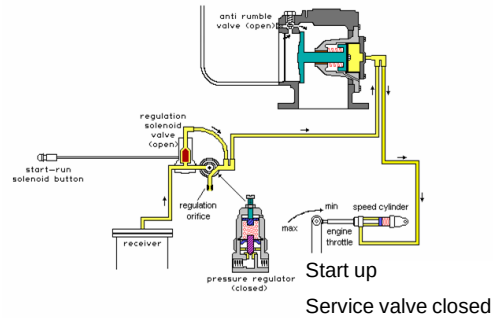


AIR FLOW & REGULATION (7/26E – 7/51)

- Connection on compressor inlet allows to reduce noise.



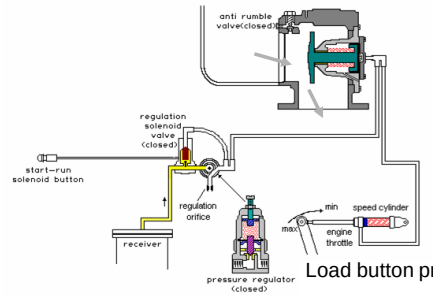
AIR FLOW & REGULATION (7/71 – 12/56)



Start up

Service valve closed

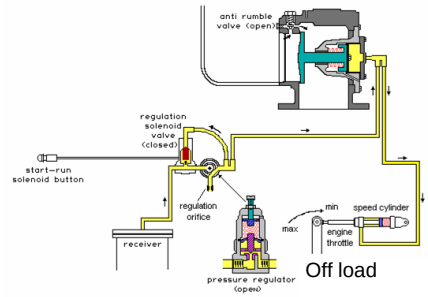
AIR FLOW & REGULATION (7/71 – 12/56)



Load button pressed

Service valve closed

AIR FLOW & REGULATION (7/71 – 12/56)



Off load

Service valve closed

AIR FLOW & REGULATION (7/71 – 12/56)

AIR FLOW & REGULATION (7/71 – 12/56)

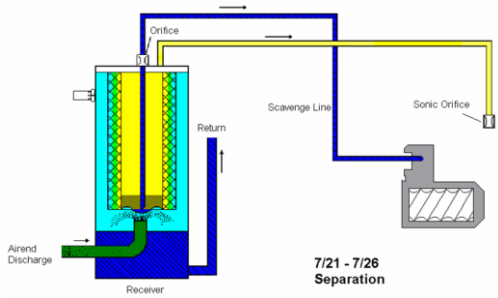
SEPARATION SYSTEM

- Functions of the separation system:
  - Removing the oil contained in the compressed air
- Most of the oil is removed from the air through a specially shaped baffle in the separator tank.
- The remaining oil is removed by the separator element.

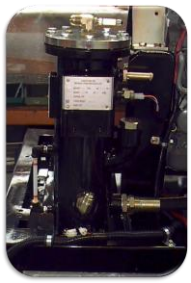
SEPARATION SYSTEM

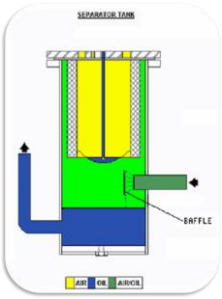
- The air and oil mixture discharges from the airend into the separator receiver. Here most of the oil separates out from the mixture under gravity when it impinges on the underside of the specially-shaped base of the separator element. The separator element then removes any remaining oil entrained in the air. The oil which flows down the inside surfaces of the element and accumulates on the base is returned via the Scavenge line (because of the pressure differential) to the airend.
- The orifice in the scavenge drop tube controls the flow rate through the scavenge line.
- The minimum pressure valve (or sonic orifice) is located before the service taps. It ensures that the pressure inside the separator receiver never falls below 4.4-5.1 bar (65-75 psi). This ensures there is sufficient oil circulation in the system at all times. It also limits the pressure drop across the separator element, thereby protecting it.

SEPARATION SCHEMATIC (7/20)



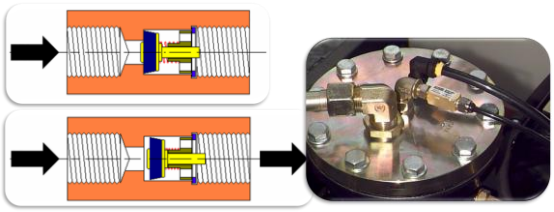
SEPARATOR/RECEIVER TANK (7/20)





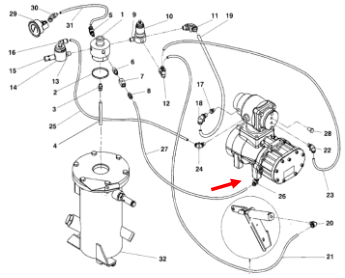
SCAVENGE LINE (7/20)

- Orifice is located in the elbow connector.
- It is designed to scavenge the oil while limiting the loss of air flow.
- Check valve prevents oil reverse flow during shutdown.



SCAVENGE LINE (7/20)

- Returns to air inlet.
- Look for clogged scavenge lines in case of oil carry over!

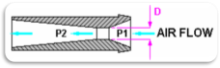


SAFETY VALVE (7/20)

- Valve is on the oil side of the element where pressure is maximum when the separator element is blocked.

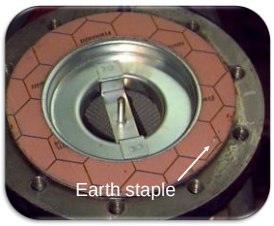
SONIC ORIFICE (7/20)

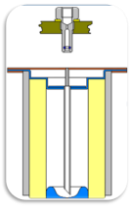
- Maintains a min. pressure (~5bar) in the receiver to:
  - keep the oil flowing.
  - limit pressure drop across the separator.
- Continuous operation at min pressure results in oil carry over due to insufficient scavenge flow.



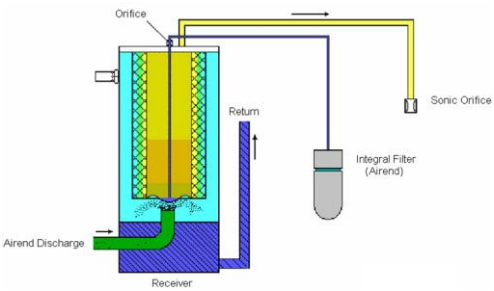
SEPARATOR ELEMENT (7/20)

- The scavenge tube is part of the separator element.





SEPARATION SCHEMATIC (7/26E – 7/51)

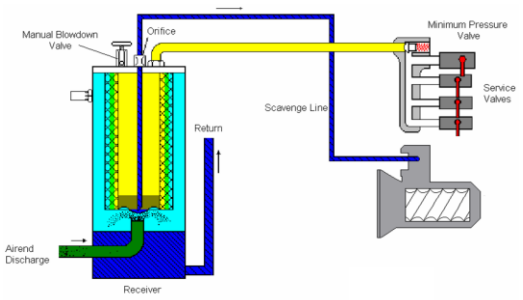


SCAVENGE LINE (7/26E – 7/51)

SCAVENGE LINE (7/26E – 7/51)

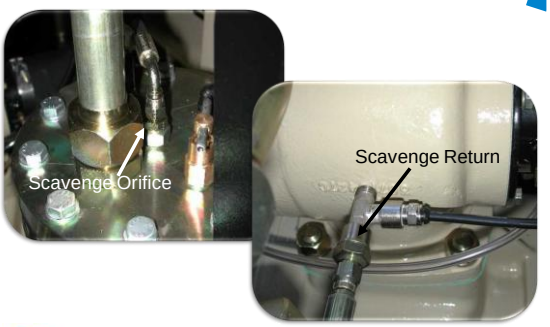
SONIC ORIFICE (7/26E – 7/51)

SEPARATION SCHEMATIC (7/71 – 12/56)



SEPARATOR TANK (7/71 – 12/56)

SCAVENGE LINE (7/71 – 12/56)



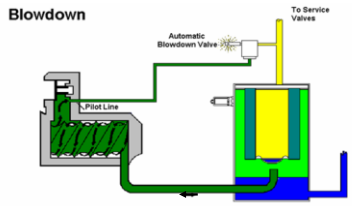
SONIC ORIFICE (7/71 – 12/56)

BLOW DOWN SYSTEM

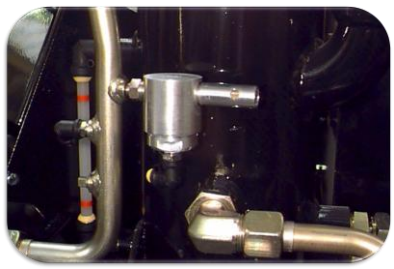
- The blow down system allows to relieve the pressure from the separator tank automatically or manually if required.

AUTO BLOWDOWN (7/20)

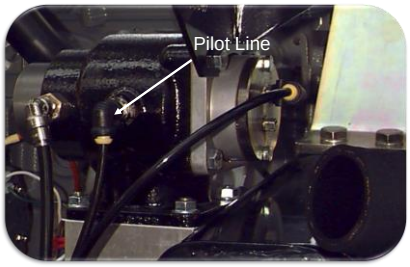
- Normally closed valve. Pilot is high pressure at inlet that appears when compressor stops and unloader check valve closes.



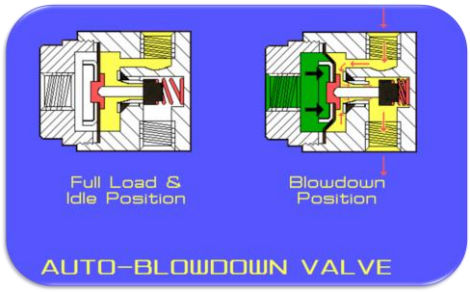
AUTO BLOWDOWN (7/20)



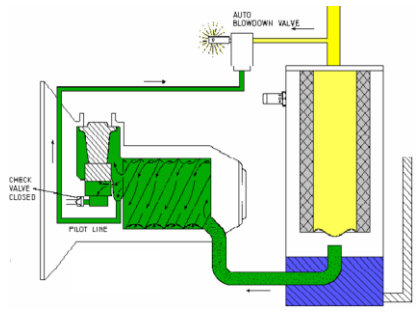
AUTO BLOWDOWN (7/20)



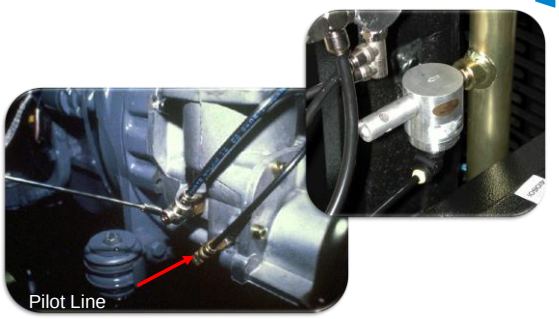
AUTO BLOWDOWN VALVE



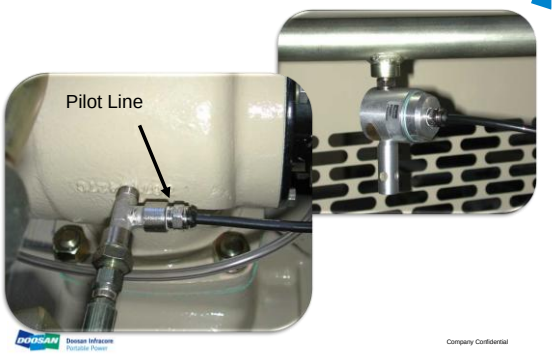
AUTO BLOWDOWN (7/26E – 7/51)



AUTO BLOWDOWN (7/26E – 7/51)

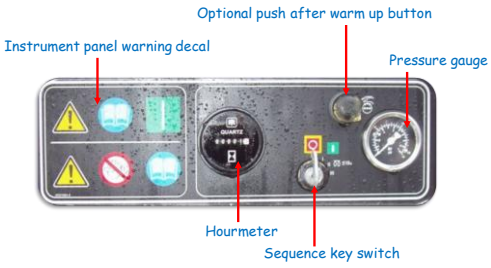


BLOWDOWN (7/71 – 12/56)

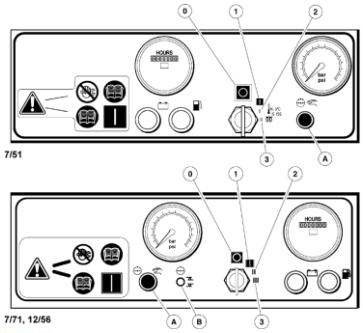


MANUAL BLOWDOWN (7/71 – 12/56)

INSTRUMENT PANEL (7/26E – 7/31E)



INSTRUMENT PANEL (7/51 – 7/71)

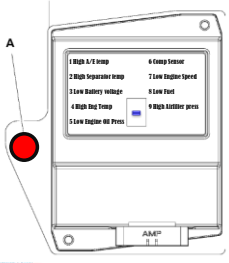


A- Load button
B- Dual pressure switch
0- "OFF" position
1- "RUN" position
2- "Override" position
3- "Crank" position

*A= optional on 7/51
std on 7/71 & 12/56
*B= optional on units able to exceed 7 bar

INSTRUMENT PANEL (7/51) Tier 3

•New Tier 3 7/51 uses standard control panel and a diagnostic readout panel called SECU.
•Diagnostic codes for compressor will be shown on the one digit display.
•Diagnostic codes for the engine will be displayed as a flash code by a separate led light. (A)

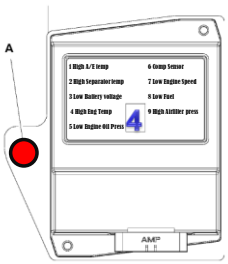


NORMAL CONDITIONS

-- **Center Bar Blinking:** Compressor is ready to start. (No fault)
H – Crank Signal Detected: Displayed while start switch is in the pre-heat or crank position.

During SECU power –up , the controller will test the display.During next step 3 digit software rev. Number will be shown.

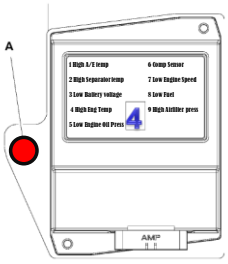
INSTRUMENT PANEL (7/51) Tier 3



ALARMS & SHUTDOWNS Compressor

1 – High A/E Temp: Indicates shutdown due to high comp temp
2 – High Separator Temp: Indicates shutdown due to high temp at separator tank discharge
3 – Low Battery Voltage: Alarm – Indicates battery or charging system malfunction
4 – High Engine Coolant Temp: Indicates shutdown due to high engine water temp
5 – Low Engine Oil Press: Indicates shutdown due to low engine oil press.
6 – Comp Sensor Failure: Indicates press sensor malfunction. Comp will not start.
7 – Low Engine Speed: Indicates shutdown due to low engine speed.
8 – Low Fuel Level: Indicates shutdown due to low fuel level. (Optional)
9 – Restricted Air Filter: Alarm. Indicates engine/comp air inlet filters need service (Optional)

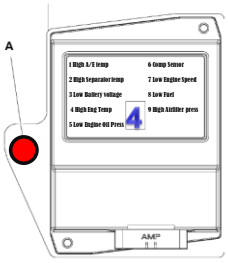
INSTRUMENT PANEL (7/51) Tier 3



ALARMS & SHUTDOWNS Compressor

A – Engine Comm Error: Engine model not recognized. Comp will start and operate within a 1700 – 2300 rpm range.
C – CAN Comm Error: CAN communication failure
E – Generator Switch Enable Error: Generator enable switch on control panel is "ON" before starting. Engine will not crank.

INSTRUMENT PANEL (7/51) Tier 3



ALARMS & SHUTDOWNS Engine (A)

Failure flashes can be read on the Engine Failure Lamp when the ON/OFF power switch is "ON" or when the unit is running.

The Failure lamp is on for 2 seconds when the ECU is powered up.

A lamp flash duration of 0.5 seconds is a "short" flash
A lamp flash duration of 1.5 seconds is a "long" flash

A flash sequence of "1 long and 3 short" would be displayed by one flash with a 1.5 second duration and 3 flashes with a 0.5 second duration.

When tow or more failures have occurred simultaneously, the failure lamp will pause for 3 seconds between flash sequences.

Failure flash sequences continuously repeat with 3 second pauses until the failure is corrected.

INSTRUMENT PANEL (7/51) Tier 3

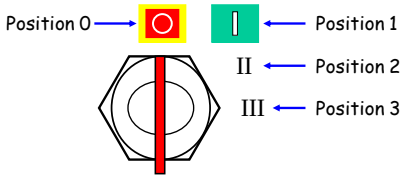
ALARMS & SHUTDOWNS Engine (A)

Failure	Failure Flashes	Remark
Coolant temperature sensor failure	4 Short	
Speed sensor failure	6 Short	
Rack position sensor failure	7 Short	
Rack actuator failure	8 Short	
EGR valve failure	1 Long and 3 Short	
CSD solenoid valve failure	1 Long and 4 Short	
Main relay failure	1 Long and 6 Short	
Rack actuator relay failure	1 Long and 7 Short	
ECU temperature alarm	2 Long and 5 Short	ECU temp > 221°F
Coolant temperature alarm	3 Long and 6 Short	Coolant temp > 239°F
ECU failure	4 Long and 1 Short	

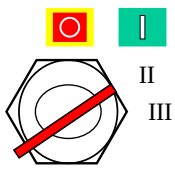
More information can be found in the Yanmar Service Manual Use this manual in conjunction with our Electronic Manual to troubleshoot the entire system.

OPERATION – STARTING

Sequence Key Switch

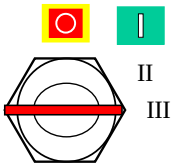


OPERATION – STARTING



Turn key switch to position 2 and hold for a maximum of 15 seconds to allow the air inlet heater to reach working temperature.

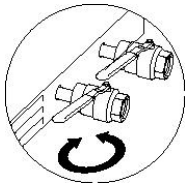
OPERATION – STARTING



Turn key switch to position 3 (engine start position), release to position 1 when the engine starts.

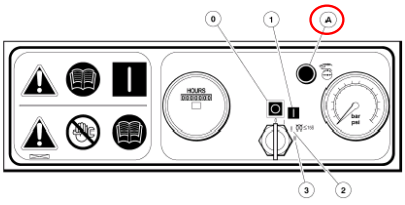
OPERATION – STARTING

- At temperatures below 0ºC or if there is difficulty starting first time:
  1. Open a service valve fully, with no hose connected
  2. Complete starting sequence as previous
  3. Close service valve as soon as engine runs freely



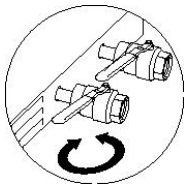
OPERATION – STARTING

- If the compressor is equipped with a start/run push button, push when the engine is warm and air is required

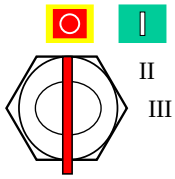


OPERATION – STOPPING

1. Close service valve(s) fully
2. Allow unit to run unloaded for a short period to reduce engine temperature



OPERATION – STOPPING



Turn key switch to position 0 (off position)

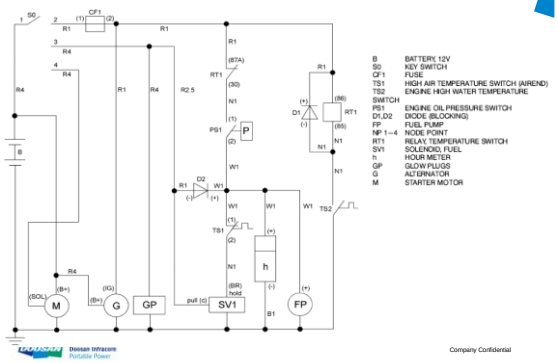
As soon as the engine stops, the automatic blowdown valve will relieve all pressure from the system. If valve fails to operate, pressure must be relieved by means of the service valve.

Never allow unit to stand idle with pressure in the system.

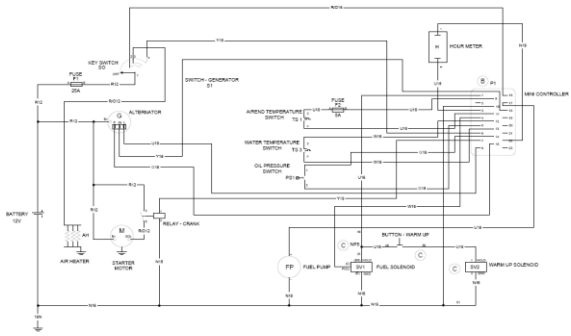
ELECTRICS

- Electrical relay operation
- Wiring diagram 7/20
- Wiring diagram 7/26E – 7/31E
- Wiring diagram 7/41
- Wiring diagram 7/51
- Wiring diagram 7/71 – 12/56

WIRING DIAGRAM (7/20)



WIRING DIAGRAM (7/26E – 7/31E)



ELECTRICS (7/26E – 7/31E)

The mini controller functions are:

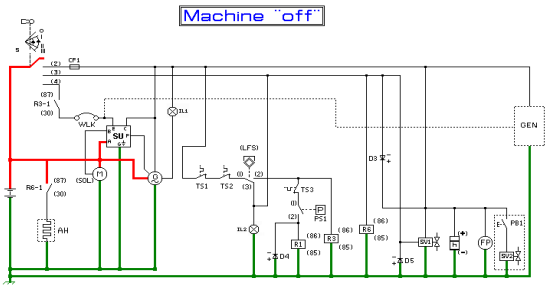
- CONTROL:
  - supplies the fuel solenoid pull-in and hold signals
  - supplies the starter solenoid signal
- SAFETY:
  - prevents the starter from being energized when the engine is running
  - prevents the engine from being started if the air end temperature is too high or fuel level is low (optional)
  - releases the fuel solenoid hold current if any switch in the shutdown chain opens while the engine is running. It provides bypass for engine oil pressure and water temperature for 20 seconds after initiating crank or until the engine is running.

ELECTRICS (7/26E – 7/31E)

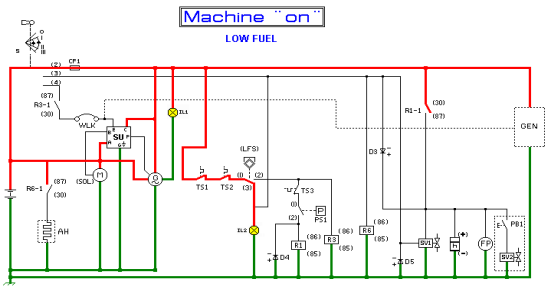
The mini controller functions are:

- DIAGNOSTICS (optional)
  - LEDs that indicate the cause of a shutdown
  - alternator light
  - Tachometer
- The air heater is driven by the key switch, not by the mini controller.

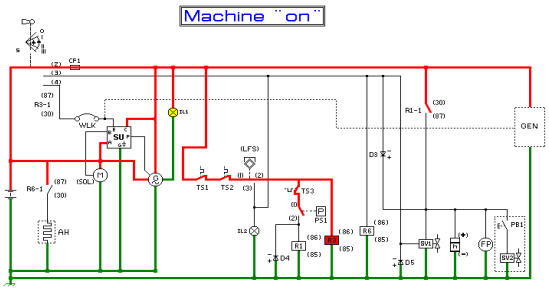
WIRING DIAGRAM (7/41)



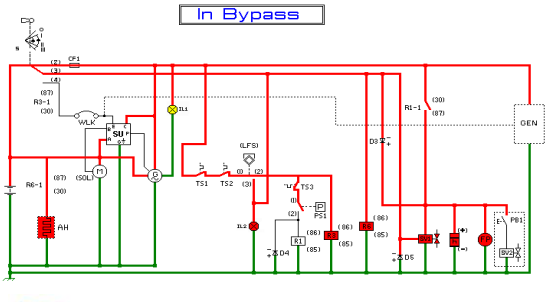
WIRING DIAGRAM (7/41)



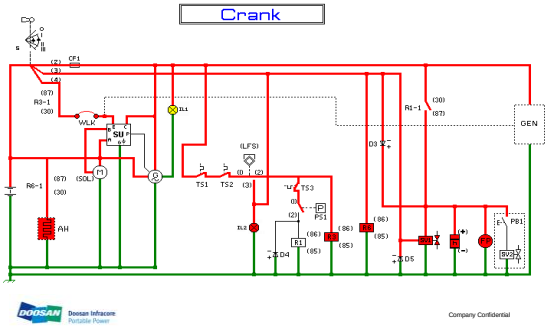
WIRING DIAGRAM (7/41)



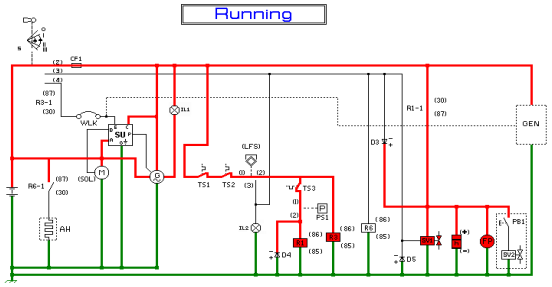
WIRING DIAGRAM (7/41)



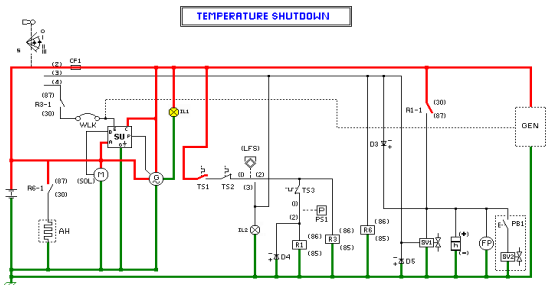
WIRING DIAGRAM (7/41)



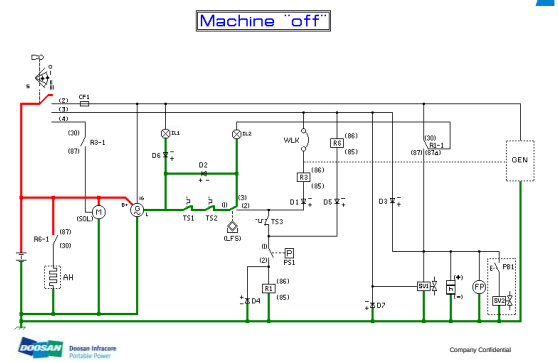
WIRING DIAGRAM (7/41)



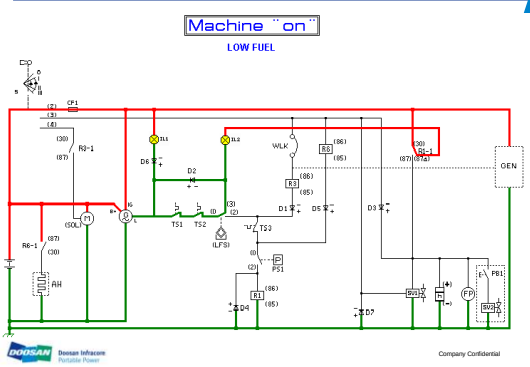
WIRING DIAGRAM (7/41)



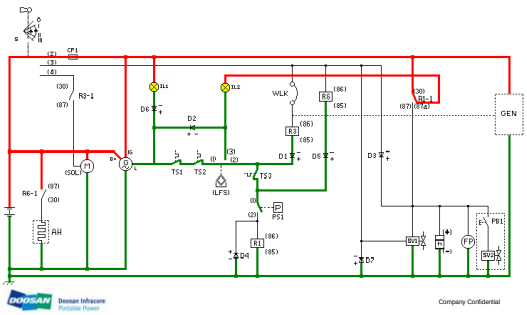
WIRING DIAGRAM (7/51 Tier 2)



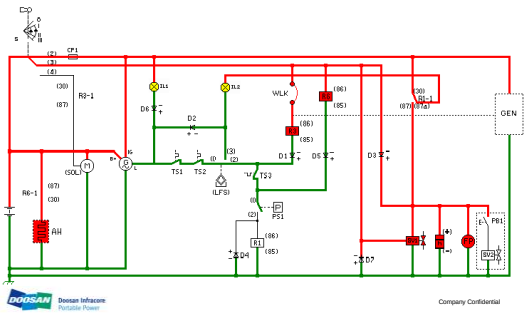
WIRING DIAGRAM (7/51 Tier 2)



WIRING DIAGRAM (7/51 Tier 2)

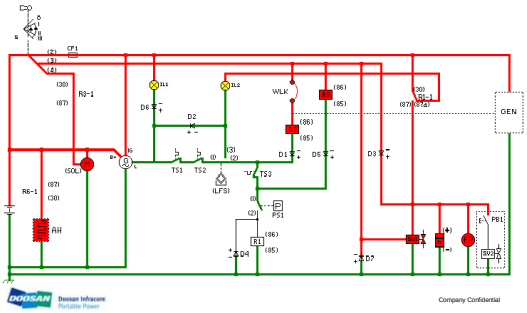


WIRING DIAGRAM (7/51 Tier 2)



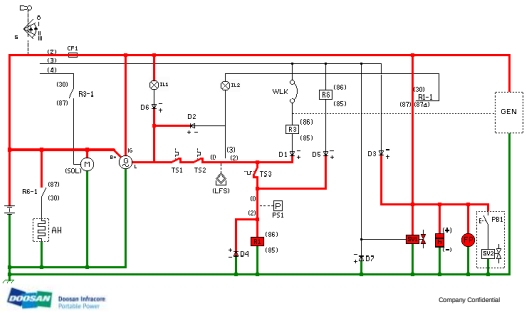
WIRING DIAGRAM (7/51 Tier 2)

Crank



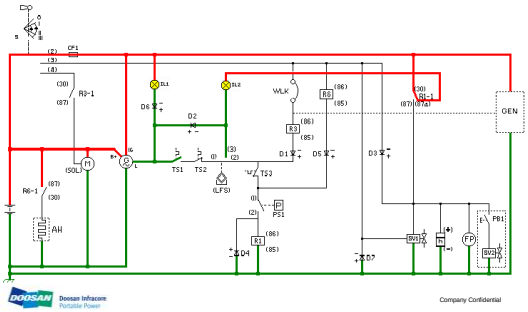
WIRING DIAGRAM (7/51 Tier 2)

Running



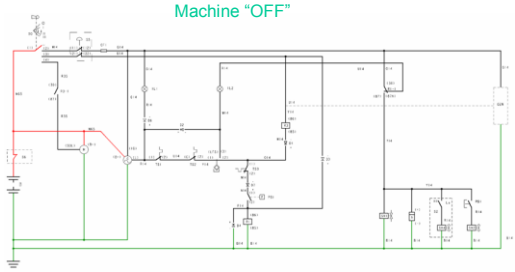
WIRING DIAGRAM (7/51 Tier 2)

TEMPERATURE SHUTDOWN



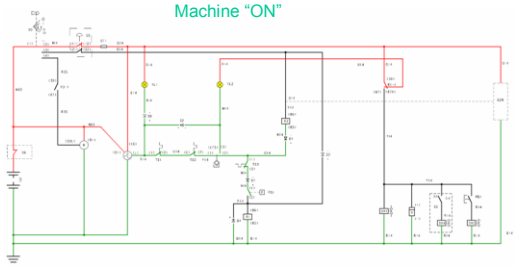
WIRING DIAGRAM (7/71 – 12/56 Tier 2)

Machine “OFF”



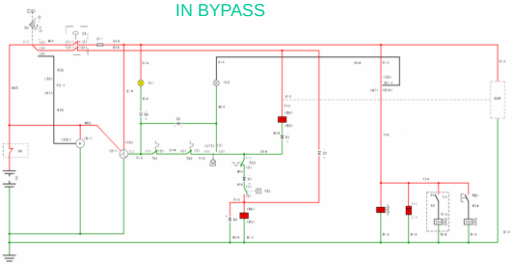
WIRING DIAGRAM (7/71 – 12/56 Tier 2)

Machine “ON”



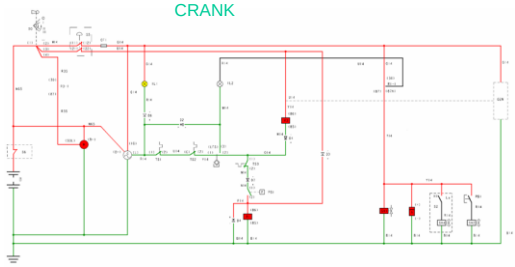
WIRING DIAGRAM (7/71 – 12/56 Tier 2)

IN BYPASS



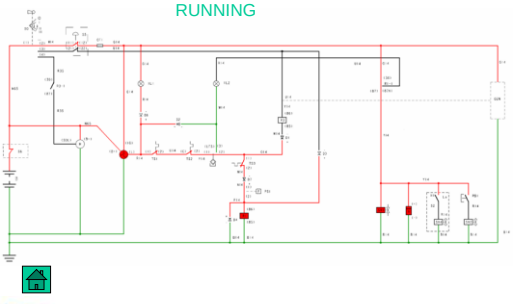
WIRING DIAGRAM (7/71 – 12/56 Tier 2)

CRANK



WIRING DIAGRAM (7/71 – 12/56 Tier 2)

RUNNING

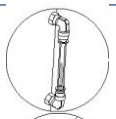


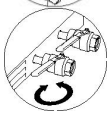
TROUBLESHOOTING

- OIL CARRYOVER
- LOW AIR VOLUME
- OVERHEATING
- HIGH PRESSURE
- STARTING PROBLEMS

OIL CARRYOVER

- Is the oil level correct, not overfilled?
- Are the service valves closed before stopping the compressor?
- Is the separator element in good condition?





OIL CARRYOVER

- Is the compressor being operated at the correct pressure?
  - Check the min pressure valve
- Is the compressor being operated at the correct engine speed?
- Is the correct type of oil being used?
- Is the scavenge line working?
  - Check scavenge orifice and check valve
  - Clean tubes
  - Check scavenge tube length

LOW AIR VOLUME

- Is the compressor being operated at the correct pressure?
  - Check the pressure regulator setting
  - Check for leaks in the regulation pipe work
  - Check if the regulator orifice is plugged
- Is the compressor being operated at the correct engine speed?
  - Check air cylinder and fuel pump throttle adjustment

LOW AIR VOLUME

- Are the air cleaners clean?
  - Check the restriction indicators and service if required
- Are there any leaks in the air pipe work?
- Is the separator element clean?

OVERHEATING

- Is the oil level correct?
- Is the correct oil grade being used?

- Are there any restrictions in the oil circuit?
  - Check the oil cooler restriction
  - Check the compressor oil filter
- Is the oil cooler clean?
- Is the oil bypass valve working?
  - Check valve operation but never remove it as the oil cooler would be bypassed

OVERHEATING

- Is the flow of cooling air re-circulating?
  - Orient the machine in the wind direction
  - Check the engine speed
  - Check the fan and drive belt operation
  - Don't run the machine with the canopy opened
- Is the ambient temperature below the LAT?
- Is the compressor being operated at the correct pressure?

HIGH PRESSURE

- Is the pressure regulator correctly operating?
  - Check the pressure setting
  - Check the diaphragm, leak at pin hole
  - Check the regulation pipe work
- Is the unloader operating correctly?
- Is the regulator orifice size correct?
- Is there a restriction across the separator element?

STARTING PROBLEMS

ENGINE WILL NOT CRANK

- Is the battery charged?
- Is the compressor inclination less than 15°?
- Is there fuel in the tank?
- Are the safety switches operating (airend discharge temp…)?

STARTING PROBLEMS

ENGINE WILL CRANK BUT NOT START

- Is the air heater operating?
- Is there a restriction or leak in the fuel lines?
- Is the engine fuel filter clean?

ENGINE TROUBLESHOOTING

- Engine diagnostics available by flash codes
  - More info can be extracted when using Yanmar YDT tool.
  - YDT also allows programming of injector or pump when replacing such items.
- EGR valve
  - This valve has a self test function which compares travel with limits stored in ecu.
  - Limited valve travel could be caused by a sooth loaded valve
    - Blocked airfilters – injector or pump issue – bad fuel.....

ENGINE PARTS REPLACEMENT PROCEDURES

- Injector replacement
  - New Injector trim file should be loaded in engine ecu (YDT)
- Pump replacement
  - New pump data needs to be loaded in engine ecu (YDT)
- Rack Actuator
  - Is mounted on the fuel pump
    - Cannot be ordered separately → needs to be replaced by a Tier 3 certified Yanmar fuel injection repair shop and pump recalibrated.
    - Only other option is to order a new pump.
- Engine ECU
  - Can be ordered from our warehouse pre-programmed after receiving the correct engine data or program by dealer with YDT.

Service Letter

- 7/20 → SL 40001 Separator install flange
  SL 40002 New exhaust design
- 7/31-7/41 → SL 40007 Wire Harness protection
- 7/26E-7/31E→ SL 40012 Fuel Filter bracket relocation
- 7/71 → SL 40013 New Coupling JD unit

- YANMAR → SL 40004 Yanmar Diagnostic Tool
- 7/20→7/51 → SL 40015 Heavy duty hose clamp

MEDIUM COMPRESSORS

Doosan Infracore

COMPRESSOR TRAINING

Medium compressors

Doosan Infracore Portable Power

MEDIUM COMPRESSORS RANGE

- 14/85 13.8 bar (200 psi), 8.5 m3/min (300 cfm)
- 10/105 – HP375 10.3 bar (150 psi), 10.3 m3/min (365 cfm)
- 9/110 – XP375 8.6 bar (125 psi), 10.6 m3/min (375 cfm)
- 7/120 – P425 7.0 bar (100 psi), 12.0 m3/min (425 cfm)

- 14/115 – VHP400 14 bar (200 psi), 11.3 m3/min (400 cfm)
- 10/125 – HP450 10.3 bar (150 psi), 12.7 m3/min (450 cfm)
- 7/170 – P600 7 bar (100 psi), 17.0 m3/min (600 cfm)
- 12/150 12 bar, 15 m3/min

Doosan Infracore Portable Power

SUMMARY

- The compressor can be divided in the following subsystems
  - ENGINE & AIREND
  - LUBRICATION & COOLING SYSTEM
  - AIR FLOW REGULATION SYSTEM
  - SEPARATION SYSTEM
  - BLOWDOWN SYSTEM
  - INSTRUMENT/CONTROL PANEL
  - ELECTRICAL WIRING

Doosan Infracore Portable Power

ENGINE (14/85 - 7/120)

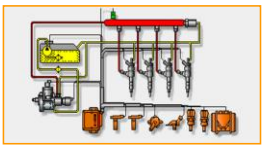
- 4IRD5AE
- 4 cylinders
- 4.5L displacement (106 x 127)
- 93kW (125hp) @ 2400 rpm
- 20 - 30% torque rise
- Turbocharged and after-cooled
- Stanadyne DE10 electronic injection pump
- Gear-driven auxiliary power take-off (37kW)
- Emission certified
- 24 Volt Electrics

ENGINE (14/85 - 7/120)

- 4IRD5AE – 4045 HF 285
- 4 cylinders
- 4.5L displacement (106 x 127)
- 93kW (125hp) @ 2200 rpm
- HPCR Common Rail
- Turbocharged and after-cooled
- Emission Tier III certified
- 24 Volt Electrics

ENGINE Tier 3 (14/85 - 7/120)

- 4IRD5AE – 4045 HF 285



HPCR

Electronic rotary pump

Electronic Injector (EI)

ENGINE (14/115 – 7/170)

- 6IRF8TE -
- 6 cylinders
- 6.8L displacement (106 x 127)
- 126kW (170hp) @2400 rpm
- 20 - 30% torque rise
- Turbocharged
- Stanadyne DE10 electronic injection pump
- Gear-driven auxiliary power take-off (37kW)
- Emission certified
- 24 Volt Electrics

ENGINE Tier 3 (14/115 – 7/170)

- 6IRF8AE – 6068 HF 285
- 6 cylinders
- 6.8L displacement (106 x 127)
- 129kW (173hp) @2200 rpm
- HPCR Common Rail
- Turbocharged
- Emission Tier III certified
- 24 Volt Electrics

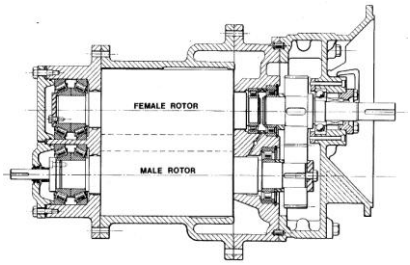
ENGINE Tier 3 (12/150)

- 6IRF8AE – Cummins QSB 6.7
- 6 cylinders
- 6.7L displacement
- 220hp(164Kw)@2000 rpm
- Bosch HPCR – 1600bar
- Turbocharged
- Emission Tier III certified
- 24 Volt Electrics

178.5mm AIREND

- Casing houses two screw-type rotors mounted on ball and roller bearings.
- Diesel engine drives the male rotor through heavy-duty coupling.
- Mechanical seal used to seal the shaft.
- Gear sets allow to change rotor speed and therefore air output.
  - 7/120 36084234 Ratio 1.355
  - 9/110 36084226 Ratio 1.255
  - 10/105 36084218 Ratio 1.163
  - 14/85 36084119 Ratio 0.963
  - 7/170 35093665 Ratio 1.767
  - 10/125 36083988 Ratio 1.465
  - 14/115 36083996 Ratio 1.255

178.5mm AIREND

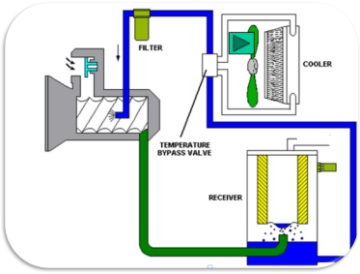


AIREND (14/85 – 7/170)

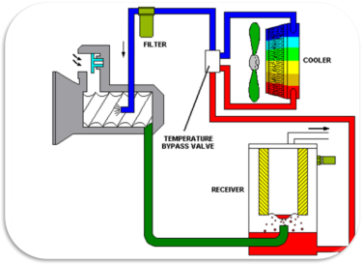
COMPRESSOR LUBRICATING SYSTEM

- Functions of the oil system:
  - Lubricating the rotors, airend bearings and mechanical seals
  - Sealing the clearances between the airend rotors
  - Cooling of the airend. Heat is generated during air compression.
- The oil flows due to the air pressure. No oil pump is required.

LUBRICATION & COOLING



LUBRICATION & COOLING



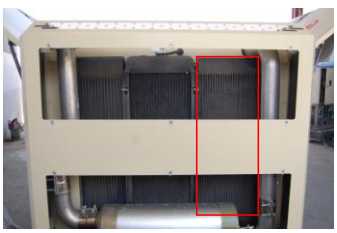
LUBRICATION & COOLING

- The Separator tank is also the reservoir of compressor oil.
- Pressure in the tank is forcing the oil through the system.

LUBRICATION & COOLING

- Cool box design with pusher type fan.

LUBRICATION & COOLING



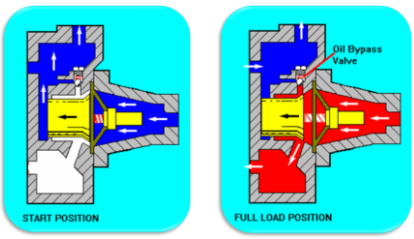
LUBRICATION & COOLING

- Compressor oil filter, 10 micron rating.

LUBRICATION & COOLING

- Allows to regulate the oil temperature around 85°C.
- Keeping the oil hot enough allows to reduce the water condensation in the compressor.
- Never remove the thermostat as this would by-pass the oil cooler!

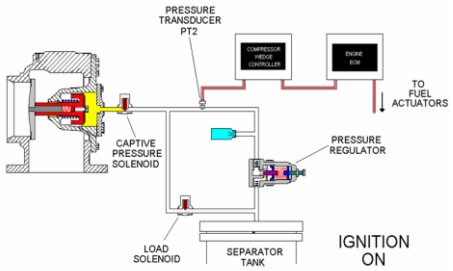
LUBRICATION & COOLING



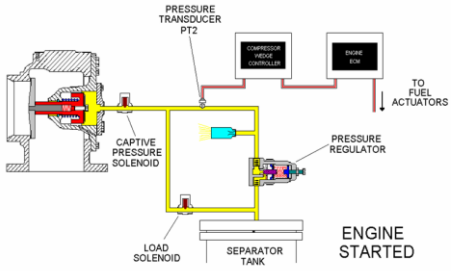
AIR REGULATION SYSTEM

- The air regulation system continuously adjusts the production of compressed air to the consumption by controlling the engine speed and unloader valve.
- The unloader is pneumatically controlled through the pressure regulator. The fuel pump throttle is electrically controlled by the wedge controller.

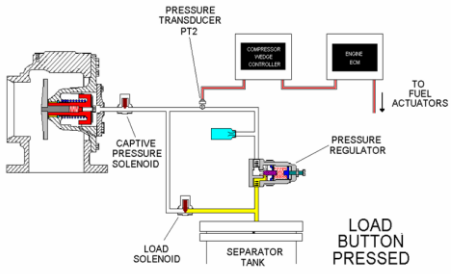
REGULATION SCHEMATIC



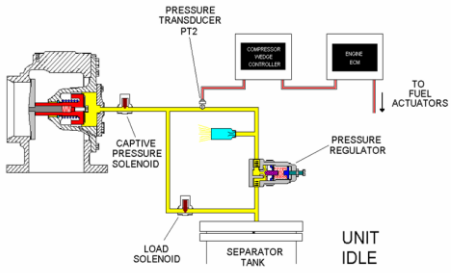
REGULATION SCHEMATIC



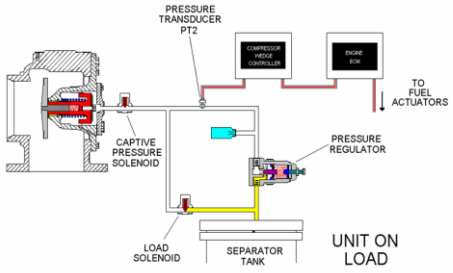
REGULATION SCHEMATIC



REGULATION SCHEMATIC



REGULATION SCHEMATIC



CAPTIVE SOLENOID

- A captive pressure solenoid is fitted to ALL models to aid starting.
- On shutdown solenoid traps air behind the unloader piston. This keeps unloader closed during cranking, hence reducing load on engine.

ORIFICE

- Continuously bleeds air from the regulation circuit.
- If blocked, unloader valve would never be able to open after start up and airend low oil pressure warning would register.
- Size of orifice greatly affects regulation characteristic and should not be adjusted.
- Located near airend.

WEDGE CONTROLLER

- The WEDGE is located inside the machine above the fuel tank.

WEDGE CONTROLLER

- WEDGE Controller is the heart of the machine monitor and control system.
- It is an Intel micro-controller based unit with analog and digital inputs and outputs.
- One of the function is to monitor regulator and discharge pressure, and varies engine speed to maintain air pressure at desired set point.

LOAD SOLENOID

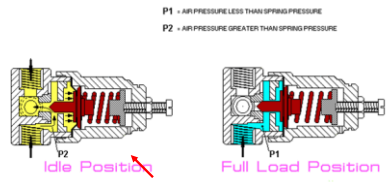
- Situated on the separator tank.

LOAD BUTTON

- The load button is a momentary action switch.
- It operates the load solenoid adjacent to the pressure regulator.
- Prior to being pressed the solenoid allows the air to by-pass the regulator.

REGULATOR VALVE - OPERATION

- Needle valve actuated by diaphragm and held closed by a spring.
- Controlled pressure preset in factory, can be adjusted by means of adjusting screw.
- Pin hole allows to determine diaphragm condition.



REGULATOR VALVE

- Situated on top of the separator tank.
  - Range 0 – 200 PSI
  - 36896892 DS

36896892 SEETRU has been superseded by the DS component

UNLOADER VALVE

- Valve actuated by piston with diaphragm.
- Spring keeps valve normally opened, pressure on piston makes the valve close.
- Also acts as check valve to avoid oil going to filters during shut down.

Tip: Pin hole allows to determine if diaphragm has failed!

UNLOADER VALVE

PRESSURE TRANSDUCER, PT1

- Situated on the pressure vessel
- Measures system pressure

-Range 0 – 500 PSI
-1/8" – 27 NPT

PRESSURE TRANSDUCER, PT2

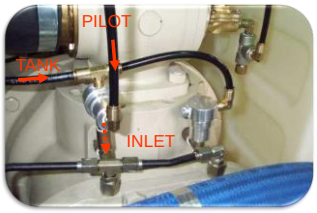
- Situated near the unloader valve,
- Measures regulation system pressure

-Range 0 – 100 PSI
-1/8" – 27 NPT

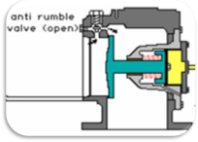
ANTI RUMBLE VALVE

- Allows some compressed air from the receiver tank to return to the inlet at idle to prevent a too great vacuum at the inlet.

Obsolete design



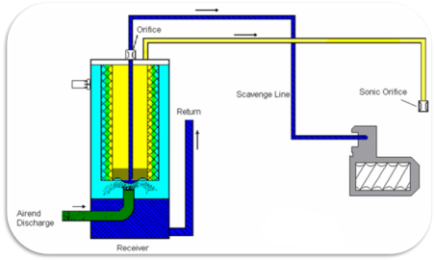
Current design



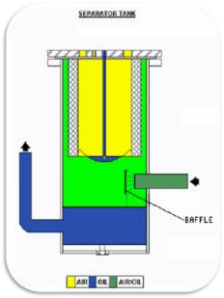
SEPARATION SYSTEM

- Functions of the separation system:
  - Removing the oil contained in the compressed air
- Most of the oil is removed from the air through a specially shaped baffle in the separator tank.
- The remaining oil is removed by the separator element.

SEPARATION SCHEMATIC



SEPARATOR/RECEIVER TANK



SCAVENGE LINE

- Orifice is located in the elbow connector.
- It is designed to scavenge the oil while limiting the loss of air flow.
- Check valve prevents oil reverse flow during shutdown.

SCAVENGE LINE

- Returns to compressor oil filter.
- Look for clogged scavenge lines in case of oil carry over!

SAFETY VALVE

- Valve is on the oil side of the element where pressure is maximum when the separator element is blocked.

MIN. PRESSURE VALVE

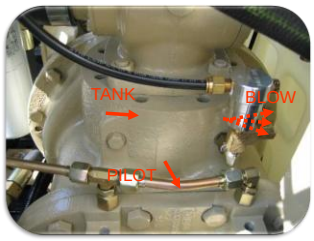
- Maintains a min. pressure (~5bar) in the receiver to:
  - keep the oil flowing.
  - limit pressure drop across the separator.
- Continuous operation at min pressure results in oil carry over due to insufficient scavenge flow.

BLOW DOWN SYSTEM

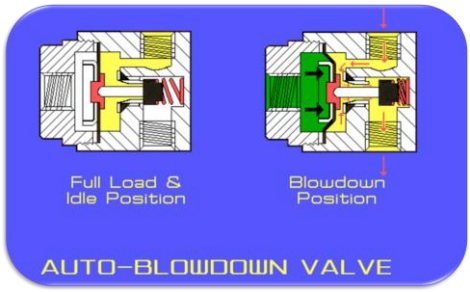
- The blow down system allows to relieve the pressure from the separator tank automatically or manually if required.

AUTO BLOWDOWN

- Normally closed valve.
- Pilot is high pressure at inlet that appears when compressor is stops and unloader check valve closes.



AUTO BLOWDOWN VALVE



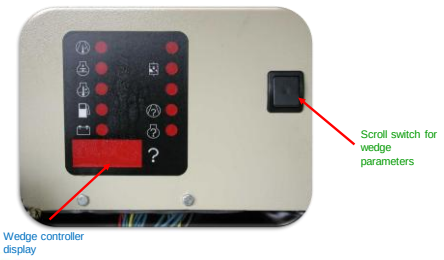
INSTRUMENT/CONTROL PANEL

- Interface between user and compressor.
- Provides control, monitoring and diagnostics functions.

INSTRUMENT/CONTROL PANEL

INSTRUMENT/CONTROL PANEL

- The WEDGE is located inside the machine above the fuel tank.



INSTRUMENT/CONTROL PANEL

1. HIGH COMPRESSOR TEMP.

Indicates shutdown due to high comp. Temp.

2. LOW ENGINE OIL PRESSURE.

Indicates shutdown due to low oil P.

3. HIGH ENGINE COOLANT TEMP.

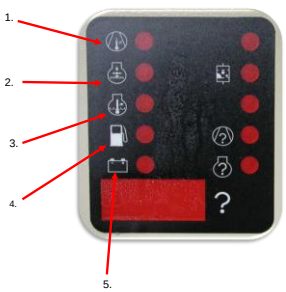
Indicates shutdown due to high water Temp.

4. LOW FUEL LEVEL.

Indicates shutdown due to low fuel level.

5. LOW BATTERY VOLTS.

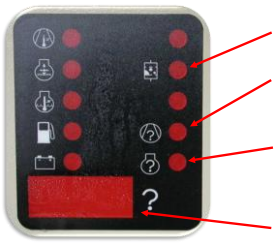
Indicates battery/charging system needs service.



WEDGE CONTROLLER

- First function of the WEDGE is to scan all analog and digital inputs at a fixed interval. The inputs are scanned every 50 milliseconds. The values are then compared against min. and max. values and an ALERT or SHUTDOWN is issued.
- Second function is to monitor discharge pressure, and varies engine speed to maintain air pressure at desired set point.
- Third function to retrieve diagnostic info from the engine.

INSTRUMENT/CONTROL PANEL



1. RESTRICTED AIR FILTER.

Alarm indicator. Indicates eng/comp air filter need service.

2. COMPRESSOR MALFUNCTION.

Indicates shutdown due to compressor system fault. Refer to fault code list.

Relayed to front panel

3. ENGINE MALFUNCTION.

Engine fault. Refer to engine fault codes.

Relayed to front panel.

4. FAULT CODE & DIAGNOSTICS DISPLAY.

Refer to fault code and parameters lists.

CPRSR MALFUNCTION LIGHT

- 1,2-digits codes
- Extract of wedge fault code reference table v1.7

	ALERT			SHUTDOWN			
	CODE	LIGHT (BLINKS)	Machine ID	CODE	LIGHT (STEADY)	DELAY (sec)	Machine ID
Engine Speed < Min. RPM				1	CPRSR Malf	30	All[3]
Engine Speed > Max. RPM				2	CPRSR Malf	30	All[4]
Engine Crank Time Exceeded				3	CPRSR Malf	0	All[1]
Engine Oil Temperature > 252 deg. F	5	CPRSR Malf.	0-6				
Intake Manifold Temperature > 180 deg. F	6	CPRSR Malf.	0-7				
Water In Fuel	8	CPRSR Malf.	5,6				
Engine Not Responding to Throttle Cmd.	10	CPRSR Malf.	All				
Too Many Start Attempts during Autostart				11	CPRSR Malf	0	All

Note: CAN derived data

ENGINE MALFUNCTION LIGHT

- 3,4-digits codes
- Extract of IR engine fault code reference table

Displayed	Code Definition
29	Analog Throttle (A) Input
100	Engine Oil Pressure
105	Manifold Air Temperature
110	Engine Coolant Temperature
111	Loss of Coolant Temperature
158	ECU Power Down Error
174	Fuel Temperature
190	Engine Overspeed
620	Sensor Supply Voltage

DEDICATED LIGHTS

- No code
- Light state table, v1.7

Note: CAN derived data

	ALERT			SHUTDOWN			
	CODE	LIGHT (BLINKS)	Machine ID	CODE	LIGHT (STEADY)	DELAY (sec)	Machine ID
Low Fuel Level		Fuel Level	0–6		Fuel Level	3	All
Air Filter Restriction		Soiled Filter	All				
Low Battery Voltage		Battery Charging Condition	All				
Engine Oil Pressure < 18 PSI		Low Engine Oil Pressure	All				
Low Coolant Level		Engine Coolant Level	0,1,5, 6I				
Engine Coolant Temp > = 215 deg. F.		High Engine Temp	All				
Engine Coolant Temp > = 220 deg. F.					High Engine Temp	10	All
IQ Filter Restriction					IQ Filter Re-striction	3	0–6I
High Discharge Temp. (RT2 > 247 deg. F)					High Comp. Temp.	3	All

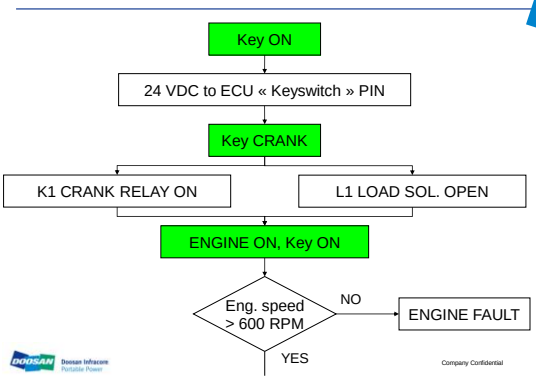
WEDGE DISPLAY

- Accessed by pressing the scroll switch.
- Number appears first and after three seconds parameter will be displayed.

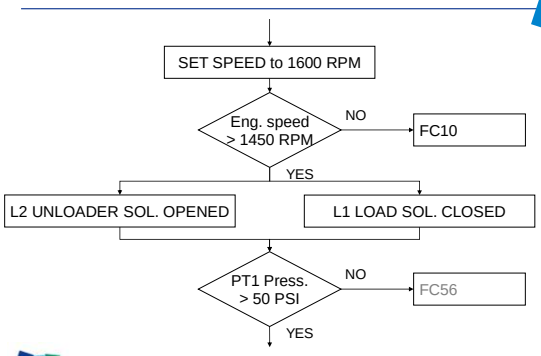
Number	Parameter	Comments
2	RPM	F/W sensor
3	RPM Filtered	
4	Reg system pressure	
5	Sep tank pressure	
6	Discharge temperature	
7	Sep tank temperature	
8	Throttle output	(Hz)
9	Machine type	**
10	Engine coolant temp	from CAN
11	Engine oil temp	from CAN
12	Engine oil pressure	from CAN
13	Intake Manifold temp	from CAN
14	RPM	from CAN
15	Fault code list	Engine code
16	Throttle Position	
17	Boost Pressure	
18	Engine Hours	
19	Load @ Speed	

** 1 = CU XHP Viking, 2 = CAT EMU LP, 3 = CAT EMU HP, 4 = XHP CAT Viking, 5 = CU EMU LP, 6 = CU EMU HP, 7 = P426 Deere, 8 = WW600 Deere

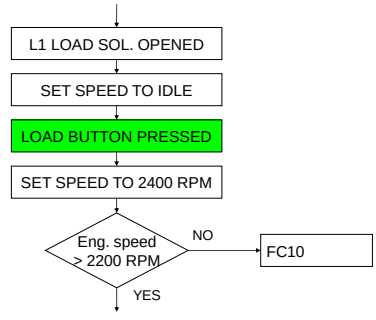
WEDGE OPERATION – STARTUP 1



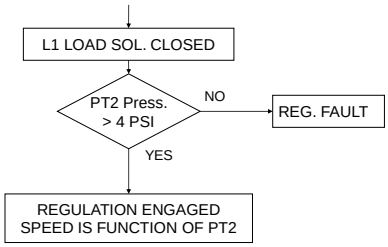
WEDGE OPERATION – STARTUP 2



WEDGE OPERATION – STARTUP 3



WEDGE OPERATION – STARTUP 4



WEDGE MACHINE ID

Disconnect the fuel level gauge before the process and reconnect when completed.

FOR WEDGE software above v1.60

- 1. Determine machine ID.
- 2. Turn ignition "ON". Machine must not be operating.
- 3. Toggle the "scroll" switch until number "19" is reached. Push and hold, the number "20" will appear. Continue to hold the switch. After 1 second, the current machine ID will appear. Continue to hold for 9 more seconds and a blinking "--" will appear. Release the switch.

WEDGE MACHINE ID

- 5. Toggle the switch, the display will show "0". Toggle until the proper machine ID appears, then stop the toggle sequence.
- 6. Wait around 10 sec. until the controller performs a reset function. At reset, the controller display first goes blank, then all 10 LED's light, the display shows all 8's, then the installed software version and finally goes blank. The engine oil pressure and alternator LED begin flashing. At this point the controller has stored the machine ID selected in step 5.
- 7. Check the setting. Reconnect the fuel level gauge.

WEDGE DISPLAY UNITS

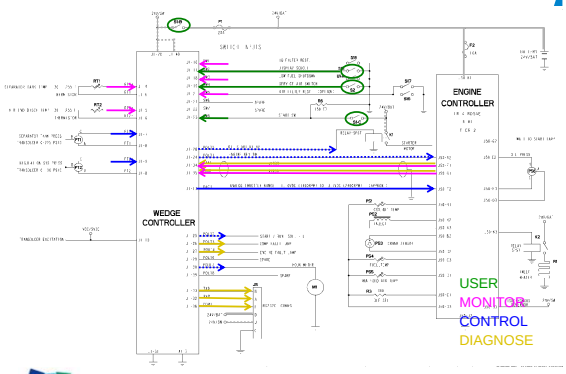
- To determine which units the WEDGE has been configured for:
  - 1. With the machine power off (Key turned OFF)
  - 2. Press and hold the "Service Air" Switch
  - 3. Turn the key switch directly to the crank position.
  - 4. Hold these switch positions until the 4 digit LED display on the WEDGE goes blank.
  - 5. Release "Service Air" switch, release key switch to "ON".
  - 6. Units will be displayed for 2 seconds as:
    - 'PSI' for Deg F, PSI
    - 'Bar' for Deg C, Bars
    - 'H9C' for Deg C, Kg/cm2
    - 'HPA' for Deg C, KPa
- To change the units setting:
  - 1. With the WEDGE showing the current setting, press and release the "Scroll" switch until the desired setting appears on the display.
  - 2. Once it appears, do not release the "Scroll" switch. Hold it in the ON position until the WEDGE restarts. This will select units selection that was displayed.
  - 3. Release the "Scroll" switch. The compressor is ready to start.

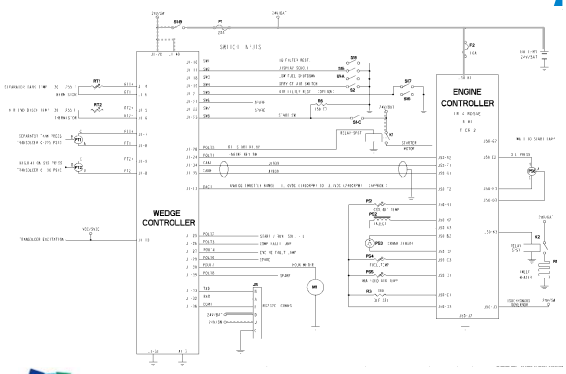
PDA SERVICE TOOL

- Plugs on connector near wedge controller.
- Features:
  - Extract shut down / alarm history
  - Read controller fault codes
  - Read/capture SAE J1939 engine data
  - Flash controller software
- Controller software can also be flashed from a PC.
  - Refer to TSB CMP-2007-004

ELECTRICAL WIRING

- System Diagram
- General Machine Wiring Schematic
- Control Panel Wiring Schematic
- Refer to Zenith Electrical/Electronic service manual for troubleshooting and additional information.





RT1 – SEPARATOR TANK TEMP

- Mounted in the side of the separator tank

RT2 – AIR DISCHARGE TEMP

- Mounted in the airend discharge piping

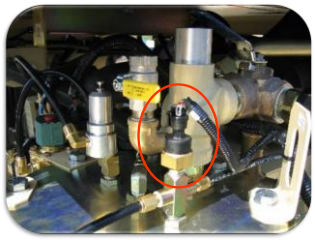
-Range 0 – 300 °F
-3/8"- 18 NPT

THERMISTOR

- Plugged between two wedge pins via main harness.
- Resistance varies with temperature.
- Temperature range : -35°C – 125°C
- Troubleshooting:
  - Check thermistor by plugging the Thermistor Simulator Plug IR#22073878. The reading should be 0°C +/- 3°C. If correct, replace thermistor
  - If NOT, disconnect P1 wedge connector and measure resistance between P1-4 and P1-6. The reading should be 33,2 Kohms +/- 1%. If NOT correct replace Wedge
  - If correct check the harness and connectors.

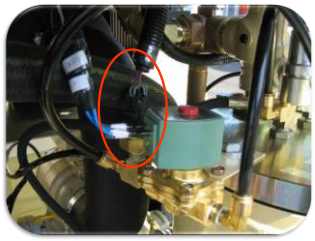
PT1 – SEPARATOR TANK PRESSURE

- Mounted near the separator tank.
- Transducer range: 0 – 15 bar (0 – 225 psig)



PT2 – REGULATION PRESSURE

- Mounted after the pressure regulator.
- Transducer range: 0 – 7 bar (0 – 100 psig)



PRESSURE TRANSDUCER

- PT1 and PT2 are gauge pressure transducers.
- The WEDGE provides 5 VDC excitation voltage to pin B (+5V) and pin A (GND).
- The pressure signal on pin C connects to the WEDGE input. The signal range is .45 to 4.5 volts.
- Troubleshooting:
  - Connect a gauge in parallel with the transducer and use the Wedge diagnostics to display the reading of PT1. If the gauge does NOT track the reading replace the transducer.

SW – AIR FILTER RESTRICTION

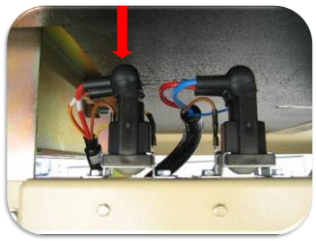
- Normally open switches
- Close when the air filter restriction reaches 20 inches of water.
- The switches provide a ground connection to an input on the WEDGE controller.
- Troubleshooting:
  - Disconnect the switch and simulate it with another switch or jumper plugged on the harness. The alarm should register.
  - If NOT check the harness and connectors.

SW – FUEL SENDER SHUTDOWN

- Normally open switch
- Close when the fuel level is low.
- The switches provide a ground connection to an input on the WEDGE controller.
- Troubleshooting:
  - The Level switch can be checked with the sender removed from the tank. Use an ohmmeter to verify switch operation. Tilting the sender tube back and forth should activate the switch.

K1 – START RELAY

- The WEDGE drives the engine starter through the auxiliary start relay, K1.
- K1 is mounted on the lifting rail above the wedge controller.



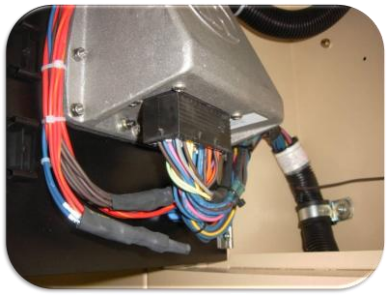
K – START RELAY

- Troubleshooting:
  - If the starter will not engage during a crank cycle, check the voltage at the coil of K1 during the crank cycle. It should be 14 - 22VDC.
  - If voltage is not at K1, check for voltage back through the ESTOP jumper and to the WEDGE.
  - If voltage is at K1 coil, verify voltage is sent to the starter solenoid by K1 contact.
  - Voltage available at the starter solenoid during a no--crank condition indicates a starter problem.

MACHINE WIRING HARNESS

- Links the wedge controller to:
  - The engine controller
  - The compressor sensors
  - The actuators
  - The control panel
  - AND the engine sensors
- The **engine** sensors are link to the **engine** controller via the **machine** harness.

CONNECTOR P1 - WEDGE



K2 – INLET AIR HEATER RELAY

Maintenance General

- Fuel Quality → SULFUR content
  - Recommended Sulfur content is less than 0.10% (1000ppm).
  - If Sulfur is between 0.10 and 0.50 % we strongly suggest decreasing oil maintenance intervals based on oil sampling data.

- Fuel Quality → Solid contaminants
  - Fuel used should meet EN590 or ASTM D975 specification
  - Dirty fuel will damage vital fuel system components , causing machine downtime and expensive repairs.
  - If Biofuel is used it should be conform to JD specs. (consult engine manual)

Options TIER 3

- Aftercooler W/ Waterseparator
- Central Drains
- Dual Pressure Regulation
- Adjustable Height Towbar
- Extended Towbar
- Ext / Adj Towbar
- Full Gauge Panel
- 4 in 1 Gauge
- Tacho
- Galvanneal enclosure
- Hose Reel Assy – Single – Double
- Hose Reel Lubricator
- IQ filter
- IQ Differential Pressure Gauge

Doosan Infracore

COMPRESSOR TRAINING

12/150

Doosan Infracore Portable Power

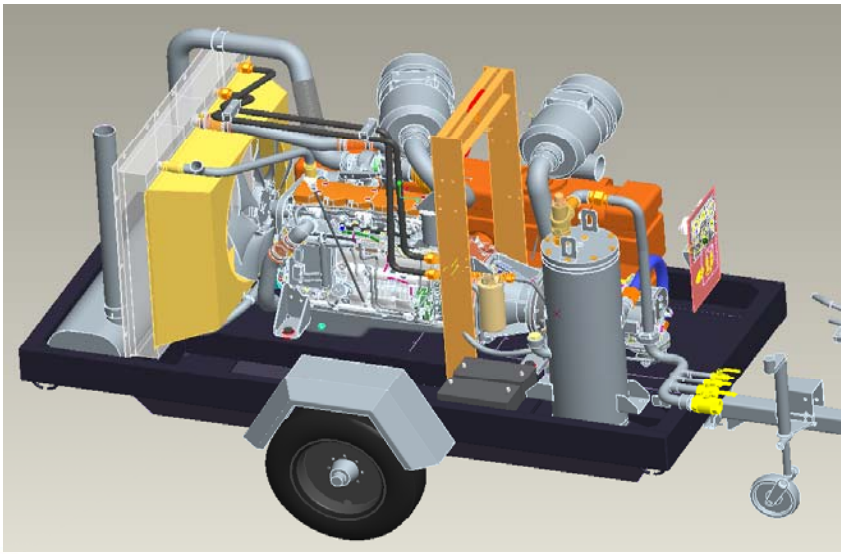
Specifications

COMPRESSOR		ENGINE	
FAD	14.9m³/min	Type	Ingersoll Rand
Discharge pressure	12 bar	No. Cylinders	6 inline
Maximum allowable pressure	12.7 bar	Oil capcity	16.7 litres
Safety valve setting	15 bar	Speed @ full load	2000 revs/min
Maximum pressure ratio	13 : 1	Speed @ idle	1300 revs/min
Operating ambient temp	- 10 to + 46°C	Electrical system	24V negative earth
Maximum discharge temp	120°C	Power @ 2000 rpm	164Kw
Cooling system	Oil injection	Fuel tank capacity	310 litres
Oil capacity	53 litres	Coolant capacity	10 litres
Max oil system temp	120°C		
Max oil system pressure	12.7 bar		

Fixed Height Running Gear		Variable Height RG	
Shipping weight	2840 kg	Shipping weight	2900 kg
Maximum weight	2940 kg	Maximum weight	3000 kg
Max horizontal towing force	3100 kg	Max horizontal towing force	2690 kg
Max vertical coupling load	150 kgf	Max vertical coupling load	150 kgf
Wheels & Tires		**Sound Data**	
No. Off wheels	2	Rated load	83dB(A)
Tire size	205/75 R17.5	Sound power level	99dB(A)
Tire pressure	6.5 bar	Avg sound level	71dB(A)

Doosan Infracore Portable Power

Layout



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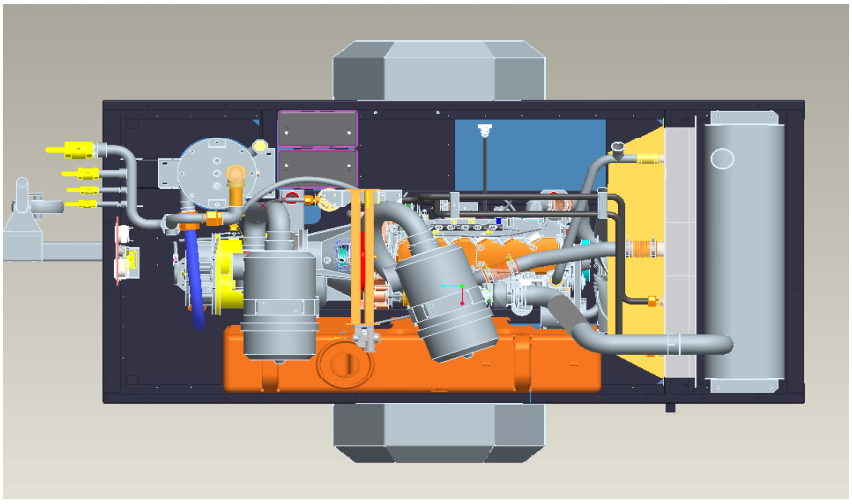
Layout



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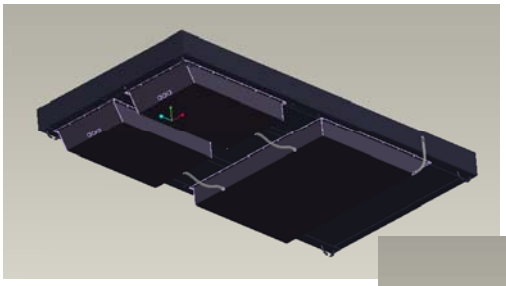
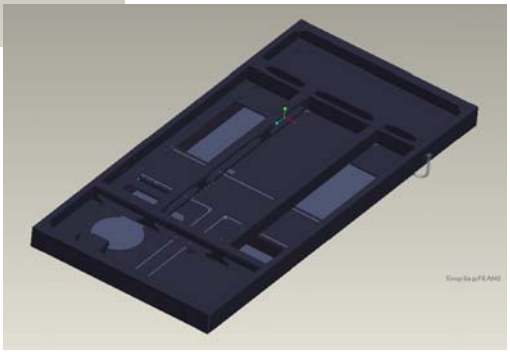
Layout – Bunded Base Frame



The bunded base frame does not allow any fluid spills .
The entire amount of fluids present in the machine(coolant-fuel-oil) , will in case of a leak be contained in the base frame.



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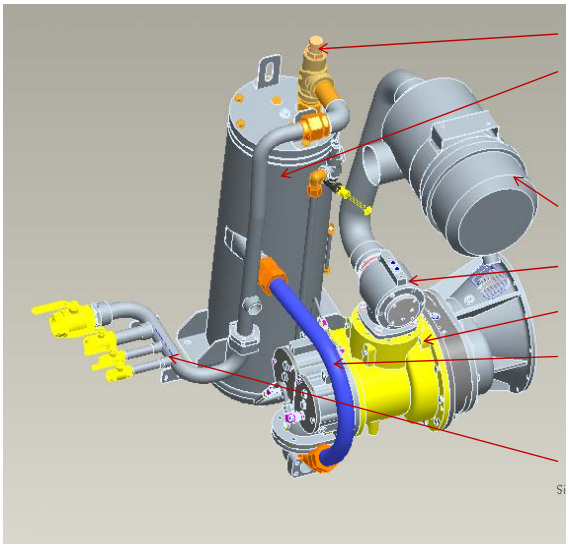
Layout – Compressor System



Minimum Pressure Valve
Separator Vessel
Intake Filter
Unloader
Airend
Airend out to separator
Outlet Valves

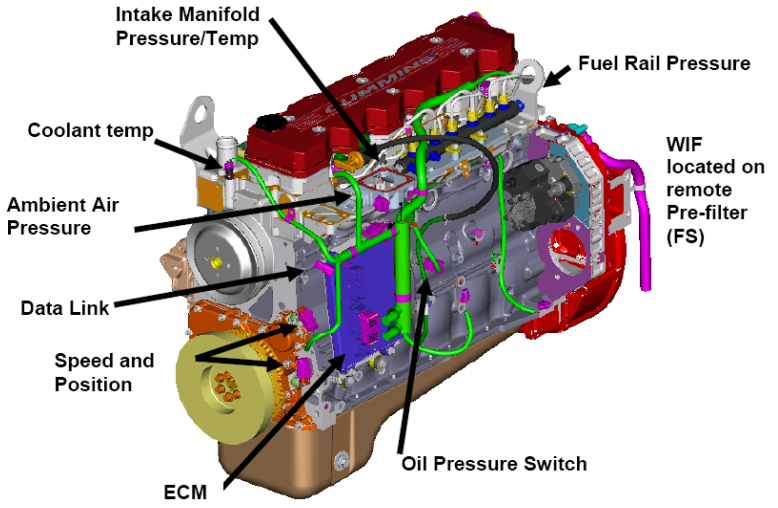
DOOSAN Doosan Infracore Portable Power

ENGINE Tier 3 (12/150)

- 6IRF8AE – Cummins QSB 6.7
- 6 cylinders
- 6.7L displacement
- 220hp(164Kw)@2000 rpm
- Bosch HPCR – 1600bar
- Turbocharged
- Emission Tier III certified
- 24 Volt Electrics

ENGINE Tier 3 (12/150)

QSB6 Harness Connections and their Locations

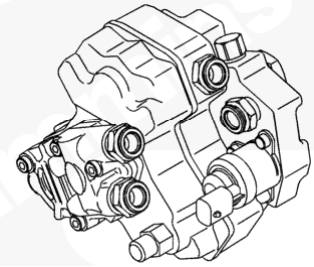


ENGINE QSB 6.7 – safety system

The electronic system includes the following sensors to monitor the engine system parameters:

- Fuel pressure, located in the high pressure rail.
- Intake manifold pressure/temperature, located in the intake manifold cover.
- Coolant temperature located at the front exhaust side of the cylinder head.
- Crankshaft speed sensor located on front of engine.
- Camshaft speed sensor located on front gear cover.
- Ambient air pressure sensor - located near the top of ECM, as part of wiring harness.
- Water in fuel sensor - located in bottom of spin on fuel filter.
- Oil pressure switch is used.

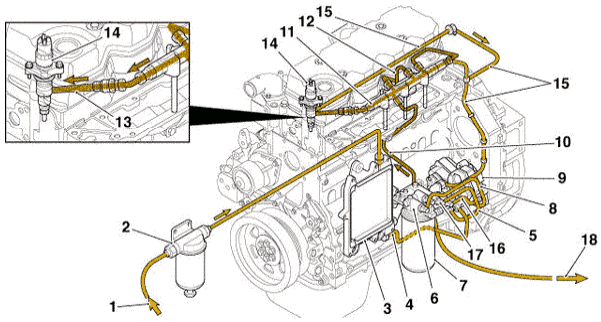
QSB6.7 – Fuel system



WARNING

The fuel pump, high-pressure fuel lines, and fuel rail contain very high-pressure fuel. Do not loosen any fittings while the engine is running. Personal injury and property damage can result. Wait at least 10 minutes after shutting down the engine before loosening any fittings in the high-pressure fuel system to allow pressure to decrease to a lower level.

QSB6.7 – Fuel system



1.From fuel supply tank
2.Water/fuel separator (**not** mounted on engine)
3.ECM cooling plate*
4.To fuel gear pump
5.To fuel filter
6.Fuel filter head
7.Fuel filter
8.To high-pressure pump
9.High-pressure pump
10.To fuel rail
11.Fuel rail
12.To injectors
13.High-pressure connector
14.Injector
15.Fuel return from injectors and fuel rail to fuel filter head
16.Fuel return from high-pressure pump to fuel filter head
17.Fuel return manifold
18.To fuel supply tank.

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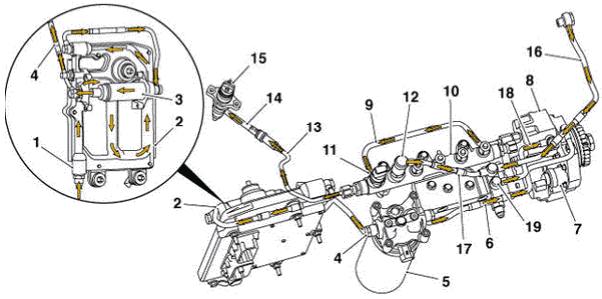
QSB6.7 – Fuel system



1.Fuel inlet - ECM cooling plate
2.ECM cooling plate
3.Lift pump
4.Fuel line (from lift pump to fuel filter)
5.Fuel filter
6.Fuel pump inlet to gear pump
7.EFC actuator
8.Fuel pump
9.High-pressure fuel line (fuel pump to rail)
10.Fuel rail
11.Fuel rail pressure sensor
12.Fuel pressure relief valve
13.High-pressure fuel line (fuel rail to fuel injector)
14.High-pressure connector to fuel injector
15.Fuel injector
16.Injector return line
17.Pressure relief return line
18.Fuel pump return line
19.Fuel return manifold.

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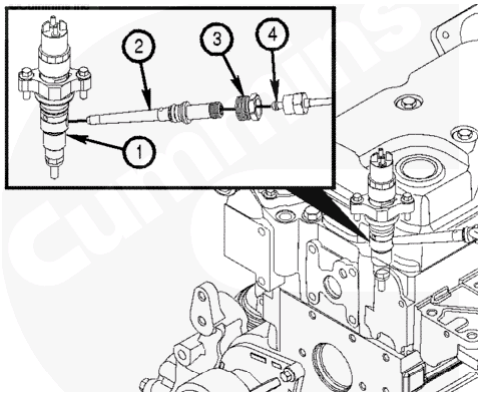
QSB6.7 – Fuel system



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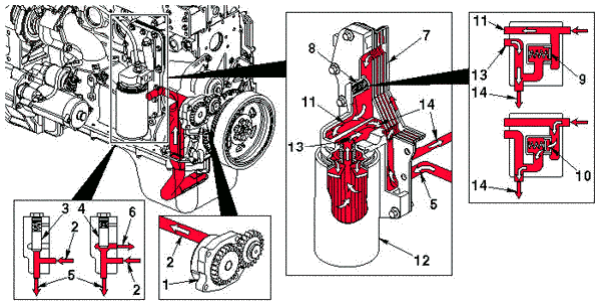
QSB6.7 – Lubricating system



1.Gerotor lubricating oil pump
2.From lubricating oil pump
3.Pressure regulating valve closed
4.Pressure regulating valve open
5.To lubricating oil cooler
6.To lubricating oil pump supply
7.Lubricating oil cooler
8.Filter bypass valve
9.Filter bypass valve closed
10.Filter bypass valve open
11.To lubricating oil filter
12.Full-flow lubricating oil filter
13.From lubricating oil filter
14.Main lubricating oil rifle.

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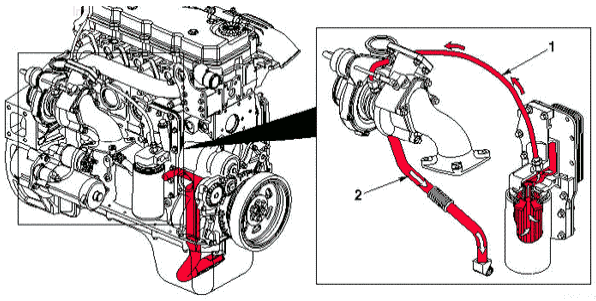
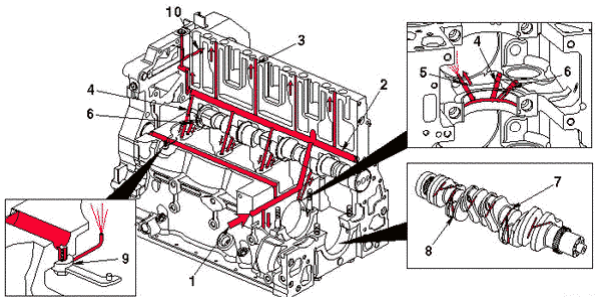
QSB6.7 – Lubricating system



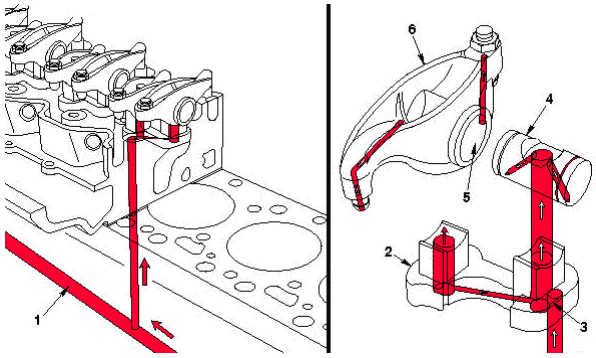
1.Turbocharger lubricating oil supply
2.Turbocharger lubricating oil drain.

QSB6.7 – Lubricating system



1.From lubricating oil cooler
2.Main lubricating oil rifle
3.To valve train
4.From main lubricating oil rifle
5.To piston-cooling nozzle
6.To camshaft
7.Crankshaft main journal
8.Oil supply to rod bearings
9.Directed piston-cooling nozzle
10.To internal lubrication of air compressor.

QSB6.7 – Lubricating system



1.Main lubricating oil rifle
2.Rocker lever support
3.Transfer slot
4.Rocker lever shaft
5.Rocker lever bore
6.Rocker lever.

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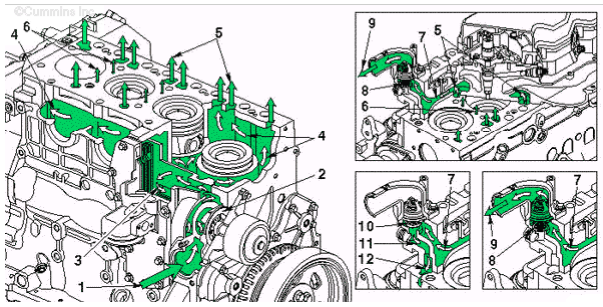
QSB6.7 – Cooling system



1.Coolant inlet
2.Pump impeller
3.Coolant flow past lubricating oil cooler
4.Coolant flow past cylinders
5.Coolant flow from cylinder block to cylinder head
6.Coolant flow between cylinders (engines **without** EGR **only**)
7.Coolant flow to thermostat housing
8.Coolant bypass passage
9.Coolant flow back to radiator
10.Bypass open
11.Coolant bypass in cylinder head
12.Coolant flow to water pump inlet.

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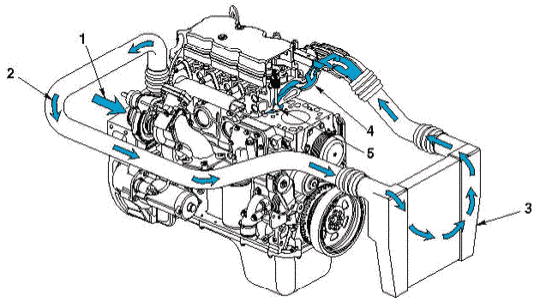
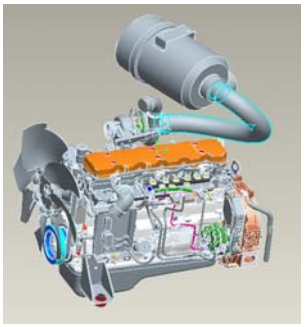
QSB6.7 – Air Intake system



1.Intake air inlet to turbocharger
2.Turbocharger air to charge air cooler
3.Charge air cooler
4.Intake manifold (integral part of the cylinder head)
5.Intake valve.



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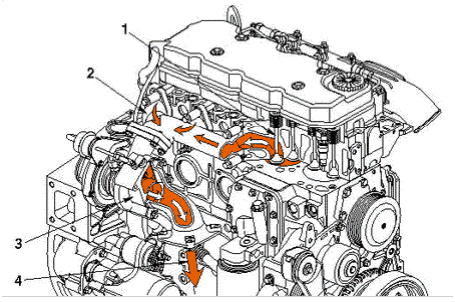
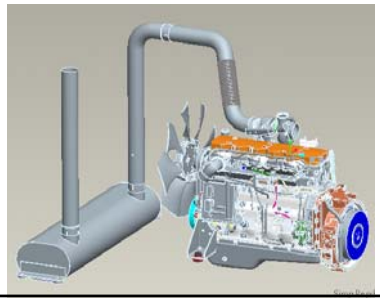
QSB6.7 – Exhaust system



1.Exhaust valve
2.Exhaust manifold
3.Turbocharger
4.Turbocharger exhaust outlet.



DOOSAN Doosan Infracore Portable Power

Maintenance – Engine specific

Maintenance Procedures at Daily Interval

•Air Intake Piping -	Check
•Engine Lubricating Oil Level -	Check
•Air Tank and Reservoirs -	Drain
•Crankcase Breather Tube -	Inspect
•Engine Coolant Level -	Check
•Fuel-Water Separator -	Drain

Maintenance – Engine specific

Maintenance Procedures at 250 Hours or 3 Months

Air Cleaner Restriction -	Check
Air Compressor Mounting Hardware -	Check
Charge-Air Cooler -	Check
Charge-Air Piping -	Check
Radiator Hoses -	Check
Air Intake Piping -	Inspect
Fan, Cooling -	Check
Coolant Level -	Check
Drive Belts -	Check

Maintenance – Engine specific

Maintenance Procedures at 500 Hours or 6 Months

Engine Coolant -	Antifreeze Check
Fuel Filter (Spin-On Type) -	Replace
Lubricating Oil and Filters -	Change
Radiator Pressure Cap -	Check

Maintenance – Engine specific

Maintenance Procedures at 1000 Hours or 1 Year

Cooling Fan Belt Tensioner -	Check
Fan Hub, Belt-Driven -	Check

Maintenance – Engine specific

Maintenance Procedures at 2000 Hours or 2 Years

Air Compressor Discharge Line -	Check
Cooling System -	Drain
Vibration Damper, Rubber -	Check
Vibration Damper, Viscous -	Check

Maintenance – Engine specific

Maintenance Procedures at 5000 Hours or 4 Years

Overhead Set -	Adjust

Maintenance – Engine Fuel Recommendation

Cummins Inc. recommends the use of ASTM number 2D fuel. The use of number 2D diesel fuel will result in optimum engine performance.
At operating temperatures below 0°C [32°F], acceptable performance can be obtained by using blends of number 2D and number 1D.

The following chart lists acceptable substitute fuels for this engine.

Acceptable Substitute Fuels									
Number 1D Diesel[1] (2) (3)	Number 2D Diesel (3)	Number 1K Kerosene	Jet-A	Jet-A1	JP-5	JP-8	Jet-B	JP-4	CITE
A	OK	**Not** OK	A	A	A	A	**Not** OK	**Not** OK	**Not** OK
An "A" means OK **only** if fuel lubricity is adequate. This means the BOCLE number is 3100 or greater as measured by ASTM specification D6078, Scuffing Load Ball On Cylinder Evaluator (SLBOCLE). Lubricity can also be measured by ASTM, specification D6079, ISO 12156, High Frequency Reciprocating Rig (HFRR) in which the fuel **must** have a wear scar diameter of 0.45 mm [0.02 in] or less.									
Any adjustment to compensate for reduced performance with a fuel system using alternate fuel is **not** warrantable.									
Winter blend fuels, such as found at commercial fuel-dispensing outlets, are combinations of number 1D and 2D diesel fuels and are acceptable.									

Maintenance – Engine Oil Recommendation

Cummins Inc. recommends the use of a high-quality SAE 15W-40 heavy-duty engine oil, such as Valvoline Premium Blue™, which meets or exceeds the American Petroleum Institute (API) performance classification CH-4/SJ or CI-4/SK and the Association des Constructeurs Européen d'Automobiles (A.C.E.A.) performance classification E5 or E7.

Cummins® Engine Standard Classifications (CES)	American Petroleum Institute Classification (API)	European Classification (ACEA)	Comments
	API CD API CE	ACEA E-1, ACEA E-2	**OBSOLETE. DO NOT USE.**
CES-20075	API CF-4/SG, API CG-4/SH	ACEA E-3	Minimum acceptable oil classification for Midrange engines. (1)
CES-20071, CES-20072, CES-20076, CES-20077	API CH-4/SJ	ACEA E-5, E-7	Good oil classification for Midrange engines without EGR.
CES-20078	API CI-4/SK		Excellent oil for Midrange engines.
1. CG-4/SH and E-3 oils can be used in areas where none of the recommended oils are available, but the oil drain interval **must** be reduced by one half of the interval given in the maintenance schedule. See the oil drain interval information in Section 2.			

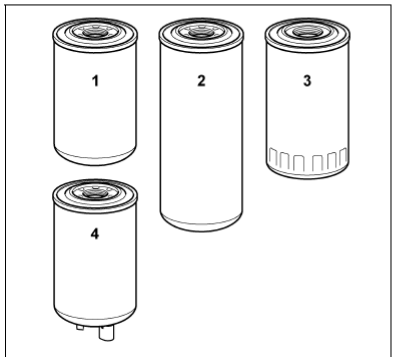
Maintenance – Engine Coolant Recommendation

Fully formulated antifreeze **must** be mixed with good-quality water at a 50/50 ratio (40- to 60-percent working range).
A 50/50 mixture of antifreeze and water gives a -36°C [-33°F] freezing point and a 108°C [226°F] boiling point, which is adequate for locations in North America. The actual lowest freezing point of ethylene glycol antifreeze is at 68 percent. Using higher concentrations of antifreeze will raise the freezing point of the solution and increase the possibility of a silica gel problem.

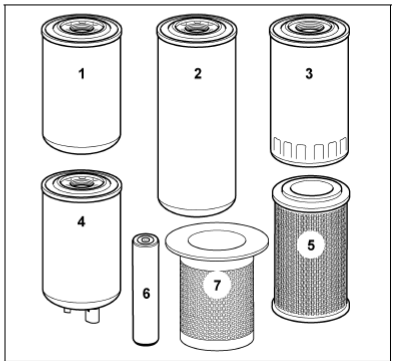
Typically, antifreeze/coolants meeting ASTM4985 (GM6038M specification) or ASTM D6210 criteria are acceptable antifreeze/coolants for QSB6.7.

Water Quality	
Calcium Magnesium (hardness)	**Maximum 170 ppm as ($CaCO_3$ + $MgCO^3$)**
Chloride	40 ppm as (Cl)
Sulfur	100 ppm as (SO_4)

Maintenance - Compressor



ccn	Qty.	Description
1-4	1	KIT – 500 HOUR
1	1	Element, oil filter (engine)
2	1	Element, oil filter (airend)
3	1	Element, fuel filter (primary)
4	1	Element, fuel filter (secondary)



ccn	Qty.	Description
1-7	1	KIT – 1000 HOUR
1	1	Element, oil filter (engine)
2	1	Element, oil filter (airend)
3	1	Element, fuel filter (primary)
4	1	Element, fuel filter (secondary)
5	2	Element, air filter
6	2	Element, air filter (safety)
7	1	Element, oil separator

Maintenance - Compressor

	Initial 500 miles /850 km	Daily	Weekly	Monthly	3 Monthly. 250 hrs.	6 Monthly. 500 hrs	12 Monthly. 1000 hrs	18 Monthly. 1500 hrs
*Fuel/Water Separator Element						R		
Compressor Oil Filter Element						R		
Compressor Oil						R		
Engine Oil Change						R		
Engine Oil Filter						R		
*Water Pump Grease.							R	
*Wheels (Bearings, Seals, etc.)						C		
*Engine Coolant						C	R	
Fuel Filter Element						R		
*Injection Nozzle Check								C
Shutdown Switch Settings							T	
Scavenger Orifice & Related Parts							C	
Oil Separator Element							R	
*Feed Pump Strainer Cleaning.							C	
Coolant Replacement							R	

Maintenance intervals are on time or hours, whichever comes first!!

Doosan Infracore Portable Power

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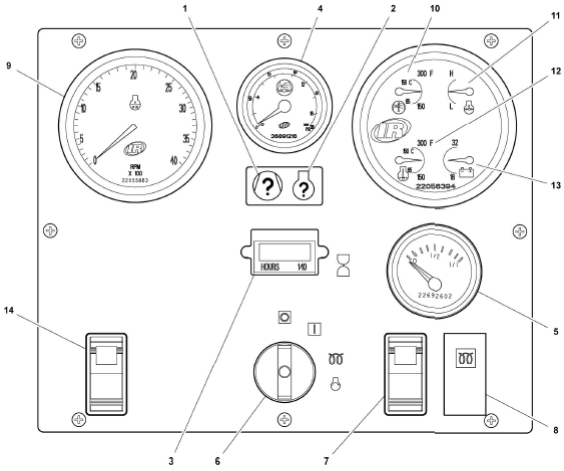
Electronics – Control Panel



DIAGNOSTIC/AUTO SHUTDOWN (STANDARD)

1. Compressor fault – Needs attention. See Wedge diagnostic panel for more detail.
2. Engine Fault – Needs attention. See Wedge diagnostic panel for more detail.
3. Hourmeter – Records running time for maintenance.
4. Compressor Discharge Pressure Gauge – Indicates pressure in receiver tank, psi (kPa).
5. Fuel Level Gauge – Indicates amount of fuel in tank.

Doosan Infracore Portable Power

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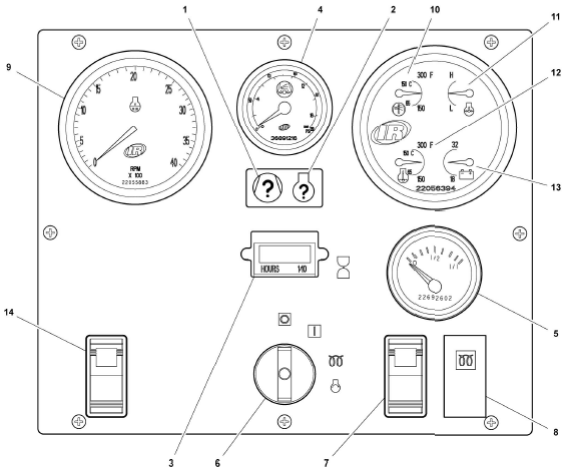
Electronics – Control Panel



CONTROLS (STANDARD)

6. Power Switch – Flip .ON. to activate systems prior to Starting.
Flip .OFF. to stop engine.

7. Service Air Switch – After warm-up, PUSH. Provides full air pressure at the service outlet.

8. Wait To Start Lamp.

9. Engine Speed Gauge – Indicates engine speed.

10. Discharge Air Temp. Gauge – Indicates in F and C.
Normal operating range: 185F/85C to 248F /120C.

11. Engine Oil Pressure Gauge – Indicates engine oil pressure (psi (kPa).

12. Engine Water Temp Gauge – Indicates coolant temperature, with normal operating range from 180F/82C to 210F /99C.

13. Voltmeter – Indicates battery condition.

OPTIONAL CONTROLS

14. Dual Pressure Switch

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INSTRUMENT/CONTROL PANEL

1. HIGH COMPRESSOR TEMP.

Indicates shutdown due to high comp. Temp.

2. LOW ENGINE OIL PRESSURE.

Indicates shutdown due to low oil P.

3. HIGH ENGINE COOLANT TEMP.

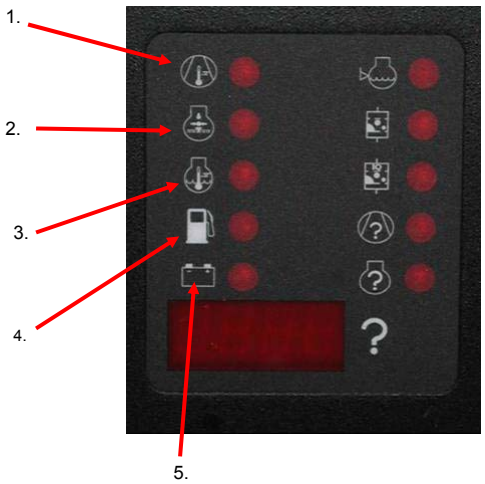
Indicates shutdown due to high water Temp.

4. LOW FUEL LEVEL.

Indicates shutdown due to low fuel level.

5. LOW BATTERY VOLTS.

Indicates battery/charging system needs service.



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INSTRUMENT/CONTROL PANEL

1. LOW ENGINE COOLANT LEVEL.

Alarm indicator lamp. Indicates coolant needs service.

2. RESTRICTED AIR FILTER.

Alarm indicator. Indicates eng/comp air filter need service.

3. RESTRICTED IQ FILTERS.

Shutdown indicator (If equipped)

4. COMPRESSOR MALFUNCTION.

Indicates shutdown due to compressor system fault. Refer to fault code list.

5. ENGINE MALFUNCTION.

Engine fault. Refer to engine fault codes.

6. FAULT CODE & DIAGNOSTICS DISPLAY.

Refer to fault code and parameters lists.

Warranty – Cummins QSB 6.7

Base Warranty.
QSB engines come with a full 2-year/2,000-hour warranty that covers all Cummins branded components, including electrics such as starters and alternators.
Major components coverage continues into the third year, up to 10,000 hours of operation from the time your QSB engine goes in service.

Three simple steps explain everything you need to know:
Step One: Full coverage on all Cummins industrial engines and branded components with unlimited hours during the first year of operation. This includes Cummins branded electrics such as alternators, starters, etc.
Step Two: Full coverage is extended for the second year, up to 2,000 hours of operation. Total hours are cumulative from the time the engine goes in service.
Step Three: Major components coverage including block, crankshaft, camshaft and rods on all products for the third year or up to 10,000 hours of operation. Total hours are cumulative from the time the engine goes in service.

LARGE COMPRESSORS

Doosan Infracore

COMPRESSOR TRAINING

EMU Range

Doosan Infracore Portable Power

Ingersoll Rand Construction Technologies

PRODUCT RANGE

- 9/270 – HP915 - 8.6bar (125psi), 27m3/min (950cfm)
- 9/300 – XP1000 - 8.6bar (125psi), 30m3/min (1060cfm)
- 12/235 – VHP825 - 12bar (175psi), 23m3/min (825cfm)
- 17/235 - 17bar (250psi), 23m3/min (825cfm)
- 21/215 - XHP750 - 21bar (300psi), 21.5m3/min (760cfm)

PRODUCT RANGE

- High ambient units (non CE) will now use the new nomenclature
  - E.G. no longer use VHP825, now 12/235
- Additional decal will distinguish between CE and non-CE units
  - CE for CE units
  - HA for non-CE units

SUMMARY

- The compressor can be divided in the following subsystems
  - ENGINE and AIREND
  - LUBRICATION & COOLING SYSTEM
  - SEPARATION SYSTEM
  - AIR FLOW REGULATION SYSTEM
  - INSTRUMENT/CONTROL PANEL
  - ELECTRICAL WIRING
- Troubleshooting

ENGINE TIER II

- 6IRQ9AE – Cummins QSL9
- 6 cylinders
- 8.9L displacement
- Power ratings @ 1800 RPM:
  - 224kW (300hp) - 9/270 & 12/235
  - 255kW (340hp) - 9/300, 17/235 & 21/215
- Turbocharged and after-cooled
- CAPS electronic injection pump
- Tier II certified
- 24 Volt Electrics

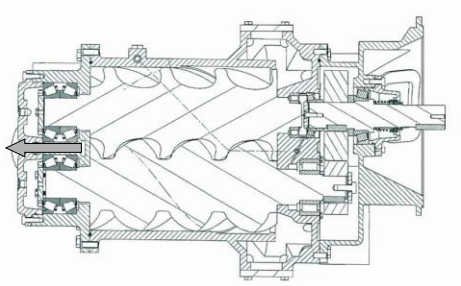
ENGINE TIER III

- 6IRQ9AE – Cummins QSL9
- 6 cylinders
- 8.9L displacement
- Power ratings @ 1800 RPM:
  - 224kW (300hp) - 9/270 & 12/235
  - 255kW (340hp) - 9/300, 17/235 & 21/215
- Turbocharged and after-cooled
- Common rail electronic
- Tier III certified
- 24 Volt Electrics

AIREND

- Casing houses two screw-type rotors mounted on ball and roller bearings.
- Diesel engine drives the male rotor through heavy-duty coupling.
- Mechanical seal used to seal the shaft.
- Gear sets allow to change rotor speed and therefore air output.
- Two different airends used on EMU range:
  - Single stage on 9/270, 9/300, 12/235
  - Two stages on 17/235, 21/215

WW 226mm AIREND

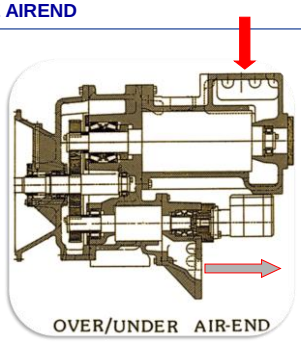


9/270, 9/300, 12/235

WW 226mm AIREND

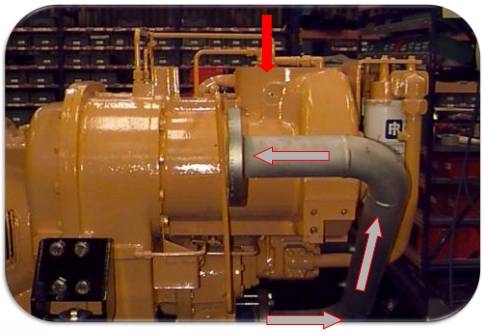
HR2 HIGH PRESSURE AIREND

- 2-stage airend
- Oil pump driven by second stage

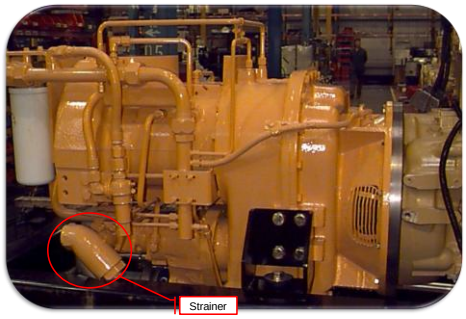


17/235, 21/215

HR2 HIGH PRESSURE AIREND



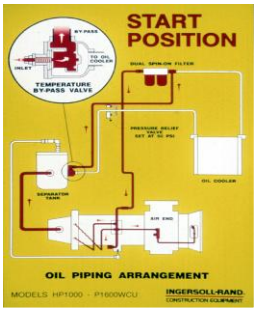
HR2 HIGH PRESSURE AIREND

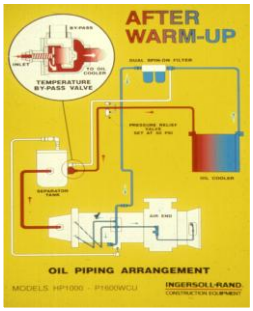


COMPRESSOR OIL SYSTEM

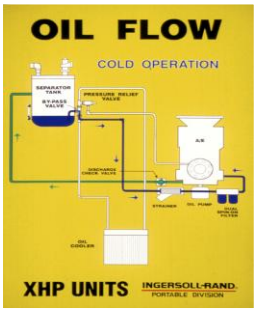
- Functions of the oil system:
  - Lubricating the rotors, airend bearings and mechanical seals
  - Sealing the clearances between the airend rotors
  - Cooling of the airend. Heat is generated during air compression.
- The oil flows due to the air pressure. Only the two-stage airend uses an oil pump.

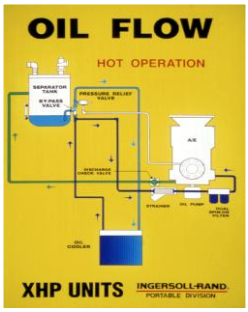
COMPRESSOR OIL SYSTEM





COMPRESSOR OIL SYSTEM





SEPARATOR/RECEIVER TANK

- Stores the compressed air and oil.
- Pressure in the tank is forcing the oil through the system.
- An oil level indicator is provided.
- Assists in the oil cooling with fresh air passing around.

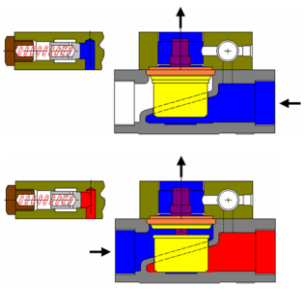
OIL TEMP. BYPASS VALVE

- Allows to regulate the oil temperature around 85°C.
- Keeping the oil hot enough allows to reduce the water condensation in the compressor.

Tip: never remove the thermostat as the oil would flow through the least restriction path and cooling would be impaired!

OIL TEMP. BYPASS VALVE

- Cold oil
- Hot oil

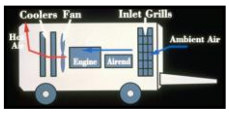


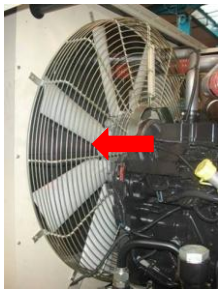
COOLER PACKAGE

Check every day and clean if necessary to ensure high efficiency.

COOLING FAN

- The fan is a pusher type, fresh air flows around the engine.
- Make sure the compressor doors are closed during operation to prevent overheating!





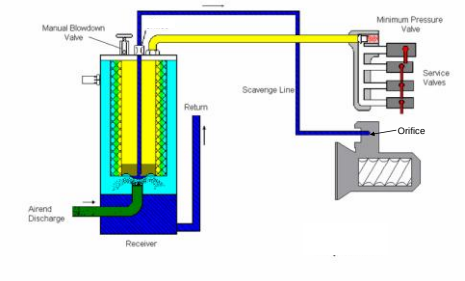
OIL FILTERS

- Provide 10 microns filtration.
- Spring-loaded bypass valve is integrated in filter head.

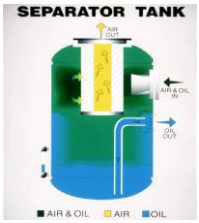
SEPARATION SYSTEM

- Functions of the separation system:
  - Removing the oil contained in the compressed air
- Most of the oil is removed from the air through a specially shaped baffle in the separator tank.
- The remaining oil is removed by the separator element.

SEPARATION SCHEMATIC



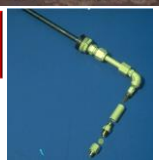
SEPARATOR/RECEIVER TANK



SCAVENGE DROP TUBES

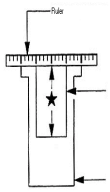
- The scavenge tube removes the oil trapped by the separator element.
- It extends up to approximately 6 to 12mm over the element's bottom.

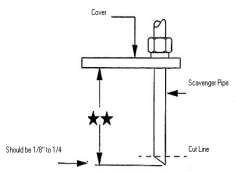
Tip: Always check scavenge tube length when replacing separator element



SCAVENGE DROP TUBES

- The scavenge tube removes the oil trapped by the separator element.





Tip: Always check scavenge tube length when replacing separator element

SCAVENGE LINE

- Returns to air inlet.
- Orifice is located in the elbow connector.
- It is designed to scavenge the oil while limiting the loss of air flow.

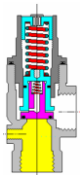
Tip: Look for clogged scavenge lines in case of oil carry over!

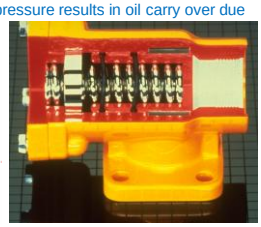
SAFETY VALVE

- Valve is on the oil side of the element where pressure is maximum when the separator element is blocked.

MINIMUM PRESSURE VALVE

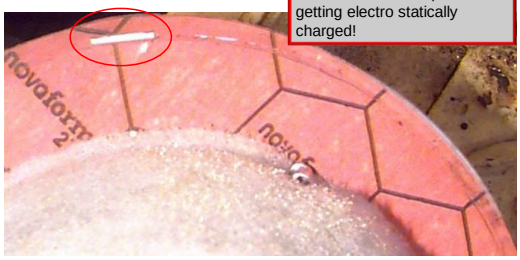
- Maintains a min. pressure (~5bar) in the receiver to:
  - keep the oil flowing.
  - limit pressure drop across the separator.
- Continuous operation at min pressure results in oil carry over due to insufficient scavenge flow.





SEPARATOR ELEMENT

Tip: Don't remove the earth staple nor use sealant as this could lead to the separator getting electro statically charged!



AIR REGULATION SYSTEM

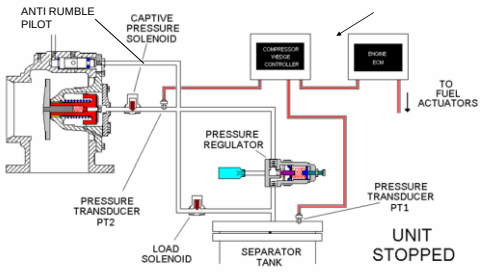
- The air regulation system continuously adjusts the production of compressed air to the consumption by controlling the engine speed and unloader valve.

- The blow down system allows to relieve the pressure from the separator tank automatically or manually if required.

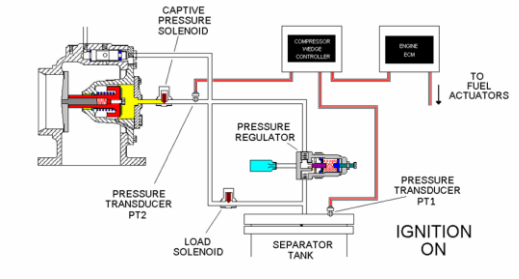
AIR REGULATION SYSTEM

- The unloader is pneumatically controlled through the pressure regulator.
- As engine is electronically controlled, units do not have a pneumatic speed control cylinder.
- Engine speed is controlled by the engine ECM. The Wedge controller monitors regulation system pressure and separator tank pressure, measured by pressure transducers, PT2 and PT1. It then computes an engine speed to maintain discharge pressure. This throttle setting is sent to the engine ECM.

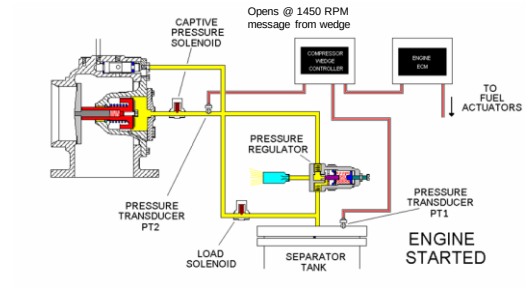
REGULATION SCHEMATIC



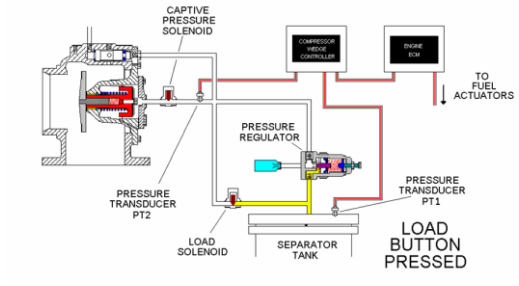
REGULATION SCHEMATIC



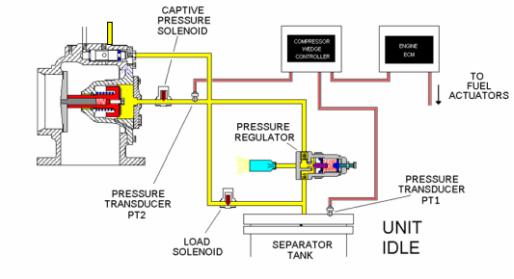
REGULATION SCHEMATIC



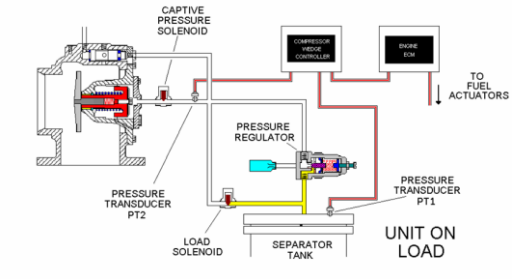
REGULATION SCHEMATIC



REGULATION SCHEMATIC



REGULATION SCHEMATIC



UNLOADER COMPRESSOR

- Pressurise the unloader valve to close it before starting.
- Stops when glow indicator lights off.

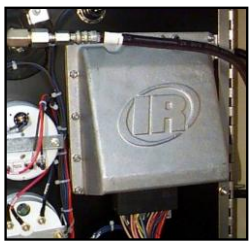
CAPTIVE SOLENOID

- Closed below 1450 RPM.
- Allows to keep the unloader valve closed to reduce load on the engine during start-up.

ORIFICE

- Continuously bleeds air from the regulation circuit.
- If blocked, unloader valve would never be able to open after start up and airend low oil pressure warning would register.
- Size of orifice greatly affects regulation characteristic and should not be adjusted.
- Located near PT2.

WEDGE CONTROLLER



- The WEDGE is located on the rear of the instrument panel.

WEDGE CONTROLLER

- WEDGE Controller is the heart of the machine monitor and control system.
- It is an Intel micro-controller based unit with analog and digital inputs and outputs.
- One of the function is to monitor regulator and discharge pressure, and varies engine speed to maintain air pressure at desired set point.

LOAD SOLENOID

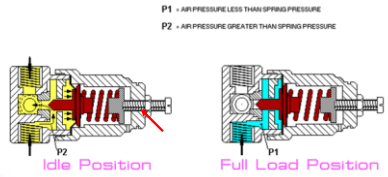
- Situated on back of control panel or near unloader valve.

LOAD BUTTON

- **The load button is a momentary action switch.**
- **It operates the load solenoid adjacent to the pressure regulator.**
- **Prior to being pressed the solenoid allows the air to by-pass the regulator.**

REGULATOR VALVE - OPERATION

- Needle valve actuated by diaphragm and held closed by a spring.
- Controlled pressure preset in factory, can be adjusted by means of adjusting screw.
- Pin hole allows to determine diaphragm condition.



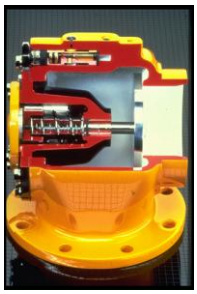
REGULATOR VALVE

- Situated on back of control panel or near unloader valve.
- Red tape is a resistor that allows defrosting in case of low temperature.

UNLOADER VALVE (one stage)

- Valve actuated by piston with diaphragm.
- Spring keeps valve normally opened, pressure on piston makes the valve close.
- Also acts as check valve to avoid oil going to filters during shut down.

Tip: Pin hole allows to determine if diaphragm has failed!

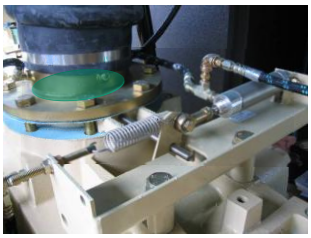


UNLOADER VALVE (one stage)

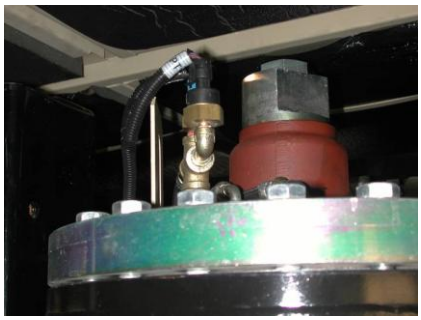
UNLOADER VALVE (two stages)

- Butterfly-type valve, normally open.
- Actuated by a piston cylinder, pressure on piston makes the valve close.
- Check valve situated at airend outlet.

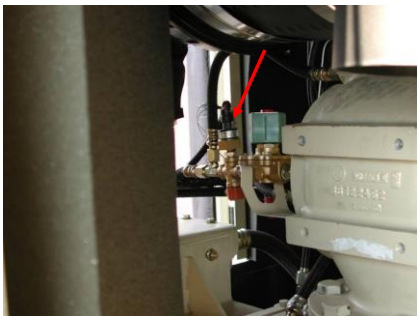
UNLOADER VALVE (two stages)



PRESSURE TRANSDUCER, PT1



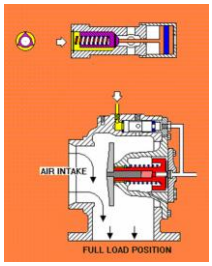
PRESSURE TRANSDUCER, PT2

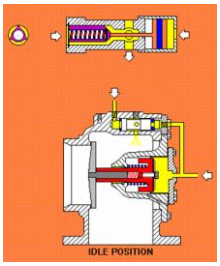


ANTI RUMBLE VALVE

- Allows some compressed air from the receiver to return to the inlet at idle.
- This prevents a too great vacuum a the inlet and possible rumble.

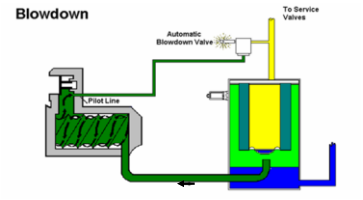
ANTI RUMBLE VALVE - OPERATION



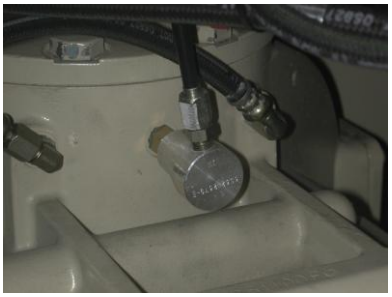


AUTO BLOWDOWN CIRCUIT (one stage)

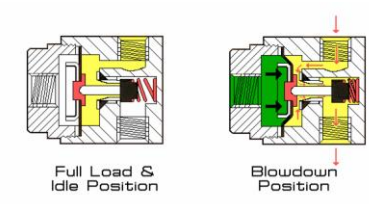
- Normally closed valve.
- Pilot is high pressure at inlet that appears when compressor is stops and unloader check valve closes.



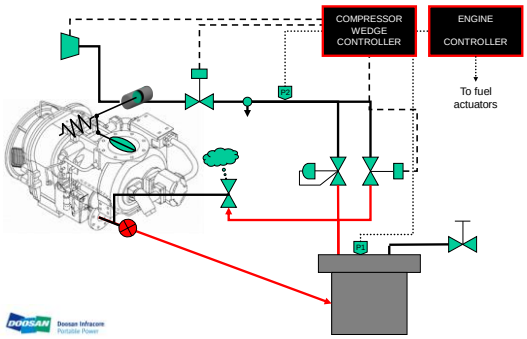
AUTO BLOWDOWN VALVE



AUTO BLOWDOWN VALVE

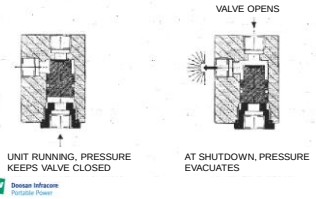


AUTO BLOWDOWN CIRCUIT (2-stages)



AUTO BLOWDOWN CIRCUIT (2-stages)

- On 2-stage unloader with the butterfly valve the check valve is located on the discharge. Therefore no pressure can build up during shut down.
- Auto blowdown is done with normally open valve that is kept closed by pilot line during operation.



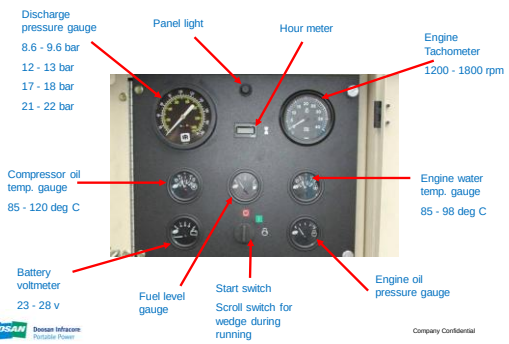
MANUAL BLOWDOWN VALVE

- Can be used as a back-up for the auto blow down valve.
- Must be closed before operation, if not the air regulation system will not work properly.

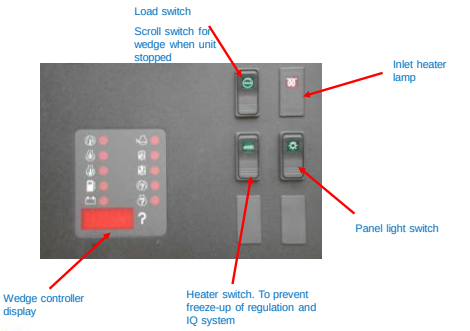
INSTRUMENT/CONTROL PANEL

- Interface between user and compressor.
- Provides control, monitoring and diagnostics functions.

INSTRUMENT/CONTROL PANEL



INSTRUMENT/CONTROL PANEL



WEDGE CONTROLLER

- First function of the WEDGE is to scan all analog and digital inputs at a fixed interval. The inputs are scanned every 50 milliseconds. The values are then compared against min. and max. values and an ALERT or SHUTDOWN is issued.
- Second function is to monitor discharge pressure, and varies engine speed to maintain air pressure at desired set point.
- Third function to retrieve diagnostic info from the engine.

INSTRUMENT/CONTROL PANEL

1. HIGH COMPRESSOR TEMP.

Indicates shutdown due to high comp. Temp.

2. LOW ENGINE OIL PRESSURE.

Indicates shutdown due to low oil P.

3. HIGH ENGINE COOLANT TEMP.

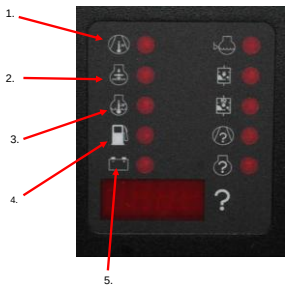
Indicates shutdown due to high water Temp.

4. LOW FUEL LEVEL.

Indicates shutdown due to low fuel level.

5. LOW BATTERY VOLTS.

Indicates battery/charging system needs service.



INSTRUMENT/CONTROL PANEL

1. LOW ENGINE COOLANT LEVEL.

Alarm indicator lamp. Indicates coolant needs service.

2. RESTRICTED AIR FILTER.

Alarm indicator. Indicates eng/comp air filter need service.

3. RESTRICTED IQ FILTERS.

Shutdown indicator (If equipped)

4. COMPRESSOR MALFUNCTION.

Indicates shutdown due to compressor system fault. Refer to fault code list.

5. ENGINE MALFUNCTION.

Engine fault. Refer to engine fault codes.

6. FAULT CODE & DIAGNOSTICS DISPLAY.

Refer to fault code and parameters lists.

CPRSR MALFUNCTION LIGHT

- 2-digits codes
- Extract of wedge fault code reference table v1.7

	ALERT			SHUTDOWN			
	CODE	LIGHT (BLINKS)	Machine ID	CODE	LIGHT (STEADY)	DELAY (sec)	Machine ID
Engine Speed < Min. RPM				1	CPRSR Malf	30	All[3]
Engine Speed > Max. RPM				2	CPRSR Malf	30	All[4]
Engine Crank Time Exceeded				3	CPRSR Malf	0	All[1]
Engine Oil Temperature > 252 deg. F	5	CPRSR Malf.	0–6				
Intake Manifold Temperature > 180 deg. F	6	CPRSR Malf.	0–7				
Water In Fuel	8	CPRSR Malf.	5,6				
Engine Not Responding to Throttle Cmd.	10	CPRSR Malf.	All				
Too Many Start Attempts during Autostart				11	CPRSR Malf	0	All

Note: CAN derived data

ENGINE MALFUNCTION LIGHT

- 3,4-digits codes
- Extract of Cummins engine fault code reference table

Displayed	Code Definition
111	Engine Control Module – Critical Internal Failure
115	Engine Speed/Position Sensor Circuit – Lost Both of Two Signals
122	Intake Manifold Pressure Sensor Circuit – Voltage Above Normal, or Shorted High
123	Intake Manifold Pressure Sensor Circuit – Voltage Below Normal, or Shorted Low
135	Engine Oil Pressure Sensor Circuit – Voltage Above Normal, or Shorted High
141	Engine Oil Pressure Sensor Circuit – Voltage Below Normal, or Shorted Low
143	Engine Oil Pressure Low – Warning
144	Engine Coolant Temperature Sensor Circuit – Voltage Above Normal, or Shorted High
145	Engine Coolant Temperature Sensor Circuit – Voltage Below Normal, or Shorted Low

DEDICATED LIGHTS

- No code
- Light state table, v1.7

Note: CAN derived data

	ALERT			SHUTDOWN			
	CODE	LIGHT (BLINKS)	Machine ID	CODE	LIGHT (STEADY)	DELAY (sec)	Machine ID
Low Fuel Level		Fuel Level	0-6		Fuel Level	3	All
Air Filter Restriction		Soiled Filter	All				
Low Battery Voltage		Battery Charging Condition	All				
Engine Oil Pressure < 16 PSI		Low Engine Oil Pressure	All				
Low Coolant Level		Engine Coolant Level	0,1,5, 6				
Engine Coolant Temp > = 215 deg. F		High Engine Temp	All				
Engine Coolant Temp > = 220 deg. F.					High Engine Temp	10	All
IQ Filter Restriction					IQ Filter Re-striction	3	0-6
High Discharge Temp. (RT2 > 247 deg. F)					High Comp. Temp.	3	All

WEDGE DISPLAY

- Accessed by toggling:
  - "Service Switch" if machine is stopped
  - "Start" key switch if machine is running
- Number appears first and after three seconds parameter will be displayed.

Number	Parameter	Comments
2	RPM	F/W sensor
3	RPM Filtered	
4	Reg system pressure	
5	Sep tank pressure	
6	Discharge temperature	
7	Sep tank temperature	
8	Throttle output	(Hz)
9	Machine type	**
10	Engine coolant temp	from CAN
11	Engine oil temp	from CAN
12	Engine oil pressure	from CAN
13	Intake Manifold temp	from CAN
14	RPM	from CAN
15	Fault code list	Engine code
16	Throttle Position	
17	Boost Pressure	
18	Engine Hours	
19	Load @ Speed	

** 1 = CU XHP Viking, 2 = CAT EMU LP, 3 = CAT EMU HP, 4 = XHP CAT Viking, 5 = CU EMU LP, 6 = CU EMU HP, 7 = P426 Deere, 8 = WW600

WEDGE OPERATION – STARTUP

Power "ON" at Control Panel:

- 1. Key switch signal (24VDC) supplied to engine controller by WEDGE controller
- 2. Frequency throttle signal ON
- 3. Unloader solenoid valve (L2) is closed (de-energized)
- 4. Start-up compressor is turned on for 10 seconds

Engine Start-up:

- When the key is switched to the engine crank position:
  - 1. Unloader solenoid valve (L2) is closed (de-energized).
  - 2. Start compressor is turned on.
  - 3. Key switch signal (24VDC) is supplied to engine controller.
  - 4. K1 auxiliary start relay is energized.
  - 5. Run/Start solenoid valve (L1) is opened (energized).

Note: Start compressor remains on, run/start solenoid stays open and unloader solenoid valve stays closed for 10 seconds after the key is released if the engine does not start.

- When the engine speed reaches 600 RPM (engine start declared):
  - 1. Engine speed is set to 1500 RPM.
- When the engine speed reaches 1450 RPM:
  - 1. Unloader solenoid valve is opened (energized).(L2)
  - 2. Start compressor is turned off.
  - 3. Run/Start solenoid valve is closed (de-energized). (L2)
- When the separator tank pressure reaches 50 psi:
  - 1. Run/Start solenoid valve is opened (energized). (L2)
- After 5 seconds:
  - 1. Engine speed is set to idle (1200 RPM if air end discharge temperature is approximately 150 degrees F or (If J1939CANis functioning). The engine coolant is 100 degrees F. Othrwise, the engine idle stays at 1500 RPM.

WEDGE OPERATION – LOADING

Loading:

- When the "Service Air" switch is pushed:
  - 1. Engine speed is set to 1800 RPM
- When engine speed reaches 1700 RPM:
  - 1. Run/Start solenoid valve is closed (de-energized).
- After 2 seconds and if the regulation system pressure is 4 psi or greater:
  - 1. Compressor pressure control is engaged.

- Operation slightly different for two stage machines with butterfly unloader, see Electronic Service Manual.

WEDGE MACHINE ID

FOR WEDGE CONTROL SYSTEMS with V1.60 or Greater Software

- 1. Determine machine ID.
- 2. Turn power to the "ON" position. Machine must not be operating.
- 3. Toggle the switch until number "19" is reached. Push and hold the data input switch and the number "20" will appear. Continue to hold the switch. After 1 second, the current machine ID will appear in the display. Continue to hold for 9 more seconds and a blinking "--" will appear. Release the switch.
- 5. Toggle the data input switch, the display will show "0". Toggle the data input switch until the proper machine ID appears on the display, then stop the toggle sequence.
- 6. Wait until the controller performs a reset function (approximately 10 seconds). At reset, the controller display first goes blank, then all 10 annunciator LED's light, the 4-digit LED display shows all 8's, the display then shows the installed software version and finally the display goes blank and the engine oil pressure and alternator LED begin flashing. At this point the controller has stored the machine ID selected in step 5.
- 7. Check the setting.

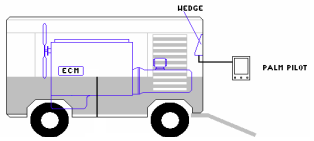
WEDGE DISPLAY UNITS

- To determine which units the WEDGE has been configured for:
  - 1. With the machine power off (Key turned OFF)
  - 2. Press and hold the "Service Air" Switch
  - 3. Turn the key switch directly to the crank position.
  - 4. Hold these switch positions until the 4 digit LED display on the WEDGE goes blank.
  - 5. Release "Service Air" switch, release key switch to "ON".
  - 6. Units will be displayed for 2 seconds as:
    - 'PSI' for Deg F, PSI
    - 'Bar' for Deg C, Bars
    - 'H9C' for Deg C, Kg/cm2
    - 'HPA' for Deg C, KPa

- To change the units setting:
  - 1. With theWEDGEshowing the current setting, press and release the "Service Air" switch until the desired setting appears on the display.
  - 2. Once it appears, do not release the "Service Air" switch. Hold it in the ON position until the WEDGE restarts. This will select units selection that was displayed.
  - 3. Release the "Service Air" switch. The compressor is ready to start.

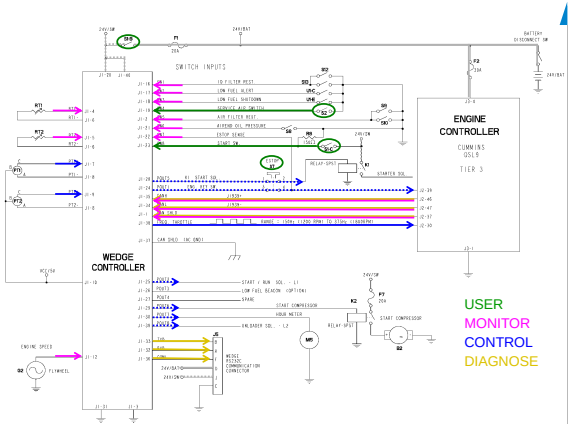
PDA SERVICE TOOL

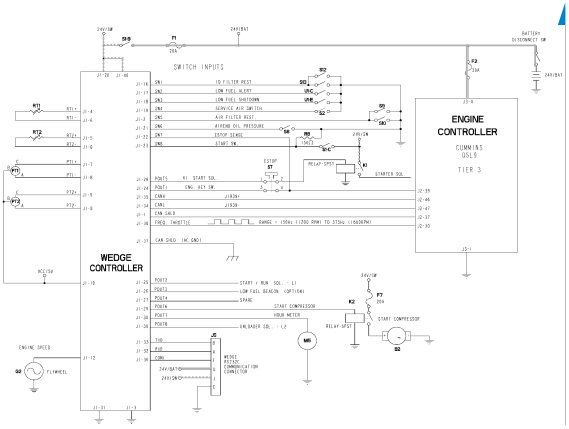
- Plugs on connector near wedge controller.
- Features:
  - Extract shut down / alarm history
  - Read controller fault codes
  - Read/capture SAE J1939 engine data
  - Download controller software



ELECTRICAL WIRING

- System Diagram
- General Machine Wiring Schematic
- Control Panel Wiring Schematic



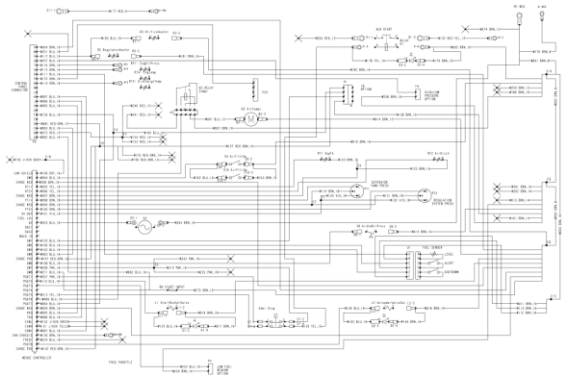


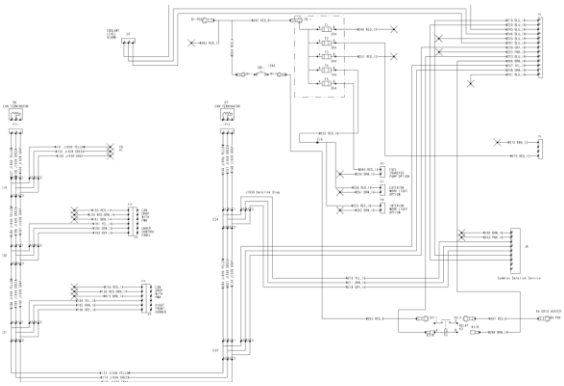
K – STARTUP AIR COMPRESSOR

- The WEDGE connects to the startup compressor through relay K2. The startup compressor is activated at engine crank to provide air to close the inlet valve to the airend.
- Troubleshooting:
  - The start compressor activate signal is turned on at engine crank for 10 seconds. At all other times it is off.
  - First ensure the protection fuse is not blown.
  - Then verify the control signal from the WEDGE to the K2 relay is activated at engine crank. This can be measured at P1-29 at the WEDGE or at pin 2 (85) on K2 relay.

MACHINE WIRING HARNESS

- Links the wedge controller to:
  - The engine controller
  - The compressor sensors
  - The actuators
  - The control panel
  - But NOT the engine sensors
- The **engine** sensors are link to the **engine** controller via the **engine** harness.

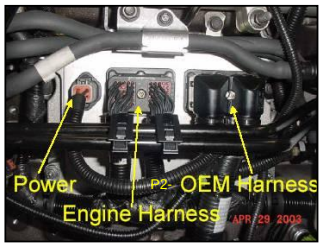




CONNECTOR P1 -WEDGE

CONNECTOR P4 - CONT. PANEL

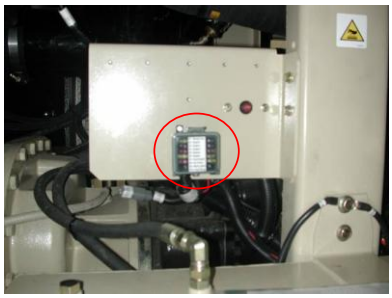
CONNECTOR P2 - ECM



CONNECTOR J6 – CUMMINS DATALINK

CONNECTOR R5 – WATER SENSOR

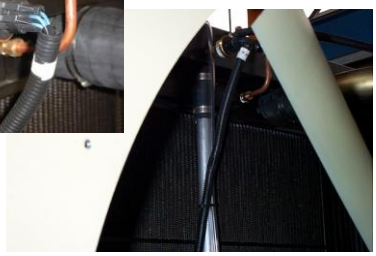
FUSE BOX LOCATION



LOAD SOLENOID

CONNECTOR B2 – UNLOADER COMPRESSOR

CONNECTOR U2 - RAD LEVEL SW



FUEL LEVEL SENDER

RT3 - DISCHARGE TEMP. SENDER

SWITCH S8 - OIL PRESSURE

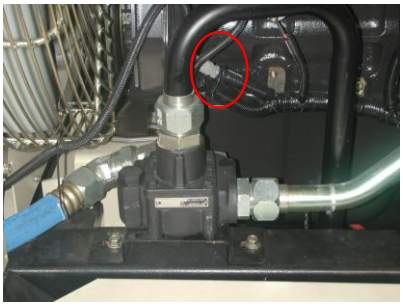
WEDGE ID RESISTOR R1 (OBSOLETE)

Machine ID Resistor 'R1'

Resistor Menu

Machine ID Code	Machine Type	Resistor Colour
0	Viking HP CU	Green
1	Viking XHP CU	Blue
2	Emu LP CAT	Yellow
3	Emu HP CAT	Red
4	Viking XHP CAT	Black
5	Emu LP CU	Purple
6	Emu HP CU	Orange
7	Zenith P425	Grey
8	WW600	White

R7 - CAN TERMINATOR



Maintenance General

- Fuel Quality → SULFUR content
  - Recommended Sulfur content is less than 0.10% (1000ppm).
  - If Sulfur is between 0.10 and 0.50 % we strongly suggest decreasing oil maintenance intervals based on oil sampling data.

- Fuel Quality → Solid contaminants
  - Fuel used should meet EN590 or ASTM D975 specification
  - Dirty fuel will damage vital fuel system components , causing machine downtime and expensive repairs.
  - If Biofuel is used it should be conform to JD specs. (consult engine manual)

Options

- Aftercooler W/ Waterseparator
- IQ system
- Low Fuel Shutdown (beacon)
- Spark Arrestor
- Overspeed valve
- Work lights
- Service Lights
- Dual Pressure
- Auto Start/Stop


DOOSAN
Doosan Infracore
Portable Power


Ingersoll Rand
Construction Technologies

Doosan Infracore

COMPRESSOR TRAINING

Viking Range

Doosan Infracore Portable Power

PRODUCT RANGE

- 25/300 - 25 bar (365 psi), 30m3/min (1070 cfm)
- 25/330 - 25 bar (365 psi), 33m3/min (1170 cfm)

Doosan Infracore Portable Power

SUMMARY

- The compressor can be divided in the following subsystems
  - ENGINE and AIREND
  - LUBRICATION & COOLING SYSTEM
  - SEPARATION SYSTEM
  - AIR FLOW REGULATION SYSTEM
  - INSTRUMENT/CONTROL PANEL
  - ELECTRICAL WIRING
- Troubleshooting

Doosan Infracore Portable Power

ENGINE CAT

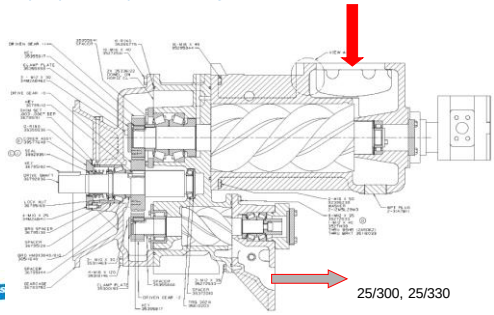
- CAT C15
- 6 cylinders
- 15.2L displacement
- Power ratings @ 1800 RPM:
  - 354kW (475hp) – 25/300
  - 403kW (540hp) – 25/330
- Turbocharged and after-cooled
- MEUI mechanically actuated, electronically controlled unit injection
- Tier III certified
- 24 Volt Electrics

AIREND

- Casing houses two screw-type rotors mounted on ball and roller bearings.
- Diesel engine drives the male rotor through heavy-duty coupling.
- Mechanical seal used to seal the shaft.
- Gear sets allow to change rotor speed and therefore air output.
- Two different airends used on Viking range:
  - Single stage on 10/370, 10/455
  - Two stages on 25/300, 25/330

HR2,5 HIGH PRESSURE AIREND

- 2-stage airend
- Oil pump driven by second stage



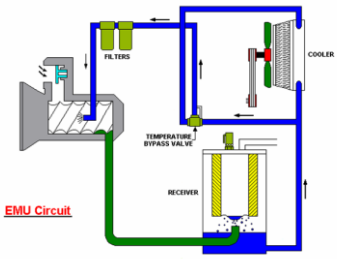
25/300, 25/330

HR2,5 HIGH PRESSURE AIREND

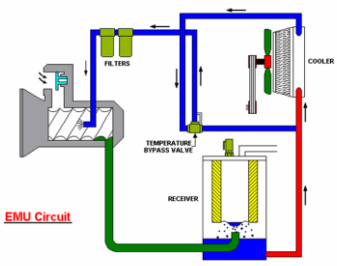
COMPRESSOR OIL SYSTEM

- Functions of the oil system:
  - Lubricating the rotors, airend bearings and mechanical seals
  - Sealing the clearances between the airend rotors
  - Cooling of the airend. Heat is generated during air compression.
- The oil flows due to the air pressure. Only the two-stage airend uses an oil pump.

COMPRESSOR OIL CIRCUIT



COMPRESSOR OIL CIRCUIT



SEPARATOR/RECEIVER TANK

- Stores the compressed air and oil.
- Pressure in the tank is forcing the oil through the system.
- An oil level indicator is provided.
- Assists in the oil cooling with fresh air passing around.

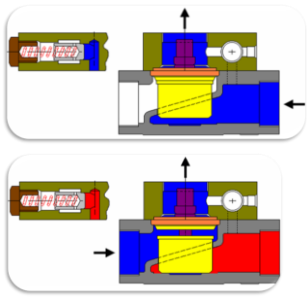
OIL TEMP. BYPASS VALVE

- Allows to regulate the oil temperature around 85°C.
- Keeping the oil hot enough allows to reduce the water condensation in the compressor.

Tip: never remove the thermostat as the oil would flow through the least restriction path and cooling would be impaired!

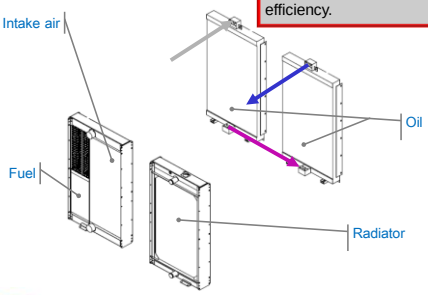
OIL TEMP. BYPASS VALVE

- Cold oil
- Hot oil



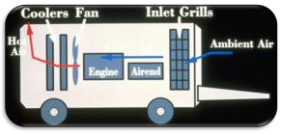
COOLER PACKAGE

Check every day and clean if necessary to ensure high efficiency.



COOLING FAN

- The fan is a pusher type, fresh air flows around the engine.
- Make sure the compressor doors are closed during operation to prevent overheating!



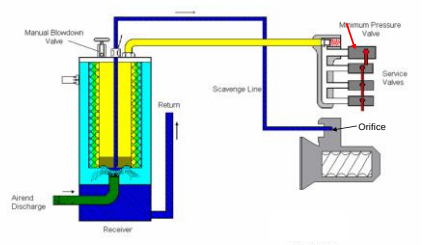
OIL FILTERS

- Provide 10 microns filtration.
- Spring-loaded bypass valve is integrated in filter head.

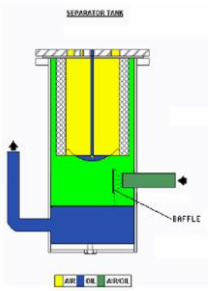
SEPARATION SYSTEM

- Functions of the separation system:
  - Removing the oil contained in the compressed air
- Most of the oil is removed from the air through a specially shaped baffle in the separator tank.
- The remaining oil is removed by the separator element.

SEPARATION SCHEMATIC

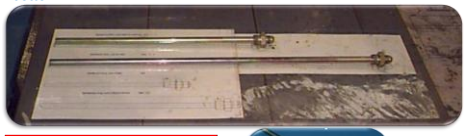


SEPARATOR/RECEIVER TANK

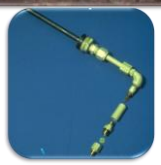


SCAVENGE DROP TUBES

- The scavenge tube removes the oil trapped by the separator element.
- It extends up to approximately 6 to 12mm over the element's bottom.

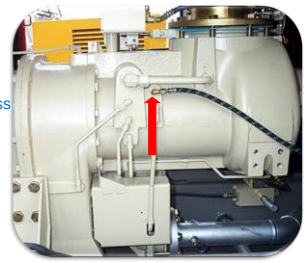


Tip: Always check scavenge tube length when replacing separator element



SCAVENGE LINE

- Returns to air inlet.
- Orifice is located in the elbow connector.
- It is designed to scavenge the oil while limiting the loss of air flow.



Tip: Look for clogged scavenge lines in case of oil carry over!

SAFETY VALVE

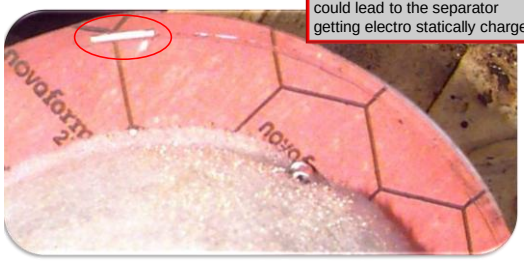
- Valve is on the oil side of the element where pressure is maximum when the separator element is blocked.
- Sensor allows to detect if the valve opens

MINIMUM PRESSURE VALVE

- Maintains a min. pressure (~10bar) in the receiver to:
  - keep the oil flowing.
  - limit pressure drop across the separator.
- Continuous operation at min pressure results in oil carry over due to insufficient scavenge flow.

SEPARATOR ELEMENT

Tip: Don't remove the earth staple nor use sealant as this could lead to the separator getting electro statically charged!

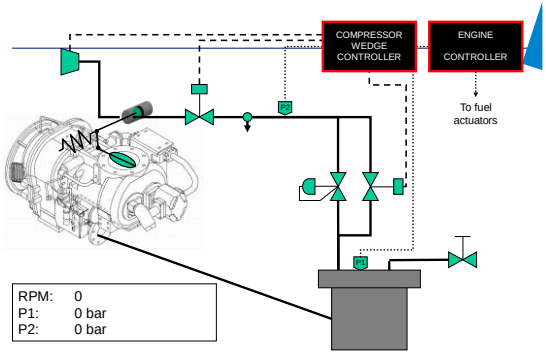


AIR REGULATION SYSTEM

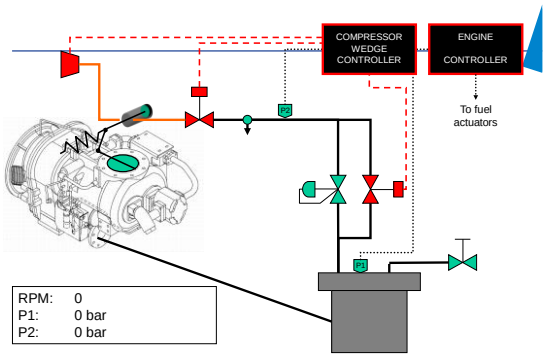
- The air regulation system continuously adjusts the production of compressed air to the consumption by controlling the engine speed and unloader valve.
  - 2 stages : 25/300 25/330

AIR REGULATION SYSTEM

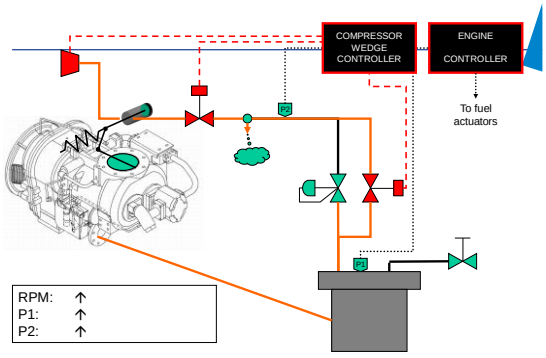
- The unloader valve is pneumatically controlled through the pressure regulator.
- As engine is electronically controlled, units do not have a pneumatic speed control cylinder.
- Engine speed is controlled by the engine ECM. The Wedge controller monitors regulation system pressure and separator tank pressure, measured by pressure transducers, PT2 and PT1. It then computes an engine speed to maintain discharge pressure. This throttle setting is sent to the engine ECM.



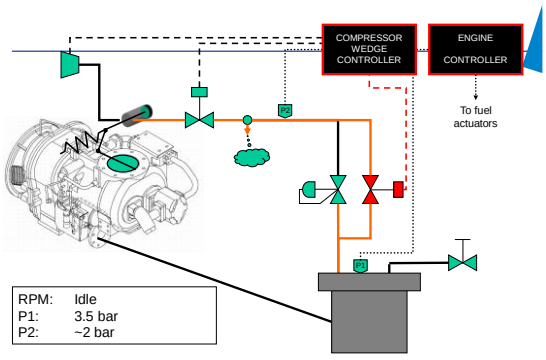
UNIT STOPPED



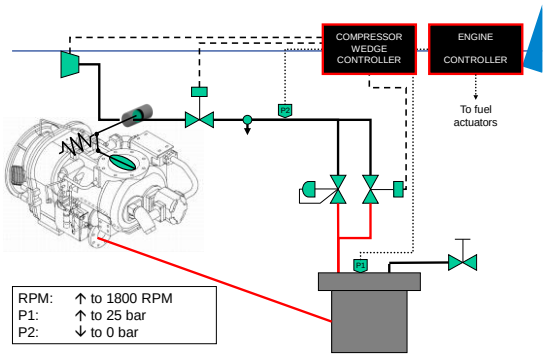
KEYSWITCH TO START



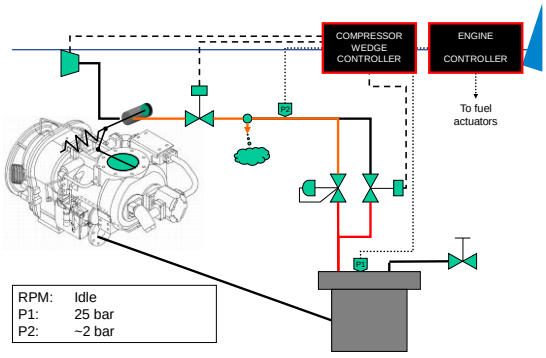
KEYSWITCH TO CRANK



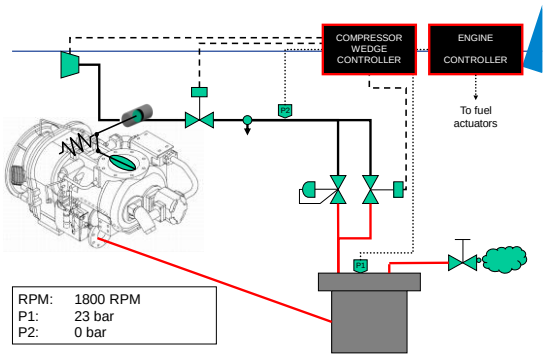
RUN UNLOADED



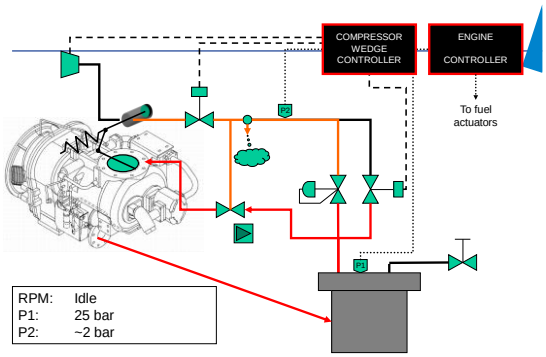
LOAD BUTTON PRESSED, LOADING



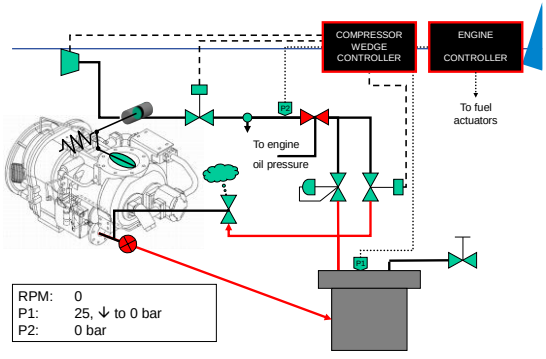
RUN, NO AIR CONSUMPTION



RUN WITH AIR CONSUMPTION



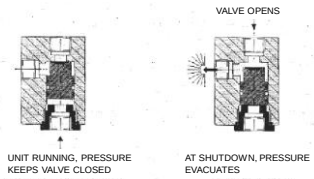
RUN, NO AIR CONSUMPTION, ANTI-RUMBLE



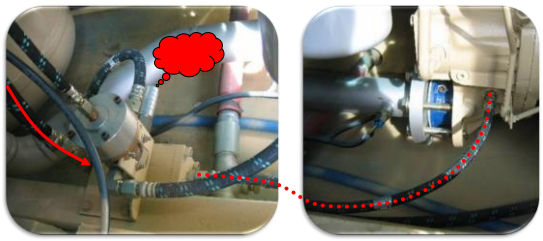
STOP, AUTO BLOWDOWN

AUTO BLOWDOWN CIRCUIT (2-stages)

- On 2-stage unloader with the butterfly valve the check valve is located on the discharge. Therefore no pressure can build up during shut down.
- Auto blowdown is done with normally open valve that is kept closed by pilot line during operation.



AUTO BLOWDOWN CIRCUIT (2-stages)



MANUAL BLOWDOWN VALVE

- Can be used as a back-up for the auto blow down valve.
- Must be closed before operation, if not the air regulation system will not work properly.

UNLOADER COMPRESSOR

- Pressurise the unloader valve to close it before starting.
- Stops when glow indicator lights off.

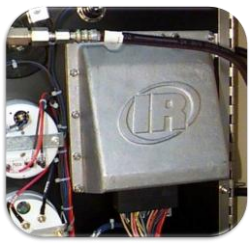
CAPTIVE SOLENOID

- Closed below 1450 RPM.
- Allows to keep the unloader valve closed to reduce load on the engine during start-up.

ORIFICE

- Continuously bleeds air from the regulation circuit.
- If blocked, unloader valve would never be able to open after start up and airend low oil pressure warning would register.
- Size of orifice greatly affects regulation characteristic and should not be adjusted.
- Located near PT2.

WEDGE CONTROLLER



- The WEDGE is located on the rear of the instrument panel.

WEDGE CONTROLLER

- WEDGE Controller is the heart of the machine monitor and control system.
- It is an Intel micro-controller based unit with analog and digital inputs and outputs.
- One of the function is to monitor regulator and discharge pressure, and varies engine speed to maintain air pressure at desired set point.

LOAD SOLENOID

- Situated on back of control panel or near unloader valve.

LOAD BUTTON

- **The load button is a momentary action switch.**
- **It operates the load solenoid adjacent to the pressure regulator.**
- **Prior to being pressed the solenoid allows the air to by-pass the regulator.**

REGULATOR VALVE - OPERATION

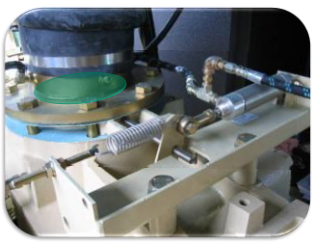
- Ball valve actuated by tank pressure and held closed by a spring.
- Controlled pressure preset in factory, can be adjusted by means of adjusting screw.

REGULATOR VALVE

- Situated on back of control panel or near unloader valve.
- Red tape is a resistor that allows defrosting in case of low temperature.

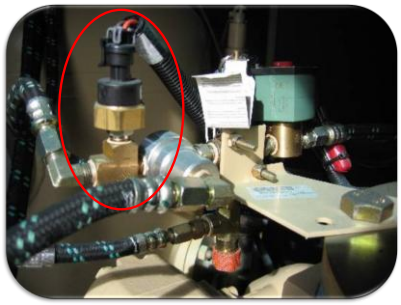
UNLOADER VALVE (two stages)

- Butterfly-type valve, normally open.
- Actuated by a piston cylinder, pressure on piston makes the valve close.
- Check valve situated at airend outlet.



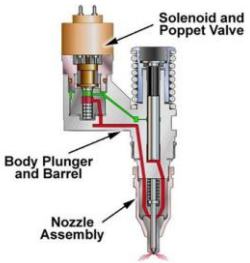
PRESSURE TRANSDUCER, PT1

PRESSURE TRANSDUCER, PT2



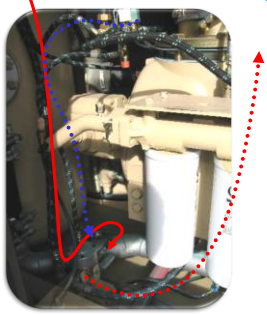
ELECTRONIC FUEL SYSTEM

- CAT MEUI Injector
- Solenoid controlled by ECM



ANTI RUMBLE VALVE

- Allows some compressed air from the receiver to return to the inlet at idle.
- This prevents a too great vacuum a the inlet and possible rumble.



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INSTRUMENT/CONTROL PANEL

- Interface between user and compressor.
- Provides control, monitoring and diagnostics functions.

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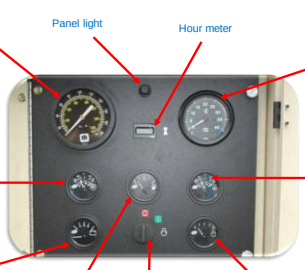
INSTRUMENT/CONTROL PANEL



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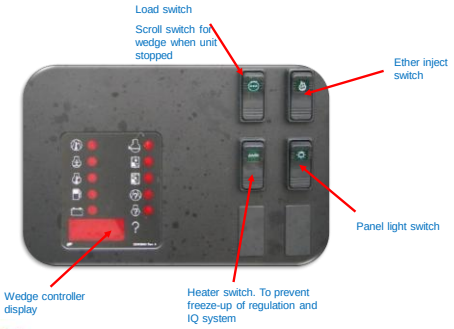
INSTRUMENT/CONTROL PANEL



WEDGE CONTROLLER

- First function of the WEDGE is to scan all analog and digital inputs at a fixed interval. The inputs are scanned every 50 milliseconds. The values are then compared against min. and max. values and an ALERT or SHUTDOWN is issued.
- Second function is to monitor discharge pressure, and varies engine speed to maintain air pressure at desired set point.
- Third function to retrieve diagnostic info from the engine.

INSTRUMENT/CONTROL PANEL

1. HIGH COMPRESSOR TEMP.

Indicates shutdown due to high comp. Temp.

2. LOW ENGINE OIL PRESSURE.

Indicates shutdown due to low oil P.

3. HIGH ENGINE COOLANT TEMP.

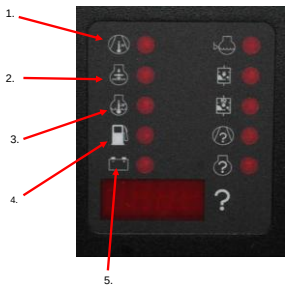
Indicates shutdown due to high water Temp.

4. LOW FUEL LEVEL.

Indicates shutdown due to low fuel level.

5. LOW BATTERY VOLTS.

Indicates battery/charging system needs service.



INSTRUMENT/CONTROL PANEL

1. LOW ENGINE COOLANT LEVEL.

Alarm indicator lamp. Indicates coolant needs service.

2. RESTRICTED AIR FILTER.

Alarm indicator. Indicates eng/comp air filter need service.

3. RESTRICTED IQ FILTERS.

Shutdown indicator (If equipped)

4. COMPRESSOR MALFUNCTION.

Indicates shutdown due to compressor system fault. Refer to fault code list.

5. ENGINE MALFUNCTION.

Engine fault. Refer to engine fault codes.

6. FAULT CODE & DIAGNOSTICS DISPLAY.

Refer to fault code and parameters lists.

CPRSR MALFUNCTION LIGHT

- 2-digits codes
- Extract of wedge fault code reference table v1.7

	ALERT			SHUTDOWN			
	CODE	LIGHT (BLINKS)	Machine ID	CODE	LIGHT (STEADY)	DELAY (sec)	Machine ID
Engine Speed < Min. RPM				1	CPRSR Malf	30	All[3]
Engine Speed > Max. RPM				2	CPRSR Malf	30	All[4]
Engine Crank Time Exceeded				3	CPRSR Malf	0	All[1]
Engine Oil Temperature > 252 deg. F	5	CPRSR Malf.	0–6				
Intake Manifold Temperature > 180 deg. F	6	CPRSR Malf.	0–7				
Water In Fuel	8	CPRSR Malf.	5,6				
Engine Not Responding to Throttle Cmd.	10	CPRSR Malf.	All				
Too Many Start Attempts during Autostart				11	CPRSR Malf	0	All

Note: CAN derived data

ENGINE MALFUNCTION LIGHT

- 3,4-digits codes
- Extract of Cummins engine fault code reference table

Displayed	Code Definition
111	Engine Control Module – Critical Internal Failure
115	Engine Speed/Position Sensor Circuit – Lost Both of Two Signals
122	Intake Manifold Pressure Sensor Circuit – Voltage Above Normal, or Shorted High
123	Intake Manifold Pressure Sensor Circuit – Voltage Below Normal, or Shorted Low
135	Engine Oil Pressure Sensor Circuit – Voltage Above Normal, or Shorted High
141	Engine Oil Pressure Sensor Circuit – Voltage Below Normal, or Shorted Low
143	Engine Oil Pressure Low – Warning
144	Engine Coolant Temperature Sensor Circuit – Voltage Above Normal, or Shorted High
145	Engine Coolant Temperature Sensor Circuit – Voltage Below Normal, or Shorted Low

DEDICATED LIGHTS

- No code
- Light state table, v1.7

Note: CAN derived data

	ALERT			SHUTDOWN			
	CODE	LIGHT (BLINKS)	Machine ID	CODE	LIGHT (STEADY)	DELAY (sec)	Machine ID
Low Fuel Level		Fuel Level	0–6		Fuel Level	3	All
Air Filter Restriction		Soiled Filter	Alls				
Low Battery Voltage		Battery Charging Condition	All				
Engine Oil Pressure < 18 PSI		Low Engine Oil Pressure	All				
Low Coolant Level		Engine Coolant Level	0,1,5, 6I				
Engine Coolant Temp >= 215 deg. F.		High Engine Temp	All				
Engine Coolant Temp >= 220 deg. F.					High Engine Temp	10	All
IQ Filter Restriction					IQ Filter Restriction	3	0–6I
High Discharge Temp. (RT2 > 247 deg. F)					High Comp. Temp.	3	All

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WEDGE DISPLAY

- Accessed by toggling:
  - "Service Switch" if machine is stopped
  - "Start" key switch if machine is running
- Number appears first and after three seconds parameter will be displayed.

Number	Parameter	Comments
2	RPM	F/W sensor
3	RPM Filtered	
4	Reg system pressure	
5	Sep tank pressure	
6	Discharge temperature	
7	Sep tank temperature	
8	Throttle output	(Hz)
9	Machine type	**
10	Engine coolant temp	from CAN
11	Engine oil temp	from CAN
12	Engine oil pressure	from CAN
13	Intake Manifold temp	from CAN
14	RPM	from CAN
15	Fault code list	Engine code
16	Throttle Position	
17	Boost Pressure	
18	Engine Hours	

** 1 = CU XHP Viking, 2 = CAT EMU LP, 3 = CAT EMU HP, 4 = XHP CAT Viking, 5 = CU EMU LP, 6 = CU EMU HP, 7 = P426 Deere, 8 = WW400

WEDGE OPERATION – STARTUP

Power "ON" at Control Panel:

- 1. Key switch signal (24VDC) supplied to engine controller by WEDGE controller
- 2. Frequency throttle signal ON
- 3. Unloader solenoid valve (L2) is closed (de-energized)
- 4. Start-up compressor is turned on for 10 seconds

Engine Start-up:

- When the key is switched to the engine crank position:
  - 1. Unloader solenoid valve (L2) is closed (de-energized).
  - 2. Start compressor is turned on.
  - 3. Key switch signal (24VDC) is supplied to engine controller.
  - 4. K1 auxiliary start relay is energized.
  - 5. Run/Start solenoid valve (L1) is opened (energized).

Note: Start compressor remains on, run/start solenoid stays open and unloader solenoid valve stays closed for 10 seconds after the key is released if the engine does not start.

- When the engine speed reaches 600 RPM (engine start declared):
  - 1. Engine speed is set to 1500 RPM.
- When the engine speed reaches 1450 RPM:
  - 1. Unloader solenoid valve is opened (energized).(L2)
  - 2. Start compressor is turned off.
  - 3. Run/Start solenoid valve is closed (de-energized). (L2)
- When the separator tank pressure reaches 50 psi:
  - 1. Run/Start solenoid valve is opened (energized). (L2)
- After 5 seconds:
  - 1. Engine speed is set to idle (1200 RPM if air end discharge temperature is approximately 150 degrees F or (If J1939CANis functioning). The engine coolant is 100 degrees F. Othrwise, the engine idle stays at 1500 RPM.

DOOSAN Doosan Infracore Portable Power

WEDGE OPERATION – LOADING

Loading:

- When the "Service Air" switch is pushed:
  - 1. Engine speed is set to 1800 RPM
- When engine speed reaches 1700 RPM:
  - 1. Run/Start solenoid valve is closed (de-energized).
- After 2 seconds and if the regulation system pressure is 4 psi or greater:
  - 1. Compressor pressure control is engaged.

- Operation slightly different for two stage machines with butterfly unloader, see Electronic Service Manual.

WEDGE MACHINE ID

FOR WEDGE CONTROL SYSTEMS with V1.60 or Greater Software

- 1. Determine machine ID.
- 2. Turn power to the "ON" position. Machine must not be operating.
- 3. Toggle the switch until number "19" is reached. Push and hold the data input switch and the number "20" will appear. Continue to hold the switch. After 1 second, the current machine ID will appear in the display. Continue to hold for 9 more seconds and a blinking "--" will appear. Release the switch.
- 5. Toggle the data input switch, the display will show "0". Toggle the data input switch until the proper machine ID appears on the display, then stop the toggle sequence.
- 6. Wait until the controller performs a reset function (approximately 10 seconds). At reset, the controller display first goes blank, then all 10 annunciator LED's light, the 4-digit LED display shows all 8's, the display then shows the installed software version and finally the display goes blank and the engine oil pressure and alternator LED begin flashing. At this point the controller has stored the machine ID selected in step 5.
- 7. Check the setting.

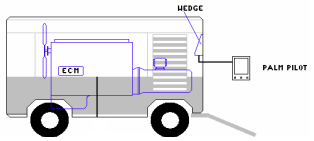
WEDGE DISPLAY UNITS

- To determine which units the WEDGE has been configured for:
  - 1. With the machine power off (Key turned OFF)
  - 2. Press and hold the "Service Air" Switch
  - 3. Turn the key switch directly to the crank position.
  - 4. Hold these switch positions until the 4 digit LED display on the WEDGE goes blank.
  - 5. Release "Service Air" switch, release key switch to "ON".
  - 6. Units will be displayed for 2 seconds as:
    - 'PSI' for Deg F, PSI
    - 'Bar' for Deg C, Bars
    - 'H9C' for Deg C, Kg/cm2
    - 'HPA' for Deg C, KPa

- To change the units setting:
  - 1. With the WEDGE showing the current setting, press and release the "Service Air" switch until the desired setting appears on the display.
  - 2. Once it appears, do not release the "Service Air" switch. Hold it in the ON position until the WEDGE restarts. This will select units selection that was displayed.
  - 3. Release the "Service Air" switch. The compressor is ready to start.

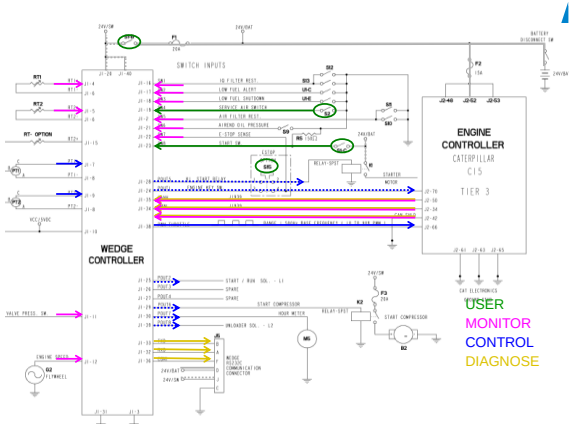
PDA SERVICE TOOL

- Plugs on connector near wedge controller.
- Features:
  - Extract shut down / alarm history
  - Read controller fault codes
  - Read/capture SAE J1939 engine data
  - Download controller software



ELECTRICAL WIRING

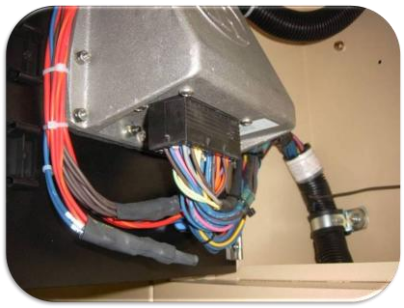
- System Diagram
- General Machine Wiring Schematic
- Control Panel Wiring Schematic



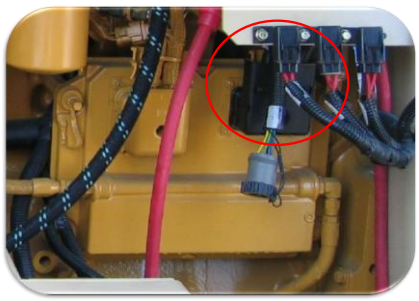
MACHINE WIRING HARNESS

- Links the wedge controller to:
  - The engine controller
  - The compressor sensors
  - The actuators
  - The control panel
  - But NOT the engine sensors
- The **engine** sensors are link to the **engine** controller via the **engine** harness.

CONNECTOR P1 -WEDGE

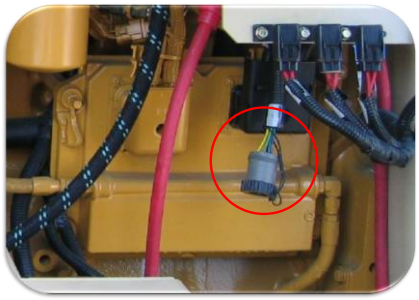


CONNECTOR P2 - ECM



CONNECTOR P4 - CONT. PANEL

CONNECTOR J6 – CAT DATALINK



SOLENOID VALVE L2 - UNLOADER

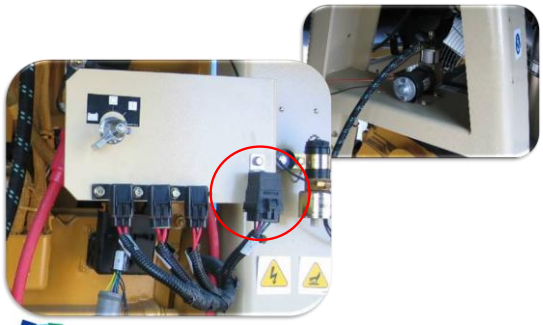
SOLENOID VALVE L1 – START/RUN

RELAY K1 – ENGINE STARTER

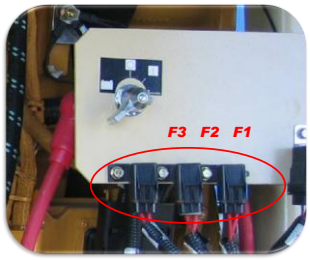
RELAY K2 – STARTUP COMPRESSOR

- The WEDGE connects to the startup compressor through relay K2. The startup compressor is activated at engine crank to provide air to close the inlet valve to the airend.
- Troubleshooting:
  - The start compressor activate signal is turned on at engine crank for 10 seconds. At all other times it is off.
  - First ensure the protection fuse is not blown.
  - Then verify the control signal from the WEDGE to the K2 relay is activated at engine crank. This can be measured at P1-29 at the WEDGE or at pin 2 (85) on K2 relay.

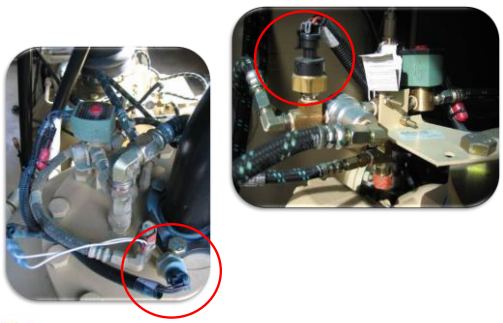
RELAY K2 – STARTUP COMP.



FUSES LOCATION



PRESSURE TRANSDUCERS PT1, PT2



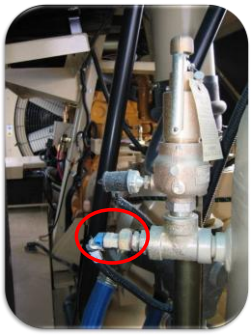
CAN TERMINATORS R4, R6

SWITCHES S10, S11 – AIR FILTER RESTRICTION

MAGNETIC SENSOR G2 – ENGINE SPEED

FUEL LEVEL SENDER

TEMP. SENSOR RT1 – SEPARATOR TANK



PRESSURE SWITCH S14 – SAFETY VALVE

TEMP. SENSORS RT2, RT3 - DISCHARGE TEMP.

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