



Doosan Infracore



## COMPRESSOR TRAINING

New EMU Tier4i / Stage3B



Doosan Infracore  
Portable Power

D. Poelmans

Product Service Manager Compressors & Tools

## SUMMARY

- Training Overview
  - Specifications
  - External Views & Dimensions
  - Package Layout
  - Subsystems
  - Maintenance
  - Options
  - Warranty



Doosan Infracore  
Portable Power

Company Confidential

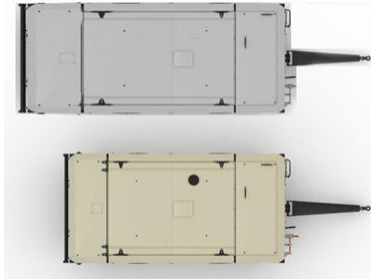
## Specifications

MODEL		12/250	9/275	9/305	21/220	17/240
<b>COMPRESSOR</b>						
Actual free air delivery	m <sup>3</sup> /min/ cfm	25.0/ 883	27.0/ 950	29.9/ 1060	21.5/ 750	23.3/ 825
Normal operating discharge pressure	psi/bar/ kPa	175/12/ 1200	125/8.6/ 860	125/8.6/ 860	300/21/ 2100	250/17.2/ 1724
Maximum allowable pressure	psi/bar/ kPa	200/13.8/ 1380	150/10.3/ 1030	150/10.3/ 1030	325/22.4/ 2240	275/19/ 1900
Safety valve setting	psi/bar/ kPa	217/15/ 1500	217/15/ 1500	217/15/ 1500	362/25/ 2500	362/25/ 2500
Maximum pressure ratio (absolute)		8:1	8:1	8:1	18.9:1	18.9:1
Operating ambient temperature range	°C/ °F	-10 to +46/ 14 to 115	-10 to +46/ 14 to 115	-10 to +46/ 14 to 115	-10 to +46/ 14 to 115	-10 to +46/ 14 to 115
Maximum discharge temperature	°C/ °F	120/ 248	120/ 248	120/ 248	120/ 248	120/ 248
<b>COMPRESSOR</b>						
Cooling system		Oil Injection				
Oil capacity	Litre	75	75	75	75	75
Maximum oil system temperature	°C/ °F	120/ 248	120/ 248	120/ 248	120/ 248	120/ 248
Maximum oil system pressure	psi/bar/ kPa	217/15/ 1500	217/15/ 1500	217/15/ 1500	362/25/ 2500	362/25/ 2500

## External View



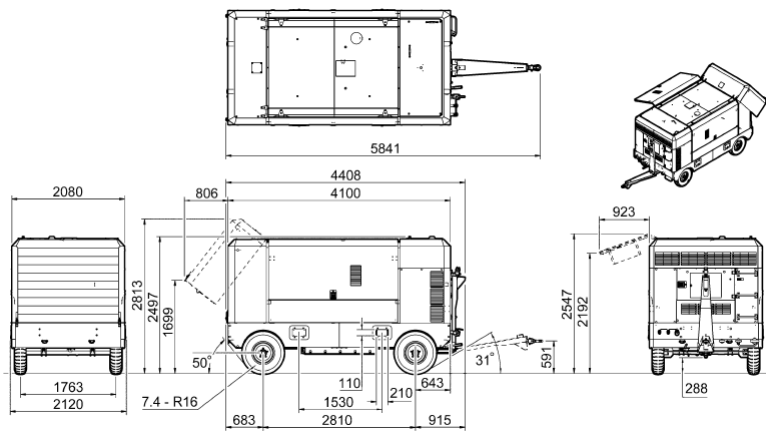
## External View & Dimensions



	EMU	E3B
Unit Height (mm)	2315	2485
Unit Width (mm)	2004	2100
Box Length (mm)	4410	4100



## External View & Dimensions



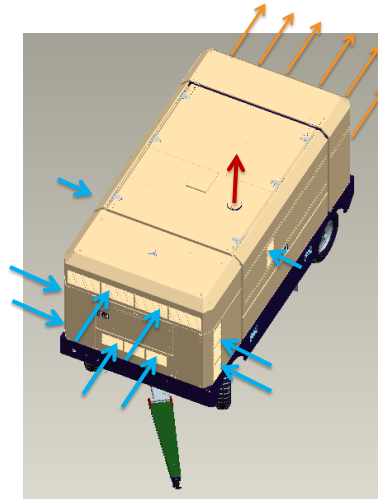
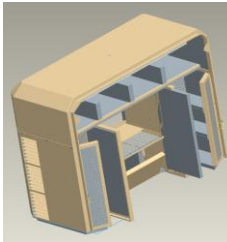
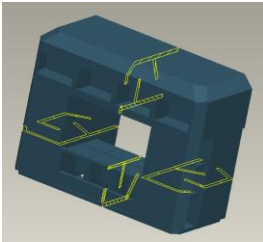
Company Confidential

## Package Layout

### Overall Design Details

#### Package Air Flow

Air intake area (m<sup>2</sup>) 1.15  
 Air intake via labyrinth ducting  
 Air outlet area (m<sup>2</sup>) 1.1  
 Air outlet type via rear louvres with internal baffles  
 Exhaust outlet through the roof with a rain cap



Company Confidential

## Package Layout

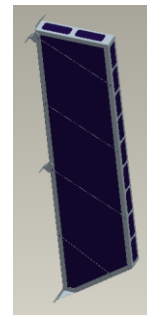
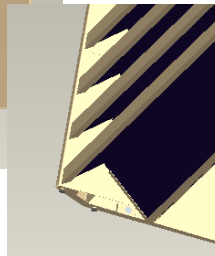
### Overall Design Details

#### Package Air Flow



Outlet louvers extended inside without barrier

Internal baffles with skeletal foam carrier



Company Confidential

## Package Layout

### Overall Design Details

Traditional Doosan / IR „diamond facet “ look

Robust and compact feeling

Low horizontal split line

Wide contrast vertical gaps to minimise appearance of panel misalignment

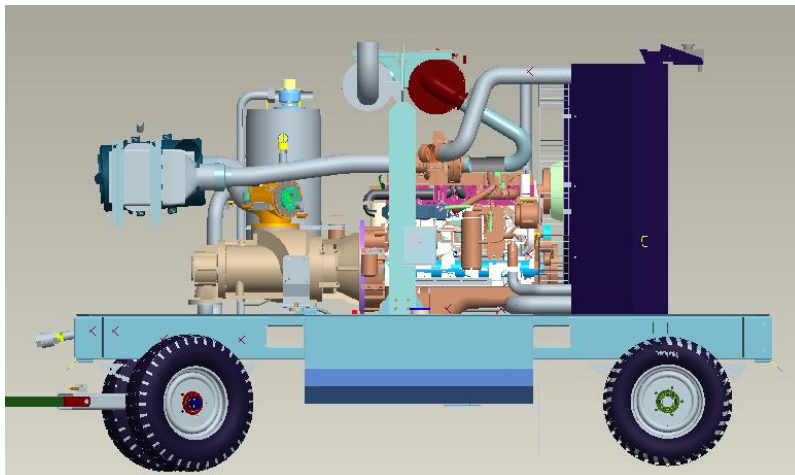


Company Confidential

## Package Layout

### Overall Design Details

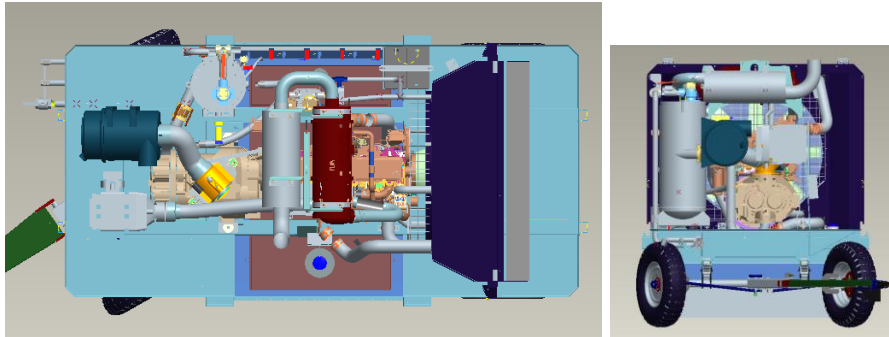
Package Air Flow



Company Confidential

## Package Layout

### Overall Design Details



Low number of obstacles to air flow inside the package

Side door inlets bring cool air directly to the fan



Company Confidential

## Package Layout

### Overall Design Details

Running Gear

STRG heavy duty, off-road tires, 25 kph, parking brake only

Simplified steering mechanism

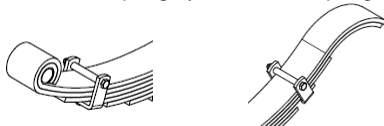
**E3B**



**EMU**



FMEA of new design is being done with the supplier  
Reinforced spring eye, extended spring tails



Company Confidential

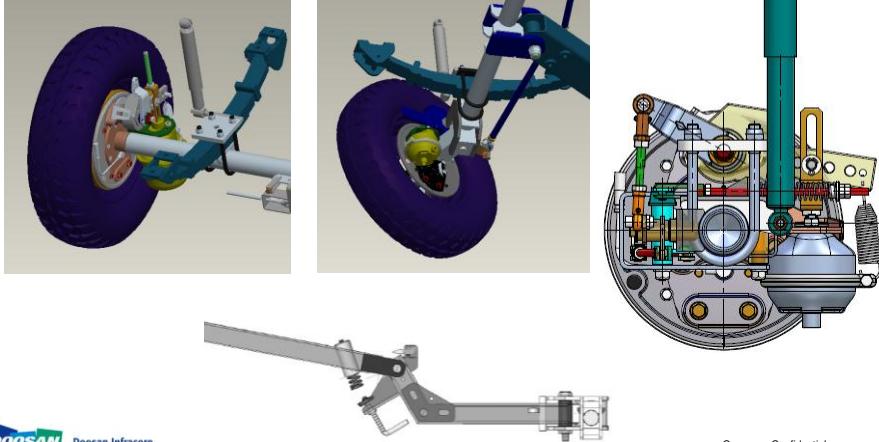
## Package Layout

### Overall Design Details

Running Gear

HSRG 105 kph, meets CE O<sub>3</sub> trailer requirements for EMEA (80 kph)

US Tandem version being developed as a direct "below the split" replacement.



**DOOSAN** Doosan Infracore  
Portable Power

Company Confidential

## Package Layout

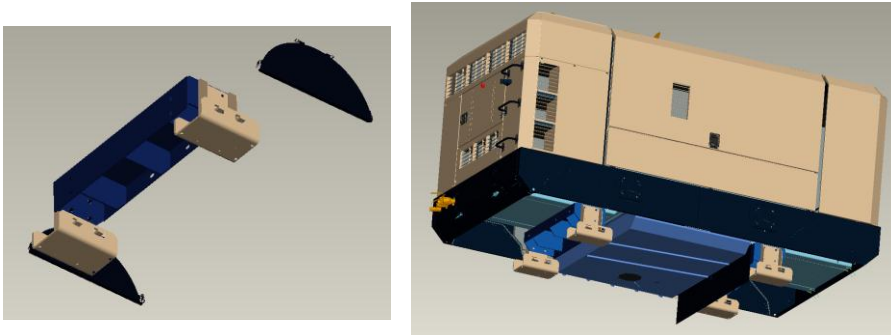
### Overall Design Details

Less Running Gear –

Skids are created from a limited number of parts, & utilised for several versions

Permanent skids are designed to give the same ground clearance as wheeled versions

Truck mounted Skid



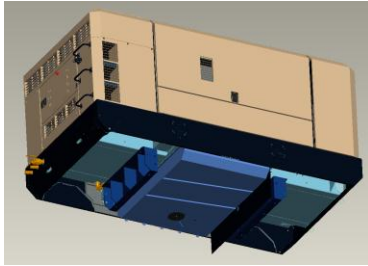
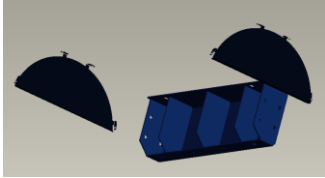
**DOOSAN** Doosan Infracore  
Portable Power

Company Confidential

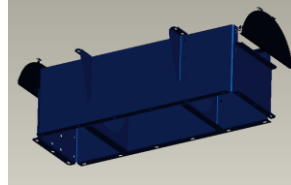
## Package Layout

### Overall Design Details

Less Running Gear – Shipping Skid



Permanent Skid, hard ground

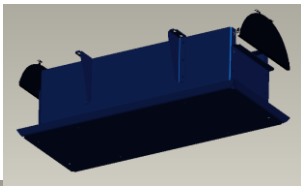


Company Confidential

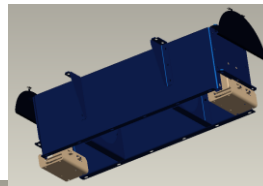
## Package Layout

### Overall Design Details

Less Running Gear – Permanent Skid, soft ground



Permanent Skid, isolated



Company Confidential

## Subsystems

- Frame and Structural
- Airend
- Engine
- Coupling
- Air Intake
- Cooling
- Separation System
- Regulation
- Piping
- Exhaust
- Fuel System
- Enclosure
- Electrical
- Controls

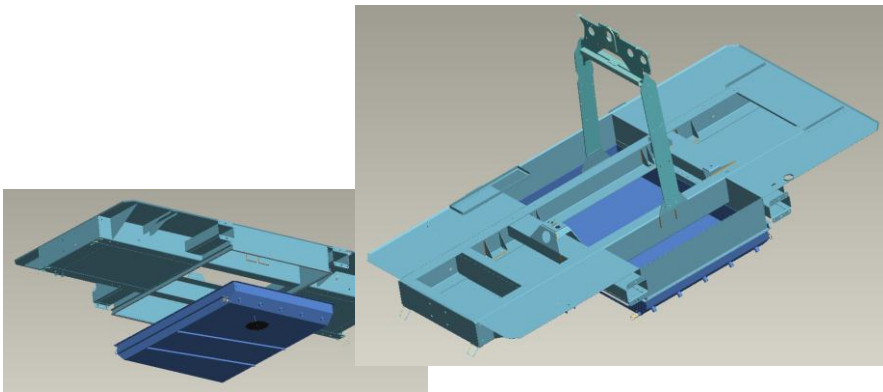


Company Confidential

## Subsystems - Frame

Fork lift channels are integrated into the frame as a structural part  
(cross beams support key items)

Frame combines with a central removable section to create a complete bundled base  
Bundled base covers whole machine

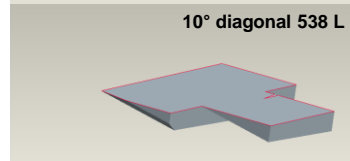
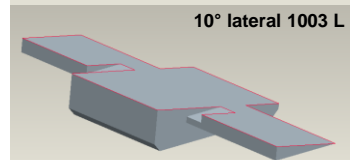
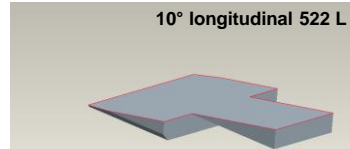
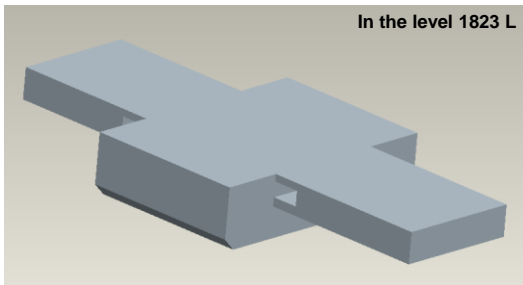


Company Confidential

## Subsystems – Bunded Base

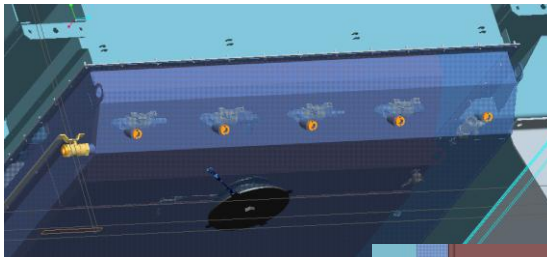
### Bunded Base volume

Compressor coolant	75 L
Engine oil	24 L
Engine coolant	52 L
Fuel	485 L
Battery Acid	10 L
110% of total liquid volume	710 L

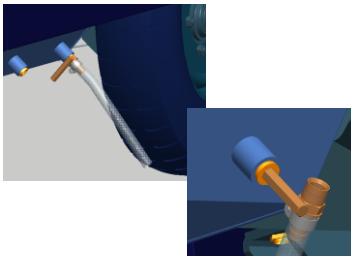


Company Confidential

## Subsystems - Drains



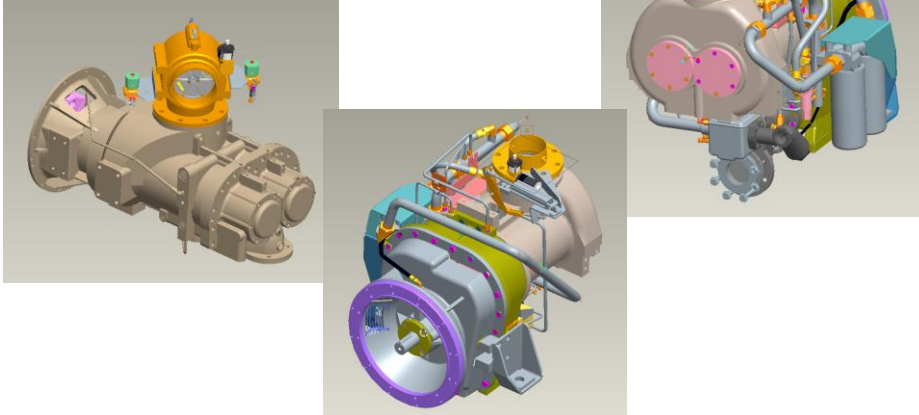
- All drains are grouped to one side area
- Good drain valve access from inside
- Distance between ports allows draining of several liquids at once
- Ports at 45° angle help to direct the outlet flow for clean collection
- A drain hose for better fluid collection is standard
- Big drain plug for bund cleaning



Company Confidential

## Subsystems – Air-ends

LP and HP Air-ends are reused from current EMU  
 12/250 will replace 12/235  
 IR approved a new oil filter position & piping for the HP version

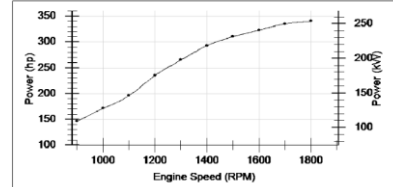
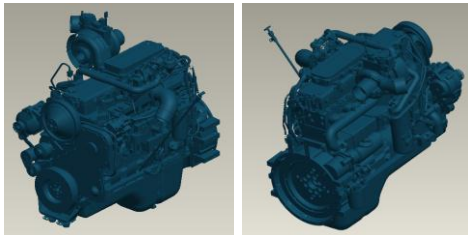
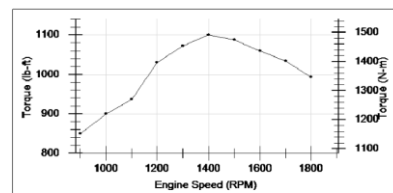


**DOOSAN** Doosan Infracore  
 Portable Power

Company Confidential

## Subsystems – Engines

Cummins QSL 9 Stage IIIB  
 Cooled EGR  
 Variable Geometry Turbo (VGT)  
 (340 BHP) **254 kW @ 1800 RPM**  
 (1,100 lb-ft) 1,491 N-m @ 1400 RPM



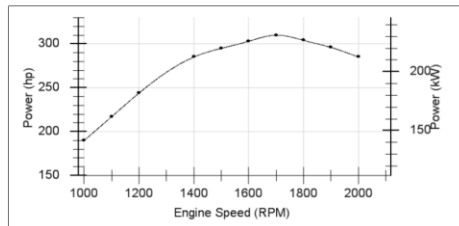
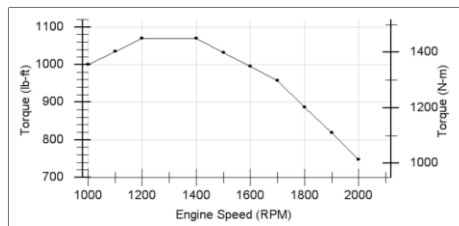
**DOOSAN** Doosan Infracore  
 Portable Power

Company Confidential

## Subsystems – Engines

Cummins QSL 9 Stage IIIB  
Cooled EGR  
Variable Geometry Turbo (VGT)  
(285 BHP) 213 kW @ 2000 RPM  
(1,069 lb-ft) 1,449 N-m @ 1400 RPM

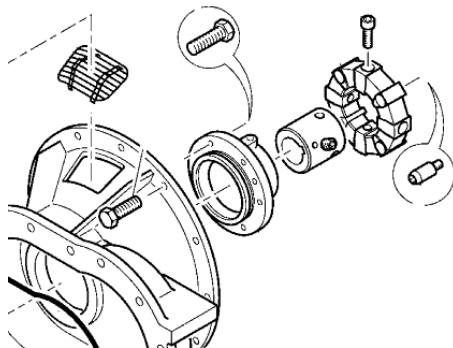
Engine will run at  
(304 BHP) **227 kW** @ 1800 RPM  
(887 lb-ft) 1,203 N-m @ 1800 RPM



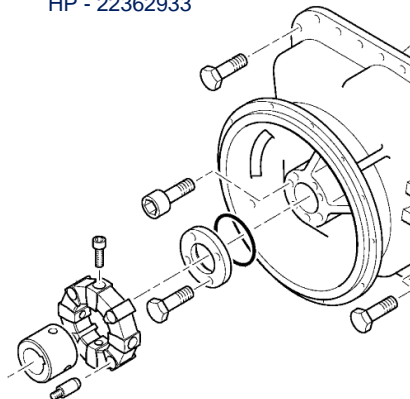
## Subsystems – Coupling

Coupling are reused from current EMU

LP – 54400031



HP - 22362933

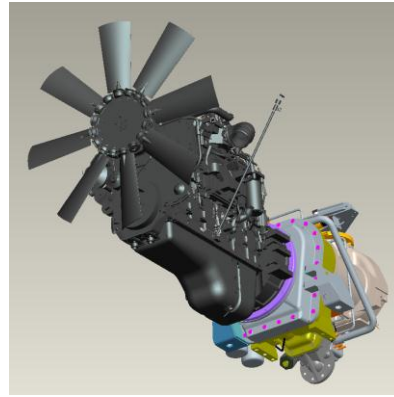
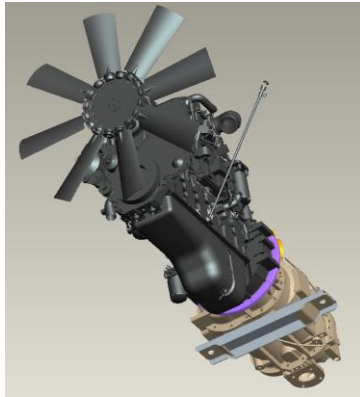


## Subsystems

Engine Support – Cummins part, Isolators reused from EMU  
Air end Supports are similar design to EMU, Isolators reused from EMU

LP

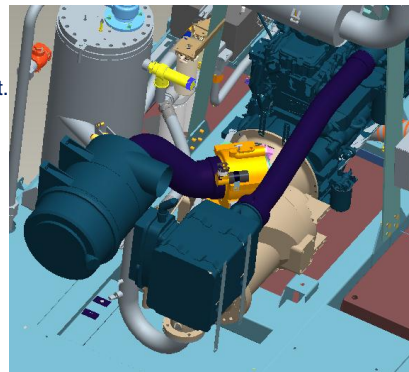
HP



Company Confidential

## Subsystems – Air Intake

Engine air cleaner supplied by Donaldson, includes pre-cleaner & safety element, includes outlet temp & pressure measurement. Mounted on front canopy internal wall, flexible hose ( the same as EMU with different length)



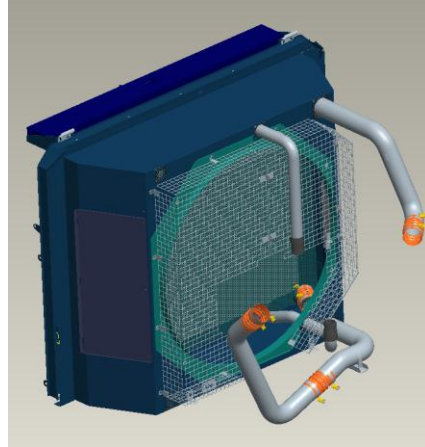
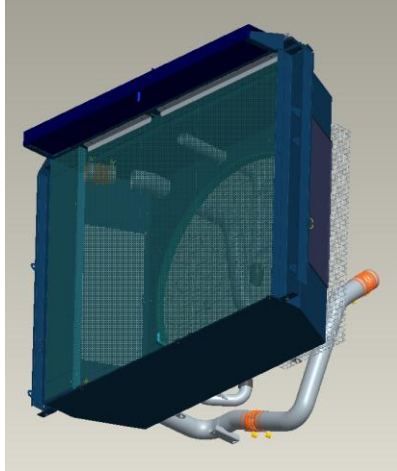
Air-end air cleaner supplied by Donaldson, includes pre-cleaner & safety element. Mounted on front canopy internal wall, flexible hose.



Company Confidential

## Subsystems – Cooling

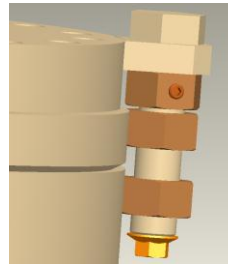
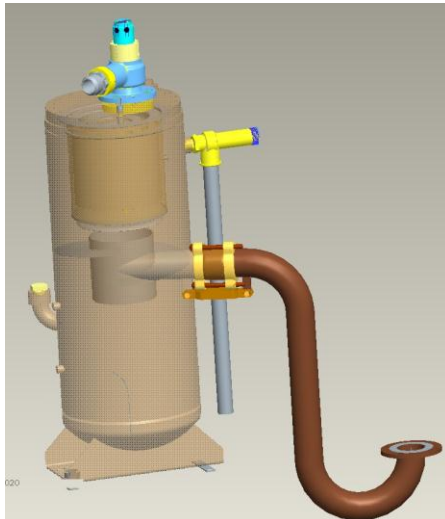
Cooling package with side cleaning doors



**DOOSAN** Doosan Infracore  
Portable Power

Company Confidential

## Subsystems – Separation

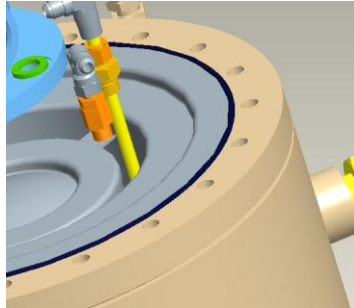


- New tangential inlet and internal baffles in sep. tank
- New method of securing discharge pipe
- New 'slide off' device for sep. tank lid
- Reused isolators
- Reused pipe coupling with new retention

**DOOSAN** Doosan Infracore  
Portable Power

Company Confidential

## Subsystems – Separation



'Sep in Sep' element type will be used for production ( shorter sep. tank) allows replacement of separation element without roof panel or full lid removal  
Separator tank element sealed by O ring



Company Confidential

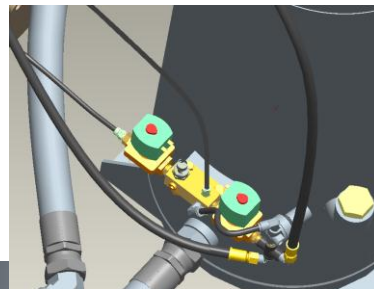
## Subsystems – Regulation

EMU regulation components are reused, except for the regulator valve, where we will use a new Hoerbiger regulator

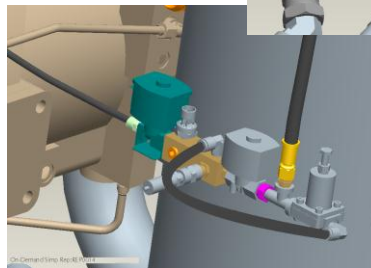
Arrangement of regulation components is simplified giving compact grouping and better access

Nylon tubing replaces hoses, throughout the regulation system

LP



HP



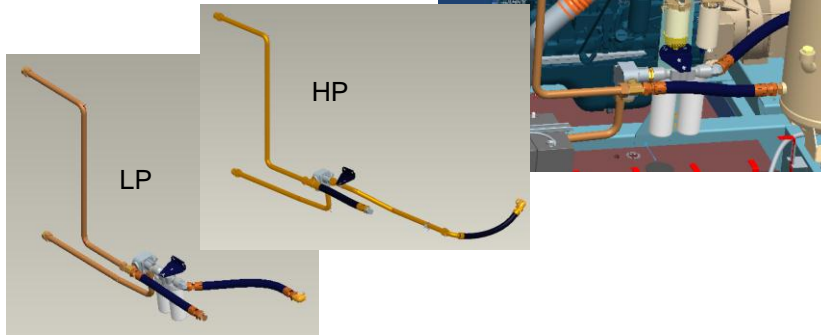
Company Confidential

## Subsystems – Piping

Size and connection of tubing and hoses reused

OTBV reused

New oil filter position for LP and HP – better access, simpler tubing, grouping of filters



**DOOSAN** Doosan Infracore  
Portable Power

Company Confidential

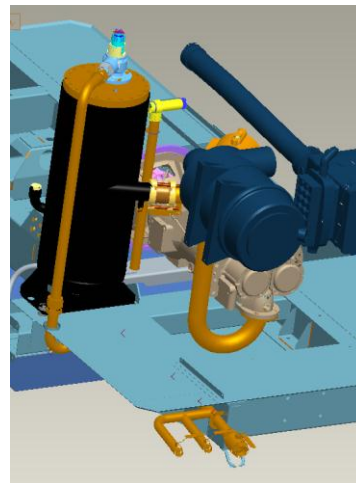
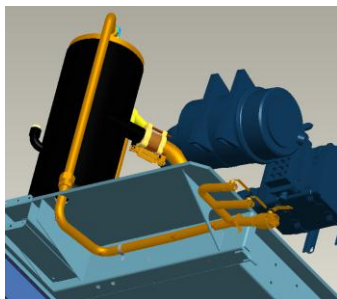
## Subsystems – Piping

Size and connection of tubing reused

Fittings and valves reused

The same tubing for LP and HP standard units

Single service valve option



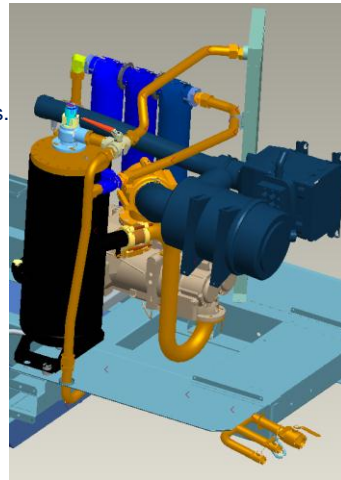
**DOOSAN** Doosan Infracore  
Portable Power

Company Confidential

## Subsystems – Piping

### Service Air Piping – A/C & IQ

Size and connection of tubing reused  
 Water separator, Filters, Fittings, Valves reused  
 The same tubing for LP and HP compressed air filters.  
 'Aftercooler Louvers' option for US use



Company Confidential

## Subsystems – Exhaust

DPF after-treatment monitored & controlled by the engine ECM.

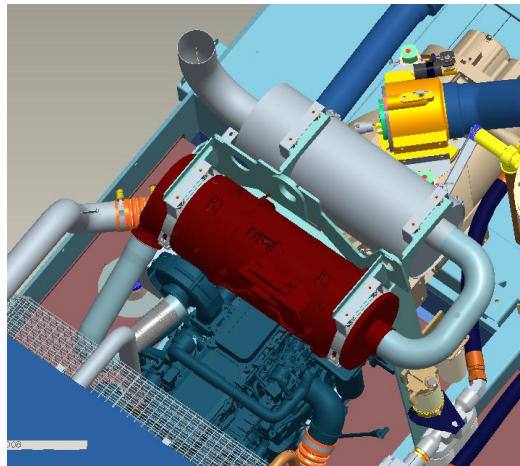
Regeneration can be operated from the machine control panel.

Special warning for extra high temperatures during regeneration

Short pipe from engine to DPF supports passive regeneration.

Back pressure of the whole system is low, due to compact design

DPF and muffler are mounted on the lifting bail, with isolators

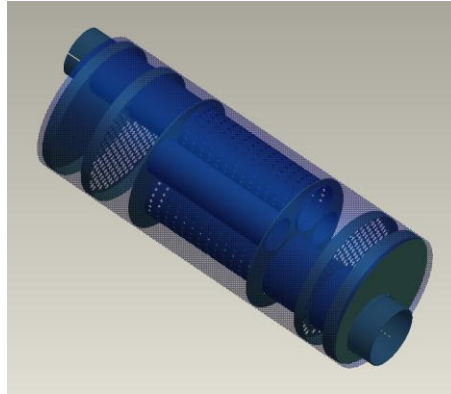
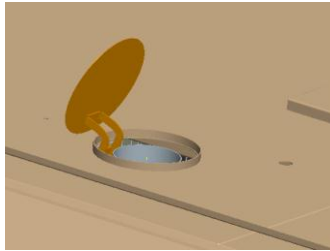


Company Confidential

## Subsystems – Exhaust

a three chamber design with absorption packing at the ends

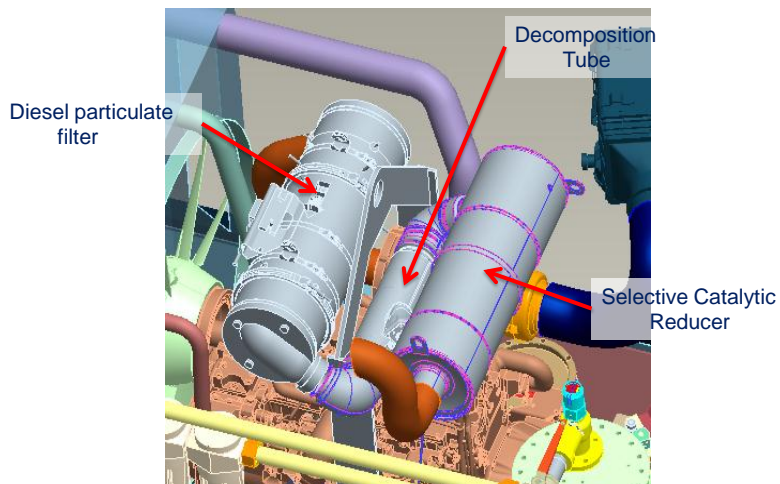
Rain cap is mounted to the roof



Company Confidential

## Subsystems – Exhaust

Exhaust – Stage 4 Considerations (T4final)

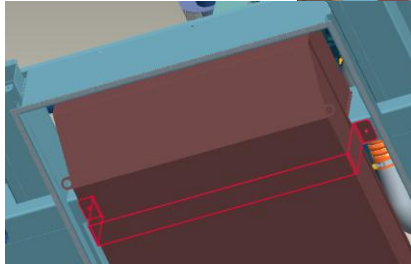
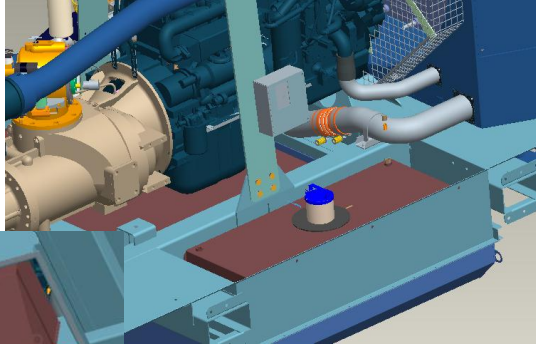


Company Confidential

## Subsystems – Fuel

Top surface of the fuel tank is below the top of the frame, & does not disturb air flow inside the unit.

Fuel tank is supported by mounting straps attached to the lower frame, eliminating stress concentrations in the tank.

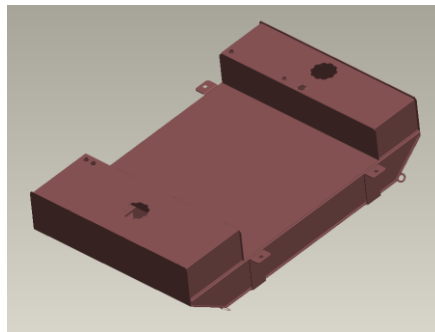
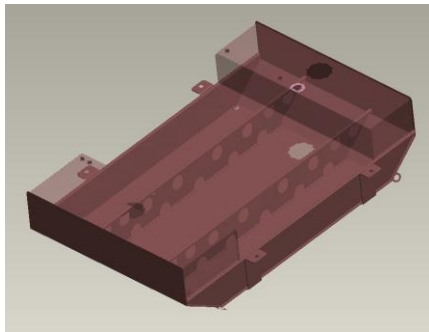


Company Confidential

## Subsystems – Fuel

Detail of fuel tank and component welding are designed, based on discussion with supplier, for the best quality results.

There are two baffles inside, which work together with front and rear wall as structural beams.



Company Confidential

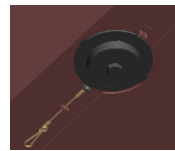
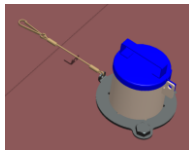
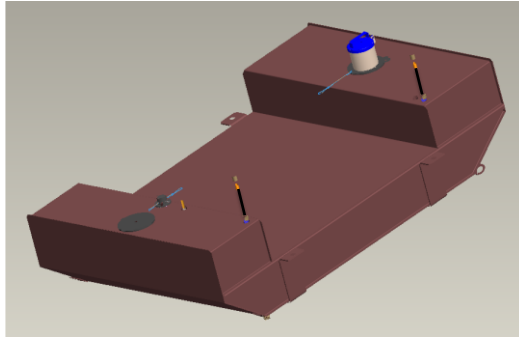
## Subsystems – Fuel

For simple cleaning there is an access on top of both sides and a big drain plug in the bottom

Access covers are designed with a bayonet sealing system and secured by wire tethers

The whole tank can be quickly and easily removed from the machine for cleaning

The filler neck can be mounted on either, or both sides.



Company Confidential

## Subsystems – Fuel

Fuel Filters in one easy to reach location.

Standard filtration is now  
30 micron waterseparator/ FF  
10 micron fuel filter  
3 micron Cummins final FF



Company Confidential

## Subsystems – Enclosure

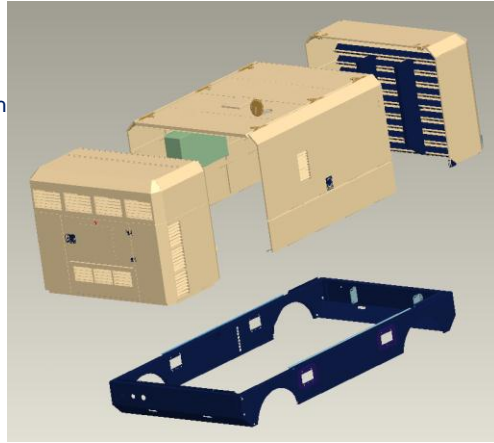
Enclosure is divided to 4 groups.

Lower panel group, contains 6 items mounted directly to the frame which support the upper enclosure.

Front end contains 11 items and creates air inlet ducting.

Rear end contains 7 items and creates air outlet ducting.

Mid-section contains 6 items



All groups can be removed independently  
(lifting eye points are provided on big panels)



Company Confidential

## Subsystems – Enclosure

The front end has a central service door which gives access to air filters

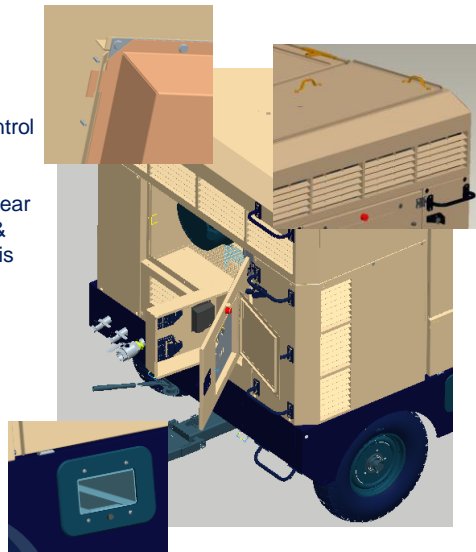
The front service door also carries the control panel arrangement.

The control panel box is mounted on the rear of the front service doors and is secured & protected by a removable cover. The box is attached by a hook arrangement which works as a simple hinge

The control panel door is mounted to the outside of the front service door & can be padlocked

Ladder access to the roof, for hook attachment, is similar to current

Fork lift protection plate is standard



Company Confidential

## Subsystems – Enclosure

The side door hinges are accessible from outside, to allow simple adjustment of the door position

Lower side access panels are attached to the bottom panels with hinges, and are securely latched in the closed position by spring pawls. A rope between both pawls allows one handed release.



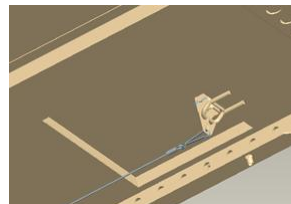
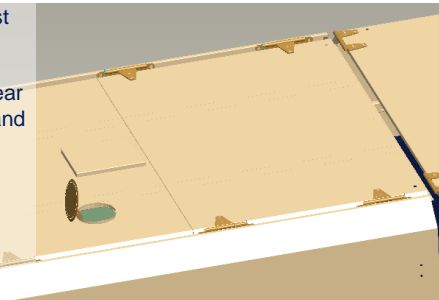
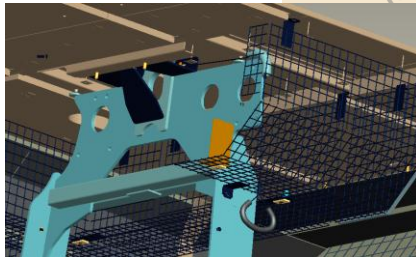
Company Confidential

## Subsystems – Enclosure

The roof is made from two panels bolted together. The lifting bail cover and the exhaust rain cap are located on the front roof panel.

Roof panels are supported by the front and rear ends, and centrally by the fan shroud frame and lifting bail

The lifting bail cover is secured by a latching pawl which is released by a wire rope and handle

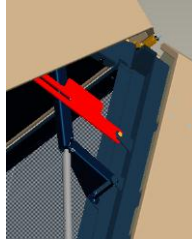
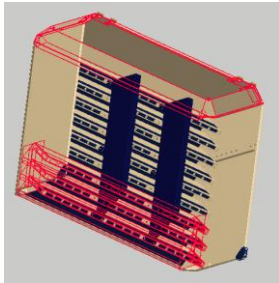


Company Confidential

## Subsystems – Enclosure

The rear end is an assembly of two sides, a top panel, 3 louvre groups and 2 baffles

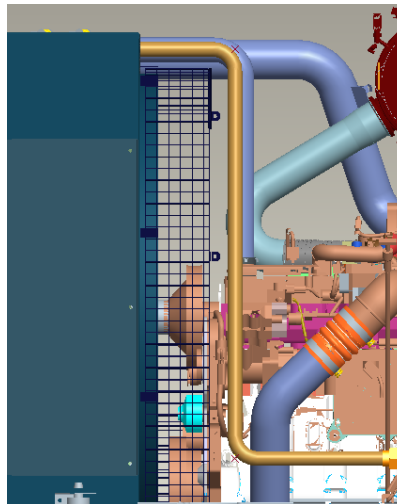
The complete rear end is hinged, allowing access for cooler cleaning. It is supported by strong gas springs with a (red) safety latch. The gas strut arrangement works through a transfer lever so that when closed both ends are captured by the cooler frame, to eliminate stress on hinges & canopy.



Company Confidential

## Subsystems – Enclosure

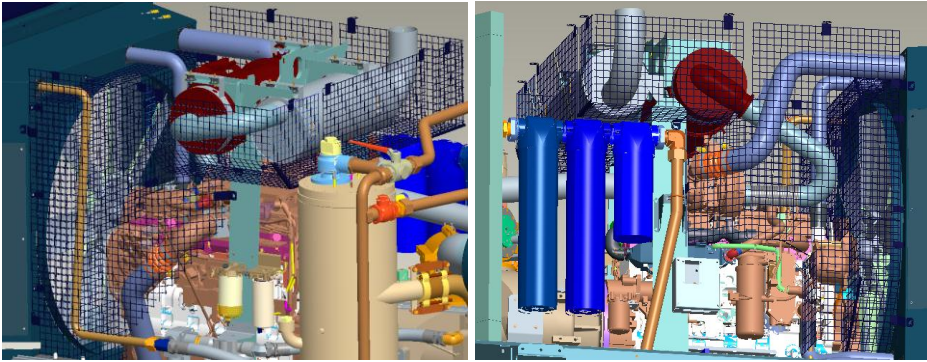
Main safety guards closely cover the fan and belt, and are produced from wire net to minimise pressure drop



Company Confidential

## Subsystems – Enclosure

Secondary safety guards cover both the main guards and hot surfaces around the engine, so rotational parts are double covered



Company Confidential

## Subsystems – Electrical

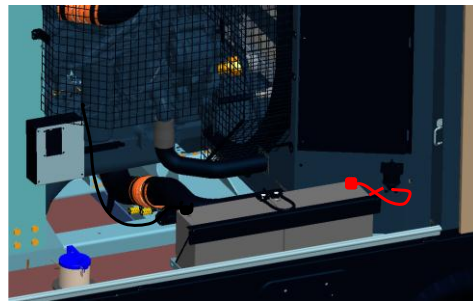
Batteries, battery switch, some cables brackets, relays & fuses are all common with EMU

Wiring harness is the same style as successfully used on 12/150, attached to supports on the engine and air-end

A small electric box protects fuses and relays against jet wash water & is mounted on the lifting bail

Terminals are protected by plastic boots

Batteries are easily accessible



Company Confidential

## Subsystems – Electrical

Lighting components in the bumper are common (new, combined style) units from other machines

The wiring harness is routed below the frame

Lighting arrangement suits both Continental / UK requirements



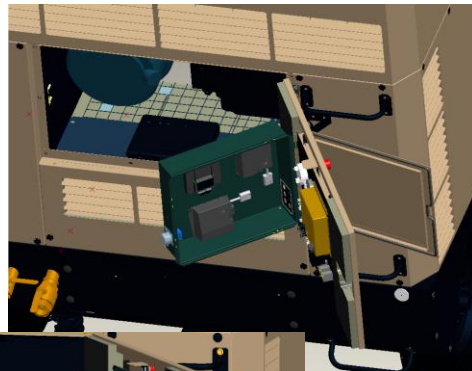
Company Confidential

## Subsystems – Control System

The control panel is mounted on the front service door and contains switches, gauges and the new Viewport

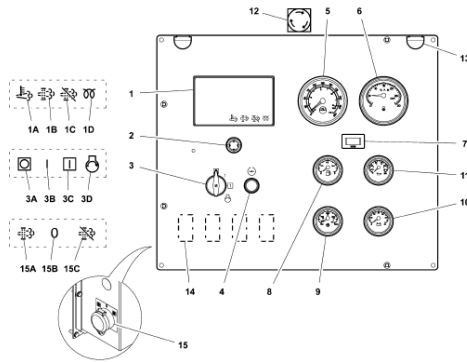
The control panel box has a sealed rear cover and contains the Titan controller and components for options

Once the rear cover is opened, all components are simply accessed from both sides



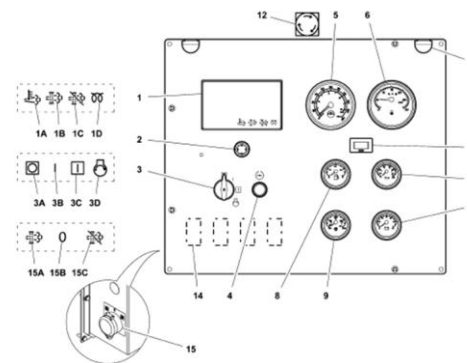
Company Confidential

## Subsystems – Control System



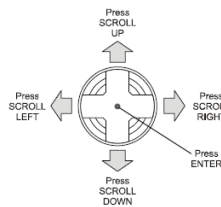
1. ViewPort: Graphic display showing information about performance parameters, warnings, faults, Maintenance Manual and Parts Catalogue.
- 1A. High Exhaust System Temperature (HEST) Lamp: Illuminates when exhaust temperatures are high due to regeneration of the DPF.
- 1B. Aftertreatment Diesel Particulate Filter (DPF) Lamp: Illuminates when the DPF requires regeneration.
- 1C. Regeneration Disabled Lamp: Illuminates when regeneration is disabled by the regeneration control switch.
- 1D. Wait to Start Lamp: Illuminates when the operator should wait before starting the engine because the intake air heater is heating.
2. Joystick: Device to move in graphic menu.
3. Main Control Switch: Used for starting and stopping the compressor.
- 3A. OFF: Stops the compressor.
- 3B. ON: Turns on compressor control system and ViewPort.
- 3C. RUN: Turns on engine control system.
- 3D. START: Initiates engine cranking. Momentary position.
4. Service Air Switch: Momentary contact switch. Allows engine to warm up at low compressor pressure.

## Subsystems – Control System



5. Discharge Air Pressure Gauge: Indicates pressure in receiver tank, normally from 0 psi (kPa) to the rated pressure of the machine.
6. Engine Tachometer: Indicates engine speed in RPM from 0 when stopped to full speed.
7. Hourmeter: Indicates machine operating hours.
8. Compressor Oil Temp Gauge.
9. Fuel Level Gauge: Indicate fuel level in tank.
10. Battery Voltage Gauge.
11. Engine Water Temp Gauge.
12. E-STOP: Emergency Stop Push Button. Push to stop, turn to release.
13. Panel Light: Illuminates the instrument control panel.
14. Position for optional switches.
15. Regeneration Control Switch: Provides operator control of the exhaust aftertreatment regeneration.
- 15A. Regeneration Initiate Position: Requests manual (non-mission) regeneration of DPF if entry conditions are within proper range. Momentary position.
- 15B. Normal Position: Allows automatic regeneration of DPF to take place as needed.
- 15C. Regeneration Disable Position: Inhibits automatic and manual regeneration of DPF.

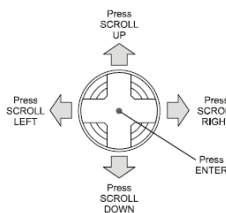
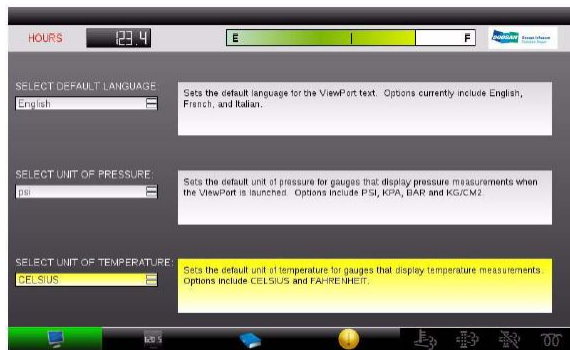
## Subsystems – Control System



**DOOSAN** Doosan Infracore  
Portable Power

Company Confidential

## Subsystems – Control System

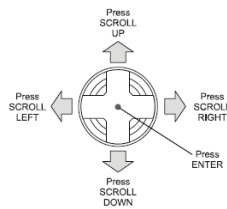
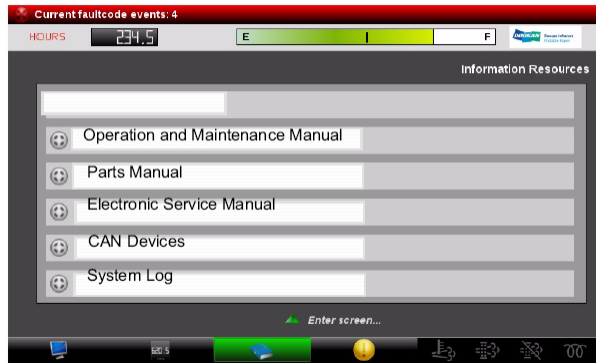


**DOOSAN** Doosan Infracore  
Portable Power

Company Confidential

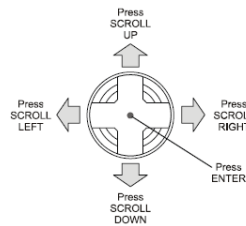
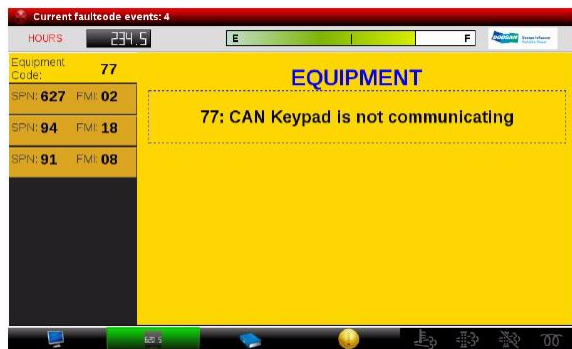
## Subsystems – Control System

### Info Screen



Company Confidential

## Subsystems – Control System



Company Confidential

## Options

Forklift pockets → can be closed when not in use.



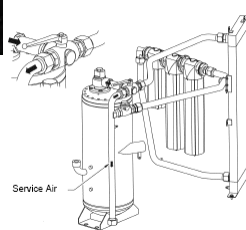
Company Confidential

## Options

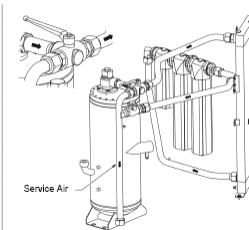
IQ option → Aftercooler + Waterseparator + 0.1 + 0.01 micron filters.



STANDARD OPERATION



IQ SYSTEM OPERATION



## Options

IQ option → Aftercooler + **Waterseparator** + 0.1 + 0.01 micron filters.



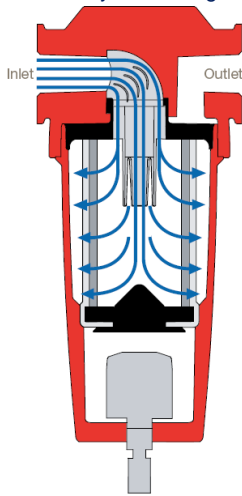
- Wet air enters the inlet port and is directed into the separator module fixed turning vanes causing the air to spin inside the vessel and then change direction as it passes the impinger.
- A vortex is then created which narrows and intensifies as it reaches the lower part of the separator.
- Bulk liquid is therefore removed from the air stream due to a combination of:
  - Directional changes of the air stream.
  - Velocity changes.
  - Centrifugal action of the vortex.
- As the vortex reaches the bottom of the separator module, air is forced through the centre of the vortex.
- Aerospace turning vanes located in the outlet of the separator module now turn an "inefficient corner" into a number of more "efficient corners" to reduce turbulence, minimise pressure loss and therefore operational costs.

**DOOSAN** Doosan Infracore  
Portable Power

Company Confidential

## Options

IQ option → Aftercooler + Waterseparator + **0.1 + 0.01 micron high efficiency coalescing and dust filters.**



**DOOSAN** Doosan Infracore  
Portable Power



### Drainage method 1

High efficiency drainage layer provides increased liquid drainage, improved chemical compatibility and higher operational temperatures when compared to ordinary materials.



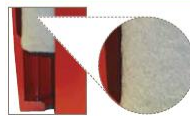
### Drainage method 2

Typical filter elements have a build up of liquid known as a "wet band" where the drainage layer is glued into the lower endcap. The OIL-X EVOLUTION design wraps the drainage layer under the lower endcap to remove coalesced liquid from the air flow path, increasing liquid removal efficiency, and providing more usable filtration surface area.



### Drainage method 3

Surface tension breakers on the lower filter element endcap provide fast and efficient drainage of coalesced liquid.

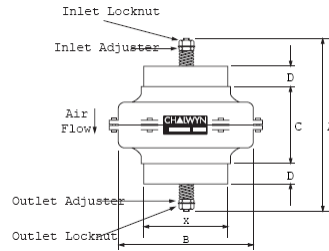


### Drainage method 4

Drainage ribs cast into the filter bowl compress the lower part of the filter element, allowing bulk liquid to rapidly drain from the filter element through capillary action.

## Options

Inlet shutdown Valve → engine protection against overspeed



### Routine Maintenance

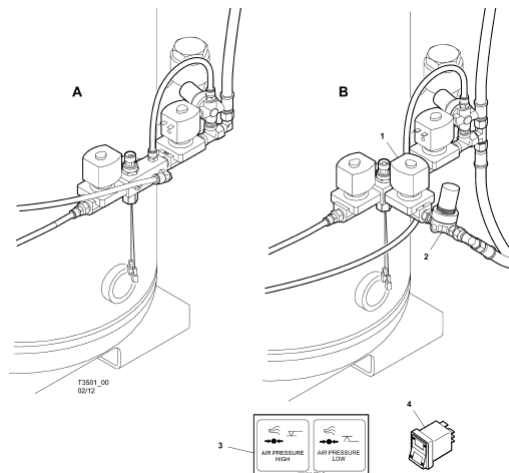
1. Disconnect intake pipework and release the valve from any support brackets etc. to allow it to be removed.
2. Inspect the valve internally for cleanliness. If necessary, clean in paraffin or white spirit taking normal precautions. Dry the valve thoroughly.
3. Check there is no excessive wear and that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



Company Confidential

## Options

Dual Pressure Regulation → Allows for dual pressure running when selecting Low or High pressure..



Company Confidential

## Options

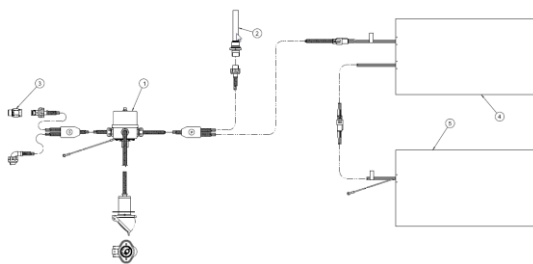
Remote Fuel connection → Machine can be connected to an external fuel tank, no fuel gauge on external tank.



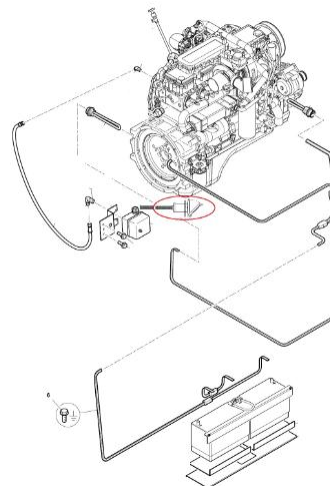
Company Confidential

## Options

Cold Start -20°C → Heaters will be added to allow -20°C startup



5	1	36920387	BATTERY HEATER PAD
4	1	22627798	BATTERY HEATER PAD
3	1	22604839	THERMOSTAT WELL
2	1	22131411	OIL PAN HEATER
1	1	22131338	PRESSURE SWITCH HARNESS

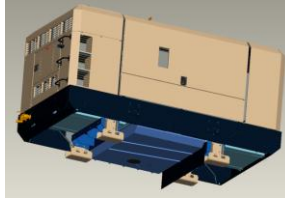


Company Confidential

## Options

Skids → Allows for mounting of compressor without running gear in different applications

Truck mount with isolators



Basic shipping skid

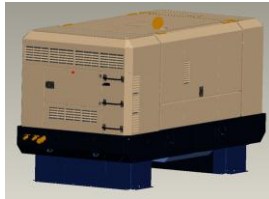


Company Confidential

## Options

Skids → Allows for mounting of compressor without running gear in different applications

Permanent skid hard surface



Permanent skid soft surface



Company Confidential

## Options

Skids → Allows for mounting of compressor without running gear in different applications

Permanent skid isolated



## Maintenance

### FILTER KITS

50 Hours

500 Hours

1000 Hours

Sep + O-ring

CPN

46551065

46551066

46551067

46551064

### SERVICE KITS

WS drain float

IQ filters o-rings

46551210

46551211

### FLUIDS

Engine Oil CJ-4

5 liters

20 liters

208 liters

46551221

46551222

46551223

Comp Oil Protec

20 liters

208 liters

89292973

89292981

Comp Oil XHP405

20 liters

208 liters

22252126

22252100

Comp Oil XHP605

20 liters

208 liters

22252076

22252050

## Warranty

---

### Standard

12 months / 2000 hours Package warranty.

24 months / 4000 hours Air-end warranty.

### Cummins Standard

24 months / 2000 hours.

### Extended Warranty

5 years / 10.000 hours Air-end warranty.

### Extended Cummins Warranty

3 years / 10.000 hours Major Components only.

Encompass customizable coverage, contact the Cummins distributor.



Company Confidential