Remember the equipment that you are driving is a valuable resource and as a professional equipment operator you need to protect it to the best of your ability. Also remember what you do with the equipment can have a great effect on aircraft and its passengers. There can literally be hundreds of lives that you can have a direct effect upon. You as the operator are responsible for the vehicle you are operating.

You can't abuse your truck just because it's big and powerful.

Your truck needs as much care as your car does. In fact, your truck works a lot harder than your car ever will and is likely to require a lot more care.

Most experienced drivers can tell you all kinds of stories about trucks that were destroyed years too soon simply because somebody didn't check something or forgot to top it up or was too lazy to tighten it up.

We have various trucks at Winnipeg James Armstrong Richardson International Airport. As an example, we have sand trucks, single axle dump trucks, tandem dump trucks, chemical trucks and plow trucks.
Get to know these trucks and learn how to operate them properly.

Some or all of the following features are commonly found on most trucks:

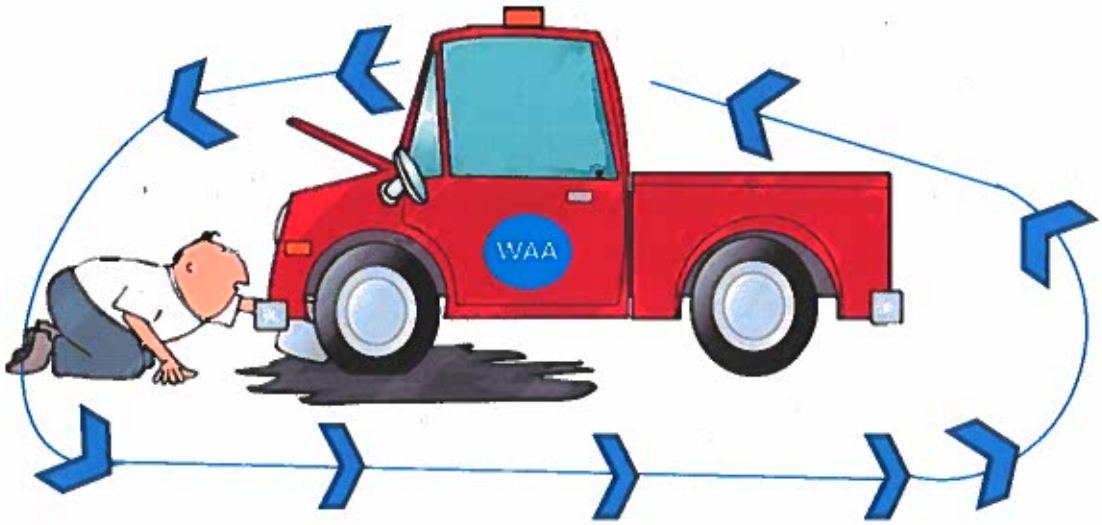
- ROTATING BEACON (must be on when you go airside)
- TWO-WAY RADIO (for airside use)
- PINTLE HOOK (trucks are often used for towing)
- BACK-UP ALARM (because you can't see behind you)
- SEAT BELTS (both seats)
- WEST COAST MIRRORS (better visibility)
- FIRE EXTINGUISHER
- LOW AIR PRESSURE ALARM

Most of the features are safety related.

THE CIRCLE CHECK

Before you climb into the cab of your truck, you want to make sure that your truck is ready to go.

- make sure your vehicle is safe
- Make sure you'll get through your shift without a breakdown.



PRIOR TO OPERATING ANY VEHICLE AT THE CSB YOU MUST DO THE FOLLOWING.

1. Check for any fluid leaks under Vehicle
2. Preform a walk around checking for damage to the vehicle (Report any damage found)
3. Pull the oil dip stick ***WIPE IT CLEAN*** insert it back into the vehicle and check the oil level.
4. Add washer fluid if needed
5. After any vehicle use ***ALWAYS ADD FUEL TO TOP UP THE TANK***
6. ***Make a One-Call ticket if needed at 204-987-9798***

It's impossible to give a detailed checklist in a manual such as this one. The one given here should serve as a guide to the things that you have to look after.

For example, the battery will probably be in different areas on different makes of trucks, but you know that you still have to check it, wherever it is.

Under The Hood Checks

- Engine Oil Level
- Radiator Level
- Power Steering Fluid Level
- All Belts for Tension and Wear
- Windshield Washer Level

Body Checks

- Cracked Lights and Lenses
- Mirrors
- Wheel Lugs
- Tire Pressure
- Tire Wear and Damage

Check Components

- Battery Levels
- Battery Tie Downs
- Battery Connection
- Hydraulic Oil Level
- Check for Obstructions around Vehicle
- Cock Closed on Air Tanks

Other Checks

- Evidence of Oil Leaks
- Evidence of Anti-freeze Leaks
  Locate Source if Possible
- Hydraulic Pump and Drive shaft

Report all damaged and defective items to your supervisor. Do not operate a defective truck. A decision will be made by the supervisor if the truck will be taken out of service at that time.

Since it is not good to put a cold engine to work, you have time to run secondary checks while waiting for the engine to warm up.

Cab Equipment
- Fully Charged Fire Extinguisher
- Wiper Motor
- Wiper blades
- Windshield Washer
- Horn City/Highway

Radio
- Check for Proper Frequency
- Check with Tower for Proper Operation

Adjust
- Seat
- Mirrors

Lights (Working and Clean)
- Beacon
- Headlights
- Taillights
- Flashers
- Plow Lights
- Back-up Lights

Check
- Brake Operation
- Back-up Alarm
- Air pressure Build Up
- Air Leaks with Engine Off
- Automatic Transmission Oil

After using any vehicle at the CSB you must top up the fuel tank.

Date: _____

Equipment Number: _____

		✓	X	N/A
Walk Around	Leaks (Fluid/Air)			
	General Condition			
Under Hood	Oil Level			
	Transmission Fluid			
	Brake/PTO Fluid			
	Power Steering Fluid			
	Coolant/ Radiator			
	Belts			
	Hoses			
	Air Cleaner			
Battery	Cable Condition			
	Mountings/Hold Down			
	Cover Secured			
Tires	Tread/Match			
	Tire Condition			
	Tire PSI			
	Wheel/Lugnuts			
Hydraulics	Reservoir Level			
	PTO Operation			
	Hose Condition			
	Cylinder Condition			
Frame/ Suspension	Loose Bolts			
	Cracks			
	Springs/ U Blots			
	Mud Flaps			
Broom	Shroud Shoveled			
	Body Shoveled			
	Broom Core			

		✓	X	N/A
Cab	First Aid Kit			
	Fire Extinguisher			
	Warning Triangles			
	Seat Belts			
	WS/Windows			
	Wipers			
	Horn/Air Horn			
	Mirrors			
	Inspection Sticker			
	Stairs			
	Clean			
Brakes	Emergency Brake			
Bed	Ladder			
	Cover/Cap			
	Loose Cargo			
	Dump Bed Safety Bar			
	Bed Lock Lamp			
	Lift Cylinder & Pin			
	Tailgate Latch			
Lamps	Head/ Dimmer			
	Parking			
	Turn Signal			
	Four Way			
	Clearance Lamps			
	Tail Lamps			
	Reverse Lamps			
	License Plate Lamp			
Air Brakes	Air Pressure			
	Buzzer/Lamp			
	Tank Drain			
	Glad Hands/Hoses			

Front, Middle and Rear Frame

ØVERÅSEN SNOWREMOVAL SYSTEMS

Machine number:	Operating time:	Date:

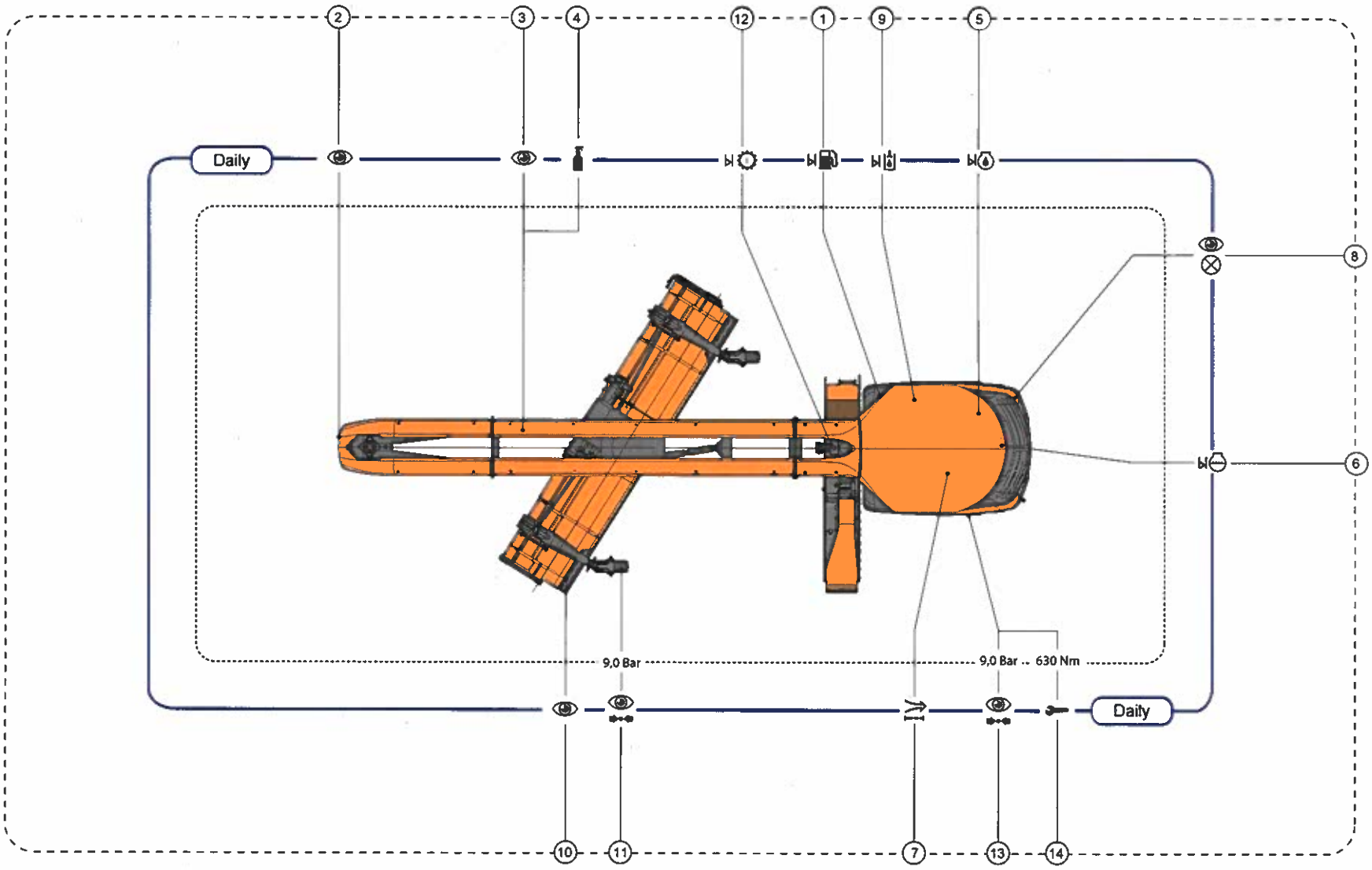
		Action to be carried out	Pos.	Comment
General	1.	Refuel	5.1.1	
	2.	Check connectors	5.1.2	
	3.	Check sweeper	5.1.3	
	4.	Clean sweeper	5.1.4	If necessary
Engine	5.	Check engine oil level	5.2.1	
	6.	Check coolant level	5.2.2	
	7.	Check air filter indicator	5.2.3	
Electrical system	8.	Check lightning	5.3.1	
Hydraulics	9.	Check hydraulic oil level	5.4.2	
Brush	10.	Check brush pattern and distance to deflector screen	5.5.2, 5.5.3	
	11.	Check tyres and tyre pressure	5.7.1	
Blower housing	12.	Check blower bearing oil level	5.6.1	
Rear axle	13.	Check tyres and tyre pressure	5.7.1	
	14.	Tighten Wheel Nuts	5.7.2	

Comment:

Date performed:	Performed by:

RS 200/400 Performance
Line Daily Maintenance
Front, Middle, and Rear Frame

ØVERÅSEN
SNOWREMOVAL SYSTEMS



Engine	Diesel	Engine oil 10W-40	Coolant	Central lubricating grease NLGI 2	Working light	Brush	Check
Gearbox	Batteries	Synthetic transmission oil 75W-90 API GL-4	Hydraulic oil ISO VG 46	Wheel bearing grease BPW ECO Li Plus	Filter	Clean	Pressure
Hydraulics	Maintenance	Lubricating oil, engine oil	Lubricating grease EP2 LI NLGI 2	Air	Brake	Check the level	Drain

ØVERÅSEN
SNOWREMOVAL SYSTEMS

USER MANUAL
RS 200/400
PERFORMANCE LINE

USER MANUAL RS 200/400 PERFORMANCE LINE

1 General

The Runway Sweeper RS 200/400 Performance Line deliver optimum performance, efficiency and results on airport runways.

As well as delivering an all-new design, our engineers have used cutting-edge, high-tech fibre glass compound materials to provide an advanced and innovative concept in terms of components, surfaces and aerodynamics.

Thanks to leading-edge brush units, fully automatic brush adjustment combined with an all-new design, the Øveraasen Runway Sweepers offer excellent service life. The self-monitoring control system, with on-board diagnostics, also means that maintenance of the sweepers is now easier and more cost-effective. For unimpeded maintenance access, the single-piece, hinged engine enclosures, rotate backwards exposing the entire engine.

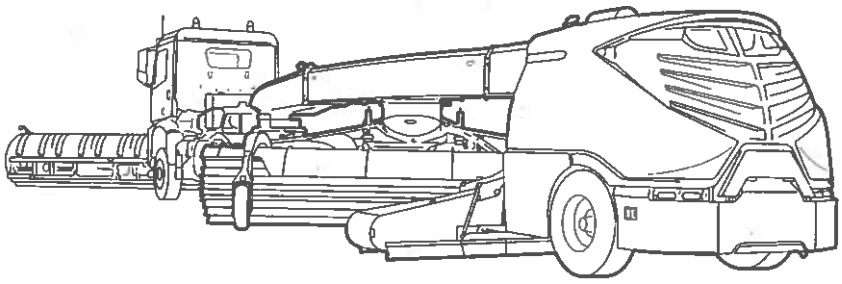


Figure 1: Runway Sweeper RS 400 Performance Line

1.1 About the User Manual

The information in this manual overlaps the user manual and there is detailed information about information that is needed for maintenance and repairs. Still, specific information about components and subsystems have to be found in the supplier's original information.

For optimal function and performance, it is important to carry out daily and periodic maintenance in accordance with the maintenance plan.

Direction references such as front, rear, right and left always refer to the driving direction of the machine.

Particularly important information for the reader is emphasised as below ("Warning!", "NOTE" and "Comments").

WARNING!

The "Warning boxes" are used when there are procedures that require extra care to avoid personal injury.

NOTE!

The "NOTE points" are used when there are procedures that require extra care to avoid damage to material/equipment.

Comments

"Comments" are used when there are procedures that require extra attention.

The User Manual for the Runway Sweeper is intended to be used by personnel who have completed special training. The User Manual contains specifications, instructions for care and operation, as well as daily maintenance.

The User Manual is divided into the following sections:

1 General

2 Specifications

3 Design and Mode of Operation

4 Operation

5 Maintenance

Appendix - Declaration of Conformity

Appendix - Maintenance chart

1.2 Safety Regulations

Incorrect and careless handling of the sweeper can cause injury or lead to dangerous situations.

The following operations/functions are particularly dangerous:

- Raising and lowering the brush.
- Rotating brush.
- Air nozzles.
- High-pressure hoses and associated components.

WARNING!

Never stand in the vicinity of the brush when the engine is running.

WARNING!

The combination of Runway Sweeper and towing tractor is a heavy truck+trailer combination. The operator must have relevant competence for operating heavy vehicles. Drivers license class CE or similar.

It is necessary to know and to comply with the safety instructions set out below:

1 Before carrying out work on the sweeper:
   - Stop the engine and remove the key.
   - Turn off the main switch.
   - If the sweeper is coupled to a tractor vehicle, remove the vehicle's ignition key and apply the parking brake.
   - Engage the emergency stop switches.
   - Open and close the engine cover.

2 Use the emergency stop switches in emergencies. Emergency stop switches are to be found on the control panel and behind the left/right wheel covers in the rear end of the machine.

3 Use the sweeper with great care in order to avoid personal injury or damage to equipment and property.

4 Pay attention to the direction of the air nozzles so that the snow does not cause damage or injury.

5 When the engine is started, only qualified personnel may remain within the danger zone.

6 Always use hearing protection when the sweeper is running.

7 Always wear gloves when handling the brush cassettes. The brushes are pointed and sharp.

8 Close all hatches on the sweeper before starting the engine. Pay particular attention if a hatch has to be opened while the engine is running.

9 Cordon off the danger zone when test-driving the sweeper.

10 The brush must be raised during transport. It must only be in operation when performing work.

11 Stop the engine and turn off all electronic equipment before refuelling.

12 Check hydraulic hoses regularly.

13 Maintenance or repairs must not be performed on the machine when it is running.

14 The Runway Sweeper trailer shall only be used in combination with a towing vehicle prepared for air brakes with ABS.

WARNING!

Do not leave the engine running when stationary in an enclosed room. The exhaust fumes contain toxic carbon monoxide. Carbon monoxide is invisible and odourless. As a result, it is difficult to detect the gas before it is too late. The gas is heavier than air, and accumulates in depressions and at floor level.

Comments

On delivery, the owner undertake the responsibility for the Runway Sweeper, and for ensuring that it is used in a safe manner.

Every country has their own safety regulations and laws that regulate the use of technical equipment and machinery. The operator of the machine is responsible for knowing about all laws/ regulations and for observing them. The same applies to safety regulations. If any of the procedures in this manual are in conflict with safety regulations in the user's country or area, the national or local regulations shall apply.

1.3 CE marking and Declaration of Conformance

The RS 200/400 Runway Sweeper is CE marked. This means that, on delivery, it complies with the relevant health, environment and safety regulations in the Machinery Directive and other relevant directives.

1.4 Unauthorized Modifications

Øveraasen AS does not accept responsibility for damage or injury caused by unauthorized modifications of the sweeper. Modifications are only permissible when written approval has been obtained from Øveraasen AS. Any unauthorized modifications will invalidate the warranty provided by Øveraasen AS.

1.5 Maintenance Provisions

It is very important to carry out maintenance in accordance with the maintenance instructions in the User Manual and Workshop Manual. Øveraasen AS does not accept responsibility for damage or injury caused by lack of maintenance on the sweeper. Insufficient or poor maintenance will invalidate the warranty offered by Øveraasen AS.

When repairs are carried out on the engine, transmission or hydraulic systems, it is very important that you keep the workplace clean and tidy.

After a repair, it is important to check that the Sweeper is working as it should, that the replaced components are in order and that there are no leaks.

1.6 Spare Parts / Service

1.6.1 General

Spare parts may only be purchased from Øveraasen AS, or as advised by Øveraasen AS. This is to ensure that only spare parts of satisfactory quality are used. The use of non-original spare parts will invalidate the warranty offered by Øveraasen AS.

1.6.2 Order Information

Please supply the serial number and model year when ordering spare parts for your RS 200/400 Runway Sweeper.

1.6.3 Contact List

Øveraasen AS

Roald Amundsens veg 1

2816 Gjøvik

Phone: +47 611 46000

Fax: +47 61 14 60 01

Spare parts

Phone: +47 611 46000

E-mail: ordre@overaasen.no

Service

Phone: +47 611 46000

E-mail: service@overaasen.no

On-call telephone 24 hours a day between October and April.

Phone: +47 906 512 00

1.7 Warranty Provisions

The damaged component must first be examined and approved, in order for a claim to be accepted during the warranty period.

Please supply the serial number and model year of your product. For contact information, please refer to chapter 1.6.2 Order Information, page 14.

Incorrect and/or careless use of the sweeper, incorrect maintenance and/or use of non-original spares will invalidate the warranty offered by Øveraasen AS.

If you have any questions or need more information, please contact us.

1.8 Updating the Manual

This manual has been updated with reservation for any design changes initiated by Øveraasen AS. Øveraasen AS reserves all rights to make amendments to the technical data, specifications and manuals. Even though every attempt has been made to ensure the correctness of this publication, Øveraasen AS accepts no responsibility for errors in the text and/or incorrect information in the technical specifications.

In the event Øveraasen AS finds it necessary to update the sweeper and/or this manual, the purchaser of the machine will receive a change notification and copies of the updated pages. Updated pages must immediately be inserted into the manual. The owner of the machine is responsible for notifying the machine driver about updates and/or changes in this manual.

2 Specifications

2.1 General

Producer	Øveraasen AS, Norway
Type designation	RS 400 Performance Line or RS 200 Performance Line

2.2 Performance

2.2.1 RS 400 Performance Line - standard version

Working width	5,5 m
Working speed, max.	65 km/h
Working speed, recommended	15-40 km/h
Clearing capacity	357.500 m^2/h

2.2.2 RS 200 Performance Line - standard version

Working width	3,6 m
Working speed, max.	65 km/h
Working speed, recommended	15-40 km/h
Clearing capacity	234 000 m^2/h

2.3 Brush

Brush diameter	1 170 mm
RS 400 Brush length (7.5 cassettes)	6 240 mm
RS 200 Brush length (5 cassettes)	4 160 mm
Brush material	Steel or poly
Brush speed	0-720 rpm
Optional Brush 8.5 cassettes Brush length Optional working width	 7 120 mm 6.3 m

2.4 Blower

Blower capacity	0-11 m^3/s
Blower speed	0-3 000 rpm
Blown wind speed	150 m/s (adjustable)

2.5 Weights

RS 400 PL (standard basic model)	14.240 kg
RS 200 PL (standard basic model)	12 560 kg

2.6 Dimensions

2.6.1 RS 400 Performance Line - standard version

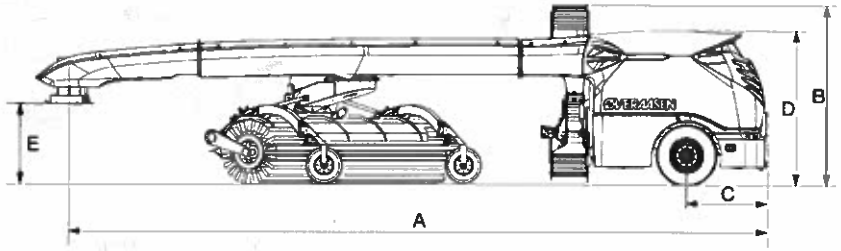


Figure 2: Dimensions, from left side

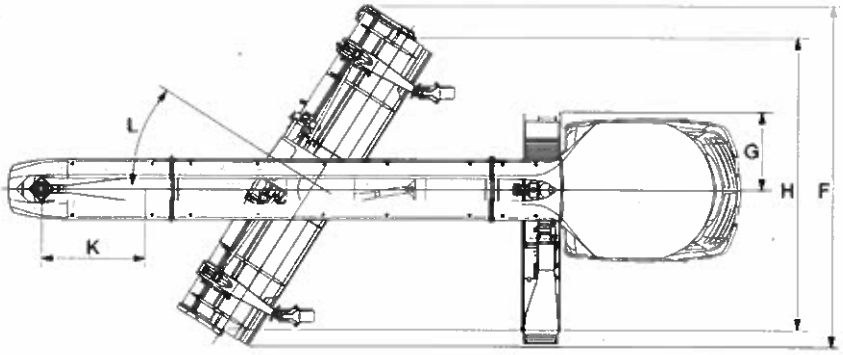


Figure 3: Dimensions, from above

A	Length from fifth wheel to rear fender	12.700 mm
B	Height with nozzles in parked position	3.250 mm
C	Length from rear axle to fender	1.490 mm
D	Height	2.793 mm
	Service height	> 4.430 mm
E	Height of fifth wheel	1.350 - 1.550 mm adjustable
F	Total width in working position	6.180 mm
	Service width	> 6.840 mm
G	Width centre to nozzle in parked position	1.400 mm 2.800 mm transport width
H	Working width	5.500 mm
K	Length from fifth wheel to brush in parked position	1.870 mm
L		32°

Total length depends on plough, tractor vehicle or nose wheel

2.6.2 RS 200 Performance Line - standard version

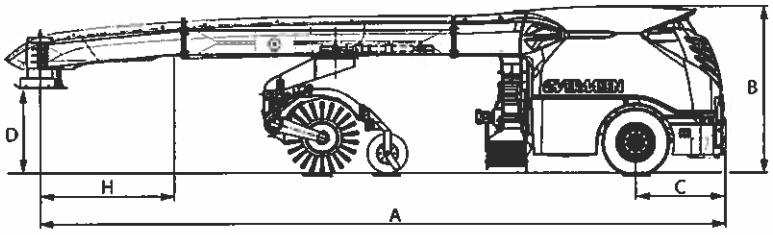


Figure 4: Dimensions, from left side

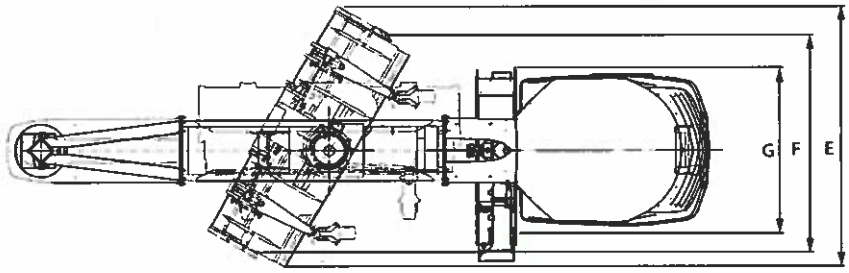


Figure 5: Dimensions, from above

A	Length from fifth wheel to rear fender	11 340 mm
B	Height	3 050 mm
	Service height	> 4.430 mm
C	Length from rear axle to fender	1.490 mm
D	Height of fifth wheel	1.350 - 1.550 mm adjustable
E	Total width in working position	4 350 mm
	Service width	> 6.840 mm
F	Working width	3 600 mm
G	Width transport, nozzle in parked position	2 800 mm
H	Length from fifth wheel to brush in parked position	1.870 mm
L	Working angle	32°

Total length depends on plough, tractor vehicle or nose wheel

2.7 Engine

Engine MTU

Producer	MTU
Engine type RS 400 Engine type RS 200	6R 1100 C50 6R 1100 C30
Emission level	EU Stage IV / Euromot 4
Assembly model	470.907
Cylinder configuration	In-line 6
Displacement, total	10,6 litres
Power rating at 1700 rpm	RS 400: 320 kW RS 200: 280 kW
Torque at 1300 rpm	RS 400: 2100 Nm RS 200: 1900 Nm
Valve clearance, cold engine approx. +20° C	Intake 0,40 ± 0,05 mm Exhaust 0,60 ± 0,05 mm
Firing order	1-5-3-6-2-4
Direction of rotation	Counter clockwise when looking at the flywheel
Cold start limit	-30° C @ Battery charging level 75%

Alternative Engine Scania

Producer	Scania
Engine type RS 400 Engine type RS 200	DC 13 384 A 331 kW DC 13 387 A 257 kW
Emission level	EU Stage IV / Euromot 4
Assembly model	470.907
Cylinder configuration	In-line 6
Displacement, total	12,7 litres
Max. speed	2 100 rpm
Torque at 1250 rpm	RS 400: 2300 Nm RS 200: 1800 Nm
Valve clearance, cold engine approx. +20° C	Intake 0,45 mm Exhaust 0,70 mm
Firing order	1-5-3-6-2-4
Direction of rotation	Counter clockwise when looking at the flywheel
Cold start limit	-30° C @ Battery charging level 75%

2.8 Exhaust Aftertreatment

Type	SCR (Selective Catalytic Reduction)
Additive	AdBlue® / DEF
Exhaust silencer and catalytic converter	SCR and DOC catalytic converter

2.9 Electrical System

System voltage	24 V
Batteries	2 x 12 V, 170 Ah
Alternator amperage	100 A
Starter motor output	7 kW
Control system	Danfoss PLUS+1®

2.10 Hydraulics

Blower pump	Variable piston, Danfoss H1P210
Brush pump	Variable piston, Danfoss H1P250
Manoeuvre pump	Variable load sensing piston, Danfoss KRR045
Rear wheel steering pump	Gear type, SN+2/11
Emergency / Service pump	Electro-hydraulic gear pump
Directional valves	Closed center, Danfoss PVG32
Blower motor	Axial piston, Danfoss 90M100
Brush motor	Radial piston, Rotary Power SMA 0480 E1

2.11 Noise

Cabin	74,5 dBA
Outside	105,1 dBA

2.12 Brakes

2.12.1 General

Brake system	Dual-circuit air operated drum brakes
EBS system	Haldex EB+ Gen3

2.13 Rear Wheel Steering

Producer	Vehicle Systems Engineering
Type	ETS with 1 steered axle
Hydraulic source	Engine mounted pump

2.14 Wheels and Tyres

2.14.1 Rear wheels

Number of wheels	2
Dimensions	425/65 R22.5
Tyre pressure	9 bar

2.14.2 Support wheels

Number of wheels	2
Dimensions	7.5/10 14 P.R
Tyre pressure	9 bar
Optional wheels, Large	
Dimensions	225x75x17.5
Tyre pressure	7 bar

2.15 Volumes

Fuel tank	1.000 litres
AdBlue® tank	40 litres (MTU) 38 litres (Scania)
Engine oil	Approx. 34-37 litres
Cooling system	Approx. 35 litres
Hydraulic oil tank	150 litres
Blower bearing	Approx. 2,9 litres

2.16 Lubricants and Fluids

2.16.1 Oil and Fluid Specifications

Position	Type	Specification
Engine MTU	Engine oil	Mercedes-Benz 228.5/51
	Coolant 50% pure water 50% anti-freeze	Mercedes-Benz 325.5/ 326.5 Filled at factory with: Fuchs Anti Freeze (red)
Engine Scania	Engine oil	Scania LDF,
	Coolant 50% pure water 50% anti-freeze NOTE! Drain system when filling with a new type of coolant	Scania antifreeze G40 (red) OR Fuchs Antifreeze Longlife (pink) - factoryfilled OR Fuchs Antifreeze Premium G40 (purple)
Diesel tank	Diesel Sulphur-free commercial diesel fuel	EN 590as 2010 et seq. <10 ppm sulphur OR ASTM D975 <15 ppm sulphur, Gel point min -25°C (CFPP).
AdBlue® tank only	AdBlue®, also called DEF, Diesel Exhaust Fluid,	NOx reduction agent in accordance with standard DIN 70070 / ISO 22241
AdBlue® filter sealing rings	Silicon grease	Special grease. Often included in the filter kit.
Hydraulic oil tank	Hydraulic oil	Viscosity: ISO VG 46 Filled at factory with: Fuchs Hydraway HVXA 46 OR at temperature below -15°C Hydraway HVXA 32
Blower bearing	Synthetic transmission oil	75W 90 API GL-4 Filled at factory with: Titan Cytrac TD SAE 75W-90

Position	Type	Specification
Wheel bearing Steering knuckle bearings Brake aut. slack adjuster Brake arm bearing	BPW special long life grease	BPW ECO Li plus
Central lubrication (optional equipment)	Grease	NLGI 2 Filled at factory: Renolit Uniway Li 62
Lubrication	Grease	Universal grease EP 2 Li NLGI 2, Used at factory: Renolit Uniway Li 62
General, hinges	Lubricating oil	Engine oil etc.

2.16.2 Hydraulic Oil Purity Class

The purity of oil sample taken from the hydraulic oil tank.

According to ISO 4406: 1999	17/15/12 not worse than18/16/13

2.16.3 Physical and Chemical Properties of AdBlue®

Form	Fluid
Colour	Colourless, clear, light yellow
Odour	Slight ammonia odour
pH value	10 (aqueous solution, 10%)
Crystallisation starts	-11°C
Boiling point	103°C
Flash point	-
Self-ignition temperature	Non self-igniting
Density	1,09 g/cm3 at 20°C

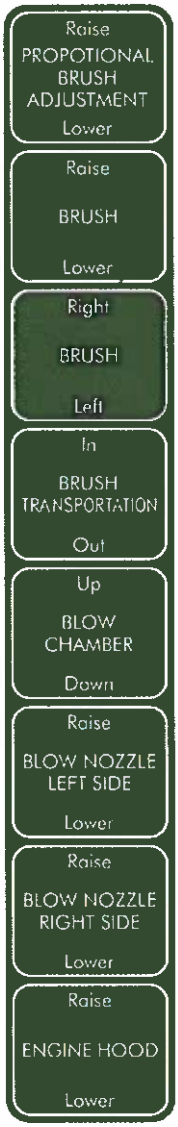
2.17 Signs and Markings

2.17.1 Danger and Information Signs

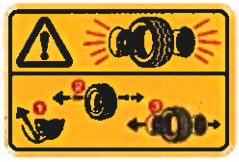
By the emergency stop in cabin

By the emergency stops rear

By the diesel filler pipe



By the directional valves



By the support wheels

By the hydraulic tank drainage

On the blower housing

By the blower

On the frame by the brush.

By the AdBlue/DEF tanks

By the wheels

By the support wheels

By the main switch

By the jump start socket

2.17.2 Type and Designation Plate

The sweeper's type plate shows the machine's type, serial number, model year and gross weight.

Figure 6: Type plate, sweeper, example – inside left-hand engine cover

The MTU engine's serial number begins with 470.907. This is the name of the engine family. The serial number is also stamped on the engine's crankcase.

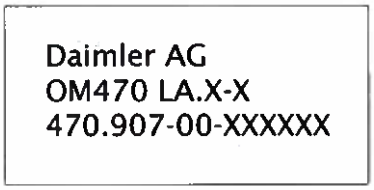


Figure 7: Type plate, MTU engine, example

The Scania engine's serial type plate indicates the engine type, serial number and technical data. The serial number is also stamped on the engine's crankcase.

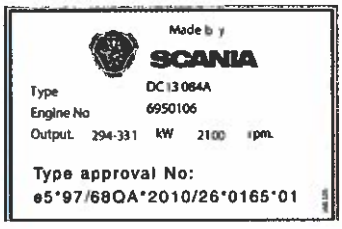


Figure 8: Type plate, Scania engine, example

2.18 Tightening Torques

- Screws/bolts must be tightened in accordance with the tightening torques specified below.
- The Nordlock washer (a two-part lock washer) is a disposable component and must not be re-used.
- Threads shall be cleaned.
- Stainless screws shall be lubricated with little wax or lubrication paste with molybdenum disulfide (MoS_2).
- Steel screws shall be lubricated with oil.
- Countersunk screws can be difficult to undo because:
  - The tool achieves little grip in relation to the screw dimension.
  - The screw's conical shape produces high friction.

  To undo the screws, use a cutting torch to rapidly heat up the centre of the screw head. Discard screws that have been heated up.

2.18.1 Wheel Nuts

WARNING!

It is imperative that the prescribed tightening torques are adhered to in order to ensure the wheels are securely fastened.

Mercedes M22x1,5	630 Nm (600-660 Nm)
Scania M22x1,5	650 Nm (600-660 Nm)

2.18.2 General Screw Joints

These tightening torques are general for the sweeper except for the engine, hydraulic components, axle, steering and brake components.

Specified values are in Nm and apply to cleaned and lubricated threads.

		Strength class Values in Nm.			**Austenitic (A)**	
Thread	**Pitch**	**8.8**	**10.9**	**12.9**	**70**	**80**
3	0,5	1,2	1,7	2,1	0,87	1,2
4	0,7	3,9	4	4,9	2	2,7
5	0,8	5,7	8,1	9,7	4,1	5,4
6	1	9,8	14	17	7	9,3
8	1,25	24	33	40	17	22
10	1,5	47	65	79	33	44
12	1,75	81	114	136	57	76
14	2	128	181	217	91	121
16	2	197	277	333	140	187
18	2,5	275	386	463	195	260
20	2,5	385	541	649	273	364
22	2,5	518	728	874	367	490
24	3	665	935	1.120	472	629

Consult the engine's workshop manual for special tightening torques.

3 Design and Mode of Operation

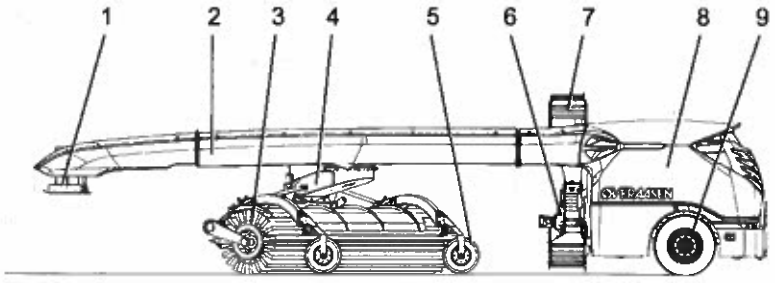
3.1 General

The RS 200/400 Runway Sweeper consists of three main parts:

1 Front frame with attachment for towing vehicle; fifth wheel or different front wheels with tow bar and connections for brake system and electronic control system.

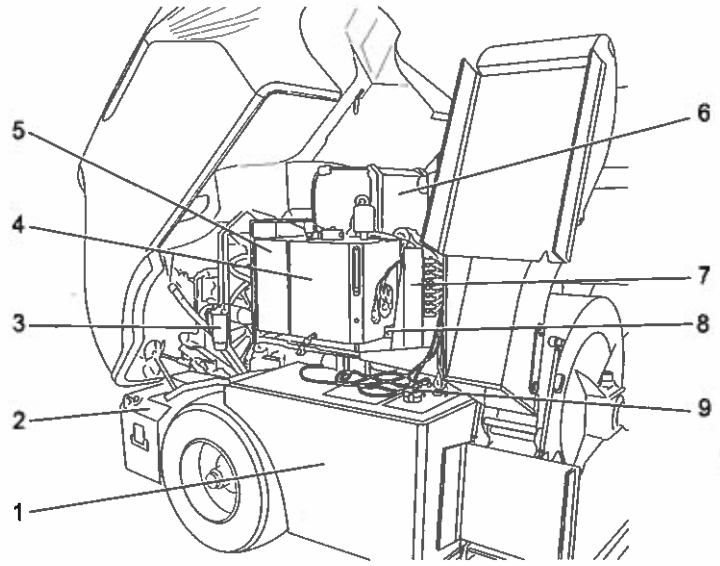
2 Middle frame have the brush bearing and carry the brush.

3 Rear frame consist of the blower unit, the power pack and rear wheels.



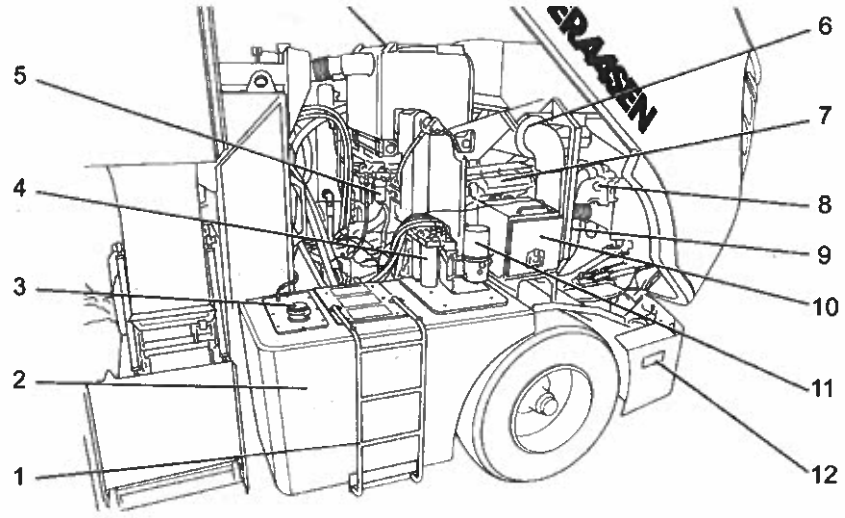
1 Adjustable semi-adapter for fifth wheel
2 Middle frame
3 Sweeper brush
4 Brush arm
5 Support wheels
6 Blower
7 Blower nozzle
8 Engine cover
9 Rear wheel

Figure 9: Example of Standard RS 400 Performance Line



1 Right fuel tank
2 Tank for AdBlue®
3 Fuel filter with water separator
4 Hydraulic oil tank
5 Electric cabinet
6 Exhaust after treatment unit
7 Directional valves for operation hydraulics
8 Service pump switch
9 Right hand side fuel filler cap

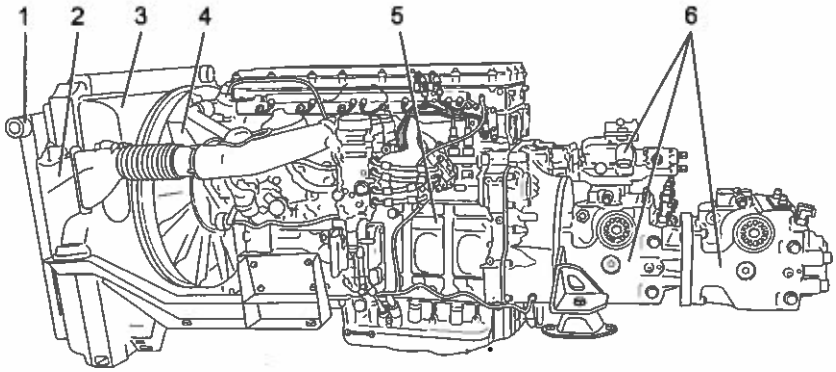
Figure 10: RS 200/400 right-hand side



1	Service steps	7	Diesel engine
2	Left fuel tank	8	Radiator and charge air cooler
3	Left hand side fuel filler cap	9	Engine room light switch
4	Pressure filters for brush and blower	10	Rear wheel steering control cabinet
5	Pressure filters for operation and rear wheel steering hydraulics	11	Central lubrication (optional equipment)
6	Engine air filter	12	Service hatch

Figure 11: RS 200/400 left-hand side

The sweeper is powered by a power-pack that provides hydraulic power to the brush, blower, manoeuvring hydraulics and the rear wheel steering system. The power-pack consists of: Engine, coolers and hydraulic pumps.



1 Hydraulic oil cooler
2 Charge air cooler
3 Coolant radiator
4 Cooler fan
5 Engine
6 Hydraulic pumps

Figure 12: Power-pack

3.2 Engine

3.2.1 MTU engine

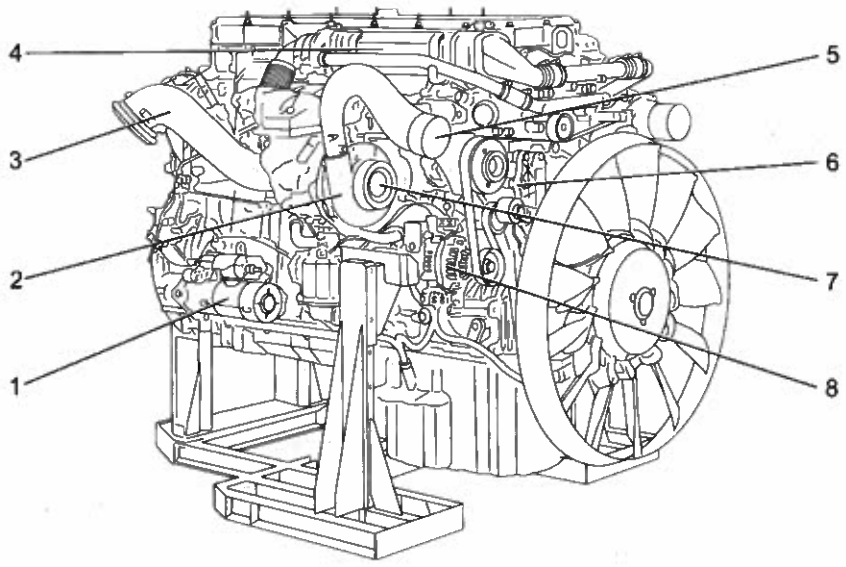
The sweeper is powered by a liquid-cooled in-line diesel engine with four-valve technology, turbocharger and charge air cooler.

The engine has electronically controlled common rail injection system. The injection nozzles are centrally located in the engine's combustion chamber.

The engine applies to the emission regulations EU Stage IV. The engine is equipped with a system for exhaust after treatment using SCR and DOC technology. This reduces nitrogen oxide emissions to nitrogen and water vapour.

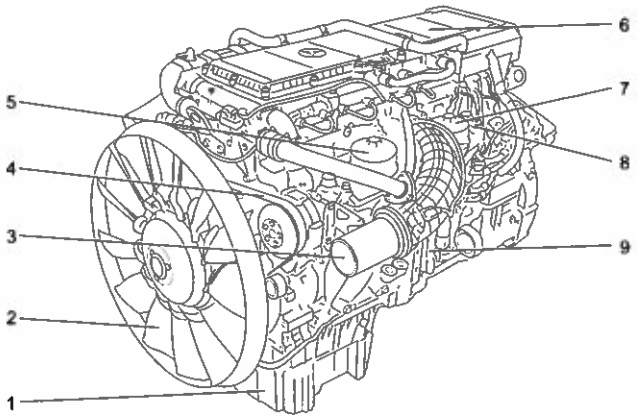
The radiator and charge air cooler is located at the rear of the sweeper and is accessed by opening the engine hood.

Overview MTU Engine



1	Starter motor	5	Outlet to charge air cooler
2	Turbo charger	6	Belt tensioner
3	Exhaust outlet	7	Inlet from air filter
4	EGR cooler	8	Alternator

Figure 13: MTU Engine, left side



1	Oil pan	6	Oil filler cap
2	Fan	7	Fuel filter
3	Inlet from charge air cooler	8	Fuel hand pump
4	Drive belt	9	Engine control unit (MR)
5	Oil filter		

Figure 14: MTU Engine, right side

Lubrication system

The engine's lubrication system comprises sump, oil pump and oil filter. The oil pump is located in the sump.

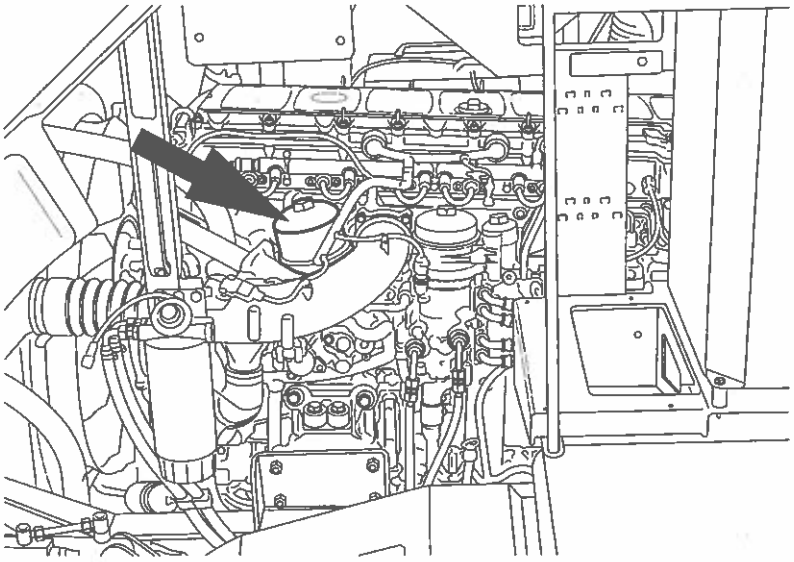
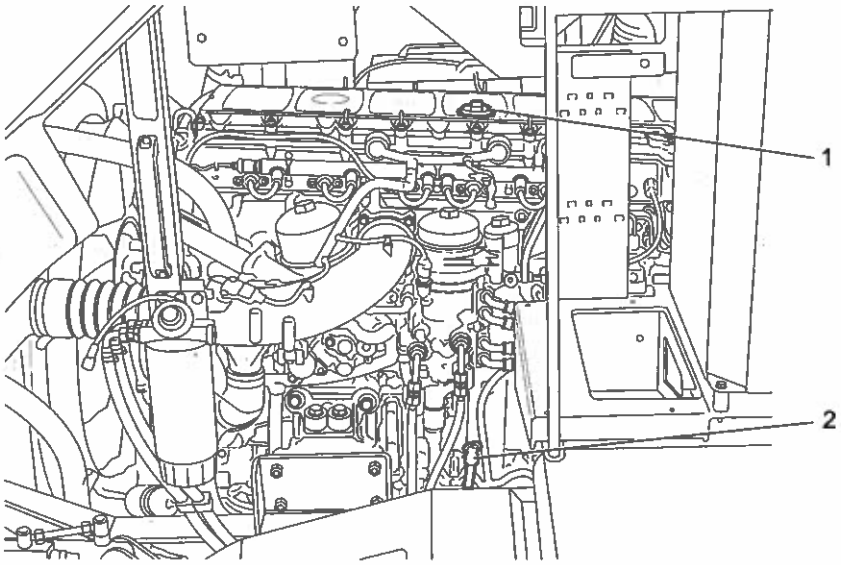


Figure 15: Oil filter, MTU engine



1 Oil filler cap 2 Oil level dip stick

Figure 16: Oil filler cap and oil level dip stick, MTU Engine

3.2.2 Scania engine

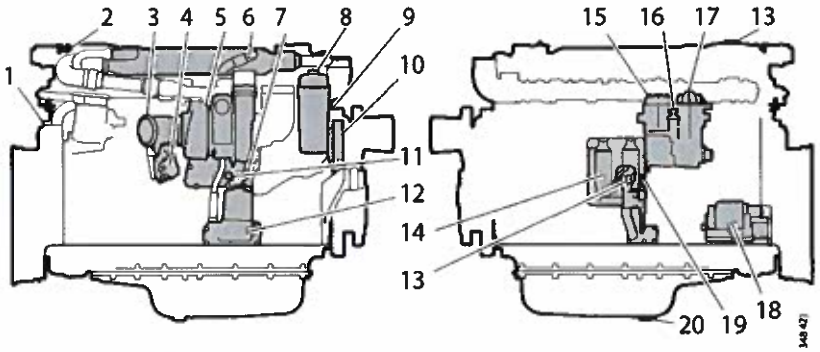
The sweeper is powered by a liquid-cooled in-line diesel engine with four-valve technology, turbocharger and charge air cooler.

The engine has electronically controlled common rail injection system. The injection nozzles are centrally located in the engine's combustion chamber.

The engine applies to the emission regulations EU Stage IV. The engine is equipped with a system for exhaust after treatment using SCR and DOC technology. This reduces nitrogen oxide emissions to nitrogen and water vapour.

The radiator and charge air cooler is located at the rear of the sweeper and is accessed by opening the engine hood.

Overview Scania engine

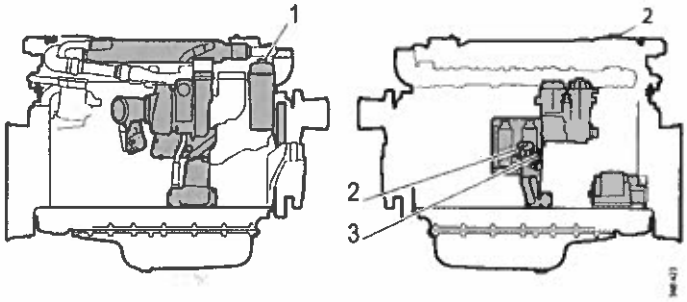


1	Engine data plate	11	Draining coolant
2	EGR valve	12	Centrifugal oil cleaner
3	Exhaust brake	13	Oil filler
4	Actuator	14	Engine control unit
5	Turbocharger	15	Water separating prefilter for fuel
6	EGR cooler	16	Hand pump for fuel
7	Oil cooler	17	Fuel filter
8	Oil filter	18	Starter motor
9	Engine serial number	19	Oil dipstick
10	Cooler pump	20	Oil plug

Figure 17: Scania Engine

Lubrication system

The engine's lubrication system comprises sump, oil pump and oil filter. The oil pump is located in the sump.



1 oil filter
2 Oil filler
3 Oil level dip stick

Figure 18: Oil filler cap and oil filter, Scania engine

3.2.3 Cooling System

The cooling system comprises a radiator, an expansion tank and a cooling fan.

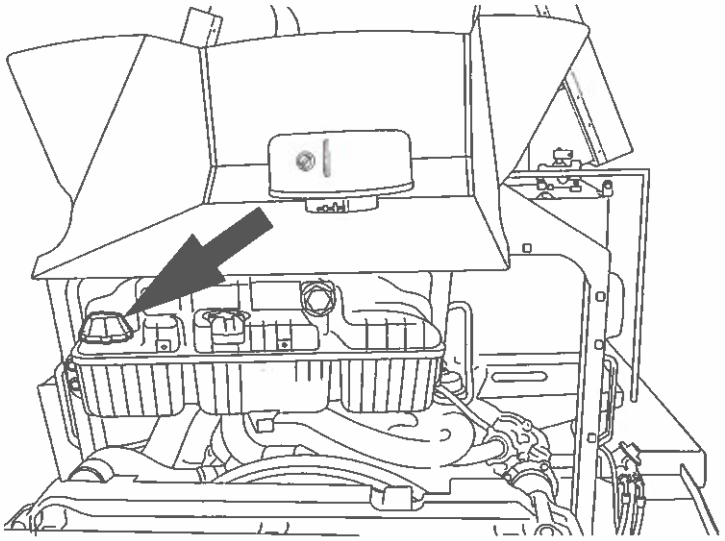


Figure 19: Expansion tank with filler cap

3.2.4 Fuel System

Only use diesel as specified in chapter 2.16 Lubricants and Fluids, page 22. Marine diesel, heating oil or similar must not be used. Fuel additives are not necessary and must not be used.

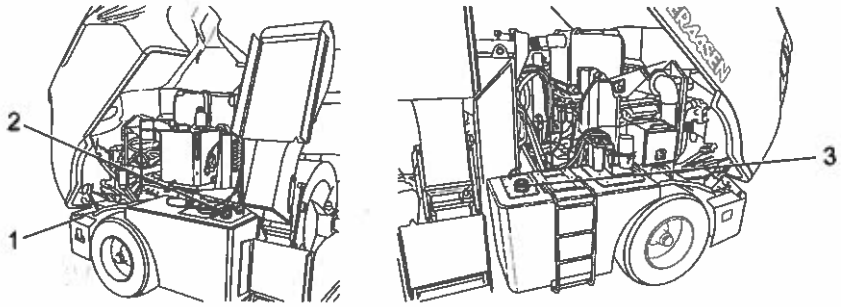
To avoid clogging up of the oil filter, it is important to use fuel that is designed for the temperatures to which the sweeper will be subjected.

The engine's fuel system comprises:

- Fuel tanks
- Pre-filter with water separator
- Fuel pump
- Fine filter
- Common rail fuel injection system.

Fuel Tanks

Fuel is filled from either side of the sweeper.

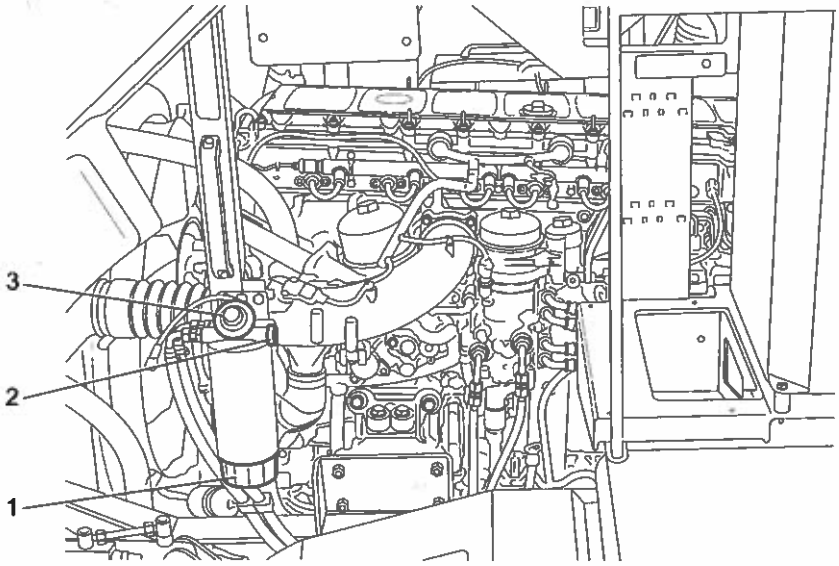


1 AdBlue®
2 Diesel fuel, right side
3 Diesel, left side

Figure 20: Filling fuel and AdBlue®

Prefilter With Water Separator

The pre-filter have a water separator. Under the water separator there is a drain valve to use when draining water. On the filter-head there are a hand pump and a fuel shut-off valve.

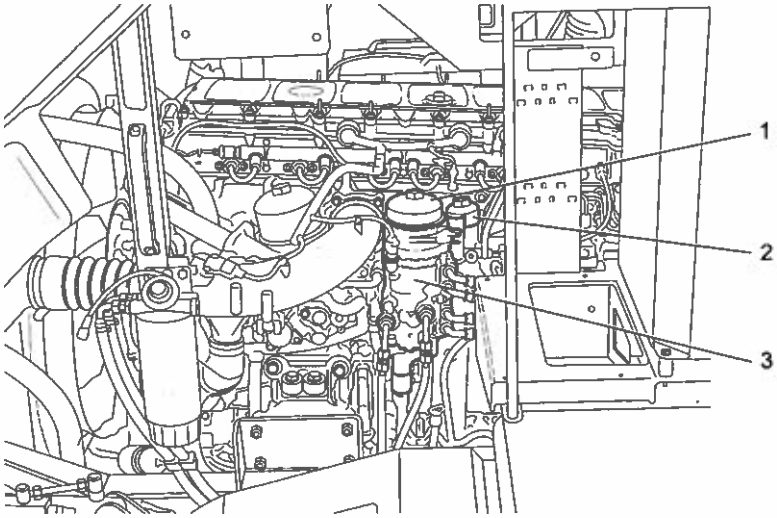


1 Water separator
2 Fuel shut-off valve
3 Hand pump

Figure 21: Pre-filter, fuel

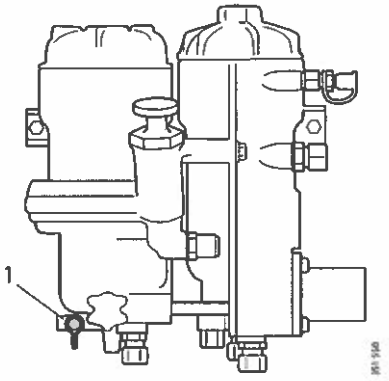
Fuel Filter

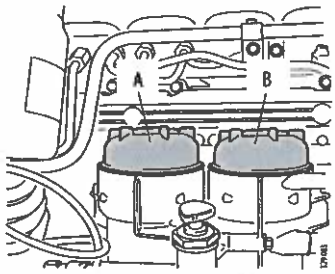
The fuel filter cleans the fuel and, through a ventilation valve, distributes a small amount of fuel and air back to the fuel tank. Fuel is transported from the fuel filter to the feed lines in the engine block.



1 Main filter cap
2 Prefilter cap
3 Fuel filter unit

Figure 22: Fuel filter, MTU engine





A Water separating suction filter.
B Pressure filter.

1 Draining nipple
2 A - Water separating suction filter
3 B - Pressure filter

Figure 23: Fuel filter, Scania engine

3.2.5 Air Intake and Exhaust System

The inlet system is equipped with a pre-cyclone and an air filter.

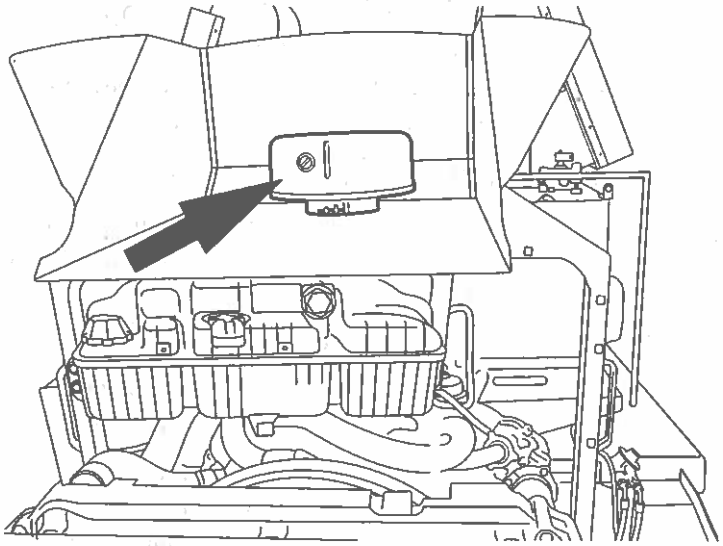
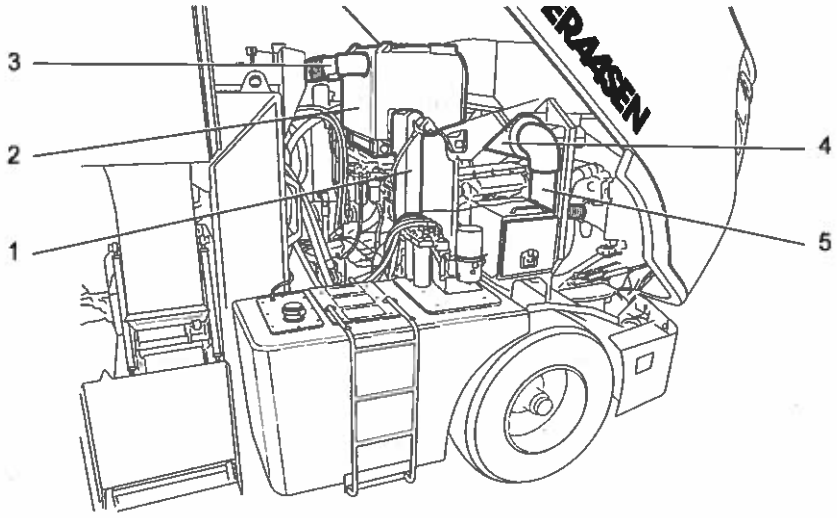


Figure 24: Air filter

The exhaust system comprises the exhaust manifold, turbo charger and silencer.



1 Exhaust pipe from turbocharger
2 Catalytic converter with exhaust silencer
3 Exhaust pipe from silencer
4 Air filter
5 Inlet pipe to turbocharger

Figure 25: Air filter and exhaust system

3.2.6 Exhaust Gas Recirculation

Exhaust Gas Recirculation (EGR) is used to reduce the amount of nitrogen oxides (NOx) to prepare for the coming SCR.

Exhaust gas is cooled down and added to the fresh air being charged into the cylinders so that the concentration of oxygen in the combustion mixture is reduced. The NOx emissions decreases but the emission of soot particles (SOF), carbon monoxide (CO), and hydrocarbons (HC) increases. And that is handled by the exhaust gas after-treatment.

3.2.7 Exhaust Gas After-treatment

The exhaust gas after-treatment system is used to reduce the pollutant emissions in the exhaust gas with in the limits stipulated in the emissions standard.

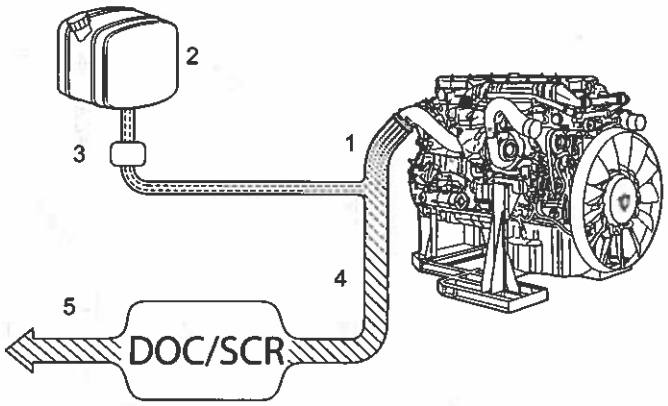
The exhaust gas treatment is carried out by:

- SCR converter (Selective Catalytic Reduction). In this stage the toxic nitrogen oxides (NOx) are reduced to nitrogen (N_2) and water (H_2O).
- DOC (Diesel Oxidation Converter). In this stage carbon monoxide (CO), hydrocarbons (HC) and soot particulates (SOF) are oxidized to carbon dioxides (CO_2) and water (H_2O).

  Additional benefits of the DOC include oxidation of several non-regulated, HC-derived emissions, such as aldehydes or PAHs, as well as reduction or elimination of the odour of diesel exhaust. One disadvantage is that a counterproductive process may occur in the catalyst. Sulphur dioxide oxidise to sulphur trioxide, which combines with water forming sulphuric acid.

  It is necessary to use low sulphur diesel fuel to obtain maximum exhaust gas after-treatment.

  The exhaust gas temperature (EGT) and the amount of AdBlue® are critical to succeed with these processes.

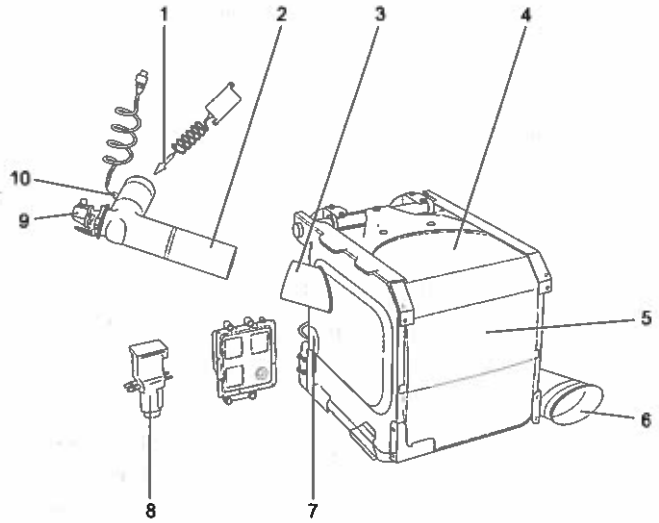


1 Exhaust fumes containing e.g. nitrogen oxides
2 AdBlue® tank
3 Measuring unit
4 Ammonia, nitrogen oxides and water vapour
5 Nitrogen, carbon dioxide and water

Figure 26: DOC/SCR procedure

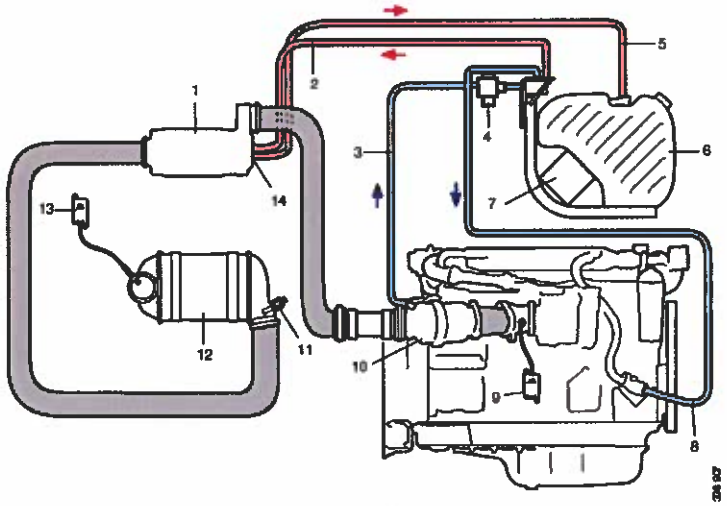
System Components

The traditional silencer also contains the catalytic converters. Several components are added to manage the exhaust gas after treatment.



1 NOx sensor on inlet
2 AdBlue® treatment reactor
3 Exhaust gas inlet
4 Identification plate
5 Exhaust gas after-treatment box
6 Exhaust gas outlet
7 EGT sensor upstream of the SCR
8 Pump module
9 AdBlue® /DEF metering unit
10 EGT sensor upstream of the AdBlue® metering unit

Figure 27: Exhaust After-treatment Unit



1 Evaporator
2 Pressure line for reductant (AdBlue)
3 Coolant hose for tank and pump heater
4 Coolant valve
5 Reductant return line
6 Reductant-tank
7 Reductant pump and control unit
8 Coolant hose, return from tank and pump heater
9 NOx sensor with control unit
10 Oxidation catalytic converter
11 Exhaust gas temperature sensor
12 SCR catalytic converter
13 NOx sensor with control unit
14 Reductant doser

Figure 28: SCR System Scania

AdBlue®

SCR requires the additive AdBlue®, which must be stored in a separate container in the vehicle. AdBlue® is a non-toxic, colourless, synthetically produced solution (urea solution).

AdBlue® is the product name of the NOx reduction agent AUS32, which has the standard designation DIN 70070 / ISO 22241. In addition to AdBlue®, the terms "urea" and "DEF" (Diesel Exhaust Fluid) are also used.

AdBlue® has a corrosive effect. This means that all components that are, or can be, in direct or indirect contact with AdBlue®, must be made from materials that do not corrode on contact with AdBlue®, such as stainless steel and plastic, although not non-ferrous metals. Functional deterioration or damage, which may arise due to the high creep or crystallisation attributable to AdBlue®, must be avoided.

If AdBlue® is heated to more than 50°C for an extended period, for example due to direct sunlight, it can break down. This will generate ammonia vapour.

NOTE!

Handling driving fluids, fuel and lubricants that are contaminated with AdBlue®.

It is necessary to ensure that AdBlue® is kept apart from other driving fluids, fuels and lubricants, such as coolants, engine oils, gear oils, fuel, hydraulic oils and brake fluids, and that they are not used in the same containers. If just a little AdBlue® finds its way into the cooling circuit, for example, this will destroy the thermostats and temperature sensors. Driving fluids that contain traces of AdBlue® must not be used again.

NOTE!

Handling AdBlue® that is contaminated with foreign substances.

Individual components in the diesel technology react extremely sensitively to even the smallest traces of contaminating substances in AdBlue®. When you are going to handle AdBlue®, it is therefore important that you always use clean containers that are only intended for this purpose. AdBlue® that contain traces of contaminated substances must not be used again.

Running the engine without AdBlue®, or with another medium that is not approved by MTU, will invalidate the engine's operating approval and certification.

The system runs a cleaning program after the engine has stopped. The main power must remain on for at least 5 minutes after the engine has stopped. For this reason, the RS 200/400 Performance Line- series are equipped with a special main switch, with a built in timer function.

AdBlue® Tank Level and Engine Limitations

If the engine is operated without AdBlue® the engine's operating permit is violated. This is because the emissions level will not be met and the legal consequence is that the engine may no longer be operated in the intended use.

If the AdBlue® level has sunk to approximately 10% a warning lamp for the AdBlue® reserve level lights up on the control panel. Fill up the AdBlue® tank in good time.

If the warning is ignored and the AdBlue® level drops further, engine torque and engine speed may be reduced.

Engine torque may be limited to 20% across the hole engine speed range and the engine speed may be limited to idling speed. This limitations are programmed according to the emissions legislation and not due to a fault in the engine.

AdBlue® Filter

The AdBlue® filter is a part of the pump module. The pump module is fitted on the right hand side, behind the rear wheel and behind the AdBlue® tank.

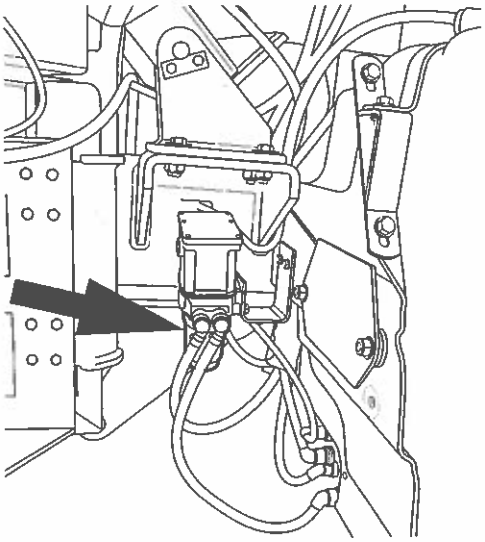


Figure 29: AdBlue® filter

3.3 Electrical System

3.3.1 General

The Runway Sweeper has two separate electrical systems, one main electric circuit and one circuit from the tractor vehicle. The system voltage is 24 V in both systems.

The main electric circuit receives voltage from the sweeper's own batteries. The batteries are charged by the alternator on the engine.

The tractor vehicle's circuit powers the trailer lights on the sweeper and the ABS-system.

3.3.2 Emergency Stop Switches

There are emergency stop switches on both sides of the sweeper as well as on the dashboard. In an emergency situation, press one of the emergency switches to stop the sweeper.

Reset the emergency stop switches on the sides by turning them in the direction of the arrow.

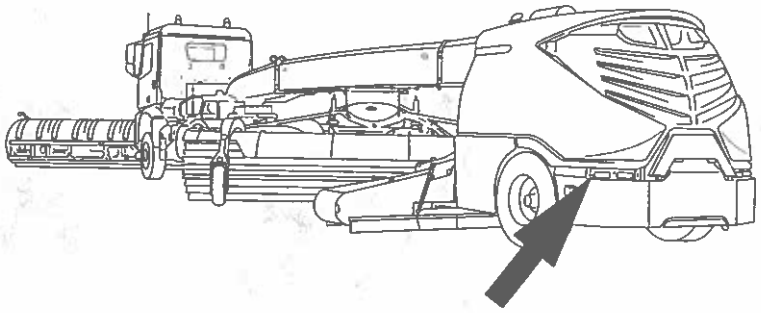


Figure 30: Emergency stop switch behind the rear wheel

Reset the emergency stop switch on the dashboard by lifting the lid and pull out the switch knob.

Figure 31: Emergency stop switch in the cab, Scania

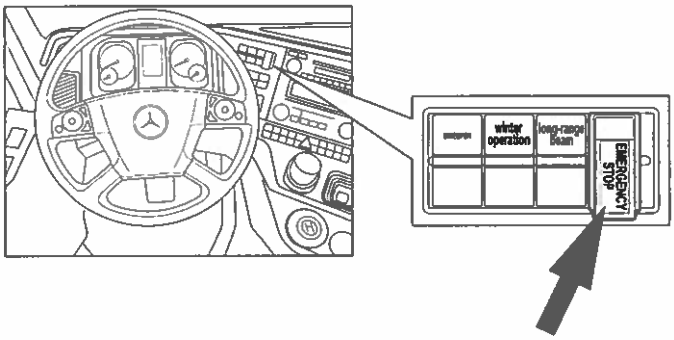
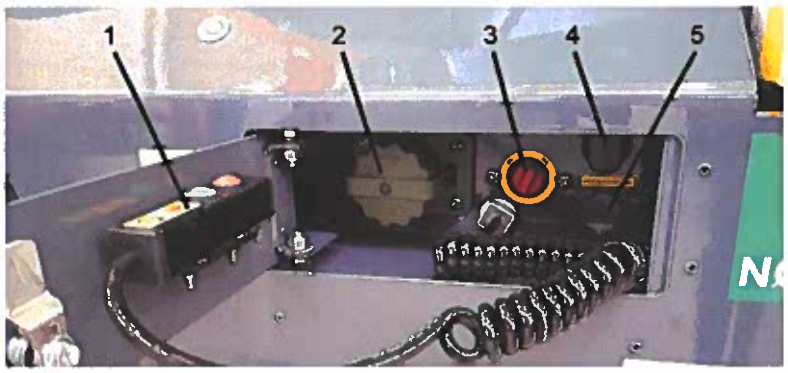


Figure 32: Emergency stop switch in the cab, Mercedes

3.3.3 Battery and Main Switch

The hatch for access to the main switch, jump start socket, engine heater socket and battery charger socket is located on the machine's left-hand side.



1 Engine cover switch
2 Jump start socket24 V
3 Main switch
4 Engine heater 230 V (Optional)
5 Battery charger 230 V (Optional)

Figure 33: Hatch for switches, left side

There are two maintenance-free 12 V batteries located behind the switch panel in the engine room on the machine's left-hand side.

3.3.4 Battery Charger

(Optional Equipment)

The battery charger is used to charge the batteries when the sweeper is not in use. The sweeper must be connected to 230 V mains voltage via the socket. Charging takes place automatically in accordance with a pre-programmed charging curve.

The battery charger has three LEDs that indicate that current charge status. The yellow LED shows that full charging is in progress. When the charging shifts to equalisation charging, the green LED also lights up. When only the green LED is lit, the batteries are fully charged and the charger shifts to trickle charging. Trickle charging continues as long as the sweeper is connected to the mains voltage.

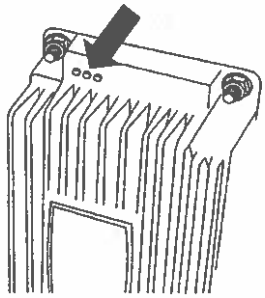


Figure 34: Battery charger, LEDs

Charging

LEDs	Status
Yellow lit	Full charging
Yellow and green lit	Equalisation charging
Green lit	Trickle charging

Error Indications

LEDs	Status
Flashing yellow	The charger cannot detect a battery
Flashing yellow and green	Low charge voltage
Yellow and green flashing alternately	Excessively high temperature in the charger
Green flashing	Battery voltage too high or charger fault
Red flashing	Battery fault

3.3.5 Jump Start Socket

(Optional Equipment)

If the sweeper needs to be jump started, the jump start socket is used to connect an external power source to the sweeper. The socket is also used as a power outlet if the sweeper is required to start another vehicle. The jump start socket is connected directly to the batteries.

3.3.6 Engine Heater

(Optional Equipment)

The engine heater is connected to a 230 V socket on the battery box.

3.3.7 Rettbox

(Optional Equipment)

The Rettbox is mounted on the rear bumper to protect electrical equipment if the engine is started with equipment connected. When the engine is started, the connector is ejected from the vehicle and the sliding lid closes automatically. The vehicle can drive safely drive away.

3.3.8 Engine Cover Switch

Switch for raising and lowering the engine cover is located inside the service hatch on the left side of the Sweeper.

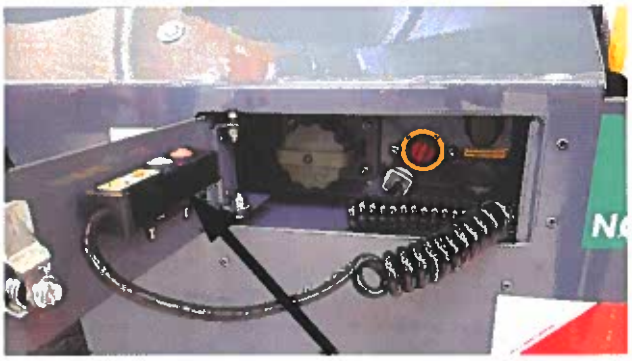


Figure 35: Engine cover switch

3.3.9 Lighting Equipment

The tractor vehicle supplies power to the following:

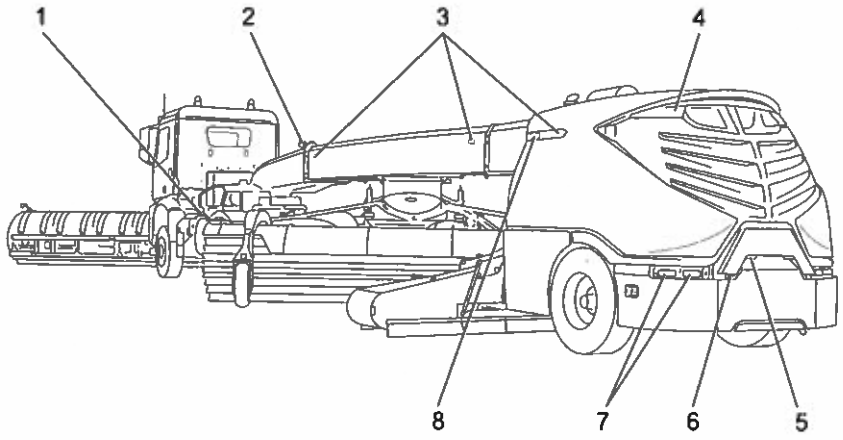
- combination lamps (brake lamp, tail lamp and direction indicators)
- license plate lamp (optional equipment)
- marker lamps (optional equipment)
- side lamps
- marker lamps.

The sweeper supplies power to the following:

- working lamp for brush
- marker lamp on brush
- engine compartment lighting
- rotating beacon.

The brush's working lights and the rotating beacon are operated from the operating panel in the tractor vehicle's driver's cab.

The brush's marker lights is lit automatically when the brush leaves the transport position.



1	Marker lights on brush	5	Flashing beacon
2	Working lights for brush	6	Reverse lights
3	Side marker lights	7	Combination lamps
4	Brake lamp	8	Flashing beacon

Figure 36: Lighting equipment

Use the switch on the left side under the engine cover to lighten the engine room light.

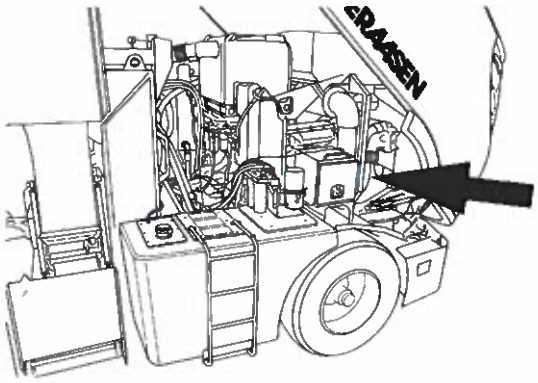


Figure 37: Engine room light switch

3.3.10 Electrical Cabinet

The sweeper's electrical cabinet is located on the left-hand side inside the engine cover.

Rear Control Panel

The rear control panel is located inside the door of the electrical cabinet.

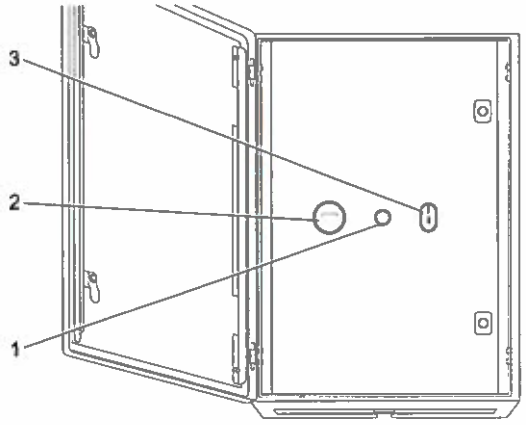


Figure 38: Rear control panel

1 Push button, brush change
2 Hour counter
3 Raise/lower button, manual brush adjustment, emergency operation

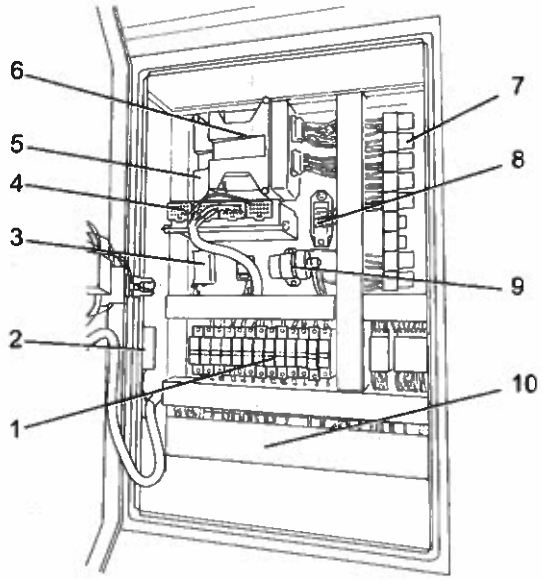
The push button (1) activates brush change procedure.

The hour counter (2) shows the sweeper's total operating time.

The raise/lower button (3) raises or lower the brush height when the brush is in working position.

Inside Electrical Cabinet

Inside the electrical cabinet there are control units, fuses and relays.



1 Automatic circuit breakers
2 Fuse
3 Engine diagnostic socket
4 Drive control system unit (MTU only)
5 Micro controller module
6 Input/Output module
7 Relays
8 CAN junction
9 Service pump relay
10 Terminals

Figure 39: Inside electrical cabinet

3.3.11 Fuses and Relays, Mercedes/MTU

Fuse	Function	Amperage
F1	ACM	10 A
F2	MCM	10 A
F3	CPC 4, OBD 2	6 A
F4	CPC 4	10 A
F5	OBD 2	10 A
F6	Output Module OX 024-110	10 A
F7	Microcontroller MC 050-110	16 A
F8	Relay K6	10 A
F9	Relay K1	20 A
F10	Terminal	6 A
F11	Connector (data cable)	6 A
F12	Relay K2	16 A
F13	Engine Cover	6 A
F14	VSE Rear Axle Steering	30 A
F15	Not in use	
F16	Inlet fuse K8 and K9	16 A

Relay	Function
K1	Emergency stop
K2	Service pump control relay
K3	Back up signal from tractor vehicle
K4	Beacon, warning light
K5	Work light
K6	Engine cover
K7	Fuel heater, central lubrication unit
K8	Aux 1/ OX 012-110/Dustbox
K9	Aux 2
K10	Service pump

3.3.12 Fuses and relays, Scania

Fuse	Function	Amperage
F1	Engine control KL30	10 A
F2	Engine control KL15	10 A
F3	Engine control KL30	6 A
F4	SCR System KL30	10 A
F5	SCR System KL15	10 A
F6	EGR System KL15	10 A
F7	Turbo KL 30	16 A
F8	Controller Output Module	10 A
F9	K4 and K5	20 A
F10	K1	6 A
F11	Encodes and angle sensor	6 A
F12	KL15, power supply	16 A
F13	K2 and K7	6 A
F14	Data cable, truck	16 A
F16	K8 and K9	16 A

Relay	Function
K1	Emergency stop
K2	Service pump control relay
K3	Back up signal from tractor vehicle
K4	Beacon, warning light
K5	Work light
K6	Engine cover
K7	Fuel heater, central lubrication unit
K8	Aux 1/ OX 012-110/Dustbox
K9	Aux 2
K10	Service pump

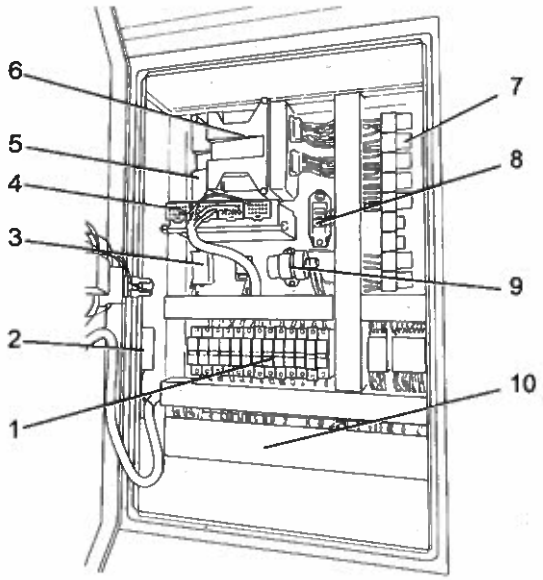
3.3.13 Runway Sweeper's Control System

The driver controls the sweeper's functions with an easy to use control panel.

Figure 40: Control panel

The control panel is linked to a reliable micro controller system where the main unit and the I/O module are located in the electrical cabinet. The control system also communicates with the engine's drive control system unit and the plough control unit through a controller area network (CAN).

The control system manage the hydraulic functions in manoeuvring hydraulics, fan and brush drive and also engine start, speed and stop. It also manages the lighting.



1 Circuit breakers
2 Fuses
3 Engine diagnostic socket
4 Drive control system unit (MTU only)
5 Micro controller module
6 Input/Output module
7 Relays
8 CAN junction
9 K10 Service pump
10 Terminals

Figure 41: Inside electrical cabinet

The control system monitors the sweeper's functions. If the system identifies a problem in the engine control unit or in a sensor, a message will appear on the control panel's display and the control unit will initiate necessary precautions.

For example, if the hydraulic oil pressure is too low, the control system will shut down the engine and show the message "Hydraulic oil pressure too low" in the display, see also section 3.4.8 Error Messages, page 69.

3.3.14 Rear View Camera

(Optional Equipment)

The rear view camera provides a good overview behind the Runway Sweeper.

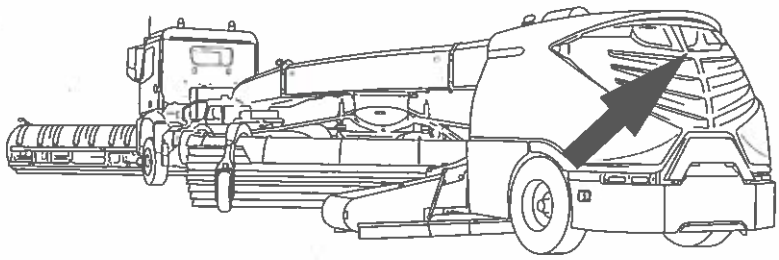


Figure 42: Rear view camera

The monitor is placed on the dashboard.

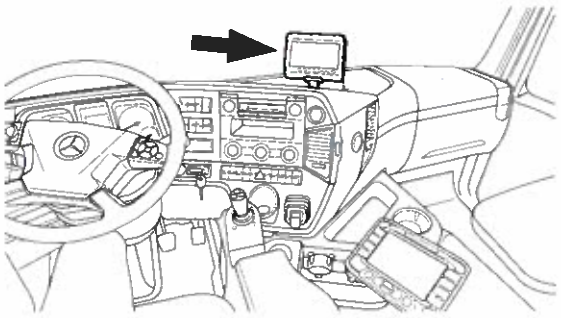


Figure 43: Monitor

A connector is used to connect the rear view camera and the monitor.

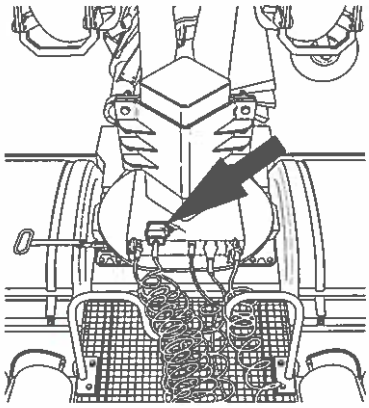


Figure 44: Rear view camera connector

3.4 Control Panel

The control panel is robust and easy to use.

It is used for operating the sweeper's main functions, and for viewing information from the sweeper.

3.4.1 Initial View

1 Warning status
2 Sweeper position indicator
3 Working mode indicator
4 Go to right working mode position
5 Go to left working mode position
6 Battery voltage
7 Brush adjustment menu button
8 Rear wheel steering indicator
9 Brush mode menu button
10 Engine tachometer
11 Brush speed indicator
12 Fan speed indicator
13 Select and confirm button
14 Up/down and left/right buttons
15 Escape and abort button
16 AdBlue® tank level
17 Diesel tank level
18 Settings menu button
19 Brush indicator
20 Working lights on/off
21 Temperature
22 Rotating beacon on/off
23 Front air
24 Engine start/stop
25 Plough weight indicator
26 Plough position indicators
27 Warning status

Figure 45: Initial view

The display have different views where the functions for each button varies due to the view or menu that is shown. The functions in the different procedures are also described in the step-by-step instructions in section 4 Operation, page 148 and forward.

3.4.2 Start View

Figure 46: Engine start

3.4.3 Reset Position and Preheat View

Figure 47: Reset position and preheat

3.4.4 Transport Position

Figure 48: Transport position

3.4.5 Settings View

Press the button for settings menu

Figure 49: Settings button

Figure 50: Settings main menu

Language

Press the language button to select language.

Plough Control

Press the plough control button to access the plough control settings.

Figure 51: Normal plough control setting

Plough ON can be changed to plough OFF to turn off the synchronised plough control.

Figure 52: Plough synchronisation OFF

Mounting mode is used when mounting and dismounting the plough to the truck's plough attachment plate.

Figure 53: Plough mounting mode ON

Engine Information

Press the engine information button to access engine information.

1	Total operating hours	5	Engine load
2	Engine oil pressure in bar	6	Battery voltage
3	Engine oil temperature	7	Fuel consumable litres/hour
4	Coolant temperature	8	Fuel consumable grams/hour

Figure 54: Engine information

Hydraulic Information

Press the hydraulic information button to access hydraulic information.

1 Brush, Pressure pump port A
2 Brush, Pressure pump port B
3 Fan, Pressure pump port A
4 Hydraulic oil pressure
5 Oil pressure plough, semi-float
6 Hydraulic oil temperature

Figure 55: Hydraulic information

3.4.6 Brush Information

1 Press the button for the brush mode menu.

Figure 56: Brush mode menu

2 Press the button for the brush information.

Figure 57: Brush information button

3 The brush information shows the total hours the brush have been in service and the distribution in the different brush modes.

1 Total running hours brush in one star mode
2 Total running hours brush in three star mode
3 Total running hours brush in manual mode
4 Total running hours blower
5 Total running hours brush
6 Total running hours since last brush change procedure

Figure 58: Brush information button

4 Press abort button to exit the view function.