



# *fiorentini*

we clean the world

## AF 6000



# Company Profile

Oswaldo Fiorentini was born on 20th January 1929 in Piancaldoli, a hamlet of Firenzuola, on the Tosco-Emiliano Apennines.

A part of Italy that Dante Alighieri so defines in his Divine Comedy: "The Beautiful Country that Santerno bathes and speaks Tosco in the land of Romagna".

Graduated in Chemical Engineering from the University of Bologna, he found employment in the most prestigious multinational groups operating in Italy at that time: Pirelli, FIAT, Essochem, Colgate.

In 1958 Ing. Fiorentini learnt from a Colgate colleague that a US company, which was exhibiting at the Milan Trade Fair, was looking for a distributor for the Italian territory to whom to entrust the sale of industrial vacuum cleaners.

By visiting the fair and showing great enthusiasm, besides his high skills and competence, Ing. Fiorentini immediately reached the agreement to become the first official distributor in Europe of Clarke Floor Machine Co. (Muskegon - Michigan - USA)

In the following twenty years the activity of distribution of Clarke products in Italy rapidly developed and important supplies were made also to those multinational groups at which Ing. Fiorentini had briefly worked, evidently leaving an excellent memory.

So here came the first deliveries outside the Italian borders, to the Fiat production plant in Togliattigrad, Tambov and Ivanfranco in Russia.

In 1978 the great turning point: the birth of ING. O. FIORENTINI S.p.A.

It is important for us all, and also a sign of gratitude towards Ing. Osvaldo Fiorentini, knowing the motivation that led him to become an entrepreneur: his fellow villagers were leaving the mountain due to lack of work and that was the spark that prompted our Founder to build his own factory in Piancaldoli.

ING. O. FIORENTINI S.p.A. was the first Italian company to manufacture a very compact electric scrubber-dryer (the smallest on the market), battery powered, and it was also the first in Europe to manufacture a ride-on scrubber-drier.

Machines that found an ever growing success in Italy and in all Europe.

Since then the "FIORENTINI" products reached every corner of the earth and make us proudly say: "WE CLEAN THE WORLD"

# Sweeper



- 1) Side brushes
- 2) Central brush
- 3) Waste vertical conveyor
- 4) Waste hopper
- 5) Water tank
- 6) Filter group
- 7) Dust vacuum fan
- 8) Hydraulic actioned filter shaker
- 9) OM934LA — Euro6 Mercedes -Benz engine
- 10) Front steering axle
- 11) Heavy-duty road tyres
- 12) Wide-angle third brush

# Technical features

## Sweeper dimensions

<b>Length:</b>	Standard sweeper .....	6'170 mm
	With third brush.....	6'250 mm
	With third brush and suction tube .....	6'350 mm
<b>Width:</b>	Standard sweeper .....	1'980 mm
	With side brushes .....	2'250 mm
<b>Height:</b>	Standard sweeper .....	2'900 mm
	With flash beacon .....	3'030 mm

## Weights and volumes

Standard machine.....	8'150 kg
Standard machine + the third brush.....	8'300 kg
Gross vehicle weight rating .....	13'550 kg
Approved payload .....	5'300 kg
Waste hopper dumping height.....	da 1260 mm a 2280 mm kg
Waste hopper capacity.....	6 m <sup>3</sup>
Water tank capacity.....	690 l
Increased water tank capacity (Optional) .....	1'200 l
Hydraulic fluid tank capacity .....	250 l
Fuel tank capacity .....	160 l
AdBlue® tank capacity .....	25 l

## Performing features Cleaning track:

central brush only .....	1'400 mm
central brush + right side brush.....	2'070 mm
central brush + side brushes.....	2'800 mm
central brush + one-side brush (RH or LH) + third brush.....	3'250 mm
central brush + side brushes + third brush .....	3'700 mm
Maximum sweeping performance .....	92'500 m <sup>2</sup> /h
Sweeping speed.....	0 – 30 km/h
Forward speed (electronically limited).....	0 – 42 km/h
Top speed in reverse (electronically limited) .....	15 km/h
Maximum slope .....	22%
Fuel economy (working on a flat road, in normal conditions, with empty tank).....	10 – 12 l/h
Wall to wall turning radius .....	4'500 mm
Average turning diameter (CUNA directive).....	9'570 mm
Kerb to kerb turning diameter.....	9'630 mm
Engine power.....	130 kW @ 2'200rpm
Tyres dimensions.....	295/60 R 22,5

## Emissions

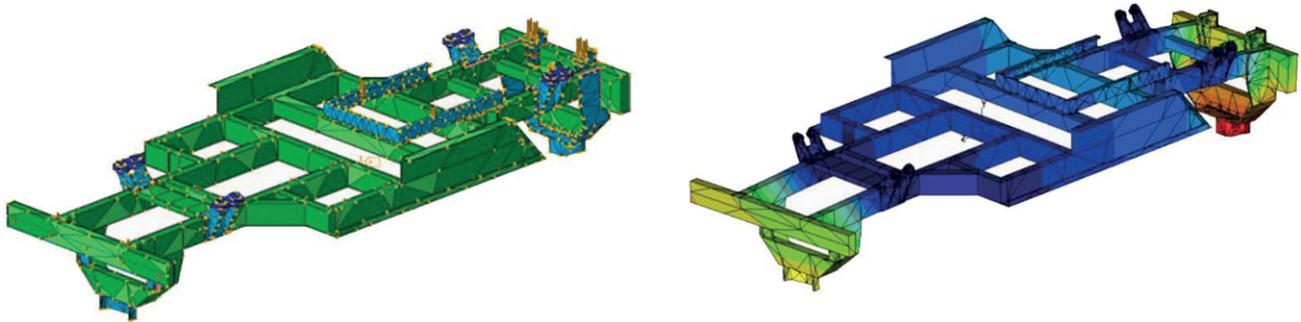
<b>Otoacoustic:</b>	Noise pressure .....	82 dB
	Noise level .....	110 dB
<b>Pollution:</b>	CO .....	1,3 g/kWh
	HC .....	0,13 g/kWh
	NO <sub>x</sub> .....	3,66 g/kWh
	Particulates.....	0,189 g/kWh
	CO <sub>2</sub> .....	737,54 g/kWh

# Main components

## Chassis

The AF6000 is equipped with a two axles load-bearing chassis made in carbon steel (Strenx 700) with a high mechanical strength, which gives the sweeper a simple but solid structure.

The structure has been designed concerning a sweeper having 4 steering wheels. As a matter of fact, the chassis and the front and rear hydro-pneumatic suspension assure the structural solidity of the sweeper, which can absorb all torsional and bending stresses produced while sweeping with a high safety margin and ensuring an incomparable comfort in driving even fully loaded.



## Endothermic engine

Mercedes-Benz Diesel engine is fully electronically controlled in order to guarantee the observance of the European directives in force concerning emissions (Stage V). This is an important change both for the environment and for the engine design complexity, since it has been studied to reduce PM (particulates) and NOx (nitric oxide) emissions.

In order to keep well-monitored the engine system, Fiorentini S.P.A. decided to install a CAN bus (Controlled Area Network), based on SAE J1939. This allows the driver to monitor diagnostic information both in the cabin and by means of suitable equipment.

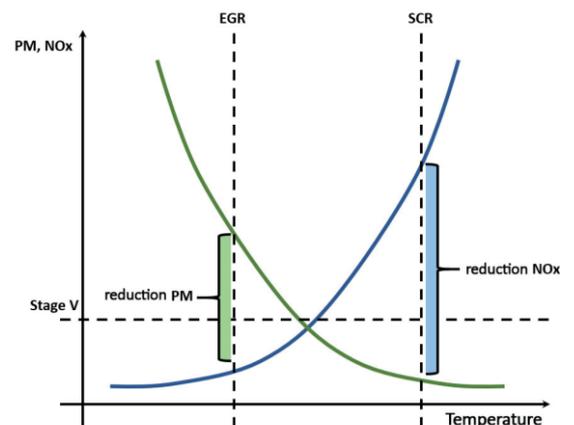
## Design philosophy for the abatement of polluting emissions

The directives in force concerning emissions provide for stringent maximum thresholds for particulates (PM), nitrogen oxides (NOx) and unburnt residues. For this reason, the reduction of these polluting sources has opposite needs in the combustion chamber. Therefore, in order to comply with the directives in force, it is necessary an EGR (Exhaust gas recirculation) after-treatment of the exhaust fumes and an EATU (multi-stage abatement system) technology. The last includes also a SCR system (Selective Catalyst Reduction) aimed at reducing the unburned polluting agents which remains in the combustion chamber.

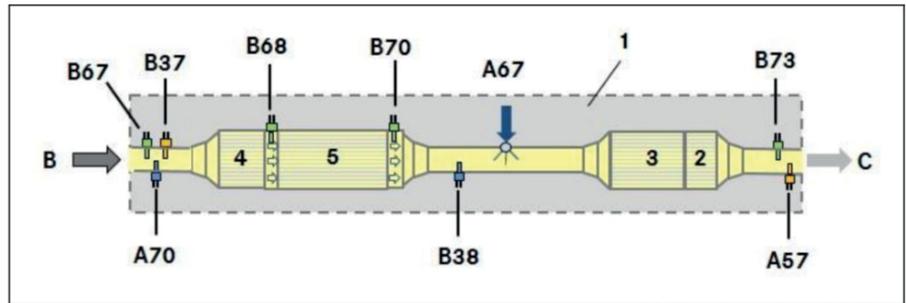
By means of the EGR technology, there is a recirculation of the exhaust fumes which increases the combustion temperature and takes what remains back to the chamber. By injecting a mixture of water and ammonia (AdBlue®) in the exhaust fumes, the EATU provokes the re-combination of nitrogen oxides by taking them apart into nitrogen and oxygen.

In the OM934LA Mercedes-Benz engine, the AdBlue® flows through an electric pump and does not require expensive compressed air systems as it happens in some competitor's machines.

The engine management system also deals with the supervision of the emission control systems.



- 1 EATU
- 2 Ammonia slip catalytic converter
- 3 SCR catalytic converter
- 4 Diesel oxidation catalytic converter (DOC)
- 5 Diesel particulate filter (DPF)
- B Exhaust-gas inlet EATU
- C Exhaust-gas outlet EATU



AGN Systembeschreibung SCS 04.jpg

- A57 EATU NO<sub>x</sub> sensor outlet
- A67 AdBlue® metering equipment
- A70 EATU NO<sub>x</sub> sensor inlet
- B37 Exhaust pressure sensor upstream of diesel oxidation catalytic converter
- B38 Exhaust pressure sensor downstream of diesel particulate filter
- B67 Exhaust temperature sensor upstream of diesel oxidation catalytic converter
- B68 Exhaust temperature sensor downstream of diesel oxidation catalytic converter
- B70 Exhaust temperature sensor downstream of diesel particulate filter
- B73 Exhaust gas temperature sensor downstream of SCR catalytic converter

AdBlue® is contained in a specific tank equipped with a level and temperature detecting sensor in order to check the right operating range of the solution. AdBlue® is sucked from its tank by means of an injection pump supplied with a specific filter and it is sent to the dosing unit, which allows the correct amount of solution to be introduced in the post-treatment system depending on working conditions. The solution injected at the beginning of the exhaust system allows the recombination of nitrogen oxides in the catalytic converter, which also fulfills the function to reduce noise levels. The engine management system supervises the whole process and promptly signals potential defects through the dashboard placed in the cabin by means of specific pilot lights.

### EATU system features

According to the introduction of the SCR system, there are some points to take into consideration concerning the emissions abatement system:

- The AdBlue® solution freezes at -10°C: in order to prevent the AdBlue® crystallization and to keep it hot enough, its tubes are installed next to the ones of the heating system;
- Once the machine is turned off, the engine management system must empty the circuit of any AdBlue® residue: in order to guarantee the power supply to the control unit for all the time necessary to carry out the shutdown operations, it has been installed a specific icon that remains active till the battery has been safely disconnected;
- Due to its high chemical corrosivity, the AdBlue® circuit, where the solution flows, and the exhaust system after the injection have been produced by using suitable materials;
- Ordinary maintenance must be carried out also considering the operations for the SCR system: every year it is necessary to replace the filter and to check the main parameters;
- AdBlue® consumption is around 3-4% of fuel: considering the tanks capacities both of the AdBlue® and fuel, it is estimated to refuel the urea tank once every 4 full diesel refuels.

Brand	Mercedes Benz
Model	OM934LA
Emissions directive	Stage V
Type	4 cylinders turbo charged and intercooled, direct injection
Displacement	5130 liters
Power	130 kW @ 2200 rpm
Max torque	750 Nm (da 1200 rpm a 1600 rpm)
Sweeping range	1050 – 1700 rpm
Starter	24 V – 5,5 kW battery power supplied
Alternator	150 A – 24 V
Cooling	Liquid
Aspiration	Two-stage dry filter and clogging indicator
Exhaust	Silenced muffler
Diagnosis	Diagnostic connector in the cabin, related equipment and diagnostic pilot lights on the dash.

## Suspensions

Suspensions are made up by 4 hydraulic cylinders controlled by an ARGO HYTOS control unit. The sweeper setting is defined by the main control system in order to be adapted to specific needs or situations. Once the sweeper leaves the factory, it is supplied with 2 different operating modes: sweeping - transfer mode. For both, Fiorentini defines pre-set parameters to ensure the sweeper the best operating mode. However, it is possible to modify the factory settings to provide the operator with the maximum flexibility according to the situation. The sweeper switches from one operating mode to the other automatically.

Moreover, the suspensions have been equipped with an additional setting, which is essential for sweeping bulky materials and overcoming obstacles like railway tracks, slowdown curbs, bumps or manholes preventing the sweeping system from any damage. This operating mode can be started from the cabin by means of a specific control.

### Rear suspensions features

Rear suspensions are hydro-pneumatic and height-adjustable in three positions:

- Low – sweeping mode;
- Medium – transfer mode;
- High – for overcoming drops up to 350mm;

This system also allows to completely raise the rear axle of the machine both in case of accidental reverse and when selected without stopping the sweeping parts, thus preventing them from damages or impacts. Then, it turns to its original height setting once the operator engages the forward gear.

### Front suspensions features

Front suspensions are hydro-pneumatic with multiple functions:

- Variable setting – sweeping mode;
- Damper – transfer mode;
- Front axle raising – for overcoming bulky materials or obstacles;

## Transmission

The hydrostatic transmission is based on DANFOSS closed circuit components with oil recirculation from the drainage and the booster pump. The electronic control is able to manage the oil flow in both directions and two different operating modes: the transfer mode having a top forward speed limited to 40 km/h and the sweeping mode with a top speed limited to 20 km/h. The operating mode can be selected from the cabin and acts automatically on the machine setting.

## Hydrostatic motor

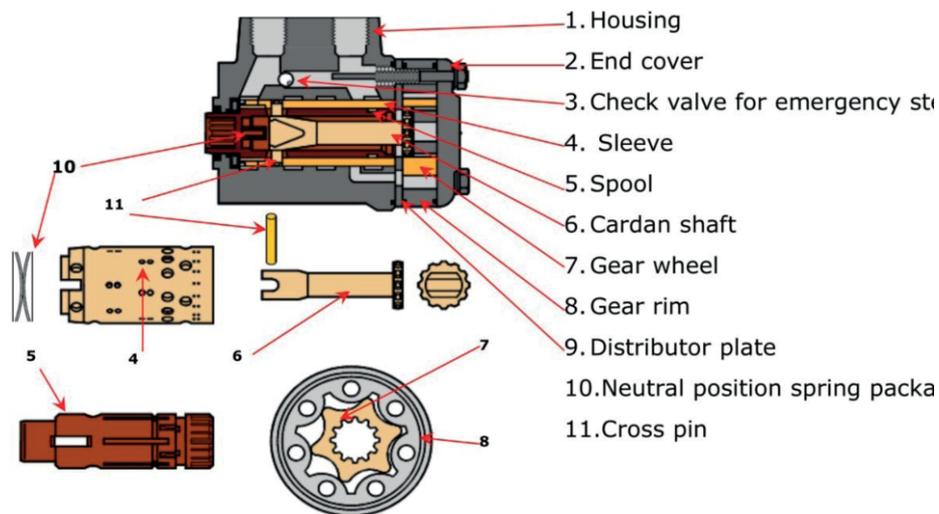
DANFOSS H1B is the hydrostatic motor used and the one that best matches with the DANFOSS H1P pump in terms of operating pressures.

The H1B has an optimized design for electronic control, as the ability to work with zero angle, which is one of the shortest lengths on the market, with the same performance and an IP69K degree of protection (resistance to pressurized water jets).

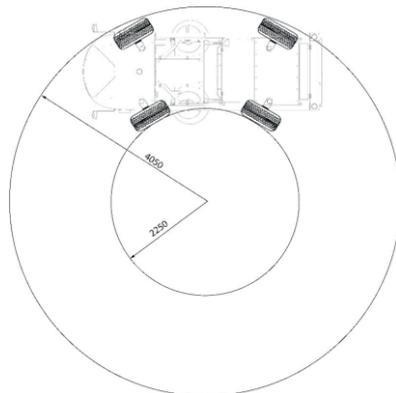
Traction system	
Transmission	Hydrostatic
Pump displacement (cm <sup>3</sup> )	71
Motor displacement (cm <sup>3</sup> )	107

## Steering

The steering is a full hydraulic power system with load sensing technology.



The hydrostatic drive acts by means of cylinders working on all the wheels in a specific and comfortable way even when steering while stationary. In compliance with current road safety regulations, the steering controls the two steering axles by supplying the sweeper with a minimum turning radius of 4500 mm, allowing maximum versatility on narrow roads and in historic centers.



Moreover, the system has been designed to allow an automatic four-wheel alignment.

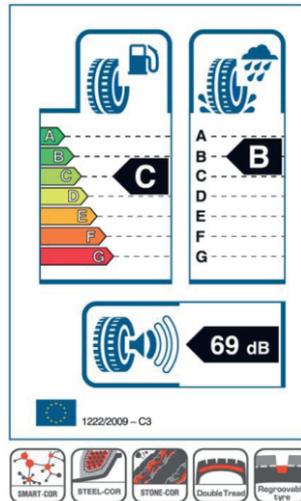
## Tyres

The AF6000 is equipped with CORDIANT PROFESSIONAL FL-1 road tyres, a new generation of tyres designed for steering axles to travel long distances.

Steering tyres have an advanced level of fuel efficiency - class C under EU eco-labelling rules (EU Directive 1222/2009). It means high economic efficiency during the usage of these tyres.

A special round belt with a unique geometrical form in the bottom of the shoulder grooves increases the contact patch in the shoulder zone, protecting the tyre from uneven wear when the tread is worn.

The STONE-SHIELD technology provides a high level of cargo transportation safety through the use of a unique 3D geometry of tread grooves. Large stones and dirt pieces are not captured, while small stones are ejected from the tyre.



CORDIANT PROFESSIONAL FL-1 have the following features:

- **DOUBLE TREAD:** A double layer construction of tread cap provides safety, reliability and cost efficiency in use. It prevents stone penetration into the rubber.
- **FUEL ECONOMY:** It increases fuel saving thanks to lower rolling resistance.
- **REGROOVABLE TYRE:** It prolongs tyre life up to 30 000 km.
- **SMART-ENDURANCE:** A unique rubber blend with highly active black carbon which increases durability, wear resistance, cut and split resistance and reduces tyre rolling resistance and fuel consumption.
- **STEEL-DEFENSE:** A new strengthened bead significantly increases the reliability of tyres in bead zone and their carrying capacity.
- **STONE-SHIELD:** 3D geometry of lines creating sidewalls of grooves is effective against stone penetration. This prevents linear cracking along the bottom and brakes damages.

Tyres data:

- Front tyres .....295/60 R 22,5
- Rear tyres: .....295/60 R 22,5
- Rolling radius ..... 2806 mm
- Inflation pressure ..... 11 bar

## Cabin

The cabin has been realized with a load-bearing steel frame with a central guide. The large window surfaces of the cab allow the all-round view of the working area and so a perfect use of the sweeper during any operation.

The cabin is supplied with dampers both in the front and in the rear and it can be tilted by means of a manual hydraulic pump in order to simplify the access to:

- Endothermic engine;
- Batteries and batteries isolator;
- Mechanical parts;
- Hydraulic system;
- Electrical system.

The operator enters the cabin thanks to a non-slip ladder and wide grab handles. The cab is also equipped with:

- Two homologated seats (on demand, operator and co-operator);
- Car radio - transceiver presetting;
- Surround view monitoring – GPS navigation device presetting;
- Rear camera;
- Fully adjustable steering column;
- Pneumatic adjustable operator seat;
- Switches provided with pilot lights;
- Large window surfaces allow the all-round view of the working area;
- Speed adjustable air conditioning system (standard equipment);
- A pressurized system with 2 high-capacity filters, which introduce only clean air (activated carbon filters are available on demand);
- N°12 manually adjustable air outlets are positioned in the cabin to not allow the window surfaces to fog up;
- Two-speeds windscreen wipers;
- Rear-view mirrors compliant with current directives and mirrors to monitor the sweeping devices on both sides;
- Ergonomic and intuitive controls are designed to be suitable and comfortable for all operators;

## Soundproofing

The cabin insulation and springs protect the operator from noise emissions and vibrations. It has been covered with soundproofing and fire-resistant materials that reduce noises to the lowest. These materials have operating temperatures which exceed the 80°C and, according to the EUROCLASS, they have been rated as class B fire retardant.



## Dashboard and controls

The sweeper controls are placed in two spots: next to the steering wheel and on the dash panel. They allow the operator to control the following functions:

- Key switch;
- Preheating system;
- Engine counter;
- Engine revolution counter;
- Shift lever;
- Headlight lever, indicators and warning alarm;
- Warning switch;
- Working headlights switch;
- Fuel gauge;
- Coolant warning light;
- Clogged air filter warning light;
- Parking lights pilot light;
- Main beams pilot light;
- Fuel reserve warning light;
- Parking brake pilot light;
- Oil pressure warning light;
- Low battery warning light.



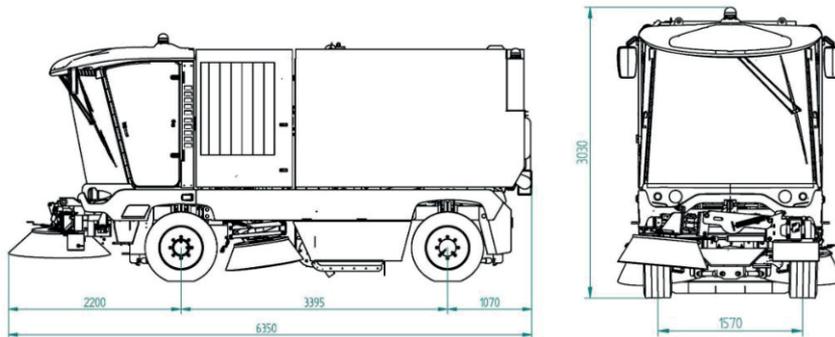
## Working controls

On the right side of the operator there is a dash panel with all the operative controls. These can be easily identified due to specific ideograms and buttons:

- Sweeping system:
  - Manual throttle;
  - Central brush positioning and rotary switch;
  - Vertical waste conveyor switch;
  - Vacuum fan and rpm governor switch;
  - Right-side brush positioning and rotary switch;
  - Left-side brush positioning and rotary switch;
  - Side brushes rpm governor potentiometer;
  - Transfer-mode suspensions pilot light;
  - Sweeping mode suspensions pilot light;
  - Rear hydro-pneumatic suspensions height switch;
  - Front chassis height-adjustment button;
- Dust abatement:
  - Two-speed water pump switch;
  - Right-side brush watering switch;
  - Left-side brush watering switch;
  - Water pump pilot light;
  - Empty water tank warning light (pumps automatic shutdown);
- Hopper lifting and dumping system:
  - Filter shaker switch;
  - Dumping switch;

## Lighting devices

The lighting devices comply with the current regulations imposed by the Traffic Code and are positioned as shown in the following image:



- 1) Front and rear flashing beacons indicate the sweeper is working;
- 2) Front indicators;
- 3) Rear headlights made up of indicators (a), parking lights (b), stoplights (c), rear fog lights (d), reflectors (e), reverse lights (f);
- 4) License plate light;
- 5) Side-indicators;
- 6) Main beam / low beam with parking light embedded. During the sweeping mode are also included:
  - 7) High-positioned headlights;
  - 8) Active Main beam / low beam;
  - 9) Brushes headlights.

## Brake

### Brake system

The sweeper is equipped with a 4 - disk hydraulic brake system on all wheels operating by means of a specific pedal. The brake circuit is fed by a 0,5 l accumulator. The circuit maximum operating pressure is 110 bars; it can be controlled through a specific pressure gauge in the cabin. In case of low pressure, warning lights have been installed near the pressure gauges.

### Parking brake

The parking brake system is negative: a hydraulic jack acts mechanically on the rear brake disks and turns off the system once the parking brake has been inserted. The negative braking keeps the parking brake more safety preventing accidental movements in case of damage.

### Emergency brake

The emergency brake has been designed to prevent dangers in case of a malfunctioning of the brake system.

Safety is further increased by the fact that the main system is made up of two separate circuits.

## Equipment

### Central brush

The central brush is placed behind the front wheels and between the side brushes. It is driven by a hydraulic motor that ensures a sufficient rotary speed to collect debris and dust. These go directly to the vertical conveyor able to collect from the finest particulates to the heaviest and most voluminous debris.

The central brush unit is supported on sides by two steel cables connected to a pneumatic cylinder by means of a rocker arm which allows a perfect oscillation and perfect road grip in all conditions. The brush ground pressure occurs automatically by means of a pneumatic system electronically controlled from the driver's seat and can be monitored through an oil-hydraulic pressure gauge. Once the operating pressure has been established, the system doesn't change the working load regardless of the bristles consumption. This system allows the central brush to adapt to the ground in its unevenness (holes, dips or bumps). The pressure keeps unchanged, exempting the operator from continuous corrective actions. The correct pressure value is saved by the system and then used when cleaning. Two supporting cables allow a perfect balance even when the brush weight changes.

During the sweeping mode, the central brush rotary speed is about 140 rpm. Brush supports need to be greased every 150 h. The brush is 1320 mm long and has a total external diameter of 650 mm. Bristles can be in polypropylene only or polypropylene mixed with steel.

Central brush	
Movement	
Starting	Via CAN
Diameter (mm)	650
Rotary speed (rpm)	150
Cleaning track (mm)	1`280
Material	PP

### Vertical conveyor

The vertical conveyor consists of a welded vertical frame made of wear-resistant steel (S235JR) with two openings: one at the ground and one at the waste hopper.

The housing is built in Weldox 700, 4 mm thick, with S235JR carbon steel blades and a loading mouth of 1310 mm x 230 mm.

Debris are collected into the conveyor system by means of the central brush.

The vertical conveyor consists of 12 blades connected with screws and supports, which are arranged on loading belts made of rubber resistant to stresses.

The belts move due to a hydraulic motor installed on an adjustable device placed in the upper external part of the frame having the function to keep the belt tightened.

The loading system is electronically controlled and able to warn the operator in case of overload limiting the sweeper functions till normal conditions have been restored. Moreover, a specific control reverses the system rotation by releasing the conveyor from bulky materials.

Vacuum fan	
Type	Blades
Drive	Hydraulic motor
Diameter (mm)	570
Blades	
Speed (rpm)	

## Dust abatement and filtering system

The abatement of dust that is raised by sweeping is achieved by means of two devices that can be operated jointly or separately.

### Water misting system

The usual system for water misting consists of spray nozzles placed next to the brushes and powered by two peristaltic electro pumps, which draw water from an AISI 304 stainless steel tank (placed inside the waste hopper) with a capacity of 690 liters, supplied with:

- inline filter;
- remote filling hose with UNI 45 connection and 8 m length;
- drain valve with full cap breather;
- level sensor;
- empty tank sensor with automatic pumps release;

A high - pressure pump (150/200 bar) equipped with a nozzle and winder can be installed as optional.

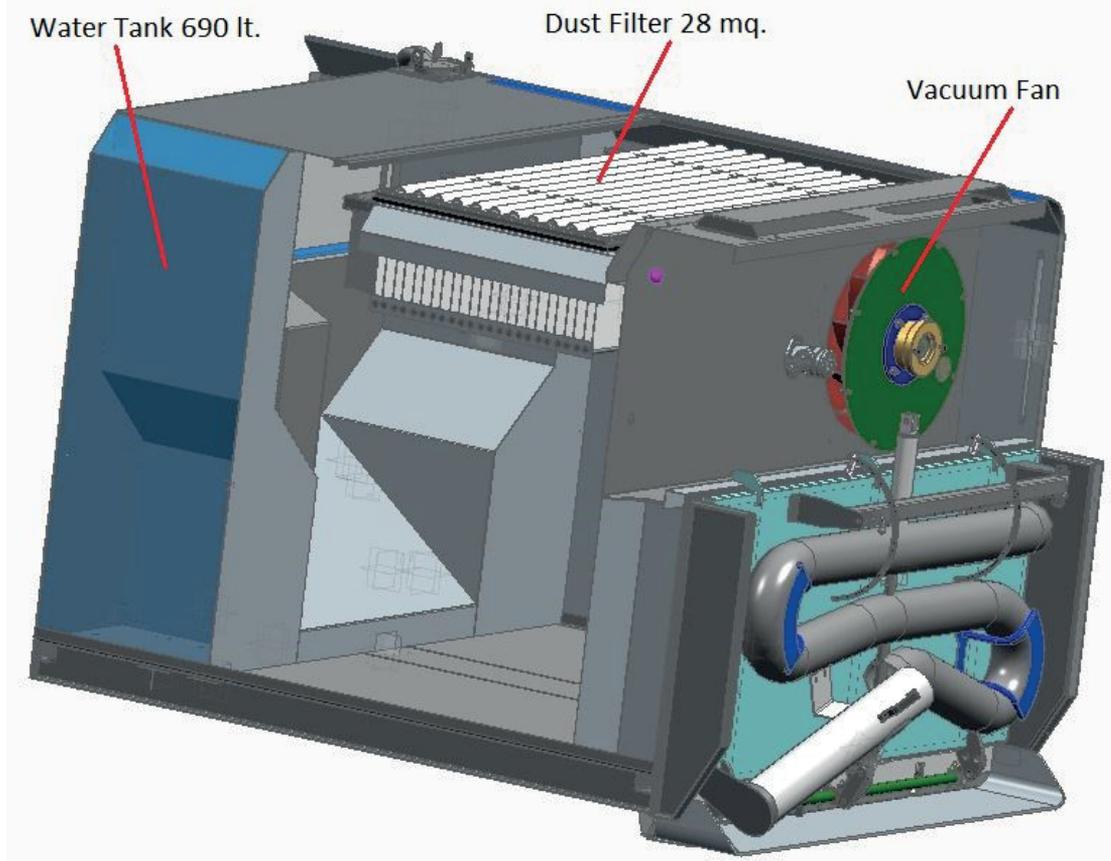
<b>Water pump (standard equipment)</b>	
Type	Electric
Capacity (l/min.)	20
Pressure (bar)	2,5 – 4,9
Nozzles	2 + 2 + 4 (third brush)
Starting	From the cabin via CAN

### Dust abatement by suction

By means of the vacuum fan, it is possible to suck all the dust in the hopper obtaining a total abatement. Air, before being reintroduced in the atmosphere, is filtered by filters able to trap particulates up to 3 microns. The filter cleans by shaking by means of an hydraulic motor, which is directly powered by a button on the dash panel.

By dry vacuum sweeping, we obtain a perfect cleaning and a total dust removal. This system is particularly used in countries with cold temperatures, where ice forms regularly, but also in countries with tropical temperatures where water is a resource to safeguard.

Filtering system	
Filter type	Bag filter
Number of bags	23
Filtering grade ( $\mu\text{m}$ )	3
Filtering surface ( $\text{m}^2$ )	28
PM10 filtering (%)	99



## Waste hopper

The waste hopper is built in AISI 304 stainless steel with a thickness of 4/5 mm and is placed on the rear part of the chassis.

All the operations about the dumping, lifting, opening and closing of the rear door take place by means of electrohydraulic devices controlled directly by the operator in the cabin.

Lifting with height dumping from 1260 mm to 2280 mm.

It is available a portable remote control - panel (Optional).

Waste loading	
Tank capacity ( $\text{m}^3$ )	6'000
Internal capacity ( $\text{m}^3$ )	5'300
Movement	Hydraulic
Dumping height (mm)	1'260
Increased dumping height (mm)	2'280
Material	AISI 304

## Hydraulic system

The hydraulic system is powered by variable displacement pumps, DANFOSS motors and distributors with "Load Sensing" technology. Everything is managed by CAN BUS control systems, which set the flow rates and operating pressures necessary to face all kind of stresses. The system is divided into several hydraulic circuits in order to get the best performance for all uses, in other words:

- Forward-reverse gear drive;
- Central brush;
- Vacuum fan (can be disconnected);
- Vertical conveyor;
- Side brushes;
- 
- Hopper lifting and dumping – filter shaker;
- Third brush (Optional);
- High pressure pump (Optional)
- Full hydraulic power steering;
- Power-assisted brake system – suspensions system;
- Safety and automatism;

The hydraulic system is fed by an hydraulic fluid tank placed in the back of the cabin. It is easily accessible and supplied with:

- Pressure filter;
- Pressure gauges;
- Level sensor;

Two 24V heat exchangers ensure suitable operating temperatures for the system even in tropical conditions.

## Electrical system

The 24V electrical system consists of 2 batteries powered by a 1540 Watt alternator by means of a battery isolator switch. It is sized and wired according to the Traffic Code current rules.

IP 67 is the related appliance class.

All switches, control units and fuses are easily accessible and well protected within the cabin in a specific closed panel.

## Communication

The AF6000 uses the CAN technology for the communication among the control units (engine, display, drive, etc.) and the external diagnostic equipment.

The success of CAN networks is due to the considerable technological advantages it offers:

- Fast response;
- Easy and flexible wiring;
- High resistance to noises;
- High reliability;

The communication takes place in compliance with the SAE J1939 to adapt to the diagnostic equipment widespread nowadays.

These technical features offer several advantages to the end user, since they allow to:

- Diagnosis on a display providing enough data to figure out the problem;
- Strengthen the sweeper control system and so increase the mean time between failures (MTBF) ;
- Simplify the faults recovery operations and so reduce the mean time to repair (MTTR);
- Simplify ordinary and extraordinary maintenance;
- Allow remote diagnostics (to reduce costs);
- Allow remote recovery interventions;

## Optional

### Third double-articulated front brush

The third brush is placed in the middle of the bumper and it is supported by articulated arms, hydraulic cylinders, safety and support springs (to reduce the brushes consumption). The first articulation can rotate by 210°.

From the driver's seat, the operator can manage all the third brush movements by means of a multifunction lever on his/her right. This lever controls an electric control valve:

- The automatic reversal of brush rotation;
- Lateral inclination selector;
- First articulation selector for both directions;
- Lifting-lowering selector;
- Right - left articulation opening and closing selector.

The anti-shock safety system allows to safeguard the third brush from accidental impacts: the electric control valve monitors the pressures of the third brush stopping the sweeper and the brush rotation. The brush, made of wood covered with galvanized metal sheet, has a diameter of 850 mm and a total external diameter of 1300 mm. The bristles are made out of polypropylene mixed with steel foils.



Third brush (OPT)	
Movement	
Starting	Via CAN bus with joystick control
Third brush diameter (mm)	1'300
Speed (rpm)	0 – 50
Material	PP / Steel

## Debris suction tube

Due to a vacuum of 11,5 kPa, the suction system is able to suck leaves, bottles and to clean manholes by means of a specific suction tube 5100 mm long with a diameter of 150mm. The terminal part of the tube is firm and supplied with one handle and a washing system placed on the back of the sweeper and supported by a rotating arm.



<b>Leaves suction tube (OPT)</b>	
Length (mm)	<b>5100</b>
Diameter (mm)	150
Vacuum (mm Hg)	54
Suction capacity (m <sup>3</sup> /h)	3000

## Radio CD player

The stereo system has been chosen among the best-known brands in the sector. The model chosen is Blaupunkt, but it can be customized. It is equipped with a couple of 2-ways loudspeakers having 100mm diameter and 30W power able to provide a great sound at any radio frequency. The system is powered by a DC - DC converter and, at the same time, it is protected from eventual short circuits or overvoltage. Selectivity is ensured by an electronic antenna with a good radio capture that is installed on the front window surface of the sweeper.

# Safety

The following safety devices are provided:

- the sweeper stops if the operator opens one of the doors;
- acoustic alarm when reversing;
- fire extinguisher in the cabin;
- the sweeper stops in case the coolant overheats, if the lubricating oil misses and in case the hydraulic fluid level is too low;
- static safety supports for the hopper once lifted;
- oil-hydraulic valves which arrest all the lifting devices in case a tube breaks;
- safety support for the waste unloading door when opened;
- acoustic alarms connected to the main safety sensors;
- central brush automatic lifting device when engaging the reverse gear.

“CE” marking in compliance with the 2006/42 / CE Regulations.









# *fiorentini*

we clean the world

#### Plants

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